

APPENDIX A

CONTENT ANALYSIS OF THE BBC'S SCIENCE COVERAGE

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1. Introduction

This report was commissioned by the BBC Trust as part of its review of the impartiality and accuracy of the BBC's coverage of science. Our aim is to provide evidence about how the BBC covers science across the full range of its output on its UK public services network. We have focused on those aspects of the coverage which may have a bearing on the question of impartiality and accuracy, but it is not for this analysis to reach a judgement about whether or not the BBC's coverage is satisfactory in these respects. That is the job of the review itself, which is being conducted by Professor Steve Jones.

Our analysis is informed by our experience over many years researching and teaching about the media representation of science and the relationship between science and society. There is an extensive academic literature on the media coverage of science, but how the notion of impartial broadcasting applies to science coverage has not been widely discussed, although some attention has been paid to the use of balance in science journalism. However, impartiality implies more than the mechanical application of balance. The BBC's Editorial Guidelines state that how impartiality is achieved will vary according to subject, type of output and audience expectations, and that due impartiality:

requires us to be fair and open minded when examining the evidence and weighing all the material facts, as well as being objective and even handed in our approach to a subject. It does not require the representation of every argument or facet of every argument on every occasion or an equal division of time for each view.¹

As John Bridcut put it in his 2007 report for the BBC Trust: "Impartiality involves a mixture of accuracy, balance, context, distance, evenhandedness, fairness, objectivity, open-mindedness, rigour, self-awareness, transparency and truth."² Likewise, the Editorial Guidelines note that accuracy can mean more than getting the facts right; facts must be weighed and output must be "well sourced, based on sound evidence, thoroughly tested and presented in clear, precise language."³ In this report, we therefore give a broad overview of pertinent features of the BBC's science output rather than restricting ourselves to the narrower questions of balance and factual accuracy.

¹ BBC (2005), *Editorial Guidelines: The BBC's Values and Standards*, 27, at <http://www.bbc.co.uk/guidelines/editorialguidelines/news/news-2005-archive/>.

² John Bridcut (2007) *From Seesaw to Wagon Wheel: Safeguarding Impartiality in the 21st Century*. BBC Trust, 5; http://news.bbc.co.uk/1/shared/bsp/hi/pdfs/18_06_07impartialitybbc.pdf.

³ BBC, *op. cit.*, 7, 16.

The bulk of this report draws on a quantitative content analysis of BBC output in May, June and July of 2009 and 2010. Discussions about the media coverage of science often proceed from anecdote, citing examples that are not necessarily representative. Quantitative content analysis can offer a more systematic view of output. However, in examining broad patterns of coverage, quantitative analysis can do little to probe the more subtle features of individual items. In places, we have therefore supplemented the quantitative analysis with qualitative analysis of individual programmes and news reports.

The quantitative analysis was conducted by Felicity Mellor. The qualitative analysis was conducted by Felicity Mellor, Stephen Webster and Alice Bell. Coding was carried out by a team of six graduates from Imperial College's MSc programmes in Science Communication and Science Media Production: Seth Bell, Elizabeth Hauke, Viviane Li, Rohan Mehra, Darius Nikbin, and Roshan Samarasinghe. Our thanks are due also to Paul Chauncy and Jamey Khan for technical support.

2. Overview of findings

This section summarises some of the key findings of the content analysis of a sample of news and non-news programmes. Details of the sampling method and coding, including the criteria we used for selecting science items, can be found in the next section.

The BBC covers science across a wide range of programmes. We found that one in four of the BBC news programmes sampled included at least one item about science. For the main television news bulletins, this rose to about half of all programmes. Radio news showed a wide variation in the amount of science covered: about three quarters of broadcasts of Radio 4's Today programme included at least one science item compared to just under a fifth of Radio 1's Newsbeat. BBC television news programmes carry roughly the same proportion of science news as equivalent news broadcasts on competitor channels. On average, non-news programming which includes some science comprises a minimum of 2% of air time on the main four BBC television channels; the minimum for Radio 4 is almost double this. (The actual proportion of non-news programmes containing science is likely to be significantly higher than these figures since our sample was based on programmes where science content was highlighted in the *Radio Times* listings.) Our sample of non-news programmes including science content ranged from a total of just three hours in eight weeks on BBC Three to an average of about five hours a week on Radio 4.

Non-news science programming on the BBC is extremely diverse, drawing on a number of genres and styles and aimed at different target audiences. Science content is included in non-science specific programming as well as in specialist science programmes. For instance, about a half of The One Show episodes include at least one science item, as do over two thirds of Countryfile episodes. However, current affairs programmes cover science topics relatively infrequently – in the year from May 2009 to April 2010, Panorama covered science in six of the 47 programmes broadcast and Analysis in just two of 25 programmes broadcast.

We found no significant factual inaccuracies in either the BBC's news coverage or its non-news coverage.

On BBC television and radio news, items about science were typically positioned in the second half of the programme, although about half were also headlined at the start of the programme. Half of the science items on broadcast news dealt with medical science and technology. Only about 5% dealt with physical sciences. About a third of the items in our sample of science articles from BBC News Online were about medical science. There were no news items about mathematics, though it should be noted that our selection criteria excluded items drawing on statistics or other mathematical techniques to examine social issues. Non-news programming has a wider range of subject matter, with about a third of items or programmes dealing with life sciences and about a fifth with physical sciences. Only a tenth of non-news science was about medical science. Mathematics is represented in non-news programming, albeit in a small proportion of output.

In long-running news stories with political dimensions or involving uncontrolled events, the science aspect of the story is covered but in a minority of items. Scientific and political comment are rarely presented side by side.

Nearly half of the sampled science items on BBC broadcast news programmes were about new research, as was about two thirds of science news on the BBC website. About a third of non-news science coverage was about new research – excepting children's programming which deals almost exclusively with established science.

Those interviewed in both science news and non-news science strands are predominantly male scientists at English universities. About one in eight news contributors were spokespeople from charities and NGOs. Less than 10% of named contributors in news items were presented as members of the public with no specific expertise. In both news and non-news, women were more likely than men to be presented as lay voices and less likely than

men to be presented as scientists. In our year-long sample of Radio 4's Material World, just 14% of contributors were women, and just 8% were women scientists. In the non-news sample as a whole, 80% of those presented as scientists were men.

Only one third of science news items include comments from more than one contributor (in addition to the journalist or presenter). News items on BBC television and radio often give insufficient detail to judge with what expertise a contributor speaks. Institutions are usually credited but not the speaker's discipline nor their involvement with the events being reported; instead, this is usually implied by editing. By contrast, online news usually states if someone is a "lead author" or "co-author" of the research being described.

About a fifth of contributors in broadcast news, a quarter of contributors in online news, and an eighth of contributors in non-news programmes, make cautionary comments about scientific claims, such as noting limits to the applicability, reliability or relevance of results. News items by science correspondents were least likely to include any expression of caution or uncertainty about the science being discussed, despite these journalists being more likely to have the knowledge base or contacts required to identify the limitations of the claims being made than are journalists in non-science-related specialisms. More far-reaching critiques or oppositional comments from contributors were rarer still. When oppositional comments were heard, they were more likely to come from non-science professionals or lay members of the public than from scientists. Oppositional comments were usually presented in the context of controversy, rather than as the routine questioning and sceptical inquiry that are a part of science.

About three quarters of broadcast news items about scientific research concerned stories where the source institution issued a press release and a further eighth of such items derived from other forms of PR activity or appeared to have done so. Almost all the press release-derived items with comment from contributors included those named in the press release or others at the institution that issued the press release; only about half of these items included comment from others. Where based on press releases, BBC online news reports typically adopted the angle provided in the press release, but in most cases there was also input from other sources or other evidence of story research on the part of the journalist.

Only about an eighth of broadcast news items about research, and almost two fifths of online news items about research, included comment from independent scientists (i.e., scientists at research institutions or other scientific organisations with no connection to the research being reported). Over two thirds of broadcast news items about research, and about half of online

reports and non-news items about current research, made no mention of experimental design (e.g., sample size, whether trials are double-blind, etc.). The funder of research was mentioned in a minority of online news reports and non-news programmes, and hardly ever in broadcast news. For online news reports, we also recorded references to any benefits or risks of the science or technology being discussed, and the extent to which the science or technology was explained. We found that reports were more likely to mention benefits than risks and that two fifths of the online reports about research findings had no more than one sentence explaining the science.

Two thirds of broadcast news items about research arose out of publications, but a publication was mentioned in only half of these items. Only a third of broadcast items arising out of a journal publication named the journal concerned and this was usually one of a small number of journals. *Nature*, the *Lancet* and the *British Medical Journal* accounted for nearly all journal citations in the broadcast news. Online news reports mentioned journals twice as often as broadcast news items and referred to a wider range of journals and these were named in almost all cases. Online reports usually included links to the mentioned journal, but in most cases the link was to the journal's home page rather than the specific paper being discussed. Almost no items, either in broadcast items or on the news website, specified whether a publication was peer reviewed.

3. Methodology

3.1 Sample period

We sampled both news and non-news output on television, radio and the BBC website. The size and timing of our sampling was determined by the timetable set for the review.

The BBC Trust had announced publicly its intention to undertake an impartiality review of science output before our research began and it is possible that this might have influenced the BBC's treatment of science during the research period. The impartiality review also coincided with what the BBC had designated as a "Year of Science" and this is likely to have altered the non-news schedules for 2010. In order to minimise the possibility of these two factors distorting our findings, we sampled 2009 coverage as well as that of 2010.

In most cases, our sampling was limited to four alternate weeks over the summer in each of the two years (see table 1). BBC News Online and non-BBC channels were sampled in 2010

only. Since most non-news programmes are not broadcast throughout the year, we also sampled an entire year's output for several BBC non-news strands (see section 3.3).

	2009	2010
Weeks sampled:	25-May to 31-May 08-Jun to 14-Jun 22-Jun to 28-Jun 06-Jul to 12-Jul	24-May to 30-May 07-Jun to 13-Jun 21-Jun to 27-Jun 05-Jul to 11-Jul
Output sampled:	BBC television and radio news BBC television and radio non-news schedule scan	BBC television and radio news BBC television and radio non-news schedule scan BBC News Online Channel 4, ITV and Sky news

Table 1: Sample weeks for news output and non-news schedule scan.

Our sample for the qualitative analysis was guided by our findings from the quantitative analysis. We looked in detail at news items or non-news programmes which we felt were illustrative of the features emerging from the quantitative analysis or which would help elucidate any properties which the quantitative analysis was unable to probe.

3.2 News sample

We sampled 16 BBC news programmes on television and radio through the sample weeks in 2009 and 2010 (table 2). For comparison, we also sampled three news programmes on commercial television for the same four weeks in 2010.

We were unable to access eleven broadcasts during the period of the coding and a further eleven editions were not broadcast due to bank holidays, sporting fixtures and so on, giving us a total sample of 645 news broadcasts. This yielded a total of almost 9000 individual news items which were assessed for science content. In order to prevent missing broadcasts from skewing the results, we give relative measures where necessary.

BBC news programmes	Non-BBC news programmes
BBC One Breakfast (Mon-Fri, 7-8am only) BBC One News at One (Mon-Fri) BBC One Newsround (Mon-Fri) BBC One News at Six (Mon-Fri) BBC One News at Ten (Mon-Fri) BBC One Weekend Evening News (Sat-Sun) BBC Two Newsnight (Mon-Fri) BBC News Channel (Mon-Sun, 5-6pm only) BBC News Channel Click (Sat) Radio 1 Newsbeat 12.45 (Mon-Fri) Radio 1 Newsbeat 17.45 (Mon-Fri) Radio 4 Today (Mon-Fri, 7-8am only) Radio 4 World at One (Mon-Fri) Radio 4 PM (Mon-Fri) Radio 4 Six O'clock News (Mon-Fri) Radio 5 Live Breakfast (Mon-Fri, 7-8am only)	ITV News at Ten (Mon-Fri) Channel 4 News (Mon-Fri) Sky News (Mon-Sun, 5-6pm only)

Table 2: News programmes sampled. The whole duration of programmes were sampled unless otherwise specified.

For online coverage, we accessed the News Front Page, Health, Science and Environment, and Technology sections of the BBC News website on each day of the sample weeks in 2010. We collected the “above the fold” linked articles for each page; that is, the three articles highlighted in the centre of the page together with all the articles listed in the page frame under the heading “Other Top Stories”.⁴ This yielded a total sample of 1051 items. Some items were repeated across different sections of the website and the specialist websites retained articles for more than one day. Excluding these repeated articles our online news sample contained 640 unique items. During the four sample weeks in 2010 we also followed all national reporters who keep blogs whose beats are science or science-related areas (see table 3). This yielded a sample of 56 unique blog postings.

⁴ Note that BBC News launched a new website design shortly after our sampling was completed.

Reporter	Beat	Blog address
Jonathan Amos	Science Correspondent, BBC News	http://www.bbc.co.uk/blogs/thereporters/jonathanamos/
Richard Black	Environment Correspondent, BBC News Website	http://www.bbc.co.uk/blogs/thereporters/richardblack/
Rory Cellan-Jones	Technology Correspondent, BBC News	http://www.bbc.co.uk/blogs/thereporters/rorycellanjones/
Tom Feilden	Science Correspondent, Today Programme	http://www.bbc.co.uk/blogs/today/tomfeilden/
Fergus Walsh	Medical Correspondent, BBC News	http://www.bbc.co.uk/blogs/thereporters/ferguswalsh
Susan Watts	Science Editor, Newsnight	http://www.bbc.co.uk/blogs/newsnight/susanwatts/

Table 3: Blogs sampled on the BBC website.

3.3 Non-news sample

Our sample of non-news television and radio output consisted of almost three hundred programmes with science content, gathered through three different sampling methods. We restricted our sample to non-fiction, but we note that one fiction film and one historical drama broadcast during our sample weeks were located in scientific settings.

i) Schedule scan

We scanned the *Radio Times* listings for BBC One, BBC Two, BBC Three, BBC Four and Radio 4 in the 2009 and 2010 sample weeks for any programmes that mentioned science or were described as science shows. After viewing, some programmes were rejected as having no science content, giving a final sample of 185 programmes. The schedule scan included repeated programmes only once. For television channels it included overnight broadcasting, but for Radio 4 it did not include the night-time transmission of the World Service.

When scanning the listings we included in our selection any programmes which promised an investigation into, or analysis of, natural phenomena, but to avoid our sample being skewed by programmes with no overt science content we did not include nature programmes or other observational programmes unless they explicitly alluded to science or investigation. Thus natural history programmes, some of which draw extensively on scientific knowledge in research and scripting but do not explicitly foreground the source of this knowledge either in

the programmes or in the listings, were largely excluded from our sample. Likewise, there are likely to have been magazine programmes which included science items but did not advertise these and which were therefore not selected for our sample. In general, this sample should be viewed as representing a minimum of the BBC's non-news science output during the sample weeks rather than its total such output during these weeks. We will refer to this sample as the schedule scan sample.

ii) Topical magazine programmes

In order to mitigate at least one of the limitations of the schedule scan sampling method, we viewed all editions of three topical magazine programmes in the 2009 and 2010 sample weeks (see table 4). This gives an indication of the extent of science coverage in such programmes, but clearly the proportion of science in other magazine programmes is likely to vary, depending on the programme style, theme and target audience.

Channel	Programme	Broadcast time
BBC One	The One Show	7pm, Mon-Fri
BBC One/BBC Two	Blue Peter	approx 5pm, Tue & Wed
BBC One	Countryfile	7pm, Sun

Table 4: Non-news topical magazines of which every edition was sampled during the sample weeks.

iii) Retrospective sample

Non-news schedules vary considerably through the course of a year and sampling weekly programmes over just a few weeks may not be representative of whole series. We therefore also examined all editions of four science strands and two current affairs strands over the course of a whole year from May 2009 to April 2010 (see table 5). This sampling was in addition to the schedule scan, so editions of these programmes may also be included in the schedule scan sample if they advertised science content in the *Radio Times* listings. However, where we derive data from the entire non-news sample, we do not double count these programmes.

Channel	Programme
BBC One	Bang Goes the Theory
BBC One	Panorama
BBC Two	Horizon
Radio 4	Analysis
Radio 4	Frontiers
Radio 4	Material World

Table 5: Non-news strands in the retrospective sample.

iv) Non-news websites

We captured the front pages of the /science and /nature websites for each day in the sample weeks in 2010 in order to examine the range of subjects featured on these pages (see section 6).

3.4 Coding

Because of the wide range of programme genres included in our overall sample, the unit of analysis varies (table 6). For television and radio magazine shows and for all news programmes, we analysed individual items within the programme. For single-topic programmes such as documentaries, we examined the programme as a whole. For online material, we took articles, blogs, and, for the non-news websites, each framed feature within the page as the unit of analysis. For convenience, we will use the term “item” to refer to all of these. It is important to note that in what follows, we distinguish between items and stories. The term “story” refers to the events being reported whilst the term “item” refers to the treatment of the story within a report. Thus a single story may be reported in multiple items on several different programmes or even in multiple items within one edition of one programme.

Output type	Unit of analysis
Broadcast news	Single item, including studio introduction, package and studio discussion as appropriate
Magazine programmes	Single item, including studio introduction, package and studio discussion as appropriate
Single-topic programmes (e.g., documentaries)	Whole programme
Online news	Article, earliest retrieved posting
Blogs	Single post, earliest retrieved posting
Non-news website homepages	Each feature frame within the page

Table 6: Definition of unit analysis for each type of output.

All items in the sample were assessed for science content. Science is a multifaceted enterprise of relevance to many aspects of modern life. In order to ensure that we could agree on what constituted a science item, we used a tightly-constrained definition. To count as a science item, we looked for at least one of the following as a significant component of the item:

- activities or findings from the natural sciences, the applied sciences, medical science, or mathematics;
- activities or findings which are referred to as scientific;
- references to scientific institutions;
- references to individuals who are identified as having scientific expertise either by virtue of their disciplinary base or by their institutional role;
- references to individuals who are identified as being “experts”, or “researchers”, or equivalent, where the implied subject of their expertise is the natural sciences, the applied sciences, medical science, or mathematics;
- the research and development stage of new technologies.

This definition excludes, among other things, references to statistics and graphs, social sciences research, those aspects of professional activities (such as clinical medicine or engineering) that are founded on science but do not directly contribute to scientific research, the commercial launch of new technologies, and discussions of health or environmental issues unless explicitly referencing one of the above. We do not wish to claim that these activities are unscientific or are not relevant to science. Rather, our definition of science, agreed with the BBC Trust on commissioning, was a pragmatic choice to ensure that we had a clearly-bounded set of criteria that could be applied consistently. Where the treatment within an item

of professional activities such as clinical medicine and engineering met the criteria for a science item set out above, such items were included in our sample.

All items identified as science items were coded according to a set of pre-tested categories (see appendix one). We also recorded those items which alluded to science but did not develop this angle, but these items were not then coded any further. Television and radio programmes were coded by one of our team of coders. All the coders have first degrees in science as well as masters degrees in science communication. All online material was coded by the project leader after the rest of the coding was complete. The non-news coding and online coding used a coding frame similar to that used for the television and radio news items, but with some modifications to take account of differences in genre and media. For the online sample, some additional categories were introduced in response to the coding of the other material to enable further characteristics to be examined.

Tests of inter-coder reliability were carried out during the coding (see appendix two) and any categories that could not be coded reliably were rejected. Nevertheless, even when a high rate of intercoder reliability is achieved, content analysis remains a subjective form of analysis. Coding all but the most uninteresting of features of media output involves a judgement on the part of the coder. A well-defined coding frame helps minimise differences between coders, but the definitions set out in the coding frame themselves embody a set of decisions about where to draw boundaries around categories that, in reality, do not constitute naturally bounded entities. It is entirely possible that coders working with a different set of criteria would generate a different set of figures. We are confident, however, that the broad outlines of our findings reach beyond these limitations and offer a robust description of BBC science.

Except where specified otherwise, the results below are based on our samples of science items rather than the entire output that was assessed for science content. In total, our sample yielded 387 broadcast news science items, 130 online news science items, 588 non-news science items, and 27 science blog items.

4. Extent of science coverage

4.1 Proportion of science in the news

Our BBC broadcast news sample contained 359 science items, 4.6% of the total number of items. A further 3.5% alluded to scientific issues but did not develop this as a significant

angle. This latter category was deliberately constructed for borderline items to ensure that the coding of science items could be accomplished reliably, but consequently it is itself less reliable. We include it only as a rough indication of the number of potential science stories that go undeveloped.

It is worth noting that a previous content analysis for an impartiality review of the BBC's coverage of the UK nations found that 1.3% of news covered science and technology and a further 5.4% covered the environment and the natural world, environmental issues, and health. This is roughly comparable with what we have found given that the latter categories would include a mix of what by our criteria would be categorised as science items and items alluding to science or with no science.⁵

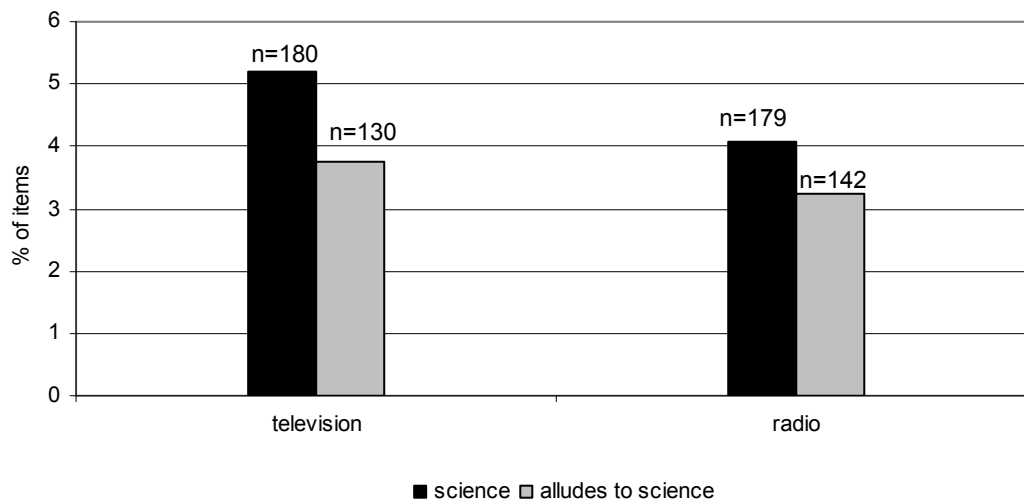


Figure 1: BBC broadcast news items covering science as a proportion of all such items. N(tv)=3464, N(radio)=4390. (See appendix three for data table.)

The amount of science covered varies between platforms and across programmes. A greater proportion of television news concerns science than is the case for radio news (figure 1; see also appendix three).

⁵ Justin Lewis, Stephen Cushion, Chris Groves, Lucy Bennett, Sally Reardon, Emma Wilkins and Rebecca Williams (2008) *Four Nations Impartiality Review: An analysis of reporting devolution*. BBC Trust, 10.

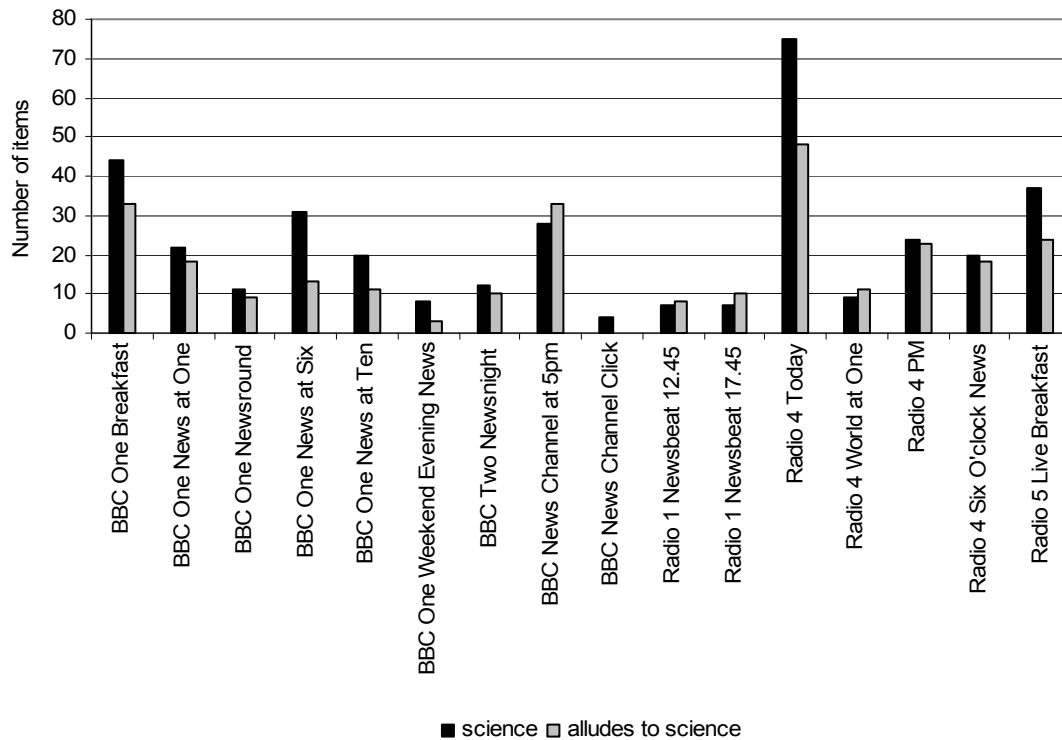


Figure 2: Number of science items on BBC broadcast news outlets. (See appendix three for data table.)

Radio 4's Today programme contributed the greatest number of science items to our sample (figure 2) but as a proportion of the total number of items in the programme its science coverage is similar to that of the BBC One News at Six and BBC One Weekend News (figure 3).

The technology programme Click (BBC News Channel) contained the greatest proportion of science items but the small total number of items – just four – in the seven editions sampled means that any comparisons with this programme must be treated with caution. Radio 4's World at One contained the smallest proportion of science items (2.1%), but this was comparable to Radio 1's Newsbeat (2.3% for the 12.45 edition). Radio 4's PM and Six O'clock news also contained a relatively low proportion of science items.

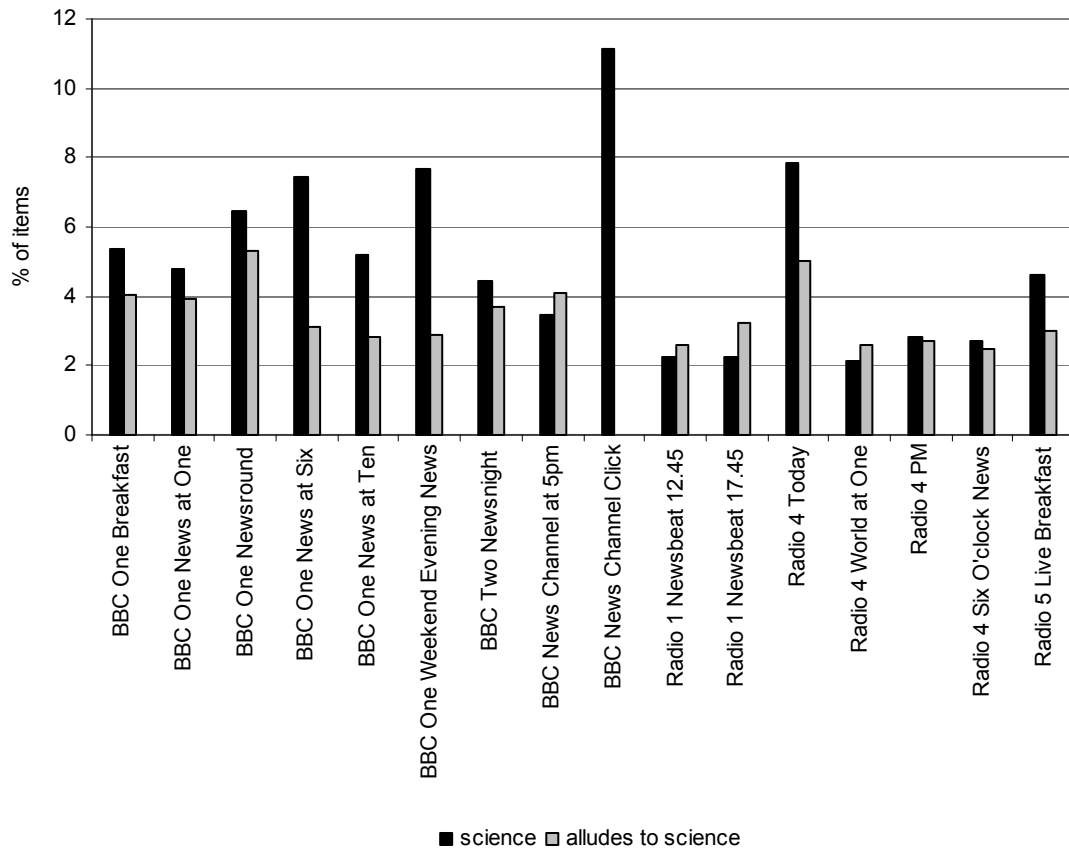


Figure 3: Comparison of the proportion of science items across different BBC broadcast news outlets. (See appendix three for data table.)

The average duration of science items was just over two and a half minutes.⁶ Although Newsnight does not cover science as frequently as other programmes, when it does cover science it devotes a lot of time to these items (over ten minutes on average compared to an average item duration of under eight minutes for that programme). As a proportion of overall air time, therefore, Newsnight is one of the three programmes devoting the greatest proportion of output to science, along with the BBC News Channel's Click and Radio 4's Today programme (figure 4; once again we note that comparisons with Click should be treated with caution due to the small sample size).

⁶ We did not record the duration of non-science items, but a previous content analysis for the BBC Trust provides a comparison. This found that BBC broadcast news items about the Middle East had an average item duration of just under two and a half minutes. Loughborough University, *The BBC's Reporting of the Israeli-Palestinian Conflict* (BBC Trust, 2006).

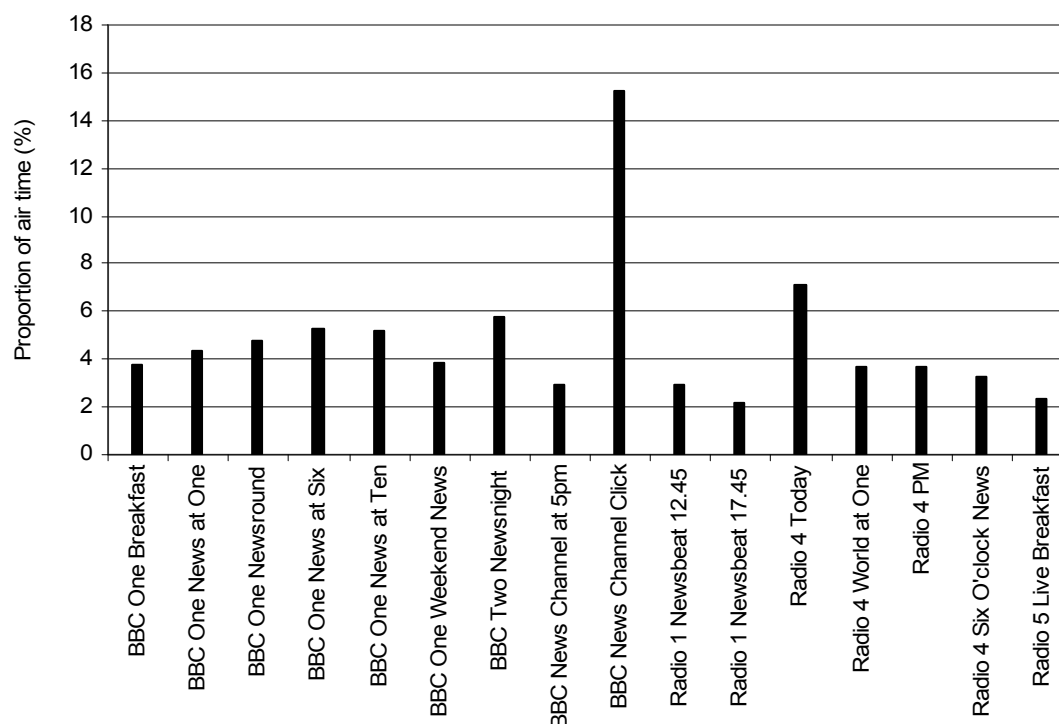


Figure 4: Proportion of air time taken up by science items relative to programme duration for BBC broadcast news outlets. (See appendix three for data table.)

The stories headlined on the BBC website include a similar proportion of science as did television and radio news. Five per cent of the items linked from the main News Front Page were science items (figure 5). However, the presence of specialist sections within the news website means there is a greater proportion of coverage overall in our online sample. Of the 640 unique items in the entire online news sample, 130 (20%) were science items and a further 41 (6.4%) alluded to science. Science items comprised 35% of items linked from the Health site and 59% of items linked from the Science & Environment site. On the Technology site, which deals largely with consumer issues and the commercial launch of new technologies, only 8% of items met our criteria for science items.

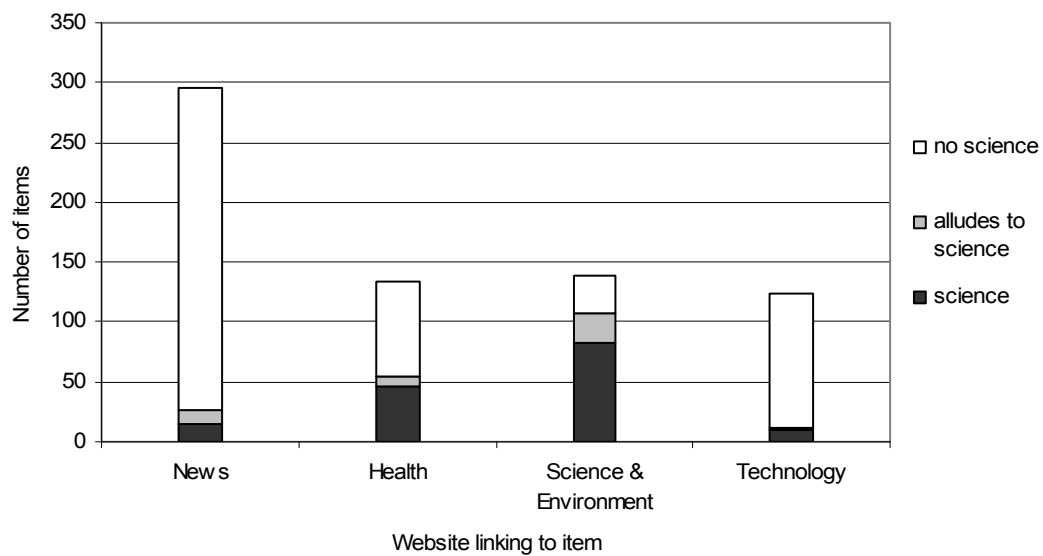


Figure 5: Science content of BBC News website. This chart double counts items appearing in more than one section, but includes only once items repeated on different days within one section. (See appendix three for data table.)

On average, online science news articles were 520 words long. Those originating from the Science & Environment section of the news website were likely to be longer than average (583 words).

Of the 56 blogs in our sample, 27 met our criteria for a science item (table 7). Frequency of posting varied during the sample weeks and, as would be expected given their different beats, the frequency with which reporters blogged on science also varied. Despite being a science correspondent, many of Jonathan Amos’s blogs and news articles reported space industry news and did not qualify as science items under our criteria.

Reporter	Total number of unique postings	Number of unique postings coded as science items
Jonathan Amos	10	5
Richard Black	13	5
Rory Cellan-Jones	15	1
Tom Feilden	8	7
Fergus Walsh	6	6
Susan Watts	4	3

Table 7: Number of science blogs in sampled blogs on BBC website.

4.2 Comparison of BBC news science coverage with other broadcasters

For the 2010 television sample, we were able to compare the amount of science in BBC television news broadcasts with equivalent programmes by other broadcasters (figure 6). These comparisons must be treated with caution given the very small numbers in these sub-samples.

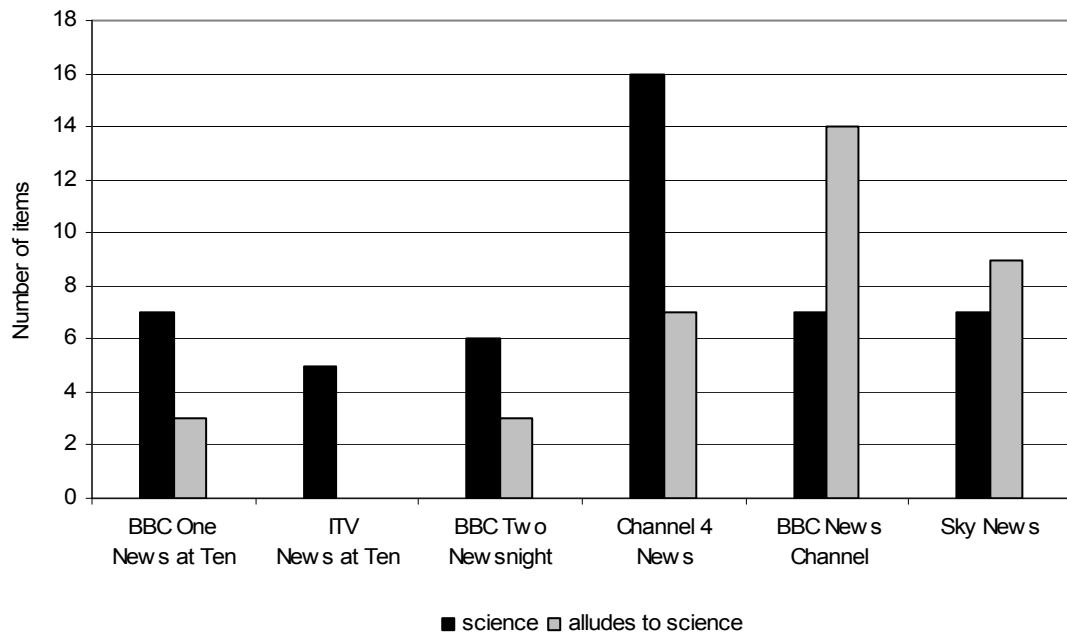


Figure 6: Number of science items in BBC and non-BBC flagship news bulletins for 2010 sample weeks. (See appendix three for data table.)

Figure 6 suggests that BBC News at Ten covers considerably less science than Channel 4 News and that Newsnight, which might be taken as an alternative comparison given the

emphasis on analysis in both programmes, covers even less. However, as noted above, comparing numbers of items risks misrepresenting shorter programmes or those with longer-than-average items. News at Ten lasts for half an hour compared to the 50 minutes of Newsnight and Channel 4 News, whilst Newsnight has longer-than average items. A different pattern emerges from comparing the proportion of air time given to science items by different broadcasters (figure 7).

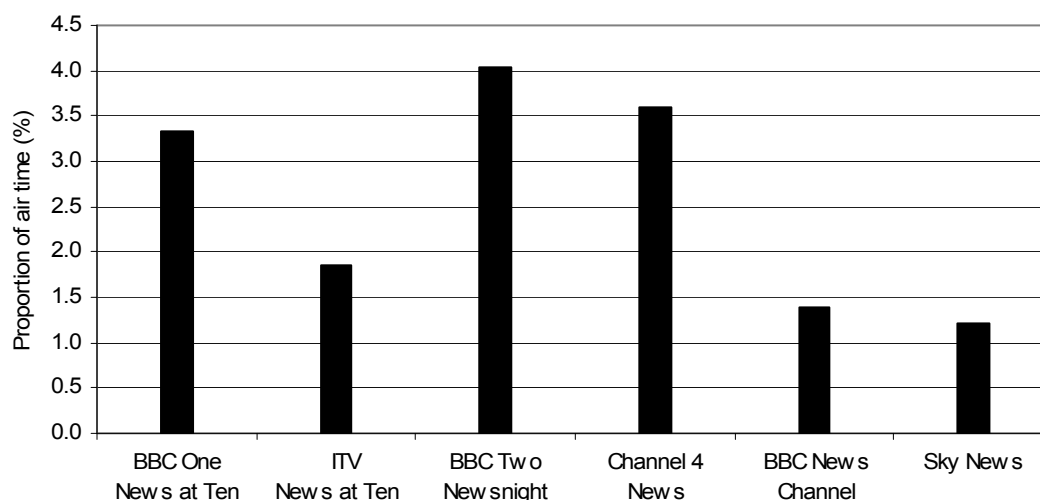


Figure 7: Air time taken up by science news items relative to programme duration for BBC and non-BBC flagship news bulletins for 2010 sample weeks. (See appendix three for data table.)

The variation in findings according to the measure adopted, along with the small sizes of these sub-samples, mean that the most we can reliably conclude is that the amount of science coverage on BBC news is roughly equivalent to the amount in equivalent programmes on non-BBC channels. The small number of science items in our non-BBC sample means that further comparisons are difficult to make and the remainder of this report will look at the BBC sample only.

4.3 Variation in BBC news coverage over time

The amount of science news on BBC television and radio varied over time. The 2009 sample contained almost one and a half times as many science items as the 2010 sample, in large part due to the swine flu pandemic which was at its peak during our 2009 sample period. However, despite the greater coverage overall, the 2009 sample also included the week with the least science coverage (figure 8). The relative lack of science items in this week was likely due to the near-saturation coverage given to the death of Michael Jackson that Friday.

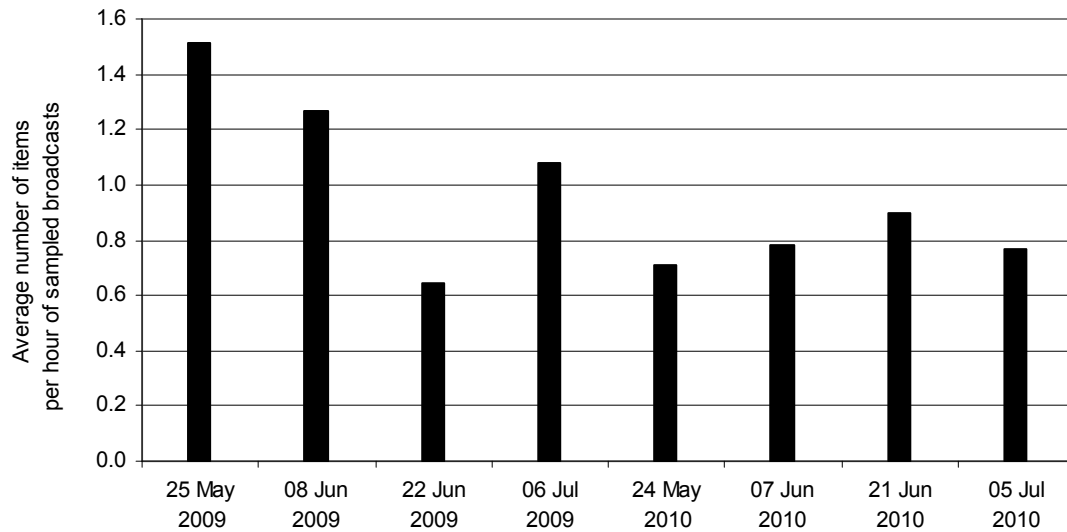


Figure 8: Amount of science coverage on BBC television and radio news in each sample week.

The amount of broadcast news coverage also varies by day of the week (figure 9).⁷ The peak in coverage on Fridays coincides with the day on which the *British Medical Journal* lifts its press embargo; a relative lack of Friday press launches on topics unrelated to science may also be a factor. Similarly, the raised coverage on Wednesdays and Thursdays may be attributable to the journal *Nature* being published on Thursdays and lifting its press embargo the evening before. These peaks in coverage are not noticeable in the online coverage, where each week day sees about the same number of new postings (23 on average). We will consider the role of journals as sources of science news in greater detail in section 13 of this report.

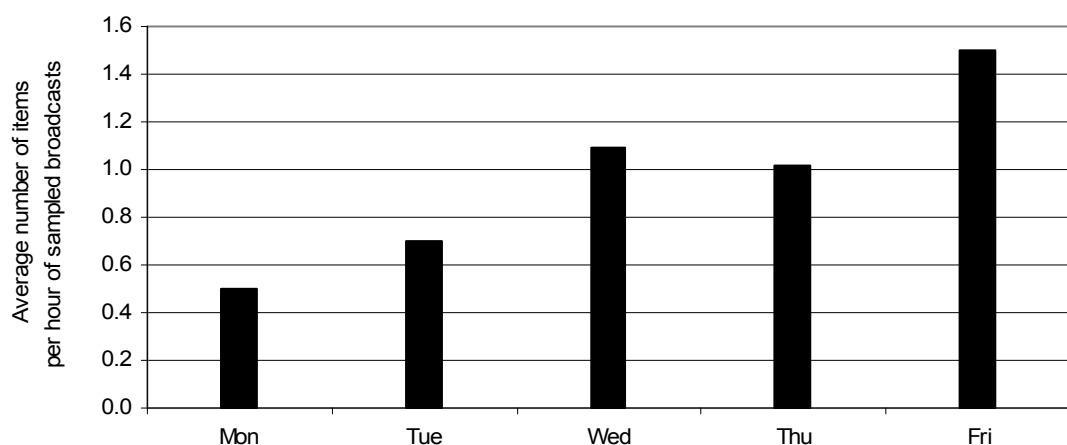


Figure 9: Amount of science coverage on BBC television and radio news by day, excluding weekends.

⁷ The much smaller number of programmes sampled over weekends makes comparison of weekday and weekend science coverage difficult so we consider only Monday to Friday here.

4.4 The amount of science in non-news programming

On average, about 2% of the air time on the channels sampled in our non-news schedule scan was taken up by programmes which highlighted science. As noted above, this should be interpreted as a minimum of BBC output rather than representing total non-news coverage for those weeks. There was great variation between channels (figure 10), ranging from a total of just three hours of programming on BBC Three in eight weeks to an average of about five hours a week on Radio 4 (almost 4% of airtime excluding the overnight transmission of the World Service). Although BBC Four broadcast fewer hours of science programming than either BBC One or BBC Two, because of its shorter on-air time this constitutes a greater proportion (3%) of its total output than those channels.

The BBC designated 2010 as a “Year of Science”. Despite this, we found that the amount of non-news science programming in our sample weeks fell slightly in 2010 (49 hours) compared to 2009 (55 hours) (figure 10). This was due to a drop in science output on BBC Two from 17.5 hours in the sampled weeks in 2009 to half that in 2010, which is accounted for by the inclusion of nearly nine hours of educational programming in the 2009 night time schedules whilst there were no equivalent broadcasts in 2010.

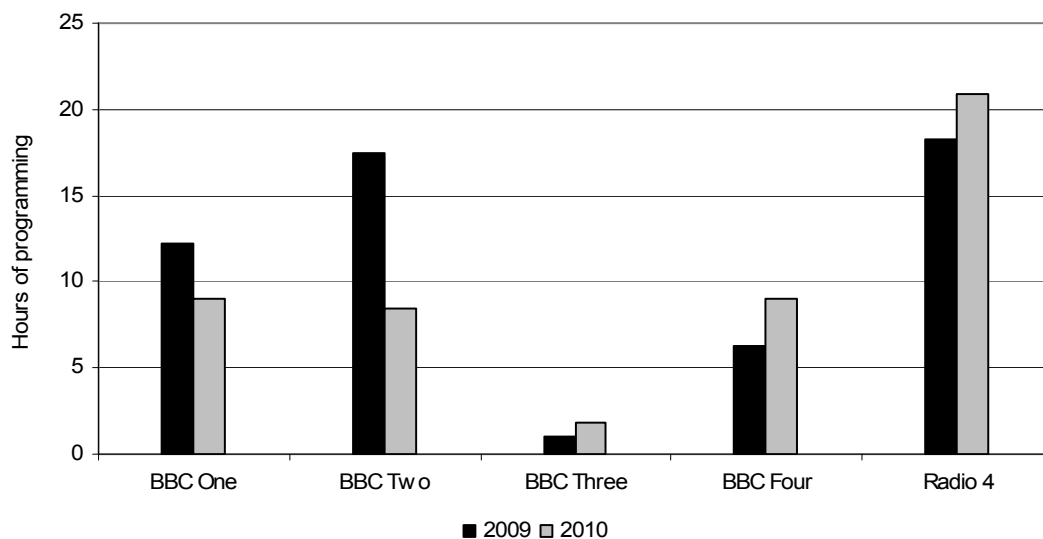


Figure 10: Total hours of BBC non-news programming advertising science content.

On average, the amount of non-news science programming falls steadily through the week, from a peak of three hours a day on Mondays to a low of one hour a day on Saturdays.

BBC One	10 Things You Need to Know	BBC Four cont.	Snow
	Bang Goes The Theory		Space Dogs
	Blue Peter		Swarm: Nature's Incredible Invasions
	Countryfile		The Jet Stream and Us
	Grow Your Own Drugs		The Moon
	Halcyon River Diaries		The Sky at Night
	Jimmy's Food Factory		Winds
	Living with Monkeys		A Brief History of Mathematics
	Museum of Life		A Moment Too Soon
	Panorama	Radio 4	All in the Mind
	Professor Regan's ...		Analysis
	Richard Hammond's Blast Lab		Archive on Four
	Rocket Science		Desert Island Discs
	The Incredible Human Journey		Farming Today
	The One Show		File on 4
	The Politics Show		Frontiers
	Uncovering Our Earliest Ancestor		Home Planet
	Wonders of the Solar System		In Our Time
BBC Two	Blood and Guts: A History of Surgery		In Touch
	Class Clips		Last Word
	Ed and Ocho's Excellent Inventions		Leading Edge
	History Cold Case		Material World
	Horizon		Moments of Genius
	How to Build ...		More or Less
	James May's 20th Century		Nature
	NASA: Triumph & Tragedy		Off the Page
	Richard Hammond's Blast Lab		Saturday Live
	Science Clips Investigates		Saving Species
	Short Circuit		Start the Week
	South Pacific		The Age of the Genome
	The Genius of Design		The Criminal Mind
	The Incredible Human Journey		The Eureka Years
	The Sky at Night		The Food Programme
	The Story of Science		The Greening of the Deserts
BBC Three	Can I Get High Legally?		The Infinite Monkey Cage
	Walking with Beasts		The Media Show
	Walking with Dinosaurs		The Mystery of the Marine Strandings
BBC Four	Atom		The Reith Lectures 2009
	Biology of Dads		The Reith Lectures 2010
	Fossil Detectives		Thinking Allowed
	Horizon		To Err is Human
	Medical Mavericks		Unseen Britain
	Parallel Worlds, Parallel Lives		Woman's Hour

Table 8: Strands, series and one-off BBC non-news programmes covering science.

Nearly all the programmes selected in the schedule scan were either parts of series or were broadcast under regular strands. We found programmes with science content in 73 different series or strands and a further nine one-off programmes (table 8). In about 60% of cases the overall theme of the series or strand was science, but this proportion is likely to be an artefact of our sampling method.

As table 8 demonstrates, science is included in a very wide range of programmes, on Radio 4 in particular. Regular non-science slots such as the Food Programme, Start the Week, the book programme Off the Page, the obituary programme Last Word, and Woman's Hour, all include items on science from time to time. On television, too, science is covered in non-specialist programmes. Our sample of every edition of The One Show broadcast during our sample weeks found that half the programmes included at least one science item and science topics are covered even more frequently on Countryfile (table 9).

	Number of science items	Science items as percentage of total number of items	Total number of programmes sampled	Percentage of programmes sampled which included at least one science item
The One Show	19	13%	27	52%
Blue Peter	3	5%	10	30%
Countryfile	10	17%	7	71%

Table 9: Coverage of science in BBC topical magazine programmes. Percentages in the second column are based on the total number of items for all sampled editions of that programme.

Compared to these programmes, we found that current affairs programmes were relatively unlikely to cover scientific topics. We sampled a full year of BBC One's Panorama and Radio 4's Analysis. Six of the 47 editions (13%) of Panorama covered science topics; whilst two of the 25 editions (8%) of Analysis did so. However, these proportions remain higher than the proportion of news output devoted to science, so these figures could be interpreted as an increased attention to science.

Almost a third of the schedule scan sample were magazine shows (i.e., programmes covering a number of discrete items); over a third were documentaries (i.e., single topic programmes involving on-location recording). Just under a quarter were educational programmes or other programmes aimed at children. The remainder were lectures, radio essays or studio discussions of single topics. (See figure 11.)

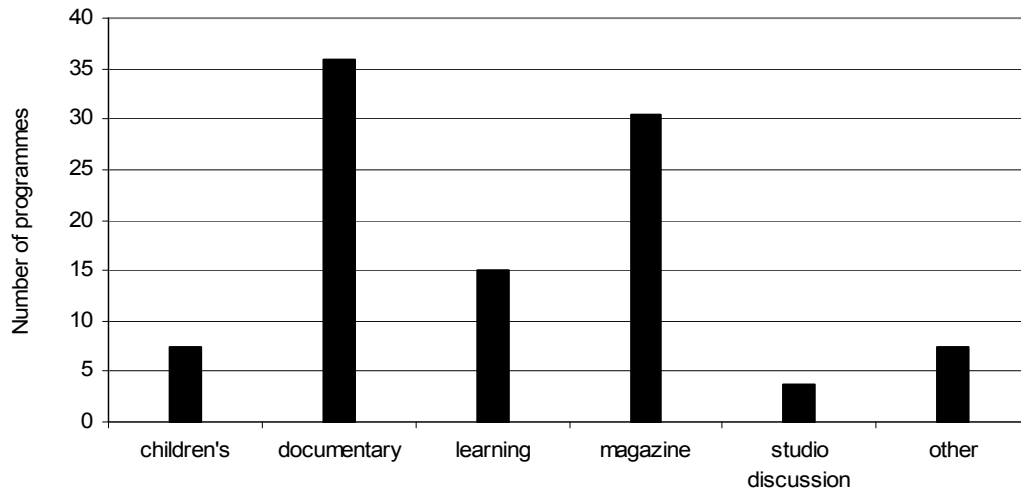


Figure 11: Genre of schedule scan sample of BBC non-news programmes.

5. Positioning of science within outlets

About half the science items in the combined 2009 and 2010 news sample were headlined at the start of the programme, but the items themselves were most often placed in the second half of the programme. Only 8% were the first item in a news bulletin – most of these concerned the long-running swine flu and oil spill stories. Six per cent of science items were placed second in the bulletin.

Of the 15 science items linked from the News Front Page of the BBC website in the 2010 online sample, twelve were linked from the “other stories” side bar rather than the centre of the page. Two of the three items positioned centrally were about the oil spill in the Gulf of Mexico, the third was about a space probe. By contrast, over 40% of the science items on the health front page were positioned in the central part of the page; 12% were the top story on at least one day. Not surprisingly, the majority of science items on the BBC news website had their primary location in the Science & Environment or the Health sections, but a number of science items linked from the sampled sites were located in other news sites (figure 12).

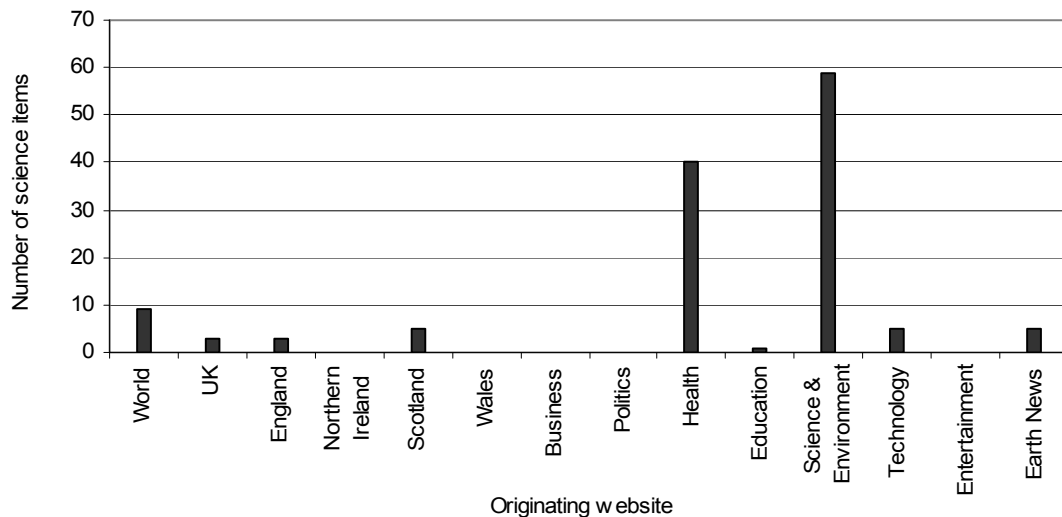


Figure 12: Originating websites for BBC online coverage of science news.

In magazine programmes not exclusively devoted to science, science items were on average positioned third out of four total items. However, almost a fifth of science items were the leading item and science items were positioned second in a further quarter of cases.

6. Subjects covered

6.1 Stories covered in science news

We identified the stories covered in each news item. We found 120 unique science stories covered in the broadcast sample. Despite news reports often being recycled through the course of a day, we found that 74 stories were covered on just one broadcast news outlet, suggesting that science stories judged newsworthy enough to be included in one bulletin are frequently dropped from the news schedules of other bulletins, either in response to other developments or to help construct different programme identities.

During the sample period there were two long-running stories which were frequently reported from a science angle: as noted above, the swine flu pandemic of 2009, and the oil spill in the Gulf of Mexico in 2010. For the purposes of analysis, we considered each of these as a single story although they were, of course, made up of multiple discrete sub-stories. Together, these two stories account for 21% of the items in our broadcast sample. The coverage of all the other stories was sharply time delimited, rarely extending over more than 24 hours. Aside from the oil spill and swine flu, the stories covered by the most (five or six) programmes dealt

with: malarial drug resistance, the “climategate” inquiry, the creation of artificial sperm, research into foetal pain, a rise in childhood diabetes, the overdiagnosis of breast cancer, the reintroduction of beavers into the UK, and a study of cheetah locomotion.

Nearly all (94%) of the stories covered in the 2010 online sample were covered in just one online science item; a quarter were also covered in at least one science item on television or radio. (The latter figure should be taken as a minimum since the relatively long static time for some online articles means that our sample included stories posted in the alternate weeks when we were not sampling television and radio coverage.) Conversely, about half the stories covered on television and radio in 2010 were also covered on the BBC news website.

6.2 Coverage of different scientific fields

Over half the science items in the broadcast news sample concerned medical science (figure 13). The prevalence of medical stories was increased by coverage of the swine flu story in 2009; 69% of our 2009 broadcast news sample was devoted to medical stories compared to 39% of our 2010 sample. We found no news items dealing with mathematics and only 5% of science items on broadcast news covered the physical sciences. Relatively few items dealt with climate science and technology given that a number of inquiries into climate science were published during the 2010 sample period. The relatively high number of stories dealing with engineering and technology was largely due to the oil spill in the Gulf of Mexico. Oil spill items make up 28 of the 49 engineering and technology items. It is worth noting that the small sample of non-BBC science items was dominated by engineering and technology items arising from the oil spill story which made up a third of that sample.

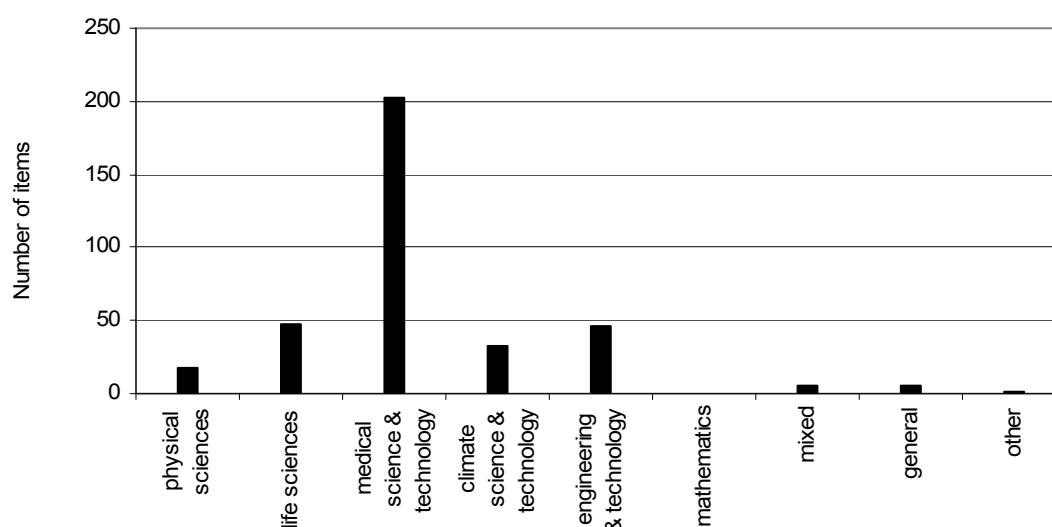


Figure 13: Scientific field covered in BBC broadcast news. See the coding categories in appendix one for how these fields were defined.

The presence of specialist news sections on the BBC websites means that the pattern of coverage is slightly different for online coverage, with a greater proportion of reports dealing with the physical sciences, but medical science is still the most frequently reported field accounting for a third of the items (figure 14). The fifteen science items linked from the News Front Page also consisted of about a third medical stories. Here too, however, a greater number of items dealt with physical sciences than was the case for the broadcast sample. The small numbers make it difficult to draw firm conclusions but this perhaps suggests that the existence of the Science & Environment news website increases the breadth of science coverage on the News Front Page.

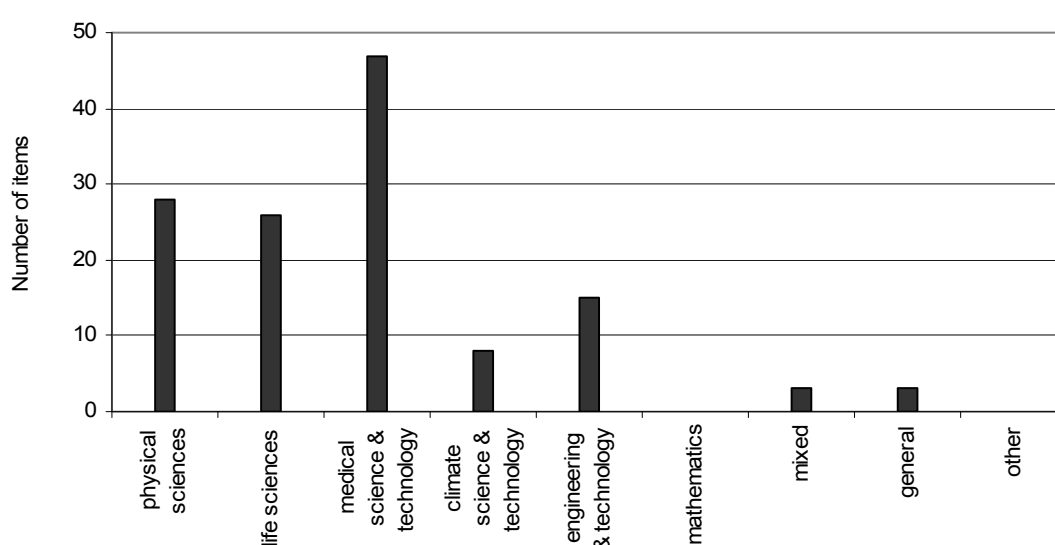


Figure 14: Scientific field covered in BBC News online items.

The dominance of medical stories in the reporting of science in the news is not found in non-news programming (figure 15). A third of items in our schedule scan sample were concerned with life sciences and a fifth with physical sciences. Only about a tenth dealt with medical science, the same as the proportion dealing with engineering and technology. It should be noted that Radio 4's Case Notes – a series of single-topic programmes on medical issues broadcast for about half the year – was off air during all our sample weeks, but this makes little difference to the overall proportion of medical items in the schedule scan sample.

There was some variation in the subjects covered across different programme types, with non-specialist programmes more likely to deal with the life sciences and less likely to deal with physical sciences, whilst the converse was true for science magazine programmes. This was largely due to the presence in our sample of a large number of items from Material World where the proportion of items dealing with the physical sciences exceeds (just) the combined

coverage of life sciences and medical sciences on that programme (see section 9.3 below). Also unlike the news sample, some mathematical topics are covered in non-news programming, though this remains a very small proportion of overall output. Radio 4's More or Less focuses on numbers, but since it scrutinises how numerical claims are used in debates about social policy rather than mathematical knowledge per se, not many items from this programme met our criteria for science items.

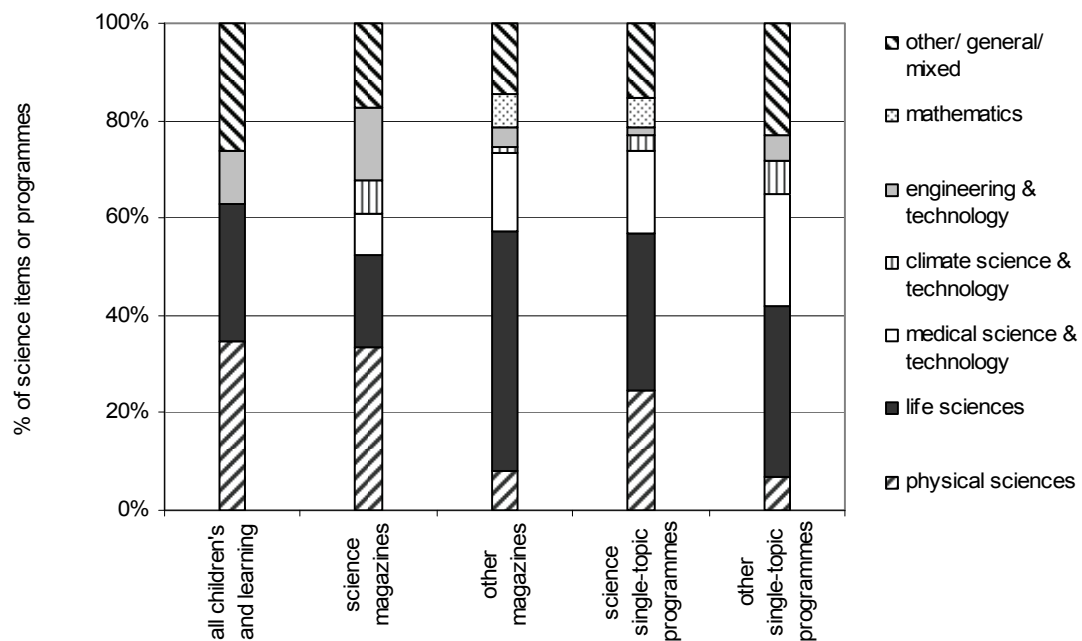


Figure 15: Scientific field covered in BBC non-news programmes.

The most frequently represented scientific field on the /science website was the physical sciences, with about a fifth of topics featured in the main frame “above the fold”, and the same proportion of all item headlines on the page, falling within this subject area (figure 16). The prevalence of items referring to general or mixed scientific fields in figure 16 is due to a large number of items advertising science programmes, such as magazine shows or history of science documentaries, that did not highlight a particular topic for that week’s edition. The majority of the items whose subject was categorised as “other” concerned psychology.

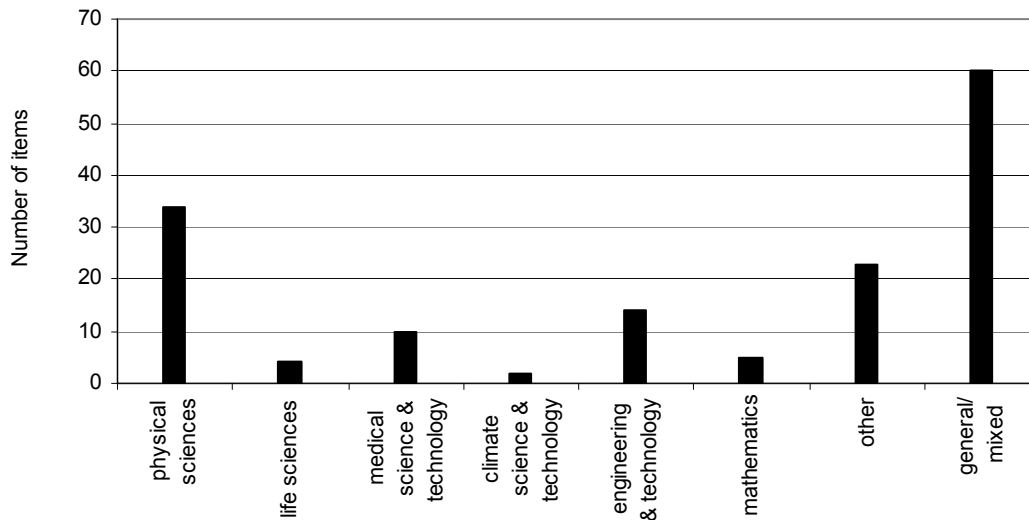


Figure 16: Subjects featured on the /science homepage of the BBC website.

Whilst the main items featured on the /science website changed most days of the week, though less often at the weekends, the main item on the /nature site had a longer static time of about half a week. The main features on the /nature website consist of photographs with a strapline and no further details. The focus is thus on the spectacle of nature rather than the content of the programmes or other parts of the website which are being advertised. The only references to science on the /nature website were in the link to the Earth News site at the bottom of the page. The majority of these links included headlines that either explicitly referred to scientists or a study, or summarised findings contributing to new knowledge about some aspect of the natural world. The Earth News headlines changed either every day or every other day, giving 13 unique items referring to science. Of these, four were about birds, three each about insects and mammals, two about sea creatures and one about plants.

6.3 Story focus

We looked at the different types of event driving the science coverage. Nearly half of BBC broadcast news items were about new research findings. A fifth of items dealt with policy actions or discussions about policy issues. (See figure 17.)

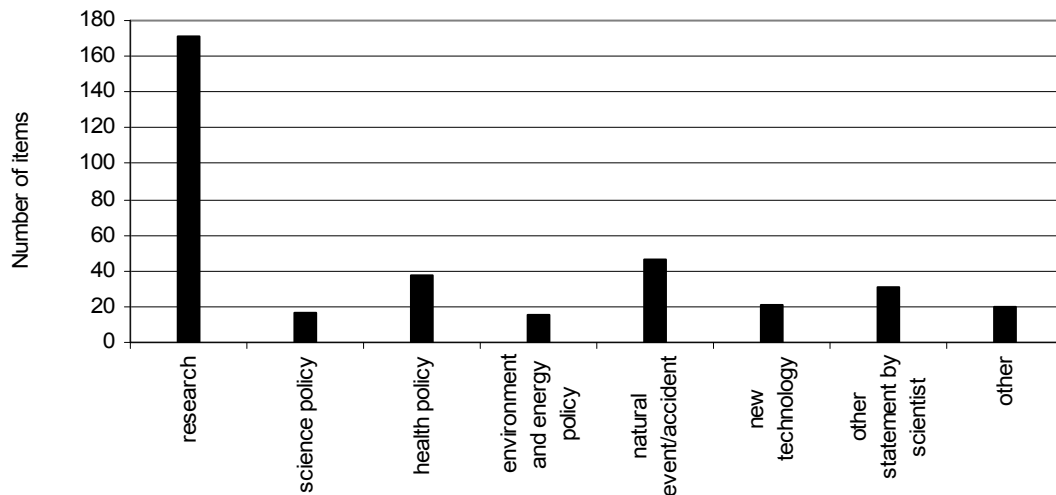


Figure 17: News events triggering science coverage in BBC broadcast news.

The preference for stories about research findings was even more marked in the online news coverage, where two thirds of items focused on stories of this type and only a sixth dealt with policy events (figure 18).

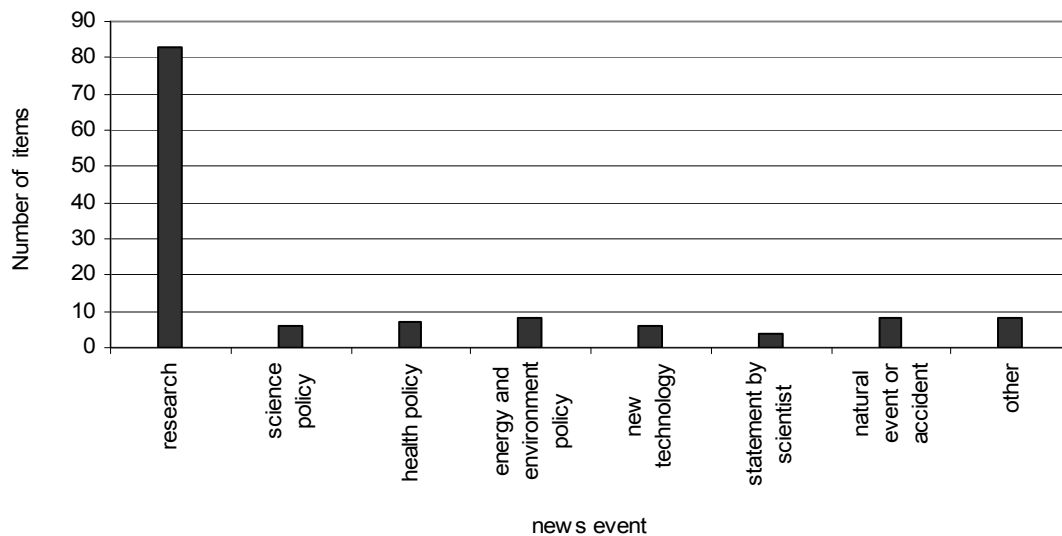


Figure 18: News events triggering science coverage in BBC News online.

Whilst the preference for news stories about research findings results in part from our narrowly-defined criteria for science items, it does demonstrate that news reports relatively infrequently elaborate on the scientific evidence informing policy-making and policy debates. Our sample period included a round of climate negotiations, a meeting to discuss the whaling ban, and legal developments over the badger cull. None of these were reported on the broadcast news in a way that discussed the science involved. Likewise, the majority of the

reporting of the swine flu and oil spill stories either described the unfolding situation or focused on the attendant politics and thus did not qualify in our study as science items.

Research stories are also frequently covered in non-news programming, but the preference for such stories is less pronounced than in news. Excluding children's programming, about a third of non-news science items looked at new research, whilst just over a quarter focused on established science. The history of science was also covered in non-news programmes, with just under a sixth of items having this focus. Only 5% of non-news science items were about policy issues and 2% about new technologies. About a fifth of non-news science items were focused around other events, such as the award of prizes and audience competitions. As would be expected, most children's programming dealt with established science, rather than reporting new research findings, but this was to the exclusion of any discussion about how science related to policy issues.

7. Factual accuracy

We asked our coders to record any factual errors that they noticed whilst coding the sample of science items. The only errors noted were an incorrect journal name in one online news item and a confusion between two different data sets in another. This does not mean there were no other inaccuracies. However, since all the coders have first degrees in science and constituted a scientifically informed and attentive audience, we can reasonably conclude that any inaccuracies that are present are either too subtle to significantly alter the meaning imparted to non-experts or concern the specifics of the stories rather than underlying scientific principles.

Discussions about the accuracy of the media coverage of science often conflate factual errors with disagreements over subjective judgements of emphasis and selection which draw on journalists' perceptions of their audience's level of understanding and interest. These may sometimes be poorly made (we have no evidence for this either way since such a subjective question is beyond the scope of a study such as this), but it is rarely a matter of being right or wrong as the notion of accuracy implies.

8. The BBC's voice of science

8.1 News reporters

The BBC employs a number of specialist correspondents with science-related beats. However, relatively few news items (about a half) are reported by a named correspondent. No items located on the England, Scotland, UK and World sections of the news website had bylines.⁸

Where we were able to establish the beat of the reporter, about two thirds of the broadcast items, and all but one of the online items, were by correspondents with science-related beats (figure 19).⁹ The distribution of reporter specialisms roughly follows the distribution of subject matter. Half the online items where the reporter's beat was known were by a science correspondent (as opposed to other science-related specialisms) compared to only 13% of the broadcast items, whilst 41% of the latter were by health or medicine correspondents.

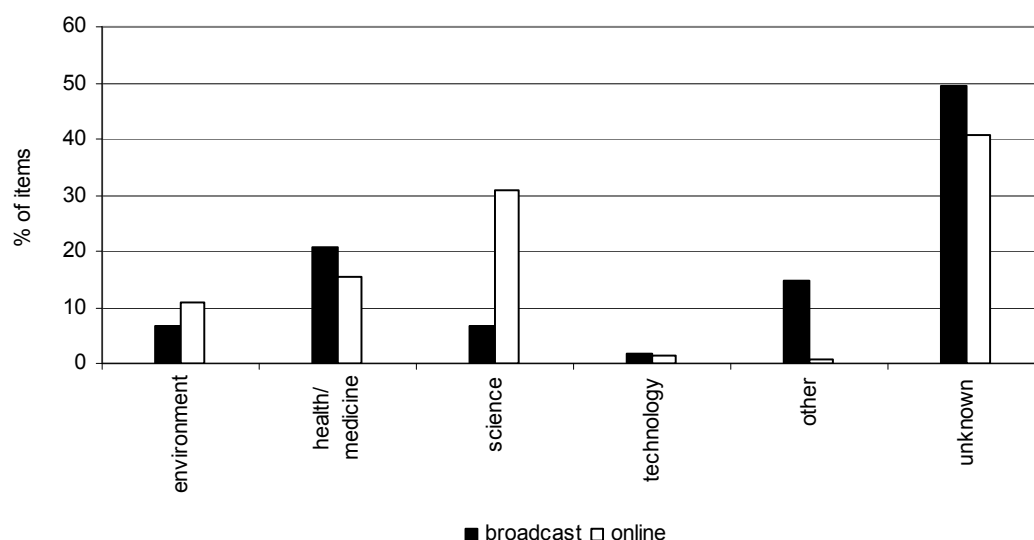


Figure 19: Reporter's beat of BBC broadcast and online news items.

⁸ There were no science items with primary location on the Wales or Northern Ireland websites (see figure 12).

⁹ David Shukman was coded as an environment correspondent since he most often covers environmental stories; his official designation is Environment and Science Correspondent.

8.2 Reporters' blogs

A number of BBC correspondents keep blogs. These offer an opportunity to present a more personalised approach to the issues the reporters cover in their news reports. Blogs therefore have the potential to play a key role in constructing an identity for BBC science output for the online audience. Yet the use of a personal voice to present news also raises potential issues for impartiality. The BBC's Editorial Guidelines give guidance on how to incorporate a personal tone of voice without damaging impartiality.¹⁰

The reporters whose blogs we followed use their blogs for different purposes. Some made the most of the blog format, writing in the first person to contextualise news stories they have reported on (Richard Black) or to offer a more personalised treatment of a story (Fergus Walsh). Other blogs were closer to the style of traditional news journalism and were used to trail upcoming programme items (Susan Watts), to give a summary of a news item or to describe related research (Tom Feilden, Jonathan Amos), or simply to provide a written version of a news story (Tom Feilden). Even in these cases the style tended to be more informal than with online news articles, but we found no evidence that this compromises impartiality.

Reporters can also use their blogs to respond to issues around the accuracy and impartiality of their news reporting. For instance, technology correspondent Rory Cellan-Jones used one blog to respond to a story he had covered about a scientist "infecting" himself with a computer virus (27 May 2010).¹¹ In the blog, Cellan-Jones noted that critics had said the research demonstrated nothing of significance since the chip had been infected prior to implantation. He had included no such comments in his news reports; his BBC One News at Ten report included comments only from the scientist who was making the claims and the only quote from an independent source in the online article referred to the research as "interesting". In his blog, Cellan-Jones accepted that he should have adopted a more sceptical tone and then quoted at some length the scientist's defence of the research. It is worth noting that Sky News also covered this story in one of only two items about scientific research in our four week sample of the 5pm bulletin. As with the BBC One report, the only interviewee in

¹⁰ BBC Editorial Guidelines, <http://www.bbc.co.uk/guidelines/editorialguidelines/page/guidance-blogs-bbc-full>.

¹¹ http://www.bbc.co.uk/blogs/thereporters/rorycellanjones/2010/05/computer_chip_implant.html.

the Sky News report was the scientist making the claims. Neither Channel 4 News nor ITV News at Ten covered the story.

In another blog (which appeared during our research period but did not fall within the sample weeks), Richard Black acknowledged a mistake he had made in an online news article about the response of rice yields to rising temperature (13 Aug 2010). Noting the vitriolic emails about his original report and referring to the various inquiries into the conduct of climate science being published at the time, Black used the blog to make a point about the pressures under which climate scientists work.

However, reporter blogs can also provoke complaints about journalistic standards. One BBC blog which did not fall within our sample but was posted during our research period, was picked up by the Knight Science Journalism Tracker which scrutinises the media coverage of science. In this blog, Tom Feilden, science correspondent for the Today programme, had drawn on a post by science writer Brian Switek without acknowledging the source. Switek pointed out in a comment to Feilden's blog that it was very similar to his own post. The overall angle Feilden took was the same as that of Switek's piece and one sentence which Feilden presented as a quote from one of the academics whose work he was reporting, was almost identical to a sentence Switek had composed himself for his blog.¹² However, Feilden had interviewed the academic, Professor Edward Simpson, in his package for the Today programme. In an update to his now corrected blog, Feilden acknowledged the mistaken attribution in his blog and explained that he had assumed the blog had been written by Professor Simpson.¹³

8.3 Non-news presenters

The wide variety of genres and styles of non-news science programming means that there is also great variation in the type of presenters in such programmes. Although some programmes use regular presenters, programmes specialising in science draw on a range of different presenters; the 64 such programmes in our sample used 53 different presenters. About a fifth of all the non-news programmes in our sample have at least one presenter who is a scientist or has some form of science specialism. Despite a number of programmes in our

¹² Charlie Petit (2010) 'Some readers tell BBC its story looks a very much like one that ran on Smithsonian site' *Knight Science Journalism Tracker* 21 Jul. <http://ksjtracker.mit.edu/2010/07/21/some-readers-tell-bbc-its-story-looks-a-very-much-like-one-that-ran-on-smithsonian-site/>.

¹³ Tom Feilden (2010) 'Dinosaurs even the score' *Tom Feilden's Blog* 20 Jul. http://www.bbc.co.uk/blogs/today/tomfeilden/2010/07/dinosaurs_even_the_score.html

sample dealing with the history of science, no programmes were presented by historians or other non-science academics with relevant expertise; however, non-expert celebrities were used to present science.

In three quarters of programmes, the presenters interacted with contributors and, on television, appeared on screen. By making the interaction with contributors visible (or audible), this form of narration can contribute to the sense of truthfulness conveyed by the programme. Disembodied voiceover narrations, on the other hand, make a different sort of truth claim by signalling an all-knowing “voice of God”. Thus voiceover narrations can reinforce the impression that objective, certain knowledge is being presented since statements do not appear to be “authored” in the same way as they do when spoken by an on-screen or interactive presenter. Despite a shift towards on-screen presenters in television documentaries, voiceover narration is still deployed in many science documentaries. About a fifth of our sample (almost half the television single-topic programmes) relied entirely on a voiceover for narration, whilst another 4% of programmes used a mix of voiceover narration and interactive presenters.

9. Genre characteristics

9.1 Characteristics of science news

We found little evidence of BBC news reports taking a light-hearted approach to science and interviewers rarely joked or laughed with interviewees. Equally rare were items taking an investigative approach. We also found no instances of interviewers questioning their interviewees in an aggressive or dismissive manner. Half the items adopted a neutral tone, but our coders judged about a third to have an overall negative tone (i.e., they were reporting bad news) and about a sixth to have a positive tone (good news stories). The tone of a report is a highly subjective measure which is difficult to apply consistently but this finding gives a rough idea of the emotional register deployed in science items. In the online sample (which was all coded by the project leader and therefore does not raise the same issues about intercoder consistency), we found just under a fifth of items adopted a positive tone and an equal proportion adopted a negative tone. For this sample we also looked at how many articles mentioned benefits accruing from the science or technology being discussed and how many mentioned risks posed by the science or technology. We found that whilst 42% mentioned benefits, only 10% mentioned risks. All but one of the 13 online items mentioning risks also mentioned benefits. This suggests that, whilst the language of news reporting about

science is largely neutral in tone, the content of reports is more likely to mention the positive implications of science than negative implications.

For the online news items we also examined the extent to which reports explained the scientific concepts under discussion or the ideas informing the research, rather than merely describing the findings. Almost half the sample included more than one sentence of developed explanation. However, a third had only minimal explanation (i.e., less than a sentence) and 28% had no explanation of the science at all. In some cases, such as science policy stories or reports about scientists' actions which were unconnected to their research, this was because the story did not concern the concepts of science. However, explanation of the science was always relevant in those stories reporting research findings. Of the 83 online items about research, 28 had only minimal explanation and five had no explanation. Thus two fifths of online items about research had little or no explanation. Furthermore, although nearly all 130 online items included at least one picture, only 15 used still photographs or other graphics to aid the explanation of the science being reported.

Only 13 broadcast news items explicitly directed viewers to the BBC website for further information about science items. Although the page frames of online news items included automatically generated links to other BBC reports on similar topics, only 21 items (16%) included links to other BBC reports within the body of the text. Twenty two of the online news items included embedded videos and seven included embedded sound files. Almost 90% of online news items included at least one link to the source of the story, such as the laboratory where the research was carried out or the journal where it was published, but 70 items (54%) included no links to other external sources. This means that in over half of online news items the reader is not offered opportunities to find further information relevant to a science story other than that provided by the source.

9.2 Blog characteristics

Blogs offer the opportunity of linking to other pages and websites which are more directly relevant to the point being made than the links generated in the frame of a news page. Some reporters' blogs made use of this, particularly those of Jonathan Amos and Richard Black, whilst those blogs which most closely followed the traditional news style did not. Only one of Tom Feilden's blogs contained any in-text links to sites other than the Today programme. By enabling journalists to "show their working", blogs can also make visible the process of testing evidence and sources which is required for duly accurate reporting. For example, journalist-bloggers may post longer quotes from sources than the edited versions included in

broadcast reports, include links to other sources of information that the journalist has used to build their story, or track unfolding stories (as with the *Guardian*'s Science Story Tracker experiment¹⁴). However, we found few examples of this type of usage in the BBC blogs we looked at.

Like the rest of the online news, blogs were more likely to mention benefits accruing from scientific research than risks (eleven of the 27 unique postings cited benefits compared to just two mentioning risks). Similarly, only two blogs had a negative tone overall, whilst eleven were positive with the remainder neutral. Thus in general, the blogs located science within good-news stories where science provides benefits to society and is rarely the source of any risks.

Blogs can facilitate interaction with audiences and provide an opportunity for audience members to interact with each other. As a crude measure of audience interaction, we recorded the number of comments of the last version of each blog downloaded during the sample weeks (all had been posted at least two days earlier). (See figure 20.)

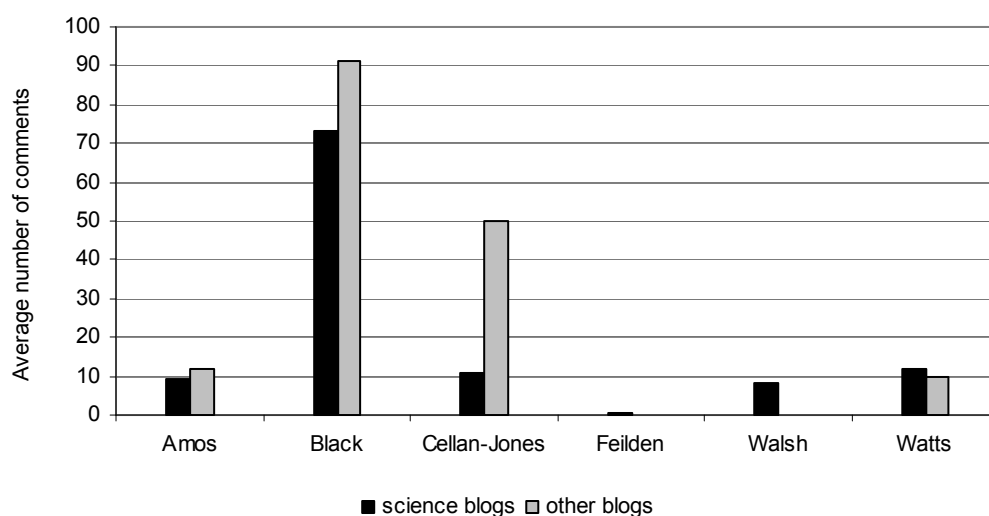


Figure 20: Average number of comments per blog.

On average, blogs coded as science items attracted only 19 comments compared to 52 for other blogs in the sample. Of the five science blogs attracting more than 19 comments, two concerned the climate science inquiry, one was about a space rocket, one about overfishing and one about the impact of the oil spill on wildlife. Thus, as one would expect, science-related issues that were already the subject of public campaigns were likely to attract the most audience comment.

¹⁴ <http://www.guardian.co.uk/science/series/story-trackers>.

Those blogs by reporters with science beats attracted the fewest comments and those by reporters with other beats attracted the most comments when not covering science despite the science blogosphere in general being very active. We note that the BBC does not currently use comment threads which allow readers to follow specific debates and which may help foster discussion.

9.3 Genre diversity in non-news science strands

As noted above, science is treated in a wide range of non-news programmes which vary greatly in genre, style and target audience. Non-news programmes are more likely than news programmes to take a light-hearted approach to science. About a tenth of programmes overall, and a third of children's programmes, were light-hearted and few programmes were negative in tone. Analysis and Panorama, when they covered science, continued the investigative approach of their other coverage, but specialist science programmes almost never challenged or interrogated scientific claims. To give a sense of the approach these programmes did take, we here give a brief overview of the BBC's three most prominent science strands: Radio 4's Material World, BBC Two's Horizon and BBC One's Bang Goes the Theory.

i) Material World

Radio 4's Material World is a long-running science magazine show broadcast once a week, with a repeat a few days later, every week of the year. The half hour programmes consist of studio discussions about topical science stories, typically three or four per episode. Presenter Quentin Cooper prompts his guests for further information, revealing how scientists solve the problems they encounter. The emphasis is on facilitating clear explanation and the style is humorous and lively, yet without implying a light-hearted or irreverent attitude towards the science being discussed. Contributors to the programme nearly always speak in succession, responding to Quentin Cooper's requests for further information, rather than debating points with each other. Over half of items in our year-long sample involved only one interviewee and less than 7% involved more than two interviewees.

The programme is largely a platform for scientists with novel developments to report or who are experts on some aspect of science or engineering currently in the news. About half the items in our sample dealt with current research. There was little discussion of policy issues but about a quarter of items dealt with other topical events, such as science prizes or natural disasters. In contrast to the non-news sample as a whole, and also to the news sample, the most frequently covered topics in Material World are those relating to the physical sciences,

which account for about a third of all items and were covered in three quarters of the programmes sampled for this strand (figure 21).

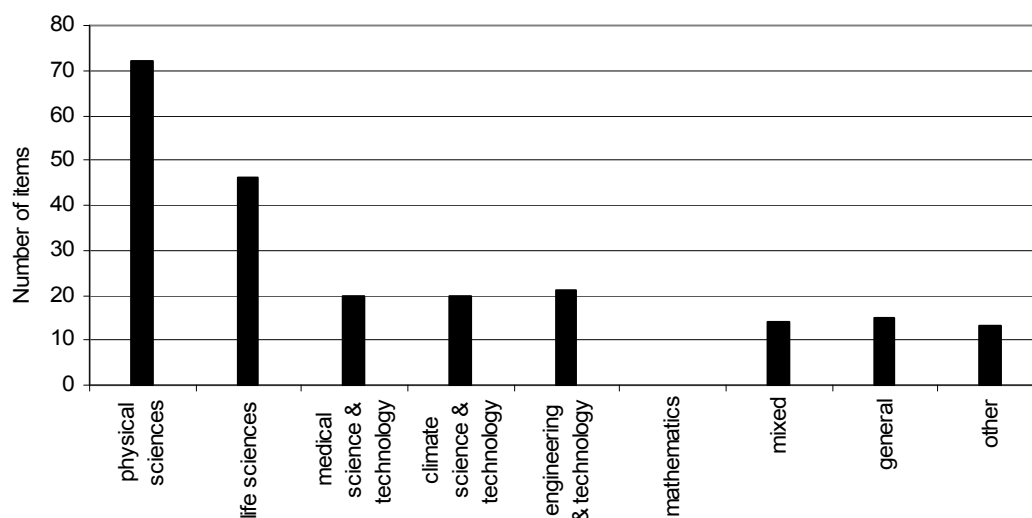


Figure 21: Subjects covered in items on Radio 4's Material World.

Whilst largely based on studio discussions, the programme does sometimes make use of alternative formats. An example is the show's citizen science project, broadcast over several episodes in 2010, which explored the process of designing and conducting systematic investigations of natural phenomena. Listeners were invited to send in proposals for a scientific study and scientists then visited the short-listed entrants in their homes to discuss their project ideas with them and to help work these up into actual experiments. The on-location recording and conversational approach of these items offered a contrast to the more directed discussions of the studio interviews with Quentin Cooper.

Uncertainties relating to the science or technology under discussion were referred to in about two fifths of the Material World items sampled. In items dealing with current research, a fifth of contributors commented on the limits of the science or technology, whilst only one contributor put forward a more fundamental challenge to the research under discussion. Taken as a whole, then, the strand portrays science as evolving – technical obstacles and uncertainties are discussed, and so the path of science and technology is shown not to be smooth – but in individual items the tentative nature of science is often left implicit.

ii) Horizon

Horizon is the BBC's flagship science documentary strand. It was first broadcast as a magazine programme when BBC Two was launched in 1964 but soon switched to the

documentary format it uses today. Programmes within the strand are quite diverse, both in terms of subject matter and style. For example, some episodes make use of a presenter, others rely on a voiceover narration, and yet others use both a presenter and a voiceover. The strand covers a range of different topics, but with less emphasis on the physical sciences than is the case in *Material World*. Of the 19 episodes in our sample, four dealt with the physical or mathematical sciences (all on topics concerning theoretical physics) and eleven dealt with life sciences or medical sciences. Almost half of all contributors are scientists but the programmes also make frequent use of lay contributors. In general, the interviewees are not heard being questioned by an interviewer and they do not debate issues with each other, rather, as is common in documentaries on all subjects, appearing as a succession of isolated “talking heads”. The discussions between scientists which make up a significant part of scientific activity are rarely depicted in *Horizon* programmes.

In addressing its non-expert audience, the strand makes extensive use of narrative to drive programmes forward, frequently adopting a structure which proceeds by posing a number of problems in succession and moving on to the next problem as a solution to the previous one is found. Through this problem-resolution structure, often coupled with a voiceover narration that marshals the comments of the programme contributors into a coherent story, the programmes typically convey a sense of closure – of certain knowledge having been obtained – despite the uncertainties raised through the course of the films.

In recent years, part of *Horizon*’s strategy to appeal to the audience’s interests has been to consider science in contexts of wider social relevance. This creates a tension between the programme’s preoccupation with science and other bodies of knowledge. The episode “How Violent Are You?” (12 May 2009), presented by former MP Michael Portillo, provides a good example of this. The subject of violence is clearly of relevance to the social sciences and cultural theory as well as to the natural sciences. Unsurprisingly, the focus of the *Horizon* film was on scientific explanation, but as a consequence the programme did not acknowledge the alternative understandings of violence which are debated in other fields nor did it examine the assumptions on which the scientific approach is based.

iii) *Bang Goes the Theory*

BBC One's science magazine show *Bang Goes the Theory*, co-produced with the Open University, is billed as a programme aimed at “putting science to the test”. The testing referred to aims at explaining natural phenomena or how technologies work, rather than challenging, or critically examining, the claims of science. In keeping with this aim, a prominent part of the show involves demonstrations of phenomena or carrying out experiments to help explain the relevant scientific concepts. Each programme typically consists of four or five separate items, some filmed on location and others based in the studio.

The programme largely covers topics within the physical and engineering sciences (figure 22) with the social relevance of the topics highlighted frequently. The life sciences were also covered in our sample of the programme, but medical science was rarely included. Over two thirds of items focused on established science rather than foregrounding the latest research findings. However, the show has itself made a notable contribution to scientific inquiry, working with scientists to conduct experiments testing claims about brain training. The results were broadcast in a special edition on 21 April 2010 and published in the journal *Nature*.

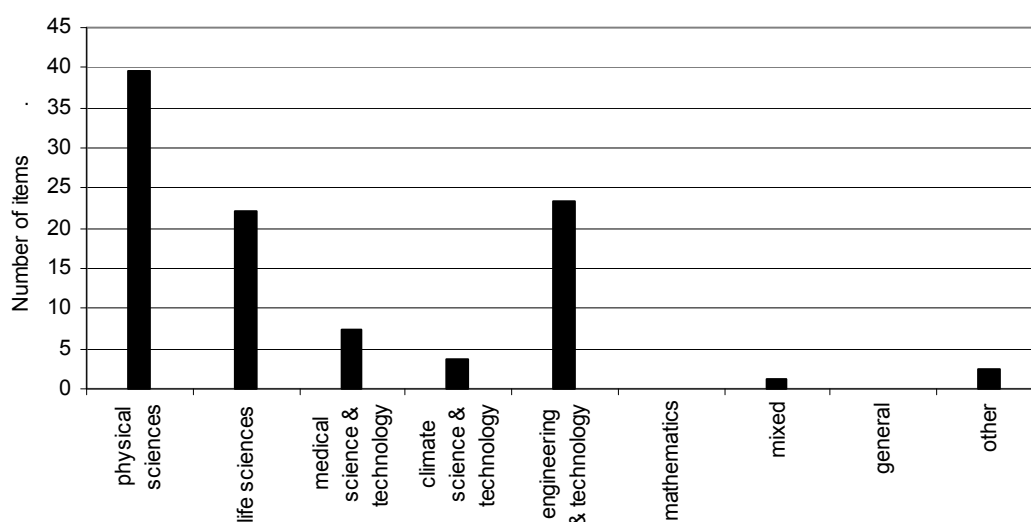


Figure 22: Subjects covered in items on BBC One's *Bang Goes the Theory*.

Bang Goes the Theory has a lively and positive tone, with frequent references to “awesome” events coming next and many expressions of enthusiasm on the part of the presenters. Appeals are made for audience participation, either through the inclusion of members of the public on camera, references to things the audience can try at home, or opportunities for members of the audience to talk to presenters online or at roadshows.

The show has three main presenters who chat to each other and take on the task of explaining the science. In addition, each programme also features an item presented by Yan Wong, who has a PhD in mathematical biology. “Dr Yan”, as he is always called, is rarely portrayed alongside the other presenters, except in promotional materials, emphasising his different role. Over a third of items have no other contributors and another third have only one other contributor. Where an item has more than one contributor, these are usually members of the audience or passers-by watching, and sometimes taking part in, a demonstration. Thus, although a quarter of contributors are scientists, over a half of contributors are not designated as having any specialist expertise. Contributors rarely discuss the limitations of scientific claims (such comments occurred in just 6% of the items in our sample) and no contributors in our sample raised more fundamental questions about the science being discussed.

Bang Goes the Theory does not often cover controversy – just three of the 81 items in our sample alluded to controversy. When it does do so, the items tend to adopt a dramatic approach. For instance, an interview with geneticist Craig Venter (27 July 2009) presented him as a highly controversial figure. A dramatic build up led to the “reveal” of who the interview would be with and the interview itself took place at a secret location in the middle of the ocean. Because the interview “had” to be conducted on a boat in the middle of nowhere, no alternative point of view could be introduced. The scientific and ethical issues were alluded to rather than directly addressed.

9.4 Stereotyping

Across all platforms and genres we found little evidence of stereotyped visual representations of scientists. In news items, shots of people in white coats or of labs filled with test tubes and bubbling flasks tend to be avoided. However, other visual clichés are used. Online items make extensive use of stock photographs and non-news programmes sometimes use recurring visual motifs which can have the effect of decontextualising the scientists who appear in the programmes. Thus three of the four Horizon programmes in our sample dealing with the physical or mathematical sciences depicted individual scientists alone in empty, dark or misty locations or pictured them using high- or low-angle shots, fish eye lenses or other effects which suggest strangeness or a distance from the ordinary world (figure 23). The other episode dealing with physical science opened with similar shots (in the same barn-like building as one of the other films) even though the bulk of the programme used realistic visuals showing actor Alan Davies meeting various experts in everyday environments or their places of work as he attempted to measure the length of a piece of string.



‘Who’s Afraid of a Big Black Hole?’ (3 Nov 2009)



‘To Infinity and Beyond’ (10 Feb 2010)



‘Is Everything We Know About The Universe Wrong?’ (9 Mar 2010)



‘How Long Is a Piece of String?’ (17 Nov 2009)

Figure 23: Frames from BBC Two Horizon programmes about physics and mathematics.

10. The distribution of expertise

10.1 Expertise of news contributors

A key question regarding the impartiality of science coverage concerns who is given voice in news reports, and in particular what authority and expertise are attributed to them. We define news participants as all those who are referred to in news reports other than the journalists and presenters presenting the items. We define a contributor as a news participant who makes any sort of linguistic utterance within a broadcast report or who is directly quoted in an online report.¹⁵ Our broadcast sample included appearances by 300 different named contributors and our online news sample included 247 different named contributors. Overall, only fourteen named individuals appeared as contributors in items about more than one story. Likewise, there was little overlap between non-news programming and news contributors – for instance,

¹⁵ For the online sample, this can include institutional statements.

on only four occasions did non-news presenters appear as news contributors. However, we cannot conclude from this that journalists do not regularly return to the same sources in multiple stories since this may occur over longer timescales than is represented by the sample studied here.

One important factor helping audiences to weigh up how reliable and well-informed a claim may be is the nature of the expertise on which a news contributor draws. On television, news contributors are usually introduced with on-screen credits which give name and title and the contributor's institutional affiliation, with the reporter cueing the contributor's speech through phrases such as "scientists have found" and "experts say". In both television and radio news, the contributor's disciplinary background is not usually specified. It is therefore often difficult to judge whether a contributor is speaking on a topic they have studied in depth, whether they are expressing a view based on anecdotal knowledge, or whether they are speaking in a different sort of professional capacity (for instance, as a public relations officer for a research organisation or a clinician whose patients may be affected by a finding). In roughly a third of broadcast items where scientific expertise was implied through the editing – as, for example, when the item cuts to an interviewee directly after the reporter says "researchers have found" – this expertise was not made explicit in the verbal content of the report. Expertise was explicitly indicated in a larger majority of online news items.

Including those news contributors for whom the expertise was implied but not explicitly stated, almost a half of named contributors in broadcast news items, and almost two thirds of named contributors in online items, were presented within the reports as scientific experts (figure 24). The proportion of scientific contributors rises in stories about research findings. Other forms of professional expertise come from politicians, spokespeople for charities and representatives of industry, together accounting for about a third of contributors in broadcast news items and a quarter in online news.

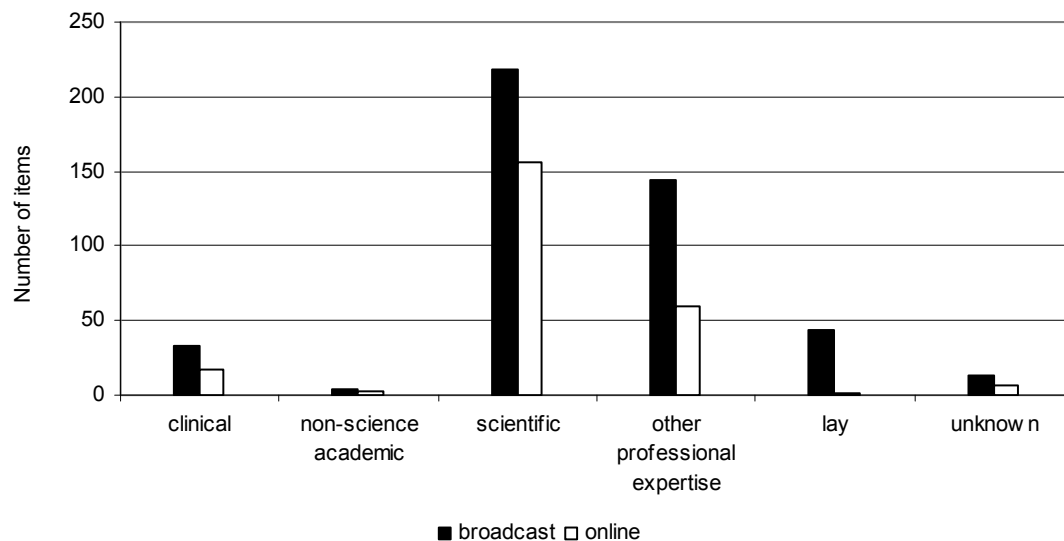


Figure 24: Expertise of named contributors in BBC broadcast news science items. Medical staff who were not indicated as being involved in research or given the title of professor were designated as having ‘clinical’ expertise. The category ‘other professional expertise’ encompasses all contributors appearing in a professional capacity who were not implied to have scientific, non-science academic or clinical expertise.

Less than 10% of broadcast items included comment from those presented as having no specialist professional knowledge of relevance to the issue, although the proportion doubles if unnamed contributors are included. Radio 1’s Newsbeat bulletins were an exception here, relying predominantly on lay voices. Only one online report included direct comment from someone presented as having no professional expertise. On average lay contributors speak for less time than those with professional expertise. It is possible that the BBC’s overall coverage may have included additional reports dealing with similar topics, such as health issues, which included lay contributors but did not satisfy our criteria for a science item. We cannot therefore conclude that lay contributors are rarely heard speaking about topics of relevance to science; however, our sample does show that lay voices are infrequently positioned alongside scientific voices. Three quarters of the lay contributor appearances in broadcast news occur in medical stories. Even in these items, however, about an equal number of items include comment from other professionals (such as spokespeople from medical charities or patient groups) and clinicians, as from lay contributors, whilst three times as many include comment from scientists. Critics of the media coverage of science often complain that news reports of medical issues are overly-reliant on personal anecdote. For the BBC, this would not appear to be the case, especially for its online reporting where the lay voice is almost entirely absent even in medical science stories. It is also worth noting that, whilst lay comment may add little to many science news reports, claims by scientific experts can enfold value judgements and assumptions – for instance, about how a new technology may be received – in which the scientists quoted have no greater expertise than the general public.

Academics working in the humanities and social sciences rarely appeared as contributors in our sample of science news items. Sociologists of science, ethicists, philosophers of science, science policy scholars, and historians of science all have expertise on either the nature of science or the relationship between science and society. However, only four broadcast items and two online items (covering just four different stories altogether) included comment from non-science academics.

The use of the titles “Dr” and “Professor” can imply expertise on the part of a contributor. About a quarter of contributors were referred to as Professor. About a fifth of contributors were referred to as Dr in broadcast items and a little over a quarter in online items. We noted seven cases where contributors referred to as Dr or Professor in one broadcast news item, were not given a title in another item; and two further items where they were referred to by their honorary titles. Whilst this latter designates social status, it does not imply expertise in the same way that Dr and Professor do. In these cases, television – having the advantage of on-screen titles – used a title more often than radio, but titles are also used on radio and are sometimes not used on television news, so the variation cannot be reduced to the constraints of different media.

Just as a contributor’s expertise is often not made explicit, in broadcast reports about new research there is also often no explicit reference to whether or not a particular contributor was involved in the research being reported. Whereas online reports often refer to someone as “lead author” or “co-author” of the research, this formulation tends not to be used so frequently in broadcast items. Both this and the lack of information about expertise may make it difficult for viewers or listeners to assess the reliability of claims being made. It is also often difficult to judge who is speaking from an interested platform, such as a lobby group or an organisation funding research, and who is in a position to offer an independent assessment of a claim.

10.2 Institutional affiliation of news contributors

The institutional affiliation of a contributor can help establish how trustworthy or reliable their claims may be. Surveys have found that the public highly trusts scientists from universities and charities but is less trusting of scientists from industry or those seen as affiliated to government.¹⁶

We found that news contributors were twice as likely to be affiliated to universities as any other type of organisations (figure 25). Contributors attached to universities appeared in about a quarter of all broadcast news items, whilst about 15% of broadcast items included comment from representatives of charities or NGOs and a similar proportion included comment from representatives of industry and commercial organisations. For items about research stories, the proportion of contributors from universities rises a little further at the expense of contributors from government and industry.

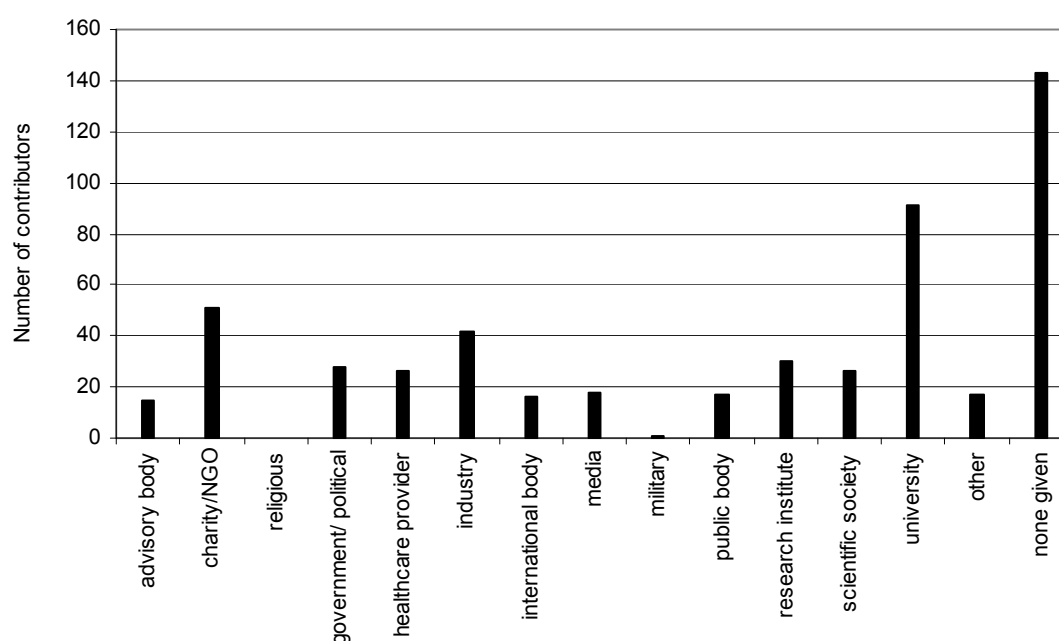


Figure 25: Institutional affiliation of contributors in BBC broadcast news science items. See the coding frame categories in appendix one for how institutional categories were defined.

In online news the pattern is similar, with over half of items including direct quotes from those attached to universities, a quarter of items including direct quotes from those at charities or NGOs, and a fifth including direct quotes from representatives of industry and commercial

¹⁶ MORI/DTI (2005) *Science in Society*. http://www.ipsos-mori.com/Assets/Docs/Polls/Final_OSTreport_051110.PDF.

organisations. For the online sample, we also compared the institutional affiliations of contributors quoted directly with those referred to or paraphrased (figure 26). Contributors quoted directly were more likely to belong to scientific institutions or charities, and less likely to belong to government or industry, than those who were not quoted directly. As with broadcast news, in online items about research stories the proportion of quoted contributors belonging to universities and research institutions rises further, from 36% to 48%, with the proportion from charities and NGOs remaining at 16%.

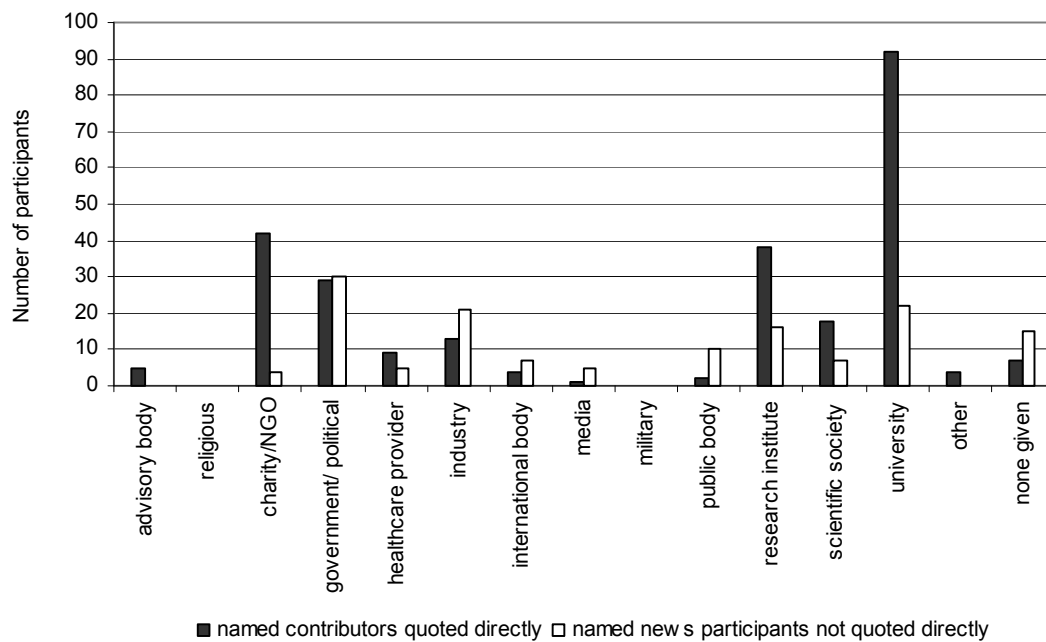


Figure 26: Institutional affiliation of news participants in BBC News online science items.

Only seven institutions were represented in items about at least five different stories – the UK government, the University of Oxford, University College London, Imperial College London, the University of Edinburgh, the Royal College of Obstetricians and Gynaecologists, and the British Heart Foundation. The presence of the British Heart Foundation in this list, despite not appearing in any broadcast items, hints at the reliance on a small number of medical charities for comment in online reporting of particular types of medical stories. The numbers are small and therefore may not indicate a trend, but all but one of the six online items about heart disease included a comment from the British Heart Foundation, as did one additional item; all three online items about cancer included a comment from Cancer Research UK; and both online items about dementia included comment from both the Alzheimer’s Research Trust and the Alzheimer’s Society.

The relative lack of direct comment from the UK government (less than 2% of items) once again reveals a separation between discussion of the scientific dimension of stories and the reporting of political developments. Five broadcast items included representatives from the UK government, whilst two included representatives of the Scottish government. No broadcast contributors were given as affiliated to the Welsh or Northern Ireland assemblies. One online item referred to the Scottish government and two to the Welsh assembly; only one of these references included a direct quote. None of the contributors identified as chief scientific advisers were advisers appointed to the devolved UK governments.

Over 80% of the university affiliations for contributors to television and radio news were to universities in the UK. However, this UK focus was less pronounced in online news, where about half of the university affiliations were to universities in the UK, a fifth to those in the US and a third elsewhere. Of the 35 universities given as the affiliation for contributors to broadcast items, 22 were in England and one in Scotland (figure 27). Similarly, of the 57 universities given as the affiliation for contributors quoted directly in the online items, 22 were in England and five in Scotland. In addition, five English universities, two Scottish universities and one Welsh university were referred to by name in the online reports without including a direct quote from a member of the university. Of the 20 online items referring to Scottish universities, five had a primary location on the Scotland website. No contributors were identified as belonging to Northern Irish universities in either broadcast or online items, nor were any Northern Irish universities named without including quotes in the online reports. However, it should be noted that there are many more universities in England than in the other UK nations and all but four of the twenty Russell Group universities are located in England.

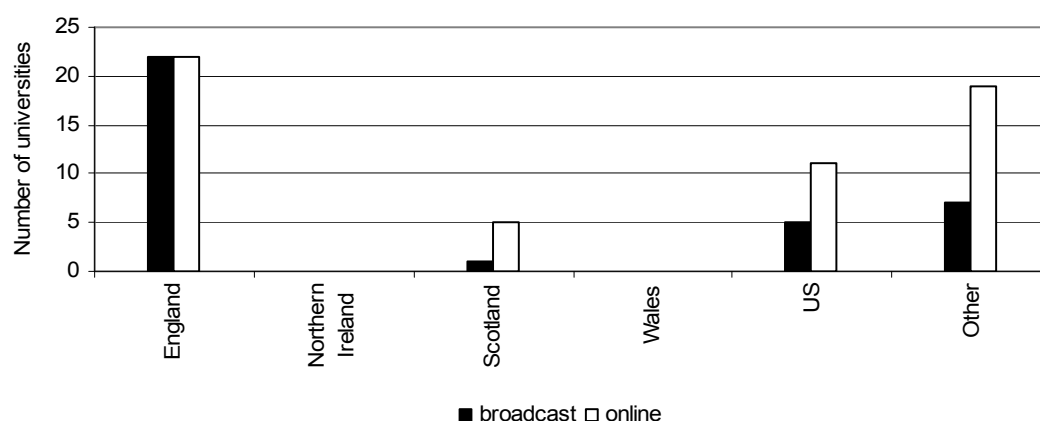


Figure 27: Location of universities given as the institutional affiliation of contributors in BBC broadcast and online science news. This chart counts each university once only for each sample.

10.3 Contributors to non-news science programming

The distribution of expertise across non-news programmes was broadly similar to that on news programmes. We again did not find any evidence of over-reliance on a few contributors. Across the whole non-news sample, we found that, excluding presenters, only 73 people (4% of all named contributors) appeared in two or more different programmes. Science items in magazine programmes typically draw on two different contributors. Single topic programmes have on average ten contributors per programme. No-one appeared in more than four programmes, or in more than three different strands or series. A quarter of contributors to specialist science programmes are introduced with the title Professor, the same as the proportion in news items, compared to 15% in science items on non-science magazine programmes and 8% on other non-science programmes. The majority of contributors on all programme types are given no title.

Contributors to non-news programmes represented over five hundred different institutions. However, almost half of all contributors were given no institutional affiliation – a figure boosted by, but not entirely attributable to, the presence in our sample of several non-educational children's programmes. Perhaps surprisingly, single-topic science programmes (documentaries, lectures, etc.) were less likely to give contributors' institutional affiliations than were science magazine programmes. Unsurprisingly, general programmes drew on contributors from a more diverse range of institutions than did science specialist programmes. Almost a third of all named institutions in the non-news sample as a whole were universities (figure 28).

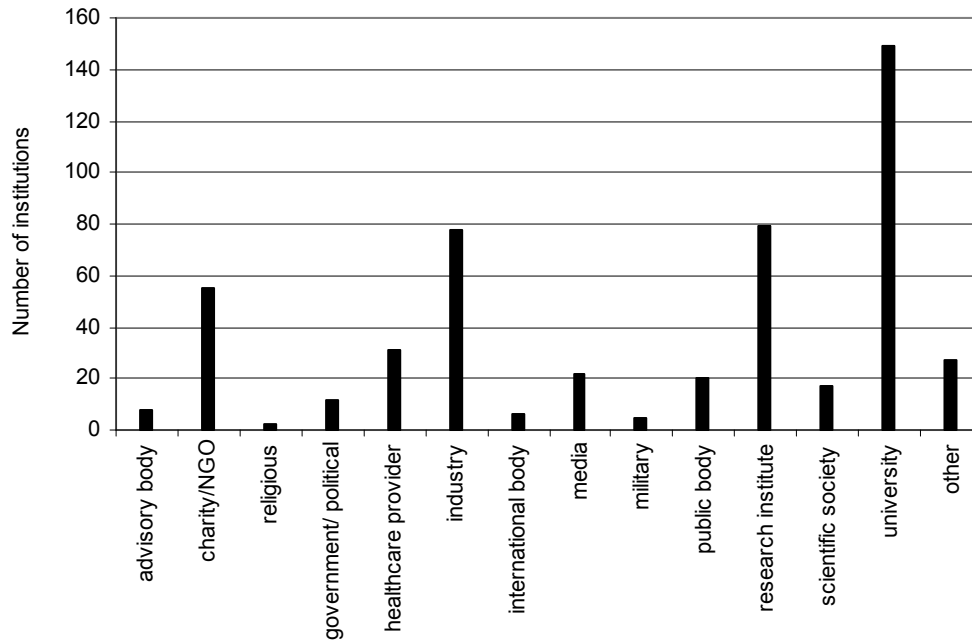


Figure 28: Institutions represented by contributors in BBC non-news science items.
This chart counts each institution once only.

Three quarters of institutions were represented in just one programme but four institutions were represented in over twenty programmes each (table 10). These four institutions are also, with the London School of Economics, the highest scoring UK universities in the Research Assessment Exercise and other university league tables.¹⁷ Despite its relative absence from news reporting, the most frequently represented institution in non-news programming was the University of Cambridge, members of which appeared in 11% of the whole non-news sample.

¹⁷ E.g., *Complete University Guide*, <http://www.thecompleteuniversityguide.co.uk/single.htm?ipg=8726>; *World University Rankings*, <http://www.timeshighereducation.co.uk/world-university-rankings/2010-2011/europe.html>.

	Number of programmes represented in	Percentage of programmes represented in
University of Cambridge	32	11
University of Oxford	25	8
University College London	25	8
Imperial College London	22	7
University of Bristol	14	5
Natural History Museum	13	4
NASA	13	4
King's College London	12	4
BBC	9	3
University of Manchester	9	3

Table 10: The ten most frequently represented institutions in non-news programmes with science content.

At one level, the UK-focus was less pronounced than in the news, with half the universities represented being UK institutions and a third US (figure 29). However, because UK universities were represented more frequently, 31% of all contributor affiliations were to UK universities, with only 10% to US universities and only 3% to universities in other countries. As with news items, contributors from UK universities were most likely to be based at universities in England. Scottish universities were represented in 16 programmes, Northern Irish universities in three programmes, and Welsh universities in eight programmes, compared to 269 programmes which included contributors from English universities.

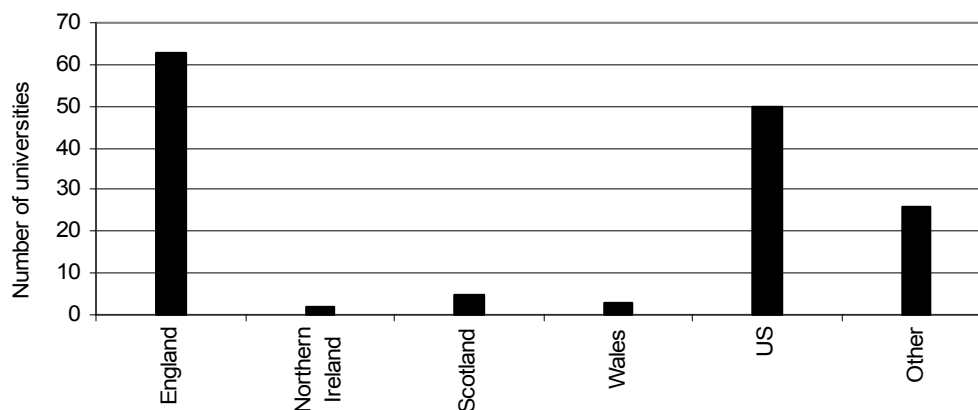


Figure 29: Location of universities represented in BBC non-news science items.
This chart counts each university once only.

Not surprisingly, scientific expertise dominates in specialist science programming, but also accounts for 42% of the contributors to items with science content in non-science magazine programmes (figure 30). A greater range of voices is heard in documentaries and studio

discussions not heavily promoted as science series. However, it should be noted that this latter category did include programmes, such as Jimmy's Food Factory, which the BBC itself categorises as science programmes. Such programmes embed science within wider topics and present a greater diversity of voices than the more up-front science strands such as Horizon.

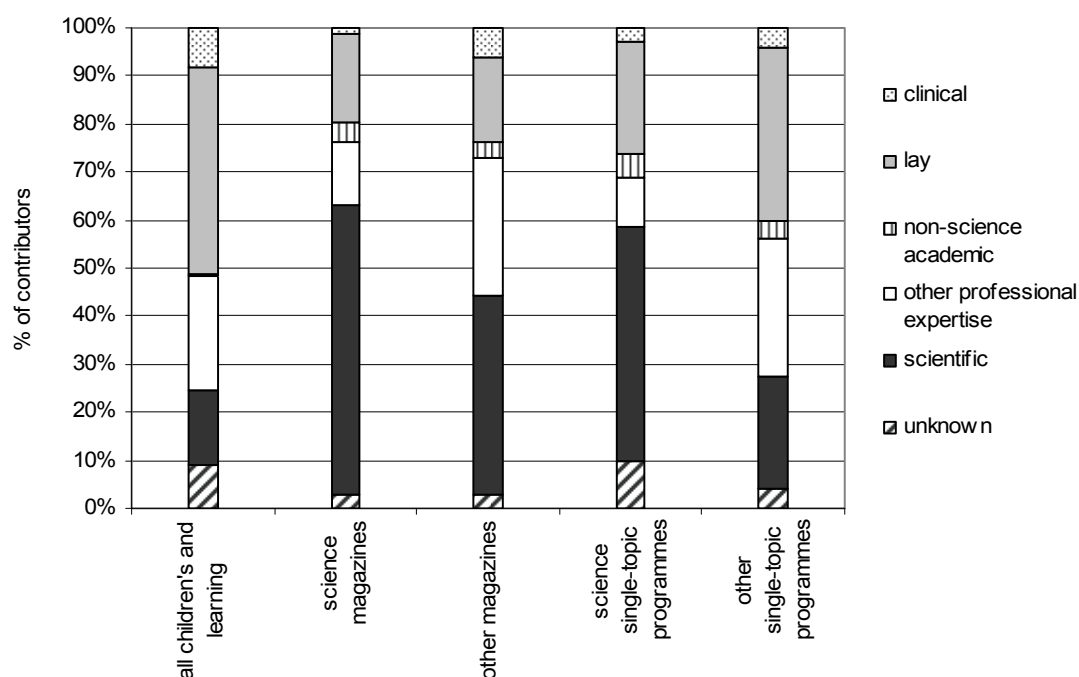


Figure 30: Expertise of contributors in BBC non-news science items.

11. Gender

Less than a quarter of the contributors in BBC news items were women.¹⁸ For contributors who appeared to have scientific expertise, the proportion of women dropped further to about 17% (figure 31); somewhat less than the quarter of senior academic staff in science and technology subjects who are women. Eleven per cent of those introduced as professors were women, again a little less than the proportion of women professors in science and technology subjects in UK higher education.¹⁹ By contrast, about half of the contributors who appeared to have no professional expertise were women.

¹⁸ By comparison, of the 35 contributors appearing in our small 2010 non-BBC sample, only three (9%) were women, but it should be noted that this sample is skewed by a prevalence of oil spill stories in which the key players were male.

¹⁹ 16% of professors and 31% of senior lecturers in STEM subjects are women; http://www.athenaswan.org.uk/downloads/2008_Annual_Report.pdf.

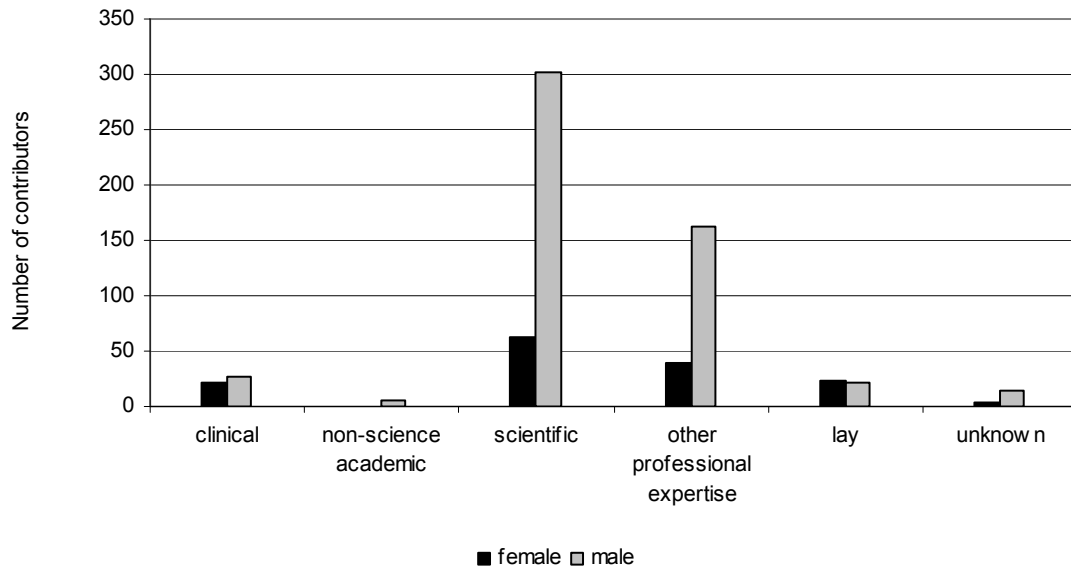


Figure 31: Distribution of contributors' expertise by gender in BBC broadcast and online news.

Eleven per cent of the women who spoke in news items were introduced as professors, compared to almost 30% of the men (figure 32). By contrast, over 56% of women were introduced using no academic title compared to 42% of men. Again, this may reflect the actual proportion of women who reach professorial level and the greater proportion of women working in communication roles in science-related organisations (e.g., medical charities) where they are less likely to have doctorates.

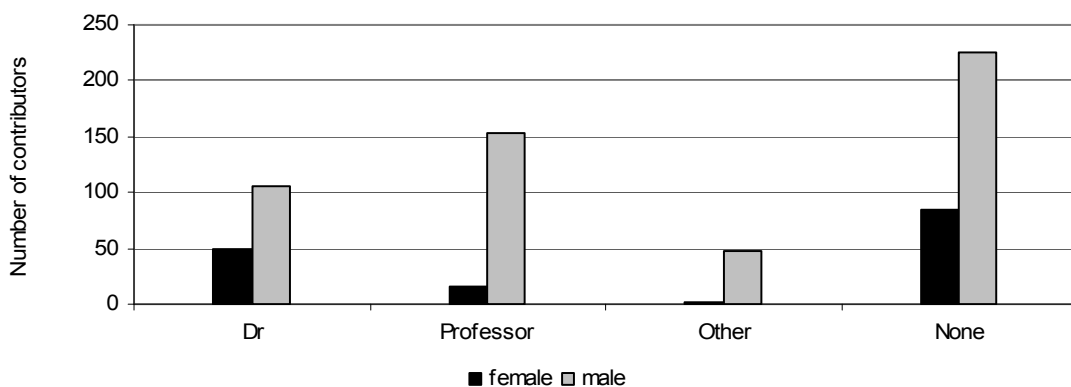


Figure 32: Distribution of news contributors' titles by gender in BBC broadcast and online news.

A similar pattern is repeated in non-news programming (figure 33). With the exception of children's programming where there was a roughly even split, male contributors outnumbered female contributors by almost three to one. The disparity was most marked in science magazine programmes and in the dedicated science strands. In Material World on Radio 4, just 14% of contributors were women and, whilst in a sixth of Material World programmes

male studio guests contributed to more than one item, no women were integrated into studio discussions in this way.

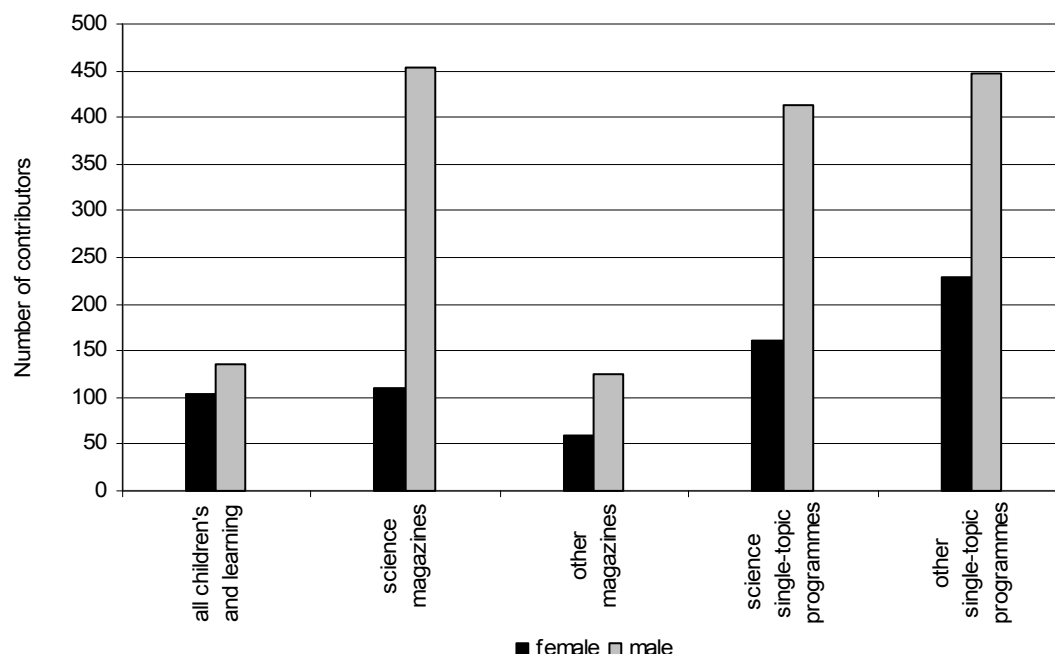


Figure 33: Gender of contributors in BBC non-news programmes.

As with news items, in non-news items women were more likely to be presented as lay voices (47% of all female contributors) than were men (19% of all male contributors). Conversely, almost a half of all male contributors were presented as having scientific expertise compared to just over a quarter of female contributors. As with news contributors, 80% of those presented as having scientific expertise were men.

A study of ten Horizon programmes by Joan Haran and colleagues found that only one in six scientists appearing in their sample were women.²⁰ In our larger sample of Horizon programmes, we found that half the contributors overall were women and almost one in four scientists appearing in the programmes were women. However, this still meant that only a tenth of all contributors to the series were women scientists. This also held true for Material World, exacerbating the gender bias already noted for that programme. Only 8% of all contributors on Material World were women scientists. The scarcity of women scientists on Material World may in part be due to that programme's greater interest in physical sciences and engineering than is the case for other programmes, since these subjects have the smallest proportions of women – about 8% of senior lecturers in physics are women and 12% in

²⁰ Joan Haran, Mwenya Chimba, Grace Reid and Jenny Kitzinger (2003) *Screening Women in SET: How Women in Science, Engineering and Technology Are Represented in Films and on Television*. UKRC Research Report Series No.3. Cardiff School of Journalism.

engineering, compared to 24% in biology.²¹ On *Material World*, the proportion of women scientists in items about physical science and engineering was 7% compared to 16% in items about life science and medical science.

Less than a third of presenters and narrators of non-news programmes are women; for single-topic programmes, only a quarter are women (figure 34).

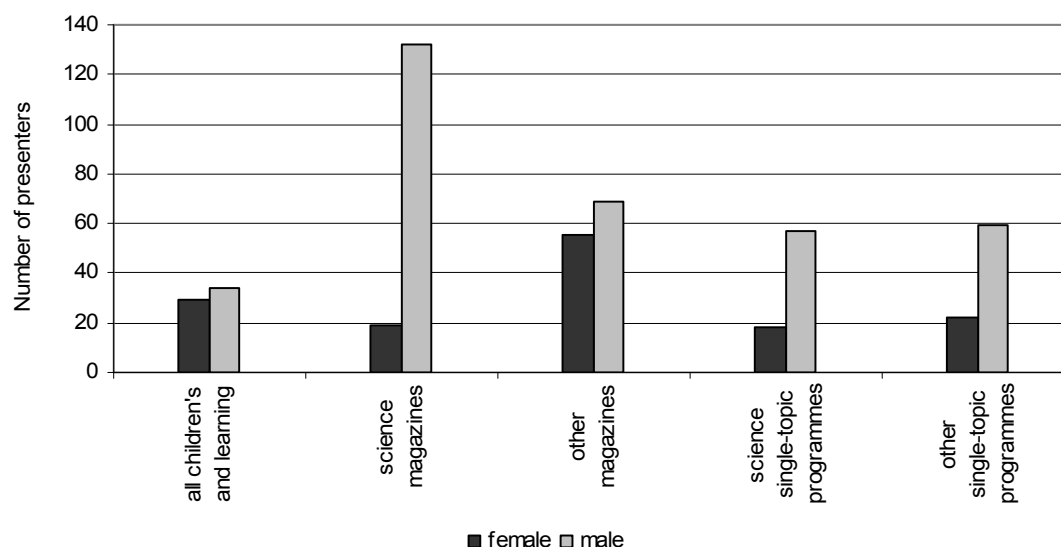


Figure 34: Gender of presenters in BBC non-news programmes. This chart counts separately multiple appearances by the same presenter in different programmes or different episodes of a series.

Of the twenty *Horizon* episodes in our sample, only one was presented by a woman scientist. There was little difference between the proportions of male and female presenters on science-dedicated single topic programmes and those for other single topic programmes, although non-science magazines and children's programming did have a greater proportion of women presenters. The numbers in some of these sub-samples are quite small, and the results for magazines are skewed by the dominance in our sample of just a few strands – *Material World*, *Countryfile* and *The One Show* – one of which (a science show) happens to be presented by a man whilst the other two (non-science programmes) include women presenters. However, the differences in the gender of presenters between programme types does raise the possibility, although we have by no means demonstrated it to be true, that women may be more likely to present BBC programmes revolving around children or chat, and that authoritative exposition, particularly of science, is more likely to be presented by men.

²¹ <http://www.athenaswan.org.uk/html/athena-swan/about-the-charter/women-in-set-statistics/>

12. Critical voices

12.1 Multiple viewpoints

In addition to a journalist's own summary and assessment of a story, which will be discussed in section 12.3, one means by which journalists strive to be impartial is through the inclusion of multiple viewpoints. On average, broadcast news included 1.5 contributors per item and online news 2.1 contributors per item. However, in the broadcast news sample, almost a third of items included no speech from anyone other than the reporter, newsreader or presenter. These were mostly very short summary items with an average duration of about 40 seconds. Another third of items included only one contributor. Thus almost two thirds of the broadcast news sample either relied on a single viewpoint or paraphrased alternative views. In items reporting on new research, this proportion rises to about 70%. There is greater use of multiple voices in online reporting, where 60% of reports gave voice to two or more contributors. Only 5% of the online news sample included no direct quotes. Of the 416 references to named individuals or organisations in the online sample, 63% were quoted directly, the statements of a further 6% were paraphrased by the journalists; the remaining 31% were referred to without attributing a statement to them.

12.2 Critical comments

Including multiple voices does not in itself imply multiple viewpoints. What news contributors say is also of significance; do they offer any critique of the scientific claims being made or do they, for instance, celebrate new findings or offer further supporting evidence? Science news is rarely a matter of purely factual statements. Both new research findings and the application of scientific evidence to policy matters involve assumptions and layers of interpretation which can be questioned, and regularly are within the scientific community. Whilst it may be inappropriate to include critical comment in all science news, the inclusion of such comment, where founded on well-reasoned analysis, can provide a means of scrutinising and weighing the claims being reported.

We therefore looked at whether news contributors expressed any caution about the interpretation of science. Did they, for instance, draw attention to limitations in research design, or to the relevance of findings, or to factors which were not considered in the research? In other words, did they engage in the sort of sceptical discussion which is often held up as the heart of the scientific process, elucidating the limitations of a piece of work or

noting uncertainties that could be explored further? We called comments of this type “cautionary comments”. We also looked for the presence of more far-reaching criticisms, or “oppositional comments”, which claimed there were fundamental flaws in the research or challenged the assumptions on which the research was based. Such comments might come from groups opposed to the application of scientific investigation to a particular issue, but they might also come from within science where different research approaches differ fundamentally on what the key questions are or what the starting assumptions should be. We refer to both cautionary and oppositional comments as “critical” comments. We stress, however, that critical comments do not necessarily imply a rejection of the whole scientific enterprise. Oppositional comments may indicate an anti-science attitude, but equally they can constitute a normal part of scientific research and be voiced from within the mainstream scientific community. Cautionary comments are unlikely to be aligned with an anti-science attitude since to note the limitations of a scientific finding implies acceptance of the findings within those limits.

Only about a fifth of contributors in broadcast news, and just over a quarter of contributors in online news, expressed cautionary comments. Roughly the same proportions apply for the sub-sample of news items dealing with research stories. Looking at the proportion of items rather than the proportion of contributors, cautionary comments were found in a quarter of all broadcast news items and just over a third of all online news items. Hardly any news contributors – 7% in broadcast news and 4% in online news – made deeper criticisms or oppositional comments. Whilst the majority of cautionary comments come from scientists, oppositional comments were more likely to come from other sources, including lay voices (figure 35). Thus oppositional comment, when it is heard, is more likely to come from outside the scientific community rather than from scientists challenging the assumptions of a scientific claim.

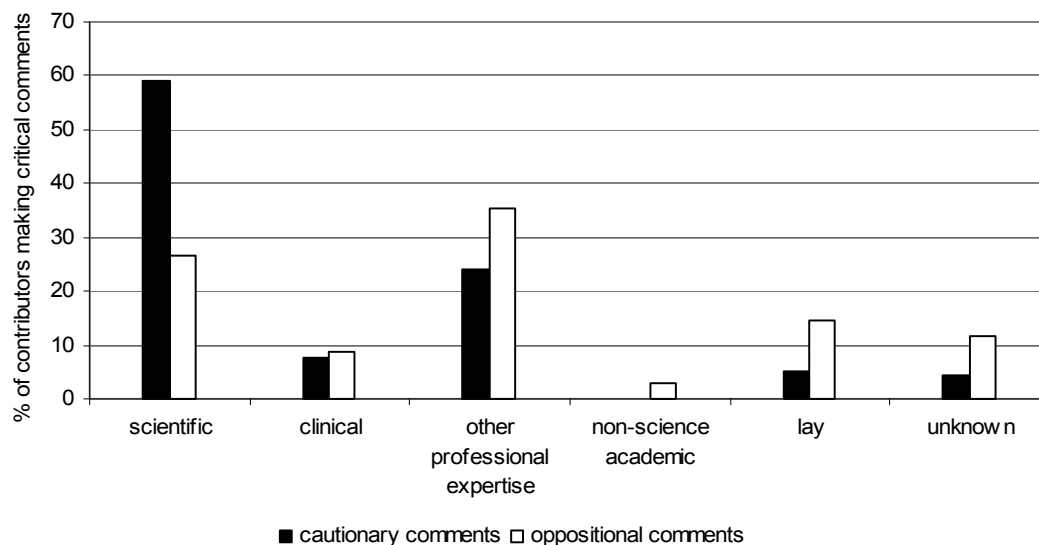


Figure 35: Expertise of contributors making critical comments in BBC broadcast news.
Percentages are of the total number of contributors making each type of comment.

Critical comments are most likely to be included in news items with two or more contributors than in items containing just one contributor; in these cases, the proportion of items containing cautionary comments rises to 54% of broadcast news and 48% of online news. If we assume that the person included in items with only one contributor is most likely to be the source of the news, then this confirms the commonsense assumption that the sources of news are least likely to point out the limitations of the evidence they cite or the findings they report. In items with two or more contributors, those making critical comments were most likely to speak later in the item; only about a fifth of those making cautionary comments appeared first in such items and a sixth of those making oppositional comments did so.

On average those who spoke for longer within broadcast news items were more likely to make cautionary or oppositional comments. Similarly, broadcast news items including cautionary or oppositional comments were on average longer (4.2 and 4.9 minutes respectively) than those which included contributors but no critical comment (3.0 minutes).

Despite typically having more time for detailed discussion of the interpretation of scientific evidence, critical comments were rarer in non-news programmes than in news items. Across all non-news programmes, only 12% of contributors made cautionary comments about science and only 3% made oppositional comments. Both cautionary and oppositional comments were more frequent in non-science magazine programmes than in other programme formats (figure 36).

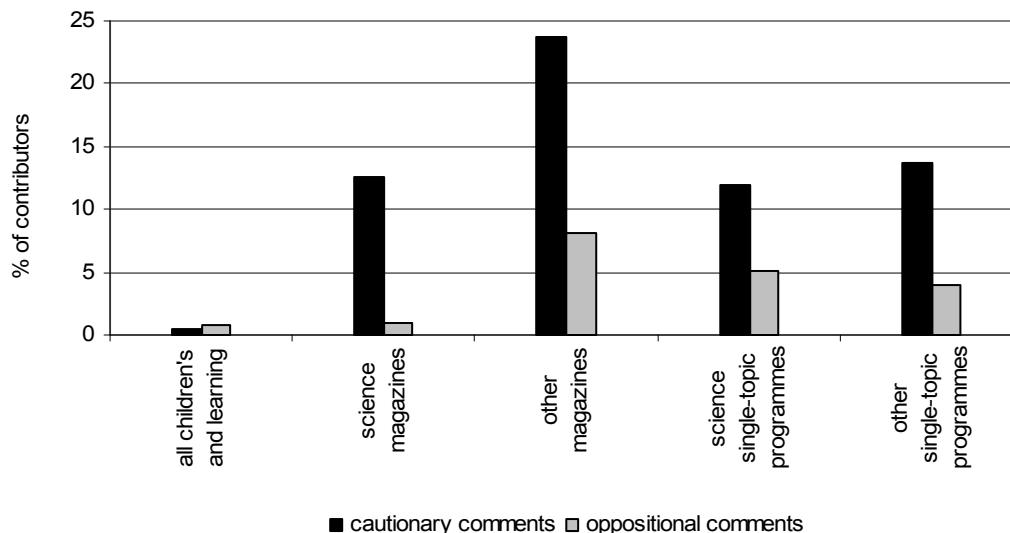


Figure 36: Cautionary and oppositional comments made by contributors to BBC non-news programmes. Percentages are of all contributors for each programme type.

As with news contributors, about half the non-news contributors making cautionary comments had scientific expertise as did about a third of those making oppositional comments. Those presented as lay members of the public and contributors with non-scientific professional expertise each accounted for a quarter of the oppositional comments, compared to only a sixth of the cautionary comments.

In news coverage there was also some variation in the inclusion of critical comments by programme. The Radio 1 Newsbeat programmes included almost no such comments, perhaps not surprisingly given the short duration of items in these programmes (a fifth of the average length of items across all programmes). More surprising is that one of the flagship programmes for news analysis – BBC Two’s Newsnight – included fewer critical comments as a proportion of the total number of contributors than other programmes (18% compared to an average of 27%). However, this finding is likely to be an artefact of the small sample of science items on Newsnight. Indeed, the picture changes if we look instead at the proportion of items with contributors that included at least one contributor making critical comments. By this measure, Newsnight had a greater proportion of such items than average and BBC One’s News at Six and Radio 4’s PM and Today programmes had a lower proportion than average. The small number of items in most of these sub-samples mean that these comparisons between programmes should be treated with caution.

Contributors in items by science correspondents were least likely to make any cautionary comments – 11% of all contributors included in broadcast news items by science correspondents made cautionary comments compared to the average of a fifth of all

contributors (figure 37). This cannot be accounted for by the different sort of stories covered by science specialists. A fifth of the items about research stories by science correspondents included cautionary comments (about the same as the proportion by unknown reporters or those with non-science related beats) compared to almost two fifths of those by health and medicine correspondents.

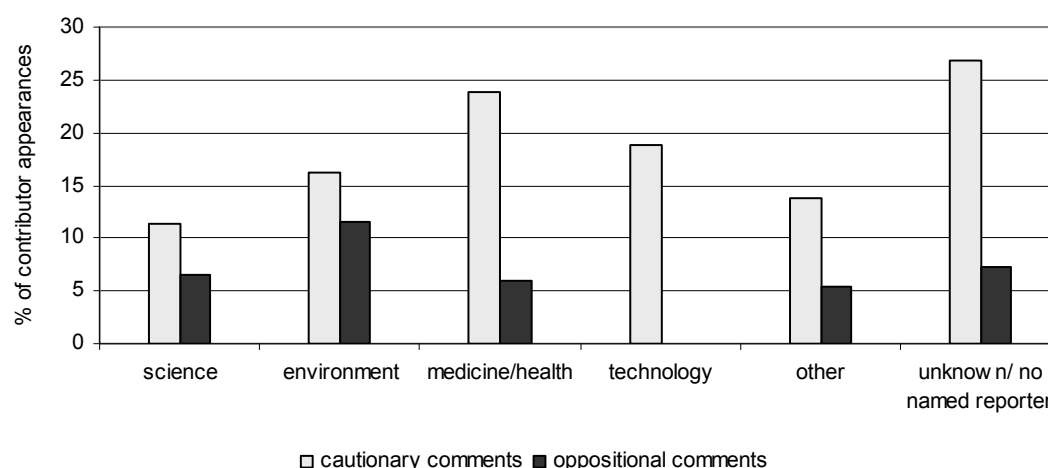


Figure 37: Inclusion of critical comments in BBC broadcast news items by reporter's beat. The sub-sample for technology reporters includes only 16 contributor appearances in only seven different items.

One response to the relative lack of cautionary or oppositional voices is that journalists often report on research that has been peer reviewed and thus avoid stories based on questionable science. However, few items stated whether or not research had been peer reviewed. Of over a hundred research items that referred to a publication, only two items mentioned peer review. A further six items in the rest of the sample mentioned peer review in connection with reports about climate change and the charges of misconduct against Dr Andrew Wakefield over his claims about the MMR vaccine.

Furthermore, central to peer review is the process of scientists critiquing each other's work. All science is questionable in the sense of being open to questioning. Peer review of even the best research is likely to point up some limitations in the work and scientists will always be able to find ways of improving or extending the available evidence. This routine questioning of science – the scepticism that is ideally a part of the scientific method and which is distilled in the process of peer review – is underrepresented in the BBC's news reporting, as we suspect it is in that of other news outlets.²² To what extent this stems from journalists'

²² Our sample of science news items on commercial television is too small to provide a robust comparison, and many of the stories in this sample concerned the oil spill story, but we note that the Sky News and ITV News at Ten samples included no cautionary or oppositional comments, whilst the

practices or from reluctance on the part of scientists to criticise each other in public remains open to debate.

A story about a new test for Alzheimer's disease provides an example of how even peer-reviewed science can have shortcomings which are not explored in news coverage but could help the audience understand the significance of the claims being made. A study published in the *British Medical Journal*, and press released for 10 June 2009, found that a quick memory test was more accurate at screening for the detection of Alzheimer's disease than the standard existing test.²³ The lead author of the study, Jeremy Brown, was interviewed on the Today programme (10 June 2009). The other BBC news programmes sampled did not cover the story. In the Today programme interview, Brown described the test and its potential use, he stressed that the test was for screening rather than diagnosis, and he finished by acknowledging that this was "just one study". Presenter Ed Stourton prompted Brown for descriptive information, and Stourton joked with co-presenter John Humphrys as they attempted to answer one of the test questions, but he did not ask Brown to comment on any limitations of the study. No other contributors were included in the item.

Over subsequent days the *British Medical Journal* website received comments from clinicians and academics, all with expertise in relevant specialisms, who pointed out a number of shortcomings with the study – for instance, the lack of assessment of the educational level of participants (which the study authors had themselves acknowledged in their *British Medical Journal* paper) – and with the test itself – including the cultural specificity of the test, the lack of discrimination for other forms of dementia, and the confounding effect of depression. Most significantly, a number of comments drew attention to the high number of false positives in the study; for every one individual correctly identified as having Alzheimer's disease, eleven had been wrongly identified as having the disease. Since the test could potentially be downloaded by patients or their relatives and administered at home, or used in care homes to help determine residents' care regimes, the high rate of false positives was thought to be of particular concern. The criticisms made on the journal website do not undermine the study, nor do they mean it was not newsworthy, but they do provide helpful insights into the reliability and potential uses of the test. Such points could have been informative to Today programme listeners but were not drawn out in the interview on that programme.

18 items in the Channel 4 News sample included a total of three items with cautionary comments and an additional one item with oppositional comment.

²³ J.M. Brown, G. Pengas, K. Dawson, L.A. Brown, and P. Clatworthy (2009) 'Self administered cognitive screening test (TYM) for detection of Alzheimer's disease: cross sectional study' *BMJ* 338:b2030.

12.3 Other expressions of uncertainty

Including direct comment from news contributors is just one way in which the limits of a scientific claim may be probed. Journalists and interviewers can also note uncertainties themselves, as can the presenters and narrators of non-news programmes. We therefore also looked at whether items taken as a whole indicated any uncertainty about scientific findings (we looked for any reference to uncertainty not the extent or detail of such references). This measure overlaps with, but is distinct from, the earlier measure of critical comments. Many cautionary or oppositional comments will include expressions of uncertainty, and such comments are included here, but this is not necessarily the case; for instance, oppositional comments may reject the claim that a new technology is needed or cautionary comments may question the costs involved, without implying that there is any uncertainty that the technology is possible or the science correct.

We found that about a third of all news items did express some uncertainty. This same proportion also held when looking only at research stories. Of these, broadcast news items by general reporters and correspondents with non-science related beats were least likely to indicate uncertainty, whilst health and medicine correspondents were most likely to do so (table 11). Critics of the media coverage of science sometimes suggest that the coverage by non-specialist reporters frequently exaggerates and misrepresents the uncertainties around the science. We found no evidence for this; indeed, our findings suggest that general reporters may under-report uncertainty.

Reporter's beat	Experimental design mentioned n (%)	Scientific uncertainty indicated n (%)	Total number of items
Science	3 (25)	5 (42)	12
Environment	3 (33)	4 (44)	9
Medicine/ health	15 (36)	21 (50)	42
Technology	0	1 (50)	2
Other	2 (18)	2 (18)	11
Unknown/no named reporter	26 (27)	27 (28)	95
All reporters	49 (29)	60 (35)	171

Table 11: Number of BBC broadcast news items about research stories that mention experimental design or scientific uncertainty.

Combining the number of broadcast and online news items with contributors who make critical comments and those items with expressions of uncertainty added by the journalist, we find that just under a half of all items (and 46% of research items) include such qualifying statements. Items by science correspondents are least likely to include such statements and items by health or medicine correspondents are most likely to include them (figure 38).

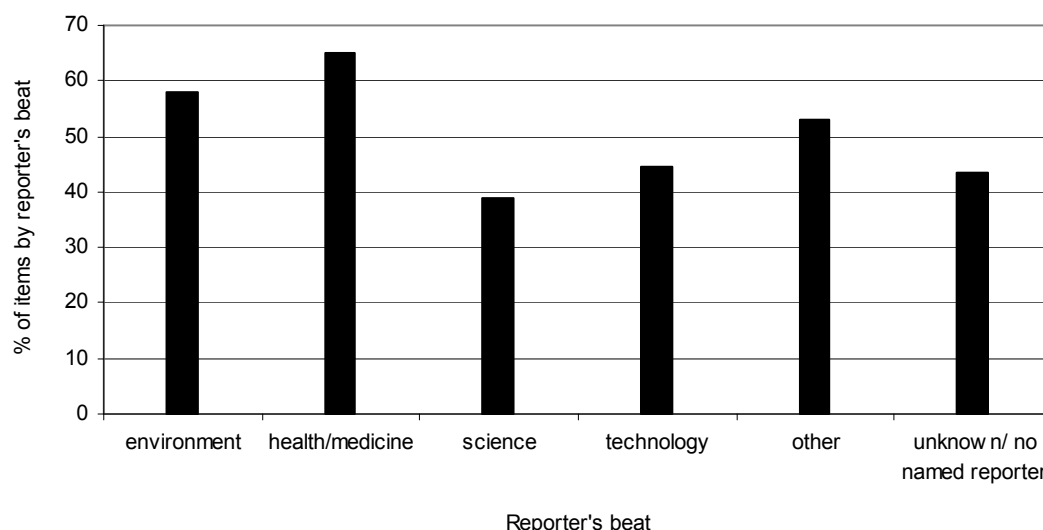


Figure 38: Percentage of items in BBC broadcast and online news that include critical comments from contributors or expressions of uncertainty voiced by the journalist. Percentages are calculated as a proportion of the number of such items to the total number of items by reporters with that beat. Note the sub-sample for items by technology correspondents includes a total of just nine items.

A story about water on one of the moons of Saturn, the media coverage of which was highlighted by Charles Petit at the US website Knight Science Journalism Tracker, offers an example of how reporting that fails to emphasise uncertainty can misrepresent the state of knowledge. Petit noted that the story arose from two back-to-back papers in *Nature* presenting differing data from the Cassini spacecraft and offering opposing interpretations.²⁴ Press releases from the University of Leicester, University College London and NASA all interpreted the presence of salt in the rings of Saturn as evidence of a water reservoir on the moon Enceladus. Minerals are ejected into the rings by water-ice jets from Enceladus. The jets had already been observed in 2005, but the new discovery of the salt was interpreted by some researchers as implying the presence of a body of liquid water. The University of Leicester press release went further, headlining with “implications for the search for extraterrestrial life”. However, a University of Colorado Boulder press release presented other

²⁴ Charles Petit (2009) ‘Dueling press releases. Either Enceladus has an interior ocean. Or not’ *Knight Science Journalism Tracker* 25 Jun. <http://ksjtracker.mit.edu/2009/06/25/dueling-press-releases-either-enceladus-has-an-interior-ocean-or-not/>

data which suggested there was no salt in the water vapour component of the jets, which was interpreted as implying there was no ocean.

BBC One's Breakfast and Newsround both covered the story on 25 June 2009. Neither gave any hint of the contrasting data and differing interpretations. On Breakfast, science correspondent Pallab Ghosh reported that the "most likely explanation" of the salt observations is that there is an ocean. This indicates some measure of uncertainty but fails to acknowledge that this explanation is the subject of debate and may be inconsistent with other data. The existence of life was taken as uncertain – "... new evidence that *could* point to the existence of life on one of the 61 moons of the planet Saturn" – but not the layers of interpretation that precede the question of extraterrestrial life. The report included a short clip of a NASA scientist talking about the possibility of life on Enceladus; his only reference to the recent findings was: "... and we now think we have liquid water there as well". The light-hearted Newsround item focused on aliens and flying saucers. It did state that "some" scientists believe there is an ocean, and followed with a conditional: "If that is the case...", but moved straight on to the possibility that the oceans might contain "alien fish". Both items included some expressions of uncertainty, but in adopting an angle about extraterrestrial life, the uncertainty accrued to this suggestion rather than the actual research findings and neither report gave any hint of the scientific debate.

As with news coverage, about a third of non-news programmes indicated uncertainty about the science being discussed. However, the frequency varied with programme type, with children's programmes being least likely to mention uncertainty whilst over half of single-topic programmes did so.

The discussion of experimental design – considerations such as sample size, statistical significance, replication and so on – can also indicate how robust scientific claims are. Less than a third of broadcast news items about research mentioned any aspect of experimental design (see table 11 above) but about half the non-news items about current research did so. In the news reports, science correspondents were slightly less likely to mention experimental design than other science-related specialists, but were more likely to do so than reporters with general or non-science beats. Over half of the online news items mentioned experimental design, but in many cases this went no further than mentioning the sample size.

13. Sourcing of news

13.1 Journals

One source of science news is the peer-review journals in which scientific research is published. A quarter of the broadcast news items overall, and 34% of those about research stories, mentioned a publication. Half of the items mentioning a publication named a journal, but only eight different journals were named despite these items covering 20 different stories (table 12). However, almost two thirds of the broadcast research items actually arose out of publications. Just over a third of items arising out of a journal publication named the journal concerned. The range of journals actually drawn on is thus somewhat wider than those listed in table 12 suggests, with an additional eight journals providing the source for research items.

	Number of items cited in	Number of stories cited in
<i>British Journal of Obstetrics and Gynaecology</i>	1	1
<i>British Medical Journal</i>	13	7
<i>Archives of Disease in Childhood</i>	1	1
<i>European Journal of Neuroscience</i>	1	1
<i>Lancet</i>	15	3
<i>Nature</i>	6	5
<i>Proceedings of National Academy of Sciences</i>	2	1
<i>Stem Cells and Development</i>	1	1

Table 12: Journals named in BBC broadcast news.

Online reports were more likely to name the journal where the research was published. Two thirds of online items about research mentioned a publication and the journal was named explicitly in all these cases. Almost a third of the other online items also mentioned publications and again, where the publication was in a journal, the journal was named. All journals cited were peer reviewed, although this was never mentioned explicitly. A far wider range of journals were drawn on – 39 across the whole online sample. As with broadcast news stories, *Nature* and the *British Medical Journal* were cited most frequently but unlike in broadcast news, the journal *Science* was also cited as frequently as the *British Medical Journal*. Online articles typically provide a link to the journal, but in the majority of cases this link is to the home page of the journal rather than the actual paper. Only a fifth of articles mentioning a journal linked to the paper. All five Earth News articles mentioning a journal

linked to the paper (though the broken link in one case may suggest why this is not preferred practice) whilst only 15% of such articles from the rest of the BBC News website did so. In 15% of cases, no link at all was provided.

A quarter of non-news items about research referred to a publication, and a journal was named in half these cases. These again came from the same small stable of journals as found in the broadcast news items, but unlike that coverage, also included two items from *Science*.

We were surprised to find that no broadcast news items were based on research published in the journal *Science*, despite this being one of the two most prestigious international journals dealing with all scientific disciplines. As table 12 shows, *Science*'s competitor *Nature* was cited relatively often. Since *Nature* is a UK-based journal and *Science* is US-based, this may be another indicator of the UK-centric nature of the BBC's science coverage. Alternatively (and more probably in our view), since we did find twelve items that referred to *Science* in the online and non-news samples, it may indicate that *Science*'s embargo times do not fit easily with the BBC broadcast news schedule.

13.2 Use of public relations material in broadcast news

One important question for impartiality is how independent coverage is. To assess this aspect of the BBC's science coverage, we traced the sources of the research stories that appeared in the broadcast news. There were 55 research stories accounting for 171, or almost half, of our broadcast science news items. For 42 of these stories, we were able to locate associated press releases from the source institutions. In some cases, PR activity may be prompted by BBC reports rather than the other way round. This appears to have been the case for two of these 42 stories, leaving 73% of research stories likely to have been sourced through press releases.²⁵ A further two stories were about media-managed events and in three cases we suspected PR activity because of the context of the story or other media reports but were unable to locate it. Overall, this means that 82% of stories about research appear to be PR-derived. This leaves ten research stories (accounting for 13% of broadcast news items about research) which do not appear to be associated with PR activity or which were sourced independently of the press releases. Of these ten stories, two, although not arising from external PR, promoted BBC activities: one was tied to a forthcoming documentary and the other reported the publication of a paper arising out of a bird survey by Radio 4's Today programme listeners. In this latter case, Sarah Mukherjee, then the Today programme's environment correspondent, was a co-

²⁵ These two cases were identified in a list of originally-sourced reports provided by BBC News in response to a draft of this report.

author of the paper. At the end of the item, the presenter joked about listeners adding the paper to their CVs and Mukherjee responded that she would certainly add it to hers, but there was no more explicit acknowledgement that Mukherjee was a co-author of the research she was reporting on.

A study by Cardiff School of Journalism looking at the PR dependency of UK journalism in general, found that 34% of broadcast news came wholly or partly from pre-packaged sources and that PR plays an agenda setting role in 52% of broadcast news. Across press and broadcast news, they found that stories about health and the natural world were the most likely to be heavily PR-dependent.²⁶ Our results confirm this PR-dependency for the BBC's science coverage.

It is important to consider not just whether stories are associated with a press release, but to what extent a report moves beyond the material provided in the press release. Who speaks within items can again give some measure of this. Of the 128 items about research where we located a press release either from the institution where the research was carried out, from a funder of the research, or from the journal where the research was published, 58 included no contributors. Of the rest, 55 included comment from sources either named in the press release or from others from that institution, whilst 34 included comment from people not connected to the research. In some cases, this independent comment may also be associated with PR activity by the contributor's institution – we were able to locate additional press releases of this type for seven items.²⁷

Almost half the non-source comment in these press-released stories came from lay contributors offering a view of the issue based on their own personal experience. Half of these were from vox pops in Radio 1 Newsbeat reports about recreational drug use. Other lay contributors may be sourced through institutions – especially medical charities and medical research centres – which were actively managing the media coverage.

In the whole sample of 171 broadcast news items dealing with research stories, only 17 of the scientists interviewed were unconnected to the research being reported. Or, to put it another way, just 13% of the research items included independent scientific comment. Only ten of

²⁶ Justin Lewis, Andrew Williams, Bob Franklin, James Thomas and Nick Mosdell (2007) *The Quality and Independence of British Journalism*. Cardiff School of Journalism.

²⁷ Some of these may have been produced in response to a news contributor being approached by the BBC, but it is also likely to be the case that there were other PR-sourced comments for which we were unable to locate a press release; for instance, where we know that charities would have been particularly active in their PR efforts because of an awareness week.

these contributors made cautionary comments; none made oppositional comments. Thus only about 6% of research items give voice to independent scientists who flag up any limitations or uncertainties in the research findings of others and none give voice to independent scientists expressing more far reaching critiques of research findings. About a fifth of research items included cautionary or oppositional comments from contributors other than independent scientists.

13.3 Independent voices in online news

Fourteen of the press-released research stories in the broadcast sample were also present in the online sample. For two of these, we did not have the full set of press materials, but for the remaining twelve we looked at how closely the text of the BBC News Online report followed the press release(s). Three of the stories had been launched at press conferences held at the Science Media Centre (SMC) and the BBC journalists drew on the discussions there, although in one case the online report drew its quotes from the journal and SMC press releases. One of these three items acknowledged that the quotes came from an SMC press conference; the others did not. Of the remaining nine items, four items used exclusively what appeared to be original quotes for comment from the source of the story (i.e., the journalists had spoken to the news participants); two included quotes from the papers in which the research had been published; one drew on the press release and a radio interview for source quotes; and the other two relied exclusively for source quotes on the press releases. Four of these nine items also included independent comment which appeared to be entirely originally sourced by the journalist; two included some or all independent comment identical to that in press releases issued by medical charities in response to the new research; and three included no independent comment.

The majority of these items adopted the same framing of the story as that found in the press released material; only three introduced original angles. The majority of the information relayed in the reports could be derived from the press releases. However, there was also evidence of journalists reading the papers in which the research was published and most of the BBC reports were structured quite differently from the press releases. Only one online report was largely composed of material lifted directly from the press release or closely paraphrased; except for quotes, the lifted material in this report never constituted as much as a whole sentence.

This small sample suggests that, although BBC journalists may rely on press releases to alert them to science stories, in the majority of cases they make some effort to introduce original

material. However, they rarely deviate from the overall framing of the story offered in the press release. Given the nature of the stories examined here – reports of recent research findings – the scope for developing fresh angles is probably limited and in some cases could be misleading or confusing. However, that half of the twelve items included no independent comment, and that some of those that did derived this from other press release material, is perhaps of greater concern.

It was beyond the scope of this project to trace press releases for all the other items in the online sample. Instead, we further examined the question of independent voices in online coverage by using the evidence within the report itself to categorise individuals either as “active agents” involved in the events being reported, as “interested parties” not directly involved with the events being reported but with an ongoing agenda or vested interest in such events, as “independent voices” with no direct connection to the events being reported or as “affected individuals” or “eye witnesses”. As with the broadcast sample, we find an exclusive dependence on the sources of the news in the majority of reports. Only 29 (35%) of the 83 research items included any reference to an individual who appeared as an independent voice and eleven (13%) referred to individuals who appeared as interested parties. About two fifths of the independent voices quoted were scientists. Another way of putting this is that only 9% of the research items in the online sample quoted independent scientists. The majority of research items (58%) only referred to those who were involved in the research being reported. None of the research items quoted individuals who could be affected by the research; this sort of comment, where it was included, came instead from the representatives of campaign groups or medical charities.

Of the independent voices quoted in the online sample, 25 (53%), including six scientists, expressed cautionary comments in a total of 22 items and none expressed oppositional comments. Just 5% of online news items about research included cautionary comment from independent scientists. Of the interested parties quoted in the sample, ten (22%) expressed cautionary comments in nine items and seven (13%) expressed oppositional comments in a further three items. Three of the latter were from lobby groups, one from an industry association (of American beekeepers), two from university scientists presented as representatives of groups sceptical about climate change and one from an individual who hosts a climate sceptic website. Thus oppositional comment, when it comes, is seen not as dispassionate critique by peers, but either as comment from those with committed views on an issue or comment in the context of highly-polarised debate.

13.4 Transparency of research funding

The question of the independence of those commenting on scientific research is further complicated by a lack of transparency about the funding of the research. The source of funding does not necessarily affect the independence with which a scientist will speak, nor will all funders necessarily hype their research to such an extent as to mislead. However, evidence suggests that the source of funding can have an influence on even the most authoritative reports of scientific findings. For instance, studies have shown that drug trials published in peer-reviewed journals are more likely to report findings favourable to the sponsor if funded by industry than if funded by other sources.²⁸ We found that 14% of the online items about research stories and only 3% of broadcast items about research explicitly mentioned who had funded the research. About 12% of non-news items about current research mentioned the funder.

13.5 PR-driven non-news: the case of *Uncovering Our Earliest Ancestor*

It is harder to trace the sourcing of non-news programmes than it is for news. However, one example of a BBC joint production, first broadcast within our sample period, serves as a cautionary tale of how documentary-making can be a part of a public relations campaign and how this can raise questions about the integrity, accuracy and impartiality of a programme.²⁹ We do not present this case as a representative example, but rather as an example of the risks of a PR-agenda and commercial media interests becoming too closely entangled with programme production.

The Link: *Uncovering Our Earliest Ancestor* was an hour-long documentary, narrated by David Attenborough and broadcast at 9pm on BBC One on 26 May 2009. The film was produced by the factual production company Atlantic Productions and co-funded by the BBC, the History Channel, ZDF in Germany and NRK, the Norwegian broadcasting corporation. It was one part of what Atlantic Productions called a “major multi-platform” event launched at a press conference at the American Museum of Natural History in New York on 20 May and timed to coincide with the publication of a scientific paper by Jørn Hurum and colleagues in

²⁸ J.E. Bekelman, Y. Li, and C.P. Gross (2003) ‘Scope and impact of financial conflicts of interest in biomedical research: a systematic review’ *JAMA* 289:4, 454-65; F.T. Bourgeois, S. Murthy and K.D. Mandl (2010) ‘Outcome Reporting Among Drug Trials’ *Annals of Internal Medicine* 153:3, 158-66; J. Lexchin, L.A. Bero, B. Djulbegovic and O. Clark (2003) Pharmaceutical industry sponsorship and research outcome and quality: systematic review’ *BMJ* 326, 1167.

²⁹ The following account draws background information from research conducted by one of our masters students; Harriet Vickers (2010) ‘The Power of Stories’ MSc Dissertation. Imperial College London.

the journal *Public Library of Sciences One* (*PLoS One*). As well as the documentary, the media package included the publication of a book, a website, and exhibition of the fossil at London's Natural History Museum and elsewhere.

The *PLoS One* paper presented an anatomical description of the fossil *Ida* which, at Hurum's instigation, had been bought by Oslo University's Natural History Museum a couple of years before. The fossil represented a new species belonging to the taxon Adapidae. The adapids are one of three taxa that could have evolved into anthropoids – the line which gave rise to monkeys, apes and humans. However, the weight of opinion is that this taxon is the least close to humans and closest to the branch that evolved into lemurs rather than humans. In their paper, Hurum and his colleagues raised the possibility of human ancestry but were careful to state that they were not advocating a link in that paper.³⁰

However, as its title suggests, the film did posit such a link – prominently, repeatedly and with little indication of uncertainty. The scientific process was portrayed as a secretive detective mission generating certainty:

They plan a long and thorough study. They must be certain of their conclusions before they reveal the fossil to the world. Until then, they will work in secret on their extraordinary treasure. (13:06)

The implication was that now the fossil was on television, certainty had been achieved. No contributors expressed any cautionary remarks throughout the film. The narration posed questions about the status of the fossil, but only to answer them with certainty. The fossil, said Attenborough emphatically two thirds of the way through the film, “is *not* a lemur”. Rather, the features discovered, said one of the researchers, point to relationships to humans. By the end of the film there seemed no doubt that the question posed at the start of the programme – “a missing link to the origins of man?” – must be answered in the affirmative. *Ida*, the film concluded, “is a transitional species, a link that is now no longer missing”.

The sense of certainty conveyed by the film was reinforced by its use of the classic structure in which narrative progression is generated by posing problems which are then resolved. The closure delivered by the narrative implied that the scientific question was also closed. Whilst the publicity machine attending this particular documentary was exceptional, this form of

³⁰ J.L. Franzen, P.D. Gingerich, J. Habersetzer, J.H. Hurum, W. von Koenigswald, *et al.* (2009) ‘Complete Primate Skeleton from the Middle Eocene of Messel in Germany: Morphology and Paleobiology’ *PLoS One* 4(5): e5723. DOI:10.1371/journal.pone.0005723.

narrative is used frequently in science documentaries, including many BBC Horizon programmes as we have noted above.

A BBC press release presented the film as a rare opportunity “to document ground-breaking science as it happens” and quoted Jay Hunt, then controller of BBC One: “I am delighted that this ground-breaking piece of scientific research will be showcased on BBC One.”³¹ The BBC One continuity announcer introduced the topic of the film as: “A ground-breaking discovery that could be the most important for centuries”. The documentary was heavily trailed through the preceding week and referred to on BBC One’s News at One, the 5pm bulletin on the BBC News Channel and BBC One’s The One Show the day before the broadcast.³² The news reports did express some uncertainty about the claims that Ida was a missing link, noted the publicity machine around the finding and indicated that the fossil would be the subject of ongoing scientific debate. In The One Show, Adrian Chiles visited the exhibit at the Natural History Museum. He talked of the views of “some scientists” that the fossil “could” represent a human ancestor, but at the same time added humorous references to Ida as “my oldest known relative”. In a short interview, David Attenborough asserted Ida’s status as a link in human evolution with certainty: “It represents the link between the earliest mammals and man. And it – it shows what we all believed. I mean, it confirms what we all believed. That we are, have evolved from that basic step.” In a studio interview that followed, Hurum acknowledged that “not everyone is believing it” and stated that the scientific paper does not claim the fossil is a “missing link”. Chiles questioned whether the story had been over-hyped and whether there was “some sort of profit motive going on here?”

Immediately after the first media reports of the New York press conference and before the UK broadcast of the documentary, the claims that Ida was a human ancestor were greeted with scepticism by palaeontologists and other informed commentators.³³ Such was the backlash to the media campaign, that the researchers felt compelled to add a “Competing Interests” statement to their *PLoS One* paper to clarify that they had not benefited financially as individuals from the deals with Atlantic Productions and publisher Little Brown and that these companies had had no influence over the science presented in the papers. Their findings were undermined further a few months later in a paper published in *Nature* – a development

³¹ BBC Press Office (2009) ‘Exclusive BBC One documentary uncovers our earliest ancestor’ 19 May. http://www.bbc.co.uk/pressoffice/pressreleases/stories/2009/05_may/19/ancestor.shtml.

³² Earlier news reports arising from the New York press conference were also broadcast but these fell outside our sample weeks and so are not captured in this analysis.

³³ Brian J. Switek (2009) ‘Poor, poor Ida, Or: “Overselling an Adapid”’, *Laelaps* 19 May. http://scienceblogs.com/laelaps/2009/05/poor_poor_ida_or_overselling_a.php; Ann Gibbons (2009) ‘Celebrity Fossil Primate: Missing Link or Weak Link?’ *Science* 324:5931, 1124 – 1125.

which was covered by Radio 4's Material World and by the BBC News website – and by another paper published in the *Journal of Human Evolution* early in 2010.³⁴ In a press release accompanying the second paper, the authors claimed that Hurum's paper had ignored two decades of published research into similar fossils.³⁵ In BBC news reports, Hurum himself described Ida as “more of an aunt than a great, great grandmother” but in their recent work he and his colleagues continue to defend their claims that Ida is related to anthropoids.³⁶

The instant response from palaeontologists suggests that the programme makers could easily have identified independent scientists to evaluate the claims about a human link. However, *PloS One* had agreed not to release the paper to journalists even under embargo and the few who were granted access had to sign non-disclosure clauses.³⁷ Without the hook that this was a key part of the story of human evolution, Ida would have been just another rather obscure, albeit well-preserved, fossil with little scope for media exclusives and international film sales. At least some of the BBC's news coverage acknowledged the uncertainty and controversy surrounding the fossil, and Harry Dean, Head of Editorial Standards at BBC Vision, has informed us that the programme makers did rescript the programme as they became aware of criticisms of the scientific claims shortly before broadcast.³⁸ But by co-funding, premiering and promoting a film which failed to explore alternative interpretations of the fossil, the BBC was widely seen as having been a party to “hype”.³⁹

³⁴ Erik R. Seiffert, Jonathan M. G. Perry, Elwyn L. Simons & Doug M. Boyer (2009) ‘Convergent evolution of anthropoid in Eocene adapiform primates’ *Nature* 461, 118-1122; B.A. Williams, R.F. Kay, E.C. Kirk, and C.F. Ross (2010) ‘*Darwinius masillae* is astrepsirrhine – a reply to Franzen et al. (2009)’ *Journal of Human Evolution* DOI: 10.1016/j.jhevol.2010.01.003.

³⁵ Press Office (2010) ‘Recently Analyzed Fossil Was Not Human Ancestor As Claimed, Anthropologists Say’ University of Texas. 2 Mar. http://www.utexas.edu/news/2010/03/02/human_ancestor_fossil/.

³⁶ Philip D. Gingerich, Jens L. Franzen, Jörg Habersetzer, Jørn H. Hurum, B. Holly Smith (2010) ‘*Darwinius masillae* is a Haplorhine - Reply to Williams et al. (2010)’ *Journal of Human Evolution* DOI:10.1016/j.jhevol.2010.07.013.

³⁷ Brian J. Switek (2010) ‘Ancestor or Adapiform? *Darwinius* and the Search for Our Early Primate Ancestors’ *Evolution: Education and Outreach* 3:468–476.

³⁸ Personal communication.

³⁹ E.g., Martin Robbins (2009) ‘Ida on the BBC: When Science Communication Attacks’ *The Lay Scientist* (26 May) <http://www.layscience.net/node/572>.

14. Reporting controversy

14.1 Indications of controversy

The scientific exchanges that followed the Ida announcements could be taken as a typical example of a controversy within science were it not for the media splash that preceded them. Yet in that case controversy was largely absent from the treatment of the story on the BBC. In other cases, the opposite can be true and science only becomes a subject of media attention because it is implicated in a controversy.

We therefore looked at how often BBC coverage construes science as a matter of controversy, taking controversy as the presence of contributors with opposing views or the use of words such as “controversy”, “controversial”, “debate”, “disagreement” or “conflict”. We found that controversy is alluded to in about a quarter of broadcast news items, a sixth of online news items, an eighth of blogs and a fifth of all non-news items. Research stories were less likely to be construed as controversial than other stories. Controversy was alluded to in 18% of broadcast news items about research, 4% of online news items about research and 15% of non-news items about current research.

In order to illustrate some of the issues that arise in reporting controversy, we looked in detail at the two stories which dealt with the most contested issues in our sample – one concerning climate science and the other concerning genetically modified animals.

14.2 Reporting climate change

There was relatively little reporting on climate change within our sample. However, one news story which did fall within our sample weeks was the report of the Independent Climate Change E-mails Review into the “climategate” affair over the leaked emails from the University of East Anglia’s Climatic Research Unit (CRU). The review panel, chaired by Sir Muir Russell, announced their findings at a press conference held at the Science Media Centre on 7 July 2010. Both the report and the press conference emphasised three main findings in the following order:

- “... we find that their [the CRU scientists’] rigour and honesty as scientists are not in doubt.”
- “... we did not find any evidence of behaviour that might undermine the conclusions of the IPCC assessments.”

- “But we do find that there has been a consistent pattern of failing to display the proper degree of openness...”⁴⁰

The announcement was reported on all the sampled news outlets broadcast after the press conference, with the exception of Radio 1’s Newsbeat, BBC One’s Newsround and the BBC News Channel 5pm bulletin. The story was not headlined “above the fold” on the front page of the BBC News website, but there was a link at the bottom of the page to an item on the Science & Environment website where the story was positioned as the second headline. Although broadcast before the findings were announced, the Today programme also covered the story with an item on the findings and reception of two previous inquiries into the affair. We will not look further at that item, but will look at the reports of the inquiry findings in some detail to illustrate how the nuances of an item’s treatment can inflect the overall message presented.

All reports referred to the lack of openness in their introductions but none opened with the finding that the review had found nothing that undermined the Intergovernmental Panel on Climate Change (IPCC) assessments. All the television news reports included direct quotes of the three main findings; the radio reports paraphrased the first and third, but did not always refer to the second. The online report quoted the first and third and paraphrased the second.

All the broadcast reports that included packages, and the online report, also referred to the more detailed finding about a graph that had appeared on the cover of a report by the World Meteorological Association. The inquiry had found that although it was legitimate to splice data and curtail reconstruction, as had been done with this graph, the failure to make these procedures sufficiently explicit was misleading. However, although they referred to this finding, none of the broadcast reports referred to the inquiry’s finding that there was no evidence to support another allegation that had arisen in response to the emails, that the CRU scientists had used a biased selection of stations for temperature data. Nor did any broadcast reports refer to the finding that the data demanded through Freedom of Information (FOI) requests was already available in the public domain. The online report, by contrast, did refer to both these findings. At the press conference, one BBC journalist asked whether the public availability of the data indicated that the FOI requests had been maliciously motivated. The panel members would not comment directly on this point, but responded that the FOI requests

⁴⁰ *The Report of the Independent Climate Change Emails Review* (Jul 2010) <http://www.cce-review.org/pdf/FINAL%20REPORT.pdf>.

had served to provide “a good debating point”. This angle was not developed in the BBC’s news coverage.

Through most of the day, reports of the inquiry began by stating that the inquiry had exonerated the scientists. The news summary on Radio 4’s World at One was typical:

The third inquiry into emails hacked by one of England’s leading climate change institutions has largely dismissed accusations that scientists withheld key information. Staff at the University of East Anglia’s Climatic Research Unit were accused of manipulating data to back up the theory of manmade global warming. The review chaired by the former civil servant Sir Muir Russell concluded that their rigour and honesty was not in doubt but criticised them for a lack of openness.

However, BBC One’s News at Ten, although including the same package as the News at Six, inverted this message:

Climate scientists at a leading British research unit have been criticised for a lack of openness about their data. That’s one of the findings of a new inquiry into the leaking of hundreds of emails from the unit at the University of East Anglia. Climate sceptics have claimed that the emails showed the scientists had manipulated or suppressed key data on climate change. But the inquiry did find that they’d acted honourably and that their research was reliable, as David Shukman explains.

Arguably, by inverting the ordering of the inquiry’s findings, this introduction re-frames the story and de-emphasises the exoneration of the scientists which the panel members themselves had stressed. The headline message now is that the scientists have been found to be at fault, rather than the scientists having been cleared. Both versions are technically correct, but the World at One version (and those of other reports) is a more faithful representation of what the panel said than is the News at Ten version.

With the exception of Radio 4’s PM, all news outlets included comment from climate sceptics – in most cases either former Conservative Chancellor, Lord Lawson, or Dr Benny Peiser, a social anthropologist at Liverpool John Moores University who is Director of the Global Warming Policy Foundation, a think tank founded by Lawson. In the package broadcast on BBC One’s News at Six and News at Ten, Lawson was introduced as “the man who first called for [the inquiry]” and a caption gave his institutional affiliation as the Global Warming Policy Foundation. In one of the two packages Peiser appeared in, he spoke after a reference to “critics”; the caption gave his title as Dr and his affiliation as Liverpool John Moores University. In the other package, on Radio 4’s Six O’clock news, Peiser spoke after a reference to “climate sceptics” and was given no title and no institutional affiliation. Having greater space to elaborate on news contributors’ credentials, the online report was able to

describe Peiser thus: “Dr Benny Peiser, director of the Global Warming Policy Foundation, an influential sceptical think-tank”.

For radio, in particular, complex institutional affiliations are difficult to present without stalling the news narrative. Peiser serves as a good example of the difficulties associated with accrediting news contributors in a clear and informative manner. Peiser has a long-standing interest as an academic in catastrophic events, but he has no technical expertise in climate science in the sense of having formal qualifications or peer-review publications in that field. A news report which presents the “critic”, university-based Dr Peiser, vests him with greater authority than that which presents the “sceptic” Benny Peiser. Neither are incorrect, yet they differ in how they direct the viewer to understand Peiser’s status as an expert, and both are somewhat misleading in failing to elaborate the precise nature of Peiser’s expertise and his connection with a think tank with an established agenda.

Across all the packages, the news contributors directly involved in the story – the inquiry chairman, Sir Muir Russell, and Professor Edward Acton, vice-chancellor of the University of East Anglia – spoke for a total of 143 seconds; sceptics for a total of 74 seconds; and others for a total of 131 seconds. Three programmes included studio interviews. The World at One included an interview with Lord Lawson which lasted 112 seconds, followed by a shorter interview with Edward Acton. Radio 4’s PM included a three-and-a-half minute interview with Jim Al-Khalili, Professor of Physics and of the Public Engagement with Science at the University of Surrey and a presenter of BBC science documentary series. This interview explored the theme of uncertainty in science and the implications this has for communicating science to public audiences. In addition to a package presented by their science correspondent Susan Watts, which included a range of interviewees, Newsnight included an eleven minute studio discussion with Lord Lawson, Professor Bob Watson, the chief scientific adviser to DEFRA, and Yvo de Boer, formerly executive secretary of the UN’s Framework Convention on Climate Change.

Overall, about a fifth of air time went to those directly involved in the news events, a third to sceptics and half to other commentators. Max Boykoff has argued that the inclusion of sceptical voices in the reporting of climate change news is a form of bias affording minority and scientifically marginal views a status equal to that of the mainstream scientific consensus.⁴¹ The climategate inquiry was a story that involved sceptics since it was their

⁴¹ Maxwell T. Boykoff and Jules M. Boykoff (2004) ‘Balance as bias: global warming and the US prestige press’ *Global Environmental Change* 14, 125-136; Maxwell T. Boykoff (2008) ‘Lost in

criticisms of the CRU emails which made an inquiry necessary, and the inclusion of comment from prominent sceptics could be defended on these grounds. However, where controversial minority views are included, how precisely they are treated is significant. In the News at One package, Peiser was introduced after the reporter, David Shukman, asked: “So where does this leave climate science? Critics say the inquiry has been too shallow.” Although Peiser did not actually comment on the science, taken together with the titles labelling him as Dr Benny Peiser from Liverpool John Moores University, the reference to the science in Shukman’s link could be interpreted as positioning Peiser as an expert on climate science. By contrast, in the News at Six and News at Ten package, Shukman introduced Peiser immediately after talking about the role of “inquisitors” in the blogosphere: “This certainly won’t be the end of the affair according to the climate sceptic Benny Peiser.”

In the interview on World at One, Martha Kearney asked Nigel Lawson if he would leave the email issue alone now that the scientists have been exonerated, she pushed him on whether he accepted the inquiry findings, and she challenged his claims by stressing that the graph mentioned above was found to be misleading rather than an example of malpractice as Lawson implied. Lawson’s responses were reasonably lengthy although Kearney cut him off at the end. Kearney then put to Edward Acton that some charges against the university still stand and she put to him Lawson’s point about the graph. Lawson spoke first and for longer, but the views of both interviewees were tested.

In the interview on BBC Two’s Newsnight, Lawson spoke first and last, and for the longest total time. Of the fifteen questions presenter Gavin Esler asked during the discussion, five adopted a negative stance towards climate science or climate scientists (for instance, by stating that the scientists acted unwisely) and five were critical of climate policy making (by repeatedly referring to the 2009 climate talks in Copenhagen as a failure). Only one question referred to the scientists having been cleared and only one put the case for policy action (by citing the Stern report). Esler began by asking Lawson if he accepted the university’s claim that the CRU scientists had been completely exonerated. Although he then interrupted Lawson, his subsequent questions facilitated and elucidated Lawson’s points rather than challenging Lawson’s interpretation of the inquiry’s findings:

NL: ... I am quite sure that the scientists believed that when they were being secretive when they were manipulating the key graph and chart in a way that they shouldn’t have done

translation? United States television news coverage of anthropogenic climate change, 1995-2004’ *Climatic Change* 86, 1-11.

GE [interrupts]: And that – that’s hugely important in your view, that graph?

NL: Hugely important. I’m quite sure they were motivated by the fact that they thought this was an important cause they were pursuing but they did not behave in an appropriate manner

GE [interrupts]: I’m sorry to interrupt, but you make it sound like a religion – they believed in the cause.

NL: It is for them and that is one of the things I’m opposed to. ...

Contrast this with the following more robust exchange between Esler and Yvo de Boer:

GE: But I wonder whether, we’ll get on to full policy implications in a moment as Lord Lawson suggested, but I wonder if it took the foot off the neck of the politicians? They didn’t feel that somehow all the people of the world were breathing down their neck or holding them to get a deal. They could relax a bit because suddenly there was this doubt about whether the scientific evidence with these huge policy changes was correct?

YB: Well a hundred and twenty heads of state and government came to Copenhagen. They agreed a long-term goal in terms of maximum temperature increase. They mobilised hundreds of billions of dollars for support to developing countries. Many of them since then have signed up to the Copenhagen accord and have set national targets

GE [interrupts]: You see this as a success, because there are many many people who thought it was a fairly abject failure?

YB: I saw it as a success in terms of a political commitment on the part of all the major countries of the world to set goals for 2020 in terms of limiting their emissions.

As an example of how the sceptical viewpoint can be approached in an entirely different manner, we will also briefly refer to one programme that did not fall within our sample weeks but which was broadcast during the period of our research. On 28th June, the week before the Russell inquiry reported its findings, Panorama examined the climate change debate in an edition entitled “What’s Up With the Weather?” (a title which conflated weather and climate). The programme was notable for its attempt to demonstrate where all parties agreed, rather than, as is usually the case with controversies, focusing on where parties disagree. The programme interviewed a number of prominent climate scientists and climate sceptics and asked them to demonstrate on a graph how certain they were about various statements concerning climate change. Among those questioned at the start of the programme were people presented as ordinary members of the public. These respondents gave a wide range of views from very certain that manmade global warming is occurring to very certain that it is not. All other contributors, however, indicated a high level of certainty that mankind is contributing to global warming. By the end of the programme, the view of some members of the public that there was no basis at all in claims about manmade climate change was shown to be well out of line even with the views of influential sceptics. Perhaps unsurprisingly, the programme irritated those on both sides of the debate. Campaigners for action on climate

change were unhappy that the programme had given space to sceptics,⁴² whilst climate sceptics dominated the comments on an Editors blog on the programme with complaints about BBC bias and “hype” over global warming.⁴³

14.3 Genetically modified monkeys

Our second example of the BBC’s coverage of controversial science concerns the development of a group of genetically modified marmosets in Japan. In a paper published in *Nature* on 28 May 2009, a research group at Keio University announced that it had successfully created a line of transgenic marmosets modified with a fluorescent gene which causes them to glow under ultraviolet light. Whilst such genes had been introduced into primates before, this was the first time that the gene had transferred to offspring born to a modified animal. The work opened the possibility for the development of primate lines modified to express genes associated with certain diseases which could replace the reliance on modified mice in the study of those diseases, since primates model humans better than mice do. However, a News and Views commentary in *Nature* noted that marmosets are genetically further from humans than other primates and are not favoured by researchers in some specialisms.⁴⁴ An editorial in the same issue called for researchers to be better prepared to debate ethical issues around such experiments and noted that Japanese researchers were particularly reluctant to do so.⁴⁵

The story was covered in four BBC news programmes – including all the sampled news bulletins broadcast after the lifting of *Nature*’s press embargo, with the exception of Newsnight, as well as Newsround on the following day. We also retrieved the online news report of this story. All the broadcast reports included packages, the majority of which were devoted to the reporter’s explanations of the technique used and its relevance. The explanations, although brief, gave a clear account of the key points of the research. The reports explained that the fluorescent gene served as a marker to establish the success of the transfer and all noted that the significance of the latest experiments was that the introduced gene had been passed on to the animal’s young.

⁴² E.g., Dr Joseph Romm, climate-change blogger and former US Acting Assistant Secretary of Energy for Energy Efficiency and Renewable Energy; Joseph Romm (2010) ‘BBC’s Panorama falls into “balance as baloney” trap in half hour climate show’ *Climate Progress* 1 Jul. <http://climateprogress.org/2010/07/01/bbc-panorama-climate-show-whats-up-with-the-weather-flaws/>.

⁴³ ‘What’s Up With the Weather?’ *The Editors*. http://www.bbc.co.uk/blogs/theeditors/2010/06/whats_up_with_the_weather.html.

⁴⁴ David Cyranoski (2009) ‘Marmoset model takes centre stage’ *Nature* 459: 492. <http://www.nature.com/news/2009/090527/full/459492a.html>.

⁴⁵ Editorial (2009) ‘Time to connect’ *Nature* 459, 483. <http://www.nature.com/nature/journal/v459/n7246/full/459483a.html>.

All reports adopted the angle that the modified animals held promise for new treatments for human diseases but that they also raised ethical concerns according to animal rights campaigners. In most cases, both these factors were mentioned in the introduction, although the newsreader introduction for the News at Ten mentioned only the “good news” angle:

Now, scientists in Japan have created a monkey that can pass on implanted genes to its offspring. The findings are being seen as a breakthrough because monkeys are closely related to humans and scientists claim this could lead to major advances in the treatment of genetic diseases such as Parkinson’s. Our science correspondent David Shukman is with me here with more details. David.

None of the television reports included direct comment from the researchers. The report on Radio 4’s Six O’clock News did include such comment, but the poor line and indistinct speech of the researcher (we were unable to transcribe fully all that he said) provides an explanation for why this interviewee was not used in the television reports. Instead, the BBC One News at Six report used a representative from the Parkinson’s Disease Society who made cautionary remarks, stating that the research was the first stage in modelling Parkinson’s but noting that it was too early to say how long it would take to develop fully. The News at Ten and Newsround, included comment from a member of a family with Huntington’s disease, former NBC correspondent Charles Sabine who regularly speaks on the issue. Sabine was introduced as a relative of Huntington’s sufferers, rather than a journalist, and he made unqualified comments welcoming the research, speaking of a “ray of hope”. The BBC News Online article included comment from one of the co-authors of the research noting that the technique they had used to insert the gene limited the size of gene that could be transferred and that this might exclude studying Huntington’s with animals modified in this particular way. This was not mentioned in any of the broadcast items. Similarly, the difficulties of using the small-brained marmoset for studies of some neurological diseases were not mentioned in any of the reports.

All reports explicitly labelled the research as “controversial” and included a second interviewee from the British Union for the Abolition of Vivisection (BUAV). Newsround spoke to Michelle Thew, the Chief Executive of the organisation, who expressed concern about cruelty to animals and also expressed doubt that this approach would lead to new cures. The programme’s use of prose captions gave a straightforward statement of Thew’s interests – “She’s an animal rights campaigner” – even though BUAV was not mentioