

Science

Have the British public really had enough of experts?

This chapter assesses public attitudes to science and technology. We consider how we engage with science during our day-to-day lives, whether science and technology are viewed as a force for social good, and to what extent scientists in the academic and commercial arenas are trusted to act in the public interest. We also examine how the public strikes the balance between science, feelings and faith, explore our relationship with scientific developments that pose complex ethical questions such as prenatal testing, and chart how public attitudes towards such technologies have changed over time.

Spotlight

Over time, the public has become less likely to agree that modern science does more harm than good. Just 11% now feel that science does more harm than good, compared with 24% in 1993.

Modern science does more harm than good, 1993–2018



Overview

Support for modern science is strong

Attitudes towards the impact of science on our lives are largely positive.

- More than three-quarters of the public (77%) agree that science and technology are making our lives healthier, easier and more comfortable.
 - Over nine in ten (94%) of the public believe that medical research will improve our quality of life over the coming decades.
 - However, while almost three-quarters (73%) believe that medical research benefits everyone equally, almost one fifth of the public (18%) view such research as mostly benefitting those who are better off.
-

A majority trust scientists to work in the public interest

Trust in university scientists is higher than in their commercial counterparts.

- More than four-fifths (85%) of people trust university scientists to do their work with the intention of benefitting the public, while two-thirds (67%) trust commercial scientists to work with the intention of benefitting the public.
 - However, a degree of scepticism remains about the level of funding transparency, particularly in the commercial sector; while one fifth (19%) trust university scientists “not much” or “not at all” to be transparent about their sources of funding, 35% have this limited level of trust in company scientists to be open about funding sources.
-

Views remain mixed on ethically complex technologies

While public attitudes towards GM food production have shifted over time, attitudes towards other scientific developments have remained comparatively stable.

- Around a quarter (26%) agree that Britain should grow GM foods to compete with the rest of the world, with a similar proportion (25%) agreeing that the advantages of GM foods outweigh any dangers, an increase since 1999 when the level of support for these statements was around one in ten (10% and 11% respectively).
 - 74% of the public believe that scientists should be able to use cells from human embryos for medical research, while 21% believe this should not be permitted, a small shift since 2008 when the equivalent figures were 69% and 28% respectively.
 - Around two-thirds of the public agree that parents should be able to use prenatal genetic testing in the case of unborn children with serious mental or physical disabilities (67% and 66% respectively), representing little change in the overall level of support for such tests since 2003.
-

Authors

Nancy Kelley

Deputy Chief Executive, The National Centre for Social Research

Ian Montagu

Senior Researcher, The National Centre for Social Research

Professor Patrick Sturgis

London School of Economics

Ethan Greenwood

Project Manager, Wellcome

Introduction

‘Our world is suffering from a bad case of “Trust Deficit Disorder”. People are feeling troubled and insecure. Trust is at a breaking point. Trust in national institutions. Trust among states. Trust in the rules-based global order. Within countries, people are losing faith in political establishments, polarization is on the rise and populism is on the march.’

Antonio Guterres, UN Secretary General, Speech to the General Assembly 25th September 2018

Public trust in science and technology is more essential than ever. Our day-to-day lives are increasingly interwoven with and dependent upon science and technological innovation. Most of us use complex technologies daily, relying on science and technology to bank and shop, to travel, to connect and communicate, to access services, and to learn. When we look to the future, solving the global challenges of climate change, population ageing, and technology-driven labour market transformation will all require close public engagement with science and technological innovation. Yet most citizens do not have the time, expertise, or inclination to forensically assess risks and hazards arising from the production and use of pervasive and rapidly-changing technologies. As a result, trust in advice and guidance from scientific experts is a crucial, if implicit, underpinning for citizen and societal decision making.

Academic and popular accounts of the ‘crisis of trust’ connect these changes to growing support for populist parties and movements, driven by public disengagement from ‘politics as usual’ and the social and economic impacts of globalisation (Nichols, 2017). Widespread concern about low and declining levels of trust in political actors and institutions and the corrosive effect this may have on systems of representative democracy dates back to the mid-1970s (Norris, 2011). More recently, high profile U-turns and political scandals, including ‘cash for questions’ in the 1990s, followed by the MPs’ expenses scandal of the late 2000s, further damaged the British public’s confidence in politicians and government more generally (Lee and Young, 2013). From 2008 onwards, the aftermath of the Great Recession brought these concerns to the fore with renewed vigour, provoking further fears of declining confidence in politics and institutions in countries around the world (Van Erkel and Van der Meer, 2015).

Within the scientific community, concerns about declining trust and antagonism toward the role of experts have been amplified by challenges from within science and technology. Recent years have witnessed the potentially corrosive effects on public trust of ‘science hype’ and over-selling (Nowotny, 2016), the reproducibility crisis in the social and life sciences, and high-profile cases of data fabrication and research misconduct. Increasingly, deference to institutional

authority is not automatically conferred by sceptical and critical citizens who question the equitable distribution of social goods and the objectivity and neutrality of elite expertise.

In June 2016, Michael Gove (then Justice Secretary) remarked “people in this country have had enough of experts”. The prominent Leave campaigner was responding to the majority of forecasters predicting negative economic consequences of Brexit, but his comments were widely taken as a succinct expression of a new zeitgeist in which the general public has a growing and bitter distrust of authority figures, particularly those perceived to be wielding influence through technical expertise.

Given the significance of science and technology in modern life, this kind of rejection of scientific and technical expertise would have profound social consequences.

Despite widely-expressed concerns about declining public trust in science, there is little hard evidence to support the notion of a precipitate drop in trust from a notional heyday. In the United States, where the longest time-series is to be found, the evidence suggests that Americans have long expressed high levels of trust in science and scientists, with no support for any notable decline since the 1970s (Gauchat, 2014). Neither do we find evidence of low or declining trust in scientists in the UK, albeit over a shorter time period, with around six in ten adults expressing high levels of trust in university scientists between 2009 and 2015 (Wellcome Trust, 2015).

This high level of support is not uniform. Attitudes to science are associated with key demographic characteristics such as education and age, as well as gender and religious identity (Wellcome Trust, 2016). In the United States, while levels of trust of science and scientists in the general population have remained high, those on the right of politics in the US have tended to become less trusting over time (Gauchat, 2014). Similarly, while the public expresses high levels of trust in the abstract notion of ‘science’, they can be notably more sceptical about the societal benefits of specific areas of scientific research. This is particularly so for science which poses challenges to core values and beliefs and to religious faith, such as the genetic modification of plants and organisms and the use of stem cells for medical treatments (Wellcome Trust, 2009, 2012). Education is becoming an ever more important political cleavage in western democracies, with steep gradients emerging on a range of economic and social issues between graduates and non-graduates, as access to secure and well remunerated employment, housing, and health crystalize differences in world-views (Bovens and Wille, 2017).

So, have the British public really had enough of experts? To attempt to answer that question, this chapter explores public attitudes to, and understanding of, science. First, we ask whether science and technology are seen as a force for social good, whether scientists can be trusted to act in the public interest and with transparency, and whether the public feels we place too much emphasis on science,

compared to feelings or faith? Next, we consider public interest in science, asking how we engage with science in our day-to-day lives. In particular, we explore whether levels of scientific knowledge affect our attitudes to science and scientists? And then, finally, how do we feel about scientific developments that pose complex ethical questions – such as prenatal testing, stem-cell research and genetically modified (GM) foods? Are public attitudes to these controversial technologies changing? And how do views towards them differ between different social groups?

For each set of questions, we draw on BSA's time series data to consider how public attitudes to and trust in, science have changed over time. We also explore how attitudes differ between groups, focusing on a number of characteristics that are known to influence attitudes to science, including age, sex, education, and social class as well as political orientation and religious identity¹. Throughout the chapter we present the findings for these background variables only where they are significantly related to the attitude in question.

Attitudes to science

This section explores high-level attitudes to science: To what extent does the general public perceive science, technology and medical research to be a 'good thing' for society? Do people trust scientists to be acting in the public interest? And how do we feel about the weight given to science, compared to other factors such as feelings or faith?

Social value of science and technology

Public trust in science rests on our assessment of whether science and technology are 'social goods', including the role they play in society, our belief in their current and future potential to make life better, and whether we believe the benefits of science are equally felt.

In order to understand how the public feels about the value of science, we ask people to what extent they agree or disagree with the following statement:

Overall, modern science does more harm than good

Just over half of the public (55%) reject the idea that science does more harm than good (36% "disagree", while 20% "disagree strongly"). Around one in ten (11%) agree with the statement (2% "agree strongly", while 9% "agree"). Interestingly, one quarter (25%) say that they "neither agree nor disagree" with the statement, with a further 9% not able to answer at all. This suggests that for a

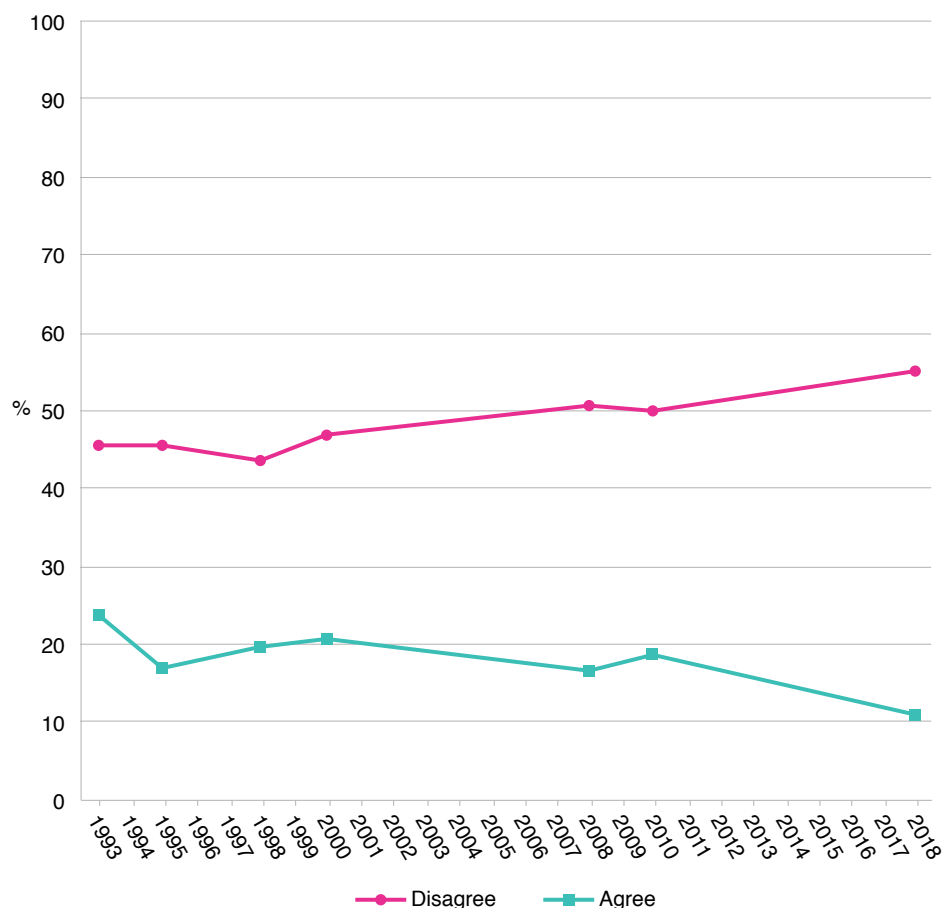
Just over half of the public (55%) reject the idea that science does more harm than good

¹ Social class was measured using the National Statistics Socio-economic Classification (NS-SEC): "managerial and professional" are relatively self-explanatory; "intermediate" is comprised of self-employed, lower supervisory or employer in a small organisation; and "routine" is comprised of those with routine or semi-routine occupations.

significant minority – around a third of respondents – the benefits and drawbacks of science may be seen as finely balanced².

Over time, the public has become less likely to agree that modern science does more harm than good, and more likely to disagree, with a sharper difference since 2000 (Figure 1).

Figure 1 Modern science does more harm than good, 1993–2018



The data on which Figure 1 is based can be found in the appendix to this chapter

There are no statistically significant differences according to sex, age, education or social class. Those on the right of the political spectrum are more likely to refute the statement that “overall, modern science does more harm than good” – only 6% of those on the right agree that “modern science does more harm than good”, compared with 11% of those in the centre and 14% of those on the left.

The relationship between attitudes towards the benefits of modern science and religious adherence is complex: while those of no religion are much more likely to disagree strongly that modern science does more harm than good, those who identify as Anglican

² Evidence from the National Centre for Social Research panel experiments indicates that while some respondents use “neither” as a proxy for “don’t know” approximately 60% choose “neither” because “My answer would vary depending on the situation” and around 20% choose “neither” because “I don’t know enough about the topic.” See also, Sturgis, P. et al (2012).

and Roman Catholic also display relatively high levels of support for science (see Table 1).

Table 1 Modern science does more harm than good, by religion

	Church of England / Anglican	Roman Catholic	Other Christian	Non- Christian	No religion	All
	%	%	%	%	%	%
Agree strongly	2	1	1	2	3	2
Agree	6	9	13	15	6	9
Neither agree nor disagree	27	29	22	32	24	25
Disagree	46	36	37	29	34	36
Disagree strongly	10	14	16	14	25	20
Don't know / Refusal	9	12	10	8	8	9
<i>Unweighted base</i>	375	177	423	140	1182	2300

We also ask questions aimed at understanding public attitudes towards the impact of science and technology on day-to-day life.

First, we ask whether people agree or disagree that:

Science and technology are making our lives healthier, easier and more comfortable

More than three-quarters (77%) agree that science and technology are making our lives healthier, easier and more comfortable, while just under a tenth (9%) disagree

More than three-quarters (77%) agree that science and technology are making our lives healthier, easier and more comfortable, while just under a tenth (9%) disagree. This level of approval for science's contribution to day-to-day life has not changed significantly since the last time we asked this question in 1996, when just under three-quarters (73%) of the public agreed.

Men (80%) are more likely than women (74%) to support the idea that science and technology have a positive impact on our lives. While those with higher educational qualifications and those in managerial and professional occupations are more likely to agree with this sentiment than their counterparts, across all groups agreement with the positive impact of science and technology on day-to-day life is very high.

We also ask respondents to consider the future impact of medical research by asking:

Please say whether you think medical research will or will not lead to an improvement in the quality of life for people in Britain over the next 20 years?

Overwhelmingly, the public believe that medical research will improve our quality of life over the coming decades, with 94% agreeing with this proposition (51% believe that medical research “definitely will lead to an improvement” in our quality of life, while 42% feel that it “probably will”). There are relatively small but statistically significant differences associated with education and social class, with higher levels of education and social class both associated with more positive views. Those from faiths other than Christianity are slightly less likely to agree (88%).

It is clear that a large proportion of the public believe that science and technology are having a positive impact on our lives, and that medical research has the potential to improve our lives in the future. But do people believe that these benefits are felt equally, or do they perceive that these benefits accrue more to the already advantaged? We ask:

Some people think that scientific research into people’s health mainly benefits those who are better off. Others think that it mainly benefits those who are worse off. Using this card, please choose the number from the scale which best describes your views.

Scientific research into people’s health mainly benefits...

1 (Those who are better off)

2

3

4 (Everyone more or less equally)

5

6

7 (Those who are worse off)

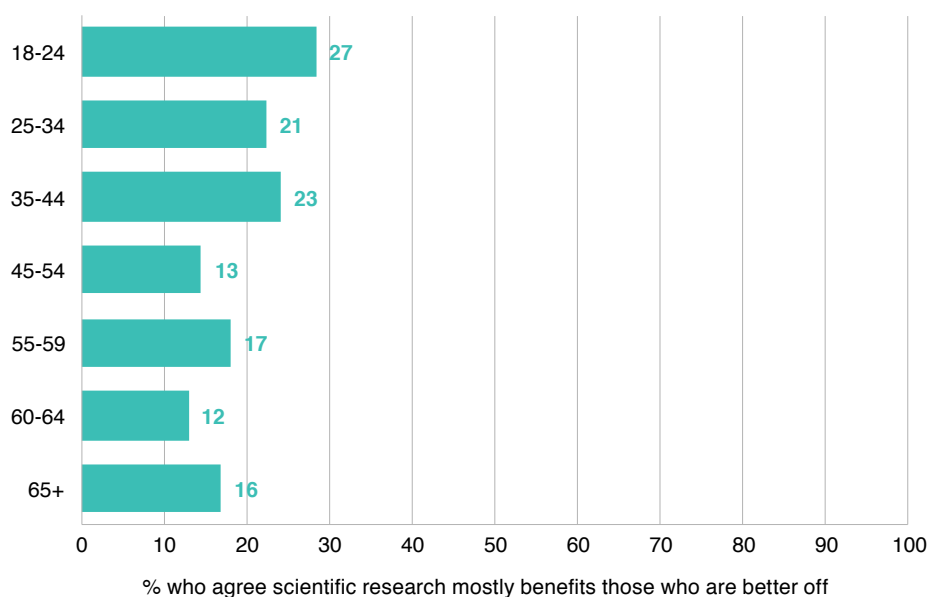
Almost three-quarters (73%) see medical research as benefiting everyone equally

As shown in Table 2, almost three-quarters (73%) see medical research as benefiting everyone equally, with women (77%) more likely to think this than men (70%). However, almost a fifth of people (21% of men, 16% of women) believe that medical research mostly benefits those who are better off.

Table 2 Views on who benefits from scientific research, by sex

	Men	Women	All
Scientific research into people's health mainly benefits...	%	%	%
Those who are better off	21	16	18
Everyone more or less equally	70	77	73
Those who are worse off	8	6	7
<i>Unweighted base</i>	1289	1632	2921

Younger people are more likely to see medical research as mostly benefitting those who are better off, with over a quarter (27%) of 18-24-year olds taking this view compared with just over a tenth (12%) of 60-64-year olds (Figure 2).

Figure 2 Belief that scientific research into people's health mostly benefits those who are better off, by age

The data on which Figure 2 is based can be found in the appendix to this chapter

Similarly, people who identify as left-wing are more likely to feel medical research primarily benefits richer people than those who identify as right-wing, a finding that is likely to be underpinned at least in part by the distinctive views of younger people on this question, who themselves are more likely to fall on the left of the political spectrum.

It appears, then, that the British public view science and technology as being, on balance, socially beneficial. Across a range of measures, well over half the population feel clear about the value that science and technology bring to our lives. Views about the impact of medical research, in particular, are overwhelmingly positive. And these

attitudes are strengthening over time, with the BSA time series showing a notable increase in positive appraisals of the role and benefits of science in society over the past 25 years. While there are some differences of view between different social groups, these differences are not substantial and there is strong support for the idea that science benefits us all.

Trust in scientists

Next, we turn to how confident people feel in scientific institutions and scientists to act in the public interest. To understand this we ask a series of questions about public benefit and transparency, addressing the potential for conflicts of interest to undermine trust. To explore the contrast between the academic and commercial sectors, two sets of questions ask:

How much do you trust SCIENTISTS working in colleges or universities in Britain to do each of the following?

....To do their work with the intention of benefiting the public

....To be open and honest about who is paying for their work.

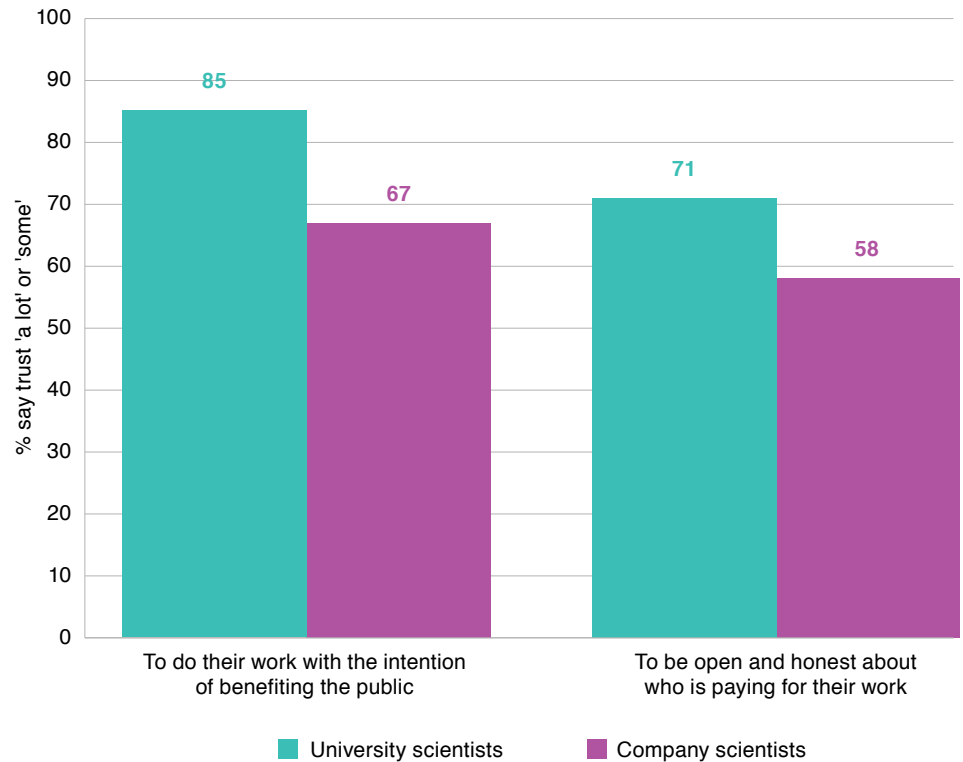
Do you trust them to do this a lot, some, not much, or not at all? If you don't know, please just say so.

Now, thinking about companies - for example, those who make medicines or agricultural supplies - how much do you trust SCIENTISTS working for COMPANIES in Britain to do each of the following?

The level of trust in scientists working in the commercial sector to be working in the public interest is, as might be expected, lower than for university scientists

This split question helps us to explore whether the corporate structure, with its primary responsibility to shareholders as opposed to the public, alters attitudes to scientists.

More than four-fifths (85%) of people trust university scientists to do their work with the intention of benefiting the public either “a lot” or “some”, compared with one in ten (9%) who trust “not much” or “not at all” (Figure 3). The level of trust in scientists working in the commercial sector to be working in the public interest is, as might be expected, lower than for university scientists: 67% state that they have “a lot” or “some” trust and over a quarter (28%) report trusting commercial scientists “not much” or “not at all”.

Figure 3 Trust in university / company scientists

The data on which Figure 3 is based can be found in the appendix to this chapter

As we saw with attitudes to science, attitudes towards trust in scientists are more positive among people with higher levels of education and those in managerial and professional occupations. As shown in Table 3, nine-tenths of people with a university education, and similar proportions of those with A-Level or O-level/GCSE qualifications, trust university scientists to work with the intention of benefiting the public, compared with less than three-quarters (73%) of people with no formal qualifications. Similarly, 90% of people in managerial occupations trust university scientists, compared with 80% of people in semi-routine and routine occupations.

Table 3 Trust in scientists to do their work with the intention of benefiting the public, by socio-demographic characteristics and position on attitude scales

% trust “a lot” or “some”	Scientists working in colleges / universities	Scientists working for companies	Unweighted base
All	85	67	2921
Highest educational qualification			
Degree	90	68	756
Higher education below degree / A-level	88	67	777
GCSE, O level, CSE or equivalent	87	69	733
No qualification	73	65	604
Socio-economic class			
Managerial or professional	90	67	1227
Intermediate occupations	87	70	387
Employers in small org; own account workers	83	66	268
Lower supervisory & technical occupations	86	72	205
Semi-routine & routine occupations	80	66	708
Placement on left-right scale			
Left	83	59	701
Centre	90	72	869
Right	88	73	693
Liberal - Authoritarian scale			
Most liberal	91	65	791
Neither	86	70	643
Most authoritarian	84	71	834
Religion			
Church of England/ Anglican	89	70	448
Roman Catholic	87	73	231
Other-Christian	82	70	553
Non-Christian	78	69	208
No religion	88	64	1469

Unlike attitudes to university scientists, attitudes to scientists working in the commercial sector do not show a statistically significant association with higher educational and social class, but they are associated with where people fall on the left-right spectrum. Three-fifths (59%) of people who identify as being on the left trust corporate scientists to work in the public interest, compared with just under



Respondents are more sceptical about funding transparency than public benefit



three-quarters of people who identify as being on the centre (72%) or right (73%). This may reflect a more general scepticism among those on the left of politics about the social benefits of private enterprise (Leibrecht and Pitlik, 2018). This hypothesis is supported by the breakdown according to liberal-authoritarian attitudes: those with the most liberal views are most likely to trust university scientists to act in the public interest, but least likely to trust commercial scientists.

Respondents are more sceptical about funding transparency than public benefit: 71% trust university scientists to be open about funding sources, while one fifth (19%) do not; trust in the commercial sector is lower (58%, with 35% saying they trust company scientists “not much” or “not at all”). For attitudes to university scientists, being younger, more highly-educated and from higher socio-economic groups are all related to trust around funding sources (Table 4). For company scientists, statistically significant differences are only found relating to education (although this was not a linear gradient) and political affiliation (only 53% of those on the left trust company scientists to be open about funding, compared with 66% of those on the right).

Table 4 Trust in scientists to be open about funding sources, by socio-demographic characteristics and position on attitude scales

% trust to be open about funding – “a lot” or “some”	Scientists working in colleges / universities	Scientists working for companies	<i>Unweighted base</i>
All	71	58	2921
Age			
18-34	75	62	551
35-54	70	56	936
55+	68	57	1430
Highest educational qualification			
Degree	79	62	756
Higher education below degree / A-level	70	54	777
GCSE, O level, CSE or equivalent	69	61	733
No qualification	62	56	604
Socio-economic class			
Managerial or professional	75	59	1227
Intermediate occupations	74	57	387
Employers in small org; own account workers	70	56	268
Lower supervisory & technical occupations	67	60	205
Semi-routine & routine occupations	65	58	708
Placement on left-right scale			
Left	69	53	701
Centre	74	59	869
Right	72	66	693
Liberal - Authoritarian scale			
Most liberal	75	60	791
Neither	72	59	643
Most authoritarian	69	58	834

Taken as a whole, there is little evidence here to support the proposition that people have ‘had enough’ of scientists. Trust in university scientists to act in the public benefit is very high, and although the level of trust is somewhat lower for scientists working in the private sector, it is still substantial. Where lower levels of trust are evident, this appears to be related to education and, to a certain extent, to political beliefs, with those on the left being more sceptical of public benefits and funding transparency in the commercial sector.

Science versus feelings and faith

Another essential dimension of public attitudes to science is the degree to which we strike the right balance between science and other factors that are relevant to societal decision making (Besley, 2013). This balance between science, faith, and feelings is relevant to our personal lives and choices, but also to public decision making and in particular the policy environment for investment in science and technological innovation. To understand how the British public feel about the role of science in informing individual and societal decision making compared to more obviously subjective modes of reasoning, we ask respondents whether they agree or disagree with the following statement:

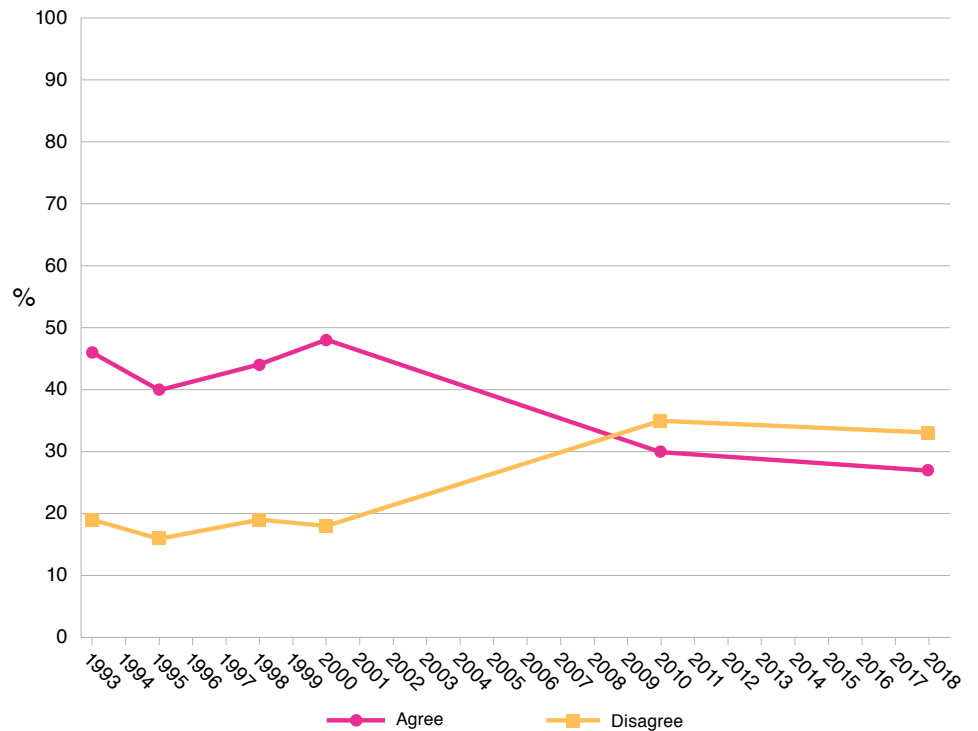
We believe too often in science and not enough in feelings and faith

Overall, attitudes to this proposition are mixed: 27% agree that we believe too often in science (although only 3% “agree strongly”), 33% disagree (with 12% saying “disagree strongly”) and 31% said they “neither agree nor disagree”. An ambivalent view of the relative balance between science, feelings and faith does not necessarily imply a negative perspective on the value of science; rather, it may reflect the idea that other factors are important in personal and social decision making.

While the public remains fairly evenly divided on this question, there has been a marked decrease since 2000 in the proportion who feel that we place too much emphasis on science over feelings and faith (Figure 4). This no doubt reflects at least in part the decline in religious faith that the UK and many other countries have witnessed over this period (see the Religion chapter) but may also represent a strengthening of confidence in science as a basis for social and individual decision-making.

There has been a marked decrease since 2000 in the proportion who feel that we place too much emphasis on science over feelings and faith

Figure 4 Agreement that ‘We believe too often in science, not enough in feelings and faith’, 1993-2018



The data on which Figure 4 is based can be found in the appendix to this chapter

As Table 5 shows, there are differences between social groups in response to this question. Men (39%) are more likely to disagree with the statement than women (28%). However, although slightly more women than men agree (29% compared with 25%), women are also more likely to not express an opinion as to whether we believe too often in science and not enough in feelings and faith.

Half of graduates (51%) disagree with the statement, compared with 34% of those whose highest qualification is at A-Level or equivalent, 25% of those with GCSEs or equivalent as their highest qualification, and 18% for those with no qualifications. However, those with lower levels of education are more likely to not be able to give a view, either by saying “neither agree nor disagree” (around a third for all groups under degree level) or “don’t know” (as high as 18% for those with no qualifications, 11% for those with GCSEs or equivalent as their highest qualification). The same pattern occurs by socio-economic class.

Attitudes to the relative importance of science, feelings and faith are related to religious identification

Unsurprisingly, attitudes to the relative importance of science, feelings and faith are related to religious identification. Among people with no religion, support for the statement is just 15%, while almost half (44%) of this group disagree that we believe too often in science and not enough in feelings and faith. Roman Catholics and those who belong to the Church of England have very similar perspectives, with one third (33%-34%) agreeing and around a fifth (20%-21%) disagreeing. While the groups are heterogenous and the

base sizes low, it is interesting to note that the views of people in the 'other Christian' and 'non-Christian' groups are distinctive, and more likely to be in support of the idea that we should focus more on feelings and faith (41% and 46% respectively). Analysis by religious attendance adds further support to these findings; while half (49%) of those who attend a service connected with their religion at least once per month either "strongly agree" or "agree" that "we believe too often in science, not enough in feelings and faith". This proportion falls to just over one third (35%) among those who attend religious services less often than once per month but at least once a year, and to just over one fifth (22%) among those who attend less often than once a year.

Table 5 Agreement with statement “We believe too often in science, not enough in feelings and faith”, by socio-demographic characteristics and position on attitude scales

		Agree	Neither agree nor disagree	Disagree	Don't know/Refused	<i>Unweighted base</i>
All	%	27	31	33	9	2300
Sex						
Male	%	25	29	39	8	992
Female	%	29	34	28	10	1308
Highest educational qualification						
Degree	%	21	24	51	4	630
Higher education below degree / A-level	%	24	36	34	5	637
GCSE, O level, CSE or equivalent	%	31	34	25	11	568
No qualification	%	33	30	18	18	434
Socio-economic class						
Managerial or professional	%	21	29	44	6	997
Intermediate occupations	%	26	36	31	7	324
Employers in small org; own account workers	%	30	30	27	13	209
Lower supervisory & technical occupations	%	28	36	27	9	159
Semi-routine & routine occupations	%	32	33	21	13	532
Placement on left-right scale						
Left	%	33	28	32	7	701
Centre	%	27	33	33	8	869
Right	%	20	34	37	10	693
Liberal - Authoritarian scale						
Most liberal	%	16	28	48	7	791
Neither	%	28	36	28	8	643
Most authoritarian	%	36	32	23	9	834
Religious affiliation						
Church of England	%	34	36	21	10	375
Roman Catholic	%	33	38	20	9	177
Other Christian	%	41	26	24	9	423
Non-Christian	%	46	29	17	8	140
No religion	%	15	32	44	9	1182

Attitudes and scientific understanding

In an ever more technologically dependent society, even non-scientists need to be able to understand and form well-founded opinions about science (Entradas 2015). The so-called ‘deficit’ model of public understanding of science assumes that hostility to technological innovation derives, at least in part, from a lack of understanding of the science underlying such innovation (Sturgis and Allum, 2004). It follows from this that support for science and scientific research programmes could be expected to be higher among more ‘scientifically literate’ members of society.

This section explores two aspects of ‘scientific literacy’: to what extent do people feel scientific understanding is interesting and important? And does level of scientific knowledge help to explain differences in attitudes to science?

Interest in science

To understand how the British public weighs the importance of an understanding of science in day-to-day life, we ask respondents the extent to which they agree or disagree with the following statement:

It is not important for me to know about science in my daily life

Three-fifths disagree with this statement – indicating that they do think knowing about science is important for daily life – while one quarter agree that scientific knowledge is not important. This represents a significant shift since we last asked the question in 1996, when 51% disagreed, suggesting the general public may be becoming more inclined to see scientific knowledge as having day-to-day relevance. This question sets a very high bar, asking not whether it is ‘important’ to know about science when grappling with specific decisions, but whether it is ‘important’ to know about science in daily life. Overwhelmingly, people support this idea, demonstrating a belief that scientific understanding matters to us as we go about our lives.

There is an association with education and occupational class, with higher education and higher occupational class associated with stronger support for the importance of scientific knowledge in daily life. Four in five graduates (78%) disagree that it is not important to know about science in daily life, compared with 39% of those with no formal qualifications. Similarly, three-quarters (74%) of people in managerial occupations disagree with the proposition, compared with 41% of people in routine and semi-routine occupations.

Interestingly, the importance of science in day-to-day life is one of the areas where we see associations between attitudes to science and political attitudes. In this case, almost three-quarters (72%) of the most liberal group disagree that it is not important to know about science as compared with just over half (56%) of the authoritarian group.

The data show strong public support for the idea that scientific knowledge is important, but do people find it interesting? In order to understand public interest in science, we ask:

Medical research is about how the body works, the causes of illnesses and diseases, and developing and testing new treatments.

How interested, if at all, would you say you are in medical research?

Over four-fifths (82%) say they are interested in medical research. This is perhaps unsurprising given the level of support for science and technology as a whole, and the direct salience of medical research to our lives and quality of life. However, there are some significant differences between groups:

Interest in medical research is more prevalent among women (84% compared with 81% for men) and older people (86% of those aged 55 and over, compared with 78% for under 35 year olds). As for positive attitudes to science, interest in medical research is associated with higher levels of education and higher occupational class; nine-tenths (91%) of graduates are interested in medical research, compared with just under seven in ten (68%) people with no formal qualifications. Similarly, almost 89% of people in managerial occupations feel interested in medical research, compared with 77% of people in semi-routine or routine occupations.

Interest in medical research differed very little between those of no religion (83%) and Christians (87% for Church of England, 84% for Roman Catholics, 85% other Christian denominations). Those from non-Christian religions are, however, less likely to say they are interested in medical research (71%).

Scientific knowledge

As we noted earlier, a prevalent belief among scientists and policy makers is that a better-informed or ‘scientifically literate’ public will be both better-placed to make personal decisions involving science and technology and have a more positive attitude to science and technology as a whole. However, empirical studies suggest that the relationship between attitudes to science and scientific understanding is more complex, with knowledge and general attitudes to science only weakly correlated, and in the case of more controversial technologies, knowledge sometimes associated with negative attitudes (Allum et al, 2008; Entradas, 2015).

In order to assess the level of people’s understanding of a range of scientific principles, respondents are asked a ‘quick quiz’ about science:

Now for a quick quiz about science. For each of the following statements, please say whether you think it is definitely true,

Interest in medical research is associated with higher levels of education and higher occupational class

probably true, probably false or definitely false. If you don't know, just say so and we'll go on to the next one.

Electrons are smaller than atoms?

More than half of human genes are identical to those of mice?

The cloning of living things produces genetically identical copies?

Lasers work by focusing sound waves?

By eating a genetically modified fruit, a person's genes could also become modified?

It is the mother's genes that determine the sex of the child?

Respondents were allocated a score of 1 for each question that was answered correctly (in the case of the first three items, respondents were given a score of 1 if they answered 'definitely true' or 'probably true', and in the case of the latter three items respondents gained a score of 1 if they answered 'probably false' or 'definitely false'). Scores were then combined, so that respondents who answered all six questions correctly achieved a score of 6, respondents who answered five questions correctly achieved a score of 5, etc.

People with higher levels of scientific knowledge are more likely to feel positively about science and technology, more likely to be interested in science and see it as relevant in day-to-day life, and more likely to support scientific interventions in ethically-complex contexts. Only trust in scientists in the commercial sector is uncorrelated with levels of scientific knowledge: having a higher quiz score is not associated with being more likely to believe corporate scientists act for the public benefit or are likely to be transparent about their funding sources. This association between higher quiz scores and more positive attitudes to science persists even after controlling for age, sex, social class and critically, education, indicating that scientific knowledge itself does indeed appear to be strongly related to attitudes to science and technology.

So far we have demonstrated that the majority of the public perceive science to be important for daily life, express a high level of interest in medical research, and believe an understanding of science and technology is important for modern living. There are differences between social groups, particularly according to education, class and, on some measures, sex, age and political views. This demonstrates that people's appraisals of the benefits of science are also related to their engagement in science, and particularly their level of knowledge. The more knowledgeable people are, the more supportive they are of science and of scientists. Our final section turns to how these factors shape public attitudes to more specific, and controversial areas of science.

Attitudes to controversial technologies

Analysis presented so far demonstrates that support for science and scientists in broad terms is very high, especially among those with higher levels of education and/or scientific knowledge. However, this may not necessarily translate to support in the context of specific, more controversial technologies. We have seen that the public believes that religious faith and feelings are also important as a guide for social action. Many areas of modern science and technology pose complex moral and ethical challenges (Nuffield Council, 2012), and for some people, faith or other beliefs may act as a ‘moral compass’ in such areas.

To explore this, we repeat a set of questions asked on previous BSA surveys about attitudes to pre-birth testing and genetically modified (GM) foods. These scientific procedures have been the subject of public debate, both in the UK and internationally. Yet their use has also become increasingly prevalent. Have the public become more positive about, or at least less opposed to, these ethically complex areas of science and technology? And are there differences between different social groups?

Attitudes to prenatal testing

Pre-birth screening tests are routinely offered in the UK, with standard tests covering infectious diseases as well as a range of physical and intellectual conditions. The purpose of the tests is to enable parents to make decisions about medical treatment for the mother and the baby during pregnancy, which may include decisions as to whether to continue with the pregnancy. This connection between pre-birth screening tests and termination has raised significant ethical concerns. Some of these are grounded in pro-life worldviews, based on the sanctity of human life and so often associated with religious faith. Others are grounded in relative rights to life and well-being of mother and baby, as well as disability rights, including concerns regarding the potential eradication of some disabled communities³.

In 2018, we ask:

Genetic tests can be carried out on an unborn child. Do you agree or disagree with parents using such tests to help them decide whether or not to have a child that...

...has a serious mental disability and would never be able to live an independent life?

...has a serious physical disability and would never be able to live an independent life?

³ This debate has particularly focused on the rights of people with Downs Syndrome, see <https://dontscreenusout.org>

As Table 6 demonstrates, responses to both questions are broadly similar. Around two-thirds agree that parents should be allowed to use pre-birth genetic tests to decide whether to have a child that has mental or physical disabilities of a kind that would mean they would never be able to live an independent life. Only 16% disagree that parents should be allowed to use this kind of pre-birth testing, and a similar proportion (15%-16%) “neither agree nor disagree”. This is very similar to the position in 2003, when BSA first asked these questions, although the proportion of people who “agree strongly” that parents should be able to choose pre-birth testing has increased significantly, indicating a strengthening of support for this kind of medical intervention.

Table 6 Views on parents’ use of genetic tests, 2003 and 2018

For an unborn child that has...	a serious mental disability		a serious physical disability	
	2003	2018	2003	2018
	%	%	%	%
Agree strongly	23	34	20	32
Agree	44	33	44	35
Neither agree nor disagree	13	15	14	16
Disagree	12	9	13	9
Disagree strongly	7	7	6	7
<i>Unweighted base</i>	<i>3272</i>	<i>2921</i>	<i>3272</i>	<i>2921</i>

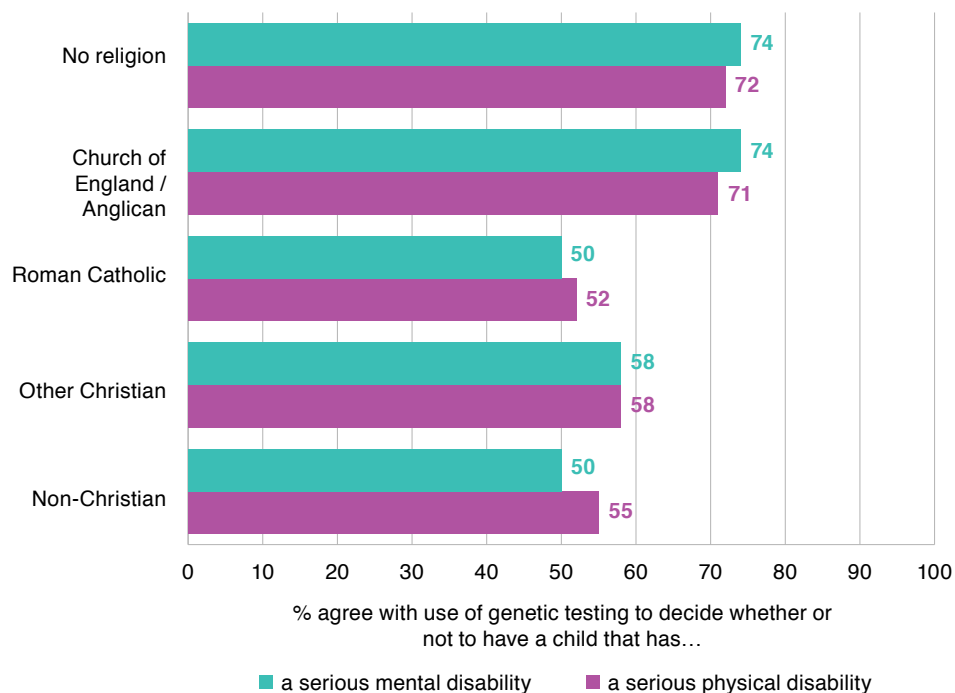
There are significant differences in attitudes to prenatal testing between religious groups

Interestingly, neither parenthood, sex, nor age is associated with levels of support for pre-birth genetic testing. There are also no significant differences according to political views.

As might be expected there are significant differences in attitudes between religious groups. The highest rates of support for prenatal testing are found among those with no religion (74% for mental disability, 72% for physical disability), along with those who identify as Church of England (74% and 71% respectively). Rates are lowest among Roman Catholics, whose Church teachings are most outspoken about terminations – although even so, around half of those identifying as Roman Catholic support testing. Those who identify with another Christian denomination and religions other than Christianity also had more mixed views.

These findings are again supported by an analysis of attitudes towards genetic testing by religious attendance; for example, while 51% of those who attend a religious service at least once per month agree with the right of parents to undertake genetic tests on an unborn child with a serious mental disability, this figure increases to 65% of those who attend a religious service less often but at least once a year, and to 70% among those who attend a service less often than this.

Figure 5 Agreement with parents' use of genetic tests, by religion



The data on which Figure 5 is based can be found in the appendix to this chapter

For both questions there is an association with education and social class; people with higher levels of education and from higher social class groups are more likely to agree that parents should be able to access pre-birth genetic testing in these circumstances. Seventy four per cent of graduates and 69% of those with A-Levels or equivalent as their highest qualification support access to genetic testing for a mental disability compared with 57% of those with no formal qualifications. This pattern is repeated in the case of a physical disability.

There is a steep gradient across levels of scientific knowledge; for both questions, around four in five with the highest levels of scientific knowledge believe that parents should be able to use pre-birth tests (82% in the case of an unborn child with a severe mental disability and 78% in the case of an unborn child with a severe physical disability) compared with around two in five (40%-43% respectively) of those with the lowest level of science knowledge.

Embryonic stem cell research

Embryonic stem cells' ability to propagate and develop into any cell type have made them valuable in a range of medical research fields, including treatment of injuries, diabetes and degenerative neurological conditions such as Parkinson's. However, as with pre-birth testing, the use of embryonic stem cells in research has been highly contested on ethical grounds by groups who believe that embryonic stem cells have the potential for life, and therefore should be protected.

In 2018 we repeat a question about the use of stem cells from human embryos in medical research which was first asked in 2008:

Some people think that scientists should be allowed to use cells from human embryos for certain types of medical research. Others think this should never be allowed. Using this card, please say what you think?

Definitely should be allowed

Probably should be allowed

Probably should not be allowed

Definitely should not be allowed

Around three-quarters of people say scientists should be allowed to use cells from human embryos for medical research

In 2018, as shown in Table 7, around three-quarters of people say scientists should be allowed to use cells from human embryos for medical research (43% “probably should”, 30% “definitely should”), while around a fifth (21%) oppose the use of stem cells in this context (13% “probably should not”, 8% “definitely should not”).

This is slightly higher than in 2008, when the combined figure supporting stem cell research was 69%, and the combined figure saying it probably/definitely should not be allowed was 28%. This suggests a positive shift in the acceptability of this area of science and technology. However, the change is relatively small and it remains to be seen if this is a long-term trend.

Table 7 Attitudes towards the use of cells from human embryos in medical research, 2008 and 2018

	2008	2018
	%	%
Definitely should be allowed	26	30
Probably should be allowed	43	43
Probably should not be allowed	16	13
Definitely should not be allowed	12	8
<i>Unweighted base</i>	2250	2921

As we saw with attitudes towards genetic testing on unborn children, faith is significantly related to attitudes to stem cell research. Rates of support are highest among those with no religion (79%), Christians who identify as Church of England (77%) and those of ‘other Christian’ denominations (70%). This compares with 59% for Roman Catholics and 62% for those who identify with non-Christian faiths (62%). Attitudes towards stem cell research also differ by frequency of attendance at religious services, with 62% of those who attend a service at least once per month displaying support for such research

compared with 74%-77% of those who attend religious services either less frequently or never.

Again, there is also a link with level of education: over four in five (82%) of graduates feel that scientists should be able to use embryonic stem cells in medical research, compared with around two-thirds (65%) of those with no formal educational qualifications. These differences are also mirrored by occupational group.

There are also statistically significant differences by sex (77% of men in support, 71% of women) and age (70% of those under 35 are in support, 74% of those aged 35-54, 76% of those aged 55+).

Finally, support for stem cell research is also strongly associated with substantive scientific knowledge: 87% of those scoring '6' on our quiz agreed that scientists should be able to use embryonic stem cells compared with just over two-fifths (44%) of those scoring '0'.

Genetically modified crops and foods

Genetically modified (GM) crops have been the subject of substantial public opposition in the UK since the technology first emerged in the mid-1990s, and there has been a moratorium on their growth in the European Union since 2003. Yet, during the time the moratorium has been in place, the use of GM in other parts of the world, including the United States, has increased enormously without any evidence of harm to human health. Might this have led to a softening of opposition to this area of science and technological innovation?

In 2018, we include a short series of questions regarding GM technology in the self-completion questionnaire. The first questions focus on the overall balance of risks and benefits associated with GM, asking people to agree or disagree with three statements:

You may have heard of genetically modified or 'GM' foods. These are made from plants which have had their genes altered. Some people say that growing these plants may damage other plants and wildlife and that food made from them may not be safe to eat. Other people say that growing these plants may mean lower food prices and less use of pesticides and weed killers. Please say how much you agree or disagree with each of these statements about genetically modified (GM) foods.

The statements themselves then read as follows:

In order to compete with the rest of the world, Britain should grow genetically modified (GM) foods

Genetically modified (GM) foods should be banned, even if food prices suffer as a result

On balance, the advantages of genetically modified (GM) foods outweigh any dangers

As Table 8 shows, opinion regarding GM technology is divided: around a quarter (26%) agree that “in order to compete with the rest of the world, Britain should grow genetically modified (GM) foods”, around a third disagree (32%) and a similar proportion (30%) neither agree nor disagree. Similarly, a quarter agree that “on balance, the advantages of genetically modified (GM) foods outweigh any dangers” (25%), while a comparable proportion (23%) disagree and just over a third (36%) neither agree nor disagree.

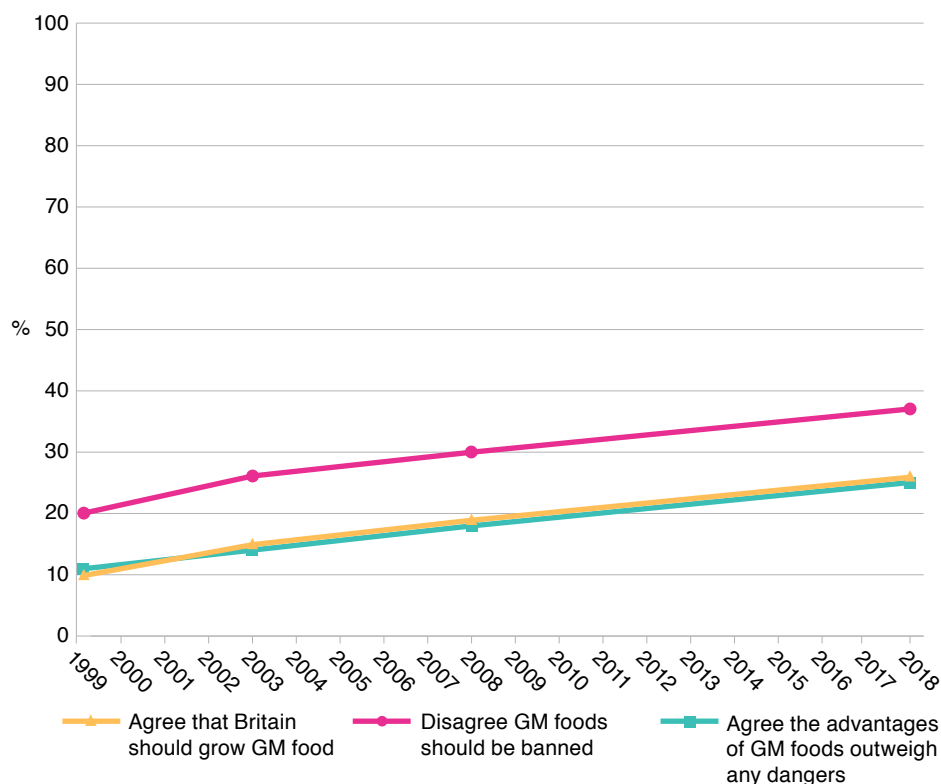
When we look at responses to the explicitly anti-GM statement: “GM foods should be banned, even if food prices suffer as a result” this mixed picture shifts slightly, with almost two-fifths (37%) disagreeing (that is expressing support for a pro-GM stance), one fifth (19%) agreeing that GM foods should be banned, and just under a third (31%) neither agreeing or disagreeing.

Table 8 Attitudes towards genetically modified (GM) foods

	In order to compete with the rest of the world, Britain should grow GM foods	On balance, the advantages of GM foods outweigh any dangers	GM foods should be banned, even if food prices suffer as a result
	%	%	%
Agree strongly	4	4	4
Agree	21	21	14
Neither agree nor disagree	30	36	31
Disagree	24	18	28
Disagree strongly	7	5	9
Don't know / Refusal	13	16	14
<i>Unweighted base</i>	2300	2300	2300

Public opinion regarding GM foods is divided, with a substantial proportion remaining uncertain in their views

Public opinion regarding GM foods in 2018 therefore is divided, with a substantial proportion remaining uncertain in their views. However, as Figure 6 demonstrates, support for GM food production has increased significantly since the late 1990s, albeit that none of the questions show a majority in favour. When we first asked our respondents this series of questions in 1999, just 10% agreed that “in order to compete with the rest of the world, Britain should grow genetically modified (GM) crops”, while 11% agreed that “on balance, the advantages of genetically modified (GM) foods outweigh any dangers”. Around half (52%) agreed that “Genetically Modified (GM) foods should be banned, even if food prices suffer as a result”, while just 20% disagreed.

Figure 6 Attitudes towards genetically modified (GM) foods, 1999–2018

The data on which Figure 6 is based can be found in the appendix to this chapter

Two further questions explore views on the potential risks of GM foods for human, animal, and plant health:

In general, do you think that growing genetically modified (GM) foods poses a danger to other plants and wildlife?

Do you think that all genetically modified (GM) foods already available in the shops are safe to eat?

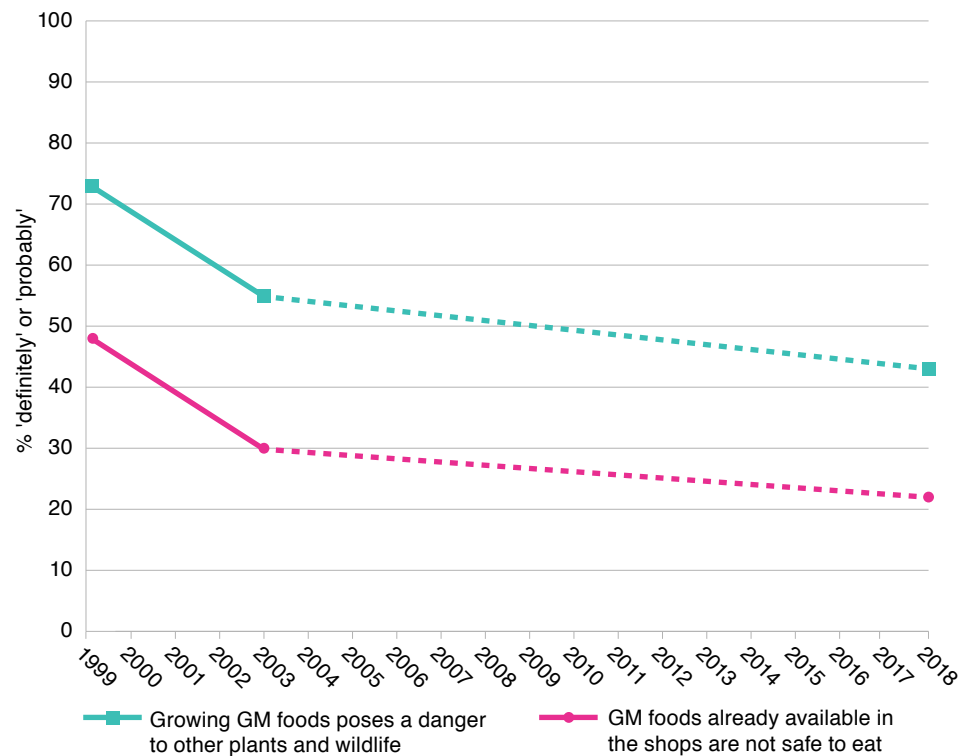
As shown in Table 9, there is considerable concern about the impact of growing GM foods upon plants and wildlife, with 43% asserting that growing genetically modified foods either “definitely” (12%) or “probably” (31%) poses a danger to other plants and wildlife. Meanwhile, although 56% feel that GM foods already available in shops are safe to eat (12% “definitely”, 44% “probably”), just over one in five (22%) disagree. Very few people (3%) are prepared to state that GM foods are “definitely not” a risk to wildlife, but equally few (4%) are certain that GM foods are “definitely not” safe. Levels of “don’t know or refusal” are high – a quarter (25%) report that they “don’t know” whether GM foods pose a danger to wildlife and around a fifth (21%) “don’t know” whether GM foods are safe to eat.

Table 9 Attitudes towards the risks involved in genetically modified (GM) food production

	Do you think growing GM foods poses a danger to other plants and wildlife?	Do you think GM foods already available in the shops are safe to eat?
	%	%
Definitely	12	12
Probably	31	44
Probably <u>not</u>	29	19
Definitely <u>not</u>	3	4
Don't know / Refusal	25	21
<i>Unweighted base</i>	<i>2300</i>	<i>2300</i>

Attitudes towards the potential risks posed by GM food production have also softened considerably over time (Figure 7). When BSA first asked the public for their thoughts on GM in 1999 perceptions of risk were relatively high; almost three-quarters (73%) felt that growing GM foods either “definitely” or “probably” posed a danger to other plants and wildlife, while around half (48%) felt that GM foods available in shops were either “probably not” or “definitely not” safe to consume. By 2003 these figures had decreased to 55% and 30% respectively and have fallen further to 43% and 22% in 2018 – a very substantial decline. This is perhaps unsurprising given that during the period between 1999 and 2018 there have been several assessments and reviews that have concluded GM crops are safe to eat and do not pose a threat to wildlife (House of Commons Science and Technology Committee, 2015).

Figure 7 Attitudes towards the risks involved in genetically modified (GM) food production, 1999–2018



The data on which Figure 7 is based can be found in the appendix to this chapter

As with most of the other questions we have considered, there is an association between attitudes to GM crops and both education and social class: those with higher educational qualifications are more likely than those with no educational qualifications to agree that “Britain should grow GM foods” and that the advantages outweigh any dangers, with a similar gradient for social class (there was no significant difference by education or social class in views regarding whether GM foods should be banned).

Those with higher qualifications are more likely to believe GM foods pose a danger to other plants and wildlife, but also more likely to feel that genetically modified foods already available in the shops are safe to eat. It should be noted, however, that for both questions those with no qualifications are more than twice as likely as graduates either to state that they “can’t choose” an appropriate answer, or to decline to respond.

There are also differences between the sexes, with women more likely to express disagreement regarding the benefits of GM technology and to be concerned about GM food’s impact on the ecosystem, and the relative safety of GM foods available in shops. It is possible that this greater scepticism among women is related to the fact that women are far more likely than men to be responsible for all or most of the buying and cooking of food in their household (Food Standards Agency, 2019).

Younger people are more concerned about the impact of growing GM foods on plants and wildlife

While there are no significant differences in attitudes to the safety of GM foods by age, younger people are more concerned about the impact on plants and wildlife, with around half (49%) of those aged 18-34 suggesting that dangers may be present, compared with two in five (40%) of those aged 55 and over.

Religious identity was also related to attitudes towards the safety of GM foods, as was political orientation. Once again, those with no religion and those who identify as Church of England hold similar views; 61% of those with no religious identity and 66% of those belonging to the Church of England believe that GM foods available to buy in shops are safe to consume, compared with half of Roman Catholics and those falling into the 'other Christian' category, while just 36% of those belonging to a faith other than Christianity view such products as safe to eat.

That religious identity is related to some but not all aspects of attitudes towards GM food production is reflected in the distribution of attitudes by religious attendance. Aside from views on whether the advantages of GM food production outweigh the dangers (where religious attendance was seen to be significantly associated with attitudes but religious affiliation was not), the pattern of attitudes towards GM food production by religious attendance mirrors the picture painted by our analysis by religious identity and reinforces the complex nature of the relationship between religion and this particular ethical debate.

Fifty three per cent of those who are categorised as the most left wing (measured on BSA's left-right scale) believe that GM crops either "definitely" or "probably" pose a risk to plants and wildlife compared with 41% of those in the political centre and 37% on the political right. This is perhaps unsurprising given the relative focus on environmental issues on the political left, including concern about the impact of 'Big Pharma' corporations such as Monsanto in developing countries⁴.

More positive views are also associated with higher levels of scientific knowledge. While 44% of people with the highest score on the knowledge scale agree that "on balance, the advantages of genetically modified (GM) foods outweigh any dangers", just 4% of those with the lowest score do so. Similarly, almost six in ten (59%) of those with the highest score disagree that growing GM foods should be banned even if prices rise, compared with just under one in five (18%) of people with the lowest score. Eight in ten (79%) of those with the highest score on the science knowledge scale feel that GM products available to purchase in shops are safe to eat compared with around three in ten (29%) of those with the lowest score. This relationship with levels of scientific knowledge was not evident for beliefs about risks to plants and wildlife.

⁴ Monsanto is the world's largest producer of genetically modified seed, as well as Roundup. It has been the subject of significant global controversy and organised campaigning as well as several high-profile lawsuits.

Table 10 Attitudes towards the risks involved in genetically modified (GM) food production, by socio-demographic characteristics

	Growing GM foods poses a danger to other plants and wildlife	GM foods already available in shops are safe to eat	Britain should grow GM foods to compete	The advantages of GM foods outweigh any dangers	GM foods should be banned, even if food prices suffer	<i>Unweighted base</i>
	% definitely / probably		% agree			
All	43	56	26	25	19	2300
Sex						
Men	39	63	34	33	18	992
Women	47	49	18	17	19	1308
Highest educational qualification						
Degree	47	64	33	33	21	630
Higher education below degree / A-level	46	61	25	25	20	637
GCSE, O level, CSE or equivalent	43	52	24	20	16	568
No qualification	33	43	19	18	16	434
Socio-economic class						
Managerial or professional	44	64	32	31	18	997
Intermediate occupations	40	54	21	21	18	324
Employers in small org; own account workers	46	53	20	20	23	209
Lower supervisory & technical occupations	40	58	24	26	20	159
Semi-routine & routine occupations	42	48	23	20	18	532
Religion						
Church of England / Anglican	45	66	28	24	19	375
Roman Catholic	48	49	24	21	19	177
Other Christian	47	50	20	22	24	423
Non-Christian	48	36	19	17	23	140
No religion	39	61	29	28	16	1182

Conclusions

Public support for, and trust in, science and scientists have long been seen as essential for the smooth functioning of a technologically-advanced society. We inhabit a socio-technical ecosystem which requires citizen confidence that scientists are competent and working for the public good (Barber, 1990). More instrumentally, of course, declining trust in science may threaten public consent and financial support for both fundamental and applied research programmes, without which the grand challenges we face simply cannot be solved.

Analysis presented in this chapter has shown that levels of confidence in science are generally high. Most people perceive modern science as a force for good, seeing it as improving their lives, and being both interesting and relevant on a day-to-day basis. We find little support here for the idea of a crisis of public trust in science or scientists, indeed there is some evidence that as we become a more scientifically and technologically complex society, so our trust in science and technology is growing.

Higher levels of education, scientific knowledge and occupational status are indeed associated with more positive views of science in both abstract and concrete terms. But these differences are not substantial, and there is little evidence of a disenfranchised population turning against the institutions of science, or of US style ‘culture wars’.

Views about the relative importance placed upon science, feelings and faith in modern society are mixed, with around a third of respondents respectively agreeing and disagreeing that “we believe too often in science and not enough in feelings and faith”, with a final third unable to say. Clearly, the public takes the view that science is not the only body of knowledge or way of knowing the world, and that other things, like faith and feelings also matter. The importance of faith in particular is evident in our attitudes to more controversial, and ethically complex technologies, such as pre-birth testing, and the use of embryonic stem cells, both of which have majority support, but are viewed far more negatively by Roman Catholics, and adherents of non-Christian faiths.

So, while trust in some key social institutions has declined, support for science has strengthened, and strengthened from a high base. This should not lead us to conclude that more cannot be done to better engage and involve the public in the specification, development, and conduct of scientific research programmes. And, indeed, our evidence reveals a small but significant minority of the public with low levels of trust and confidence in science and its governance that should lend further caution against complacency. Nonetheless, the scientific community, rather than fearing a crisis of trust, has every reason to be confident in an engaged public, open to and supportive of science and technology’s role now and in the future.

Most people perceive modern science as a force for good, seeing it as improving their lives, and being both interesting and relevant on a day-to-day basis

Acknowledgements

The National Centre for Social Research is grateful to Wellcome for their financial support which enabled us to ask the questions reported in this chapter. The views expressed are those of the authors alone.

References

- Allum, N., Sturgis, P., Tabourazi, D., Brunton-Smith, I. (2008), 'Science knowledge and attitudes across cultures: a meta-analysis', *Public Understanding of Science*, **17(1)**: 35-54
- Besley, J. (2013) 'The State of Public Opinion Research on Attitudes and Understanding of Science and Technology', *Bulletin of Science, Technology and Society*, **33(1-2)**: 12-20
- Bovens, M. and Wille. A. (2017), *Diploma Democracy: The Rise of Political Meritocracy*, Oxford: Oxford University Press.
- Entradas, M. (2015) 'Science and the public: The public understanding of science and its measurements', *Portuguese Journal of Social Science*, **14(1)**: 71: 85
- Food Standards Agency (2019), *Food and You Wave 5*, London: Food Standards Agency, available at: <https://www.food.gov.uk/research/food-and-you/food-and-you-wave-five>
- Gauchat, G. (2014), 'Politicization of science in the public sphere: A study of public trust in the United States, 1974 to 2010' *American Sociological Review*, **77(2)**: 167-187
- Gove, M. (2016), *Interview with Faisal Islam on Sky News* (3 June 2016), available at: <https://www.youtube.com/watch?v=GGgiGtJk7MA>
- Guterres, A. (2018) *UN Secretary General, Speech to the General Assembly 25th September 2018*, available at: <https://www.un.org/sg/en/content/sg/speeches/2018-09-25/address-73rd-general-assembly>
- House of Commons Science and Technology Committee (2015) *Advanced genetic techniques for crop improvement: regulation, risk and precaution*. London: The Stationary Office, available at: <https://publications.parliament.uk/pa/cm201415/cmselect/cmsctech/328/328.pdf>
- Lee, L. and Young, P. (2013), 'Politics: A disengaged Britain? Political interest and participation over 30 years' in Park, A., Bryson, C., Clery, E., Curtice, J. and Phillips, M. (eds.) (2013), *British Social Attitudes: The 30th Report*, London: The National Centre for Social Research, available at: http://www.bsa.natcen.ac.uk/media/38455/bsa30_politics_final.pdf
- Leibrecht, M. and Pitlik, H. (2018), *Is Trust in Companies Rooted in Social Trust, or Regulatory Quality, or Both?*, Henley Business School, University of Reading, available at: <https://assets.henley.ac.uk/>

[defaultUploads/PDFs/research/papers-publications/JHD-2018-03-Leibrecht-and-Pitlik.pdf?mtime=20180702113405](#)

Nichols, T. (2017) *The Death of Expertise: The Campaign Against Established Knowledge and Why it Matters*, Oxford University Press

Norris, P. (2011), *Democratic Deficit: Critical Citizens Revisited*, Cambridge: Cambridge University Press.

Nowotny, H. (2016), *The Cunning of Uncertainty*, Oxford: Polity Press

Nuffield Council on Bioethics (2012), *Emerging biotechnologies: technology, choice and the public good*, London: Nuffield Council on Bioethics, available at: http://nuffieldbioethics.org/wp-content/uploads/2014/07/Emerging_biotechnologies_full_report_web_0.pdf

Sturgis, P. and Allum, N. (2004) 'Science in Society: Re-evaluating the Deficit Model of Public Understanding', *Public Understanding of Science*, **13(1)**: 55-75

Sturgis, P., Roberts, C. and Smith, P. (2012), 'Middle Alternatives Revisited: How neither/nor response acts as a way of saying 'I don't know'', *Sociological Methods and Research*, **43(1)**: 15-38

Van Erckel, P. and Van der Meer, T. W. G. (2015), 'Macroeconomic performance, political trust, and the great recession: A multilevel analysis of the effects of within-country fluctuations in macroeconomic performance on political trust in 15 EU countries, 1999–2011'. *European Journal of Political Research*, **55(1)**: 177–197

Wellcome Trust (2009), *Wellcome Trust Monitor Survey Report: Tracking Public Views on Medical Research*, Wellcome Trust, available at: <https://wellcome.ac.uk/sites/default/files/monitor-wave1-wellcome-sep09.pdf>

Wellcome Trust (2013), *Wellcome Trust Monitor: Wave 2, Tracking public views on science, biomedical research and science education*, Wellcome Trust, available at: <https://wellcome.ac.uk/sites/default/files/monitor-wave2-full-wellcome-may13.pdf>

Wellcome Trust (2016), *Wellcome Trust Monitor Report: Wave 3 – Tracking public views on science and biomedical research*, Wellcome Trust, available at: <https://wellcome.ac.uk/sites/default/files/monitor-wave3-full-wellcome-apr16.pdf>

Appendix

The data on which Figure 1 is based are shown below.

	1993	1995	1998	2000	2008	2010	2018
	%	%	%	%	%	%	%
Agree	24	17	20	21	16	19	11
Disagree	46	46	44	47	51	50	55
<i>Unweighted base</i>	1261	1054	1684	1963	1986	928	2300

The data on which Figure 2 is based are shown below.

	18-24	25-34	35-44	45-54	55-59	60-64	65+
	%	%	%	%	%	%	%
Agree	27	21	23	13	17	12	16
<i>Unweighted base</i>	167	384	456	480	263	252	915

The data on which Figure 3 is based are shown below.

	Scientists working in colleges or universities	Scientists working for companies
% trust 'a lot' or 'some'		
To do their work with the intention of benefiting the public	85	67
To be open and honest about who is paying for their work	71	58
<i>Unweighted base</i>	2921	2921

The data on which Figure 4 is based are shown below.

	1993	1995	1998	2000	2010	2018
	%	%	%	%	%	%
Agree	46	40	44	48	30	27
Disagree	19	16	19	18	35	33
<i>Unweighted base</i>	1261	1054	1684	1963	928	2300

The data on which Figure 5 is based are shown below.

% agree with use of genetic testing to decide whether or not to have a child that has...	a serious mental disability	a serious physical disability	<i>Unweighted base</i>
No religion	74	72	1469
Church of England / Anglican	74	71	448
Roman Catholic	50	52	231
Other Christian	58	58	553
Non-Christian	50	55	208

The data on which Figure 6 is based are shown below.

	1999	2003	2008	2018
	%	%	%	%
Agree that Britain should grow GM foods to compete	10	15	19	26
Agree the advantages outweigh the dangers	11	14	18	25
Disagree GM foods should be banned	20	26	30	37
<i>Unweighted base</i>	833	2649	1986	2300

The data on which Figure 7 is based are shown below.

	1999	2003	2018
% say 'definitely' or 'probably'	%	%	%
Growing GM food poses a danger to other plants and wildlife	73	55	43
GM foods already available in the shops are not safe to eat	48	30	22
<i>Unweighted base</i>	833	2649	2300

Publication details

Curtice, J., Clery, E., Perry, J., Phillips M. and Rahim, N. (eds.) (2019),
British Social Attitudes: The 36th Report, London: The National
Centre for Social Research

© The National Centre for Social Research 2019

First published 2019

You may print out, download and save this publication for your non-commercial use. Otherwise, and apart from any fair dealing for the purposes of research or private study, or criticism or review, as permitted under the Copyright, Designs and Patents Act, 1988, this publication may be reproduced, stored or transmitted in any form, or by any means, only with the prior permission in writing of the publishers, or in the case of reprographic reproduction, in accordance with the terms of licences issued by the Copyright Licensing Agency. Enquiries concerning reproduction outside those terms should be sent to The National Centre for Social Research.

The National Centre for Social Research
35 Northampton Square
London
EC1V 0AX
info@natcen.ac.uk
ISBN: 978-1-5272-4448-1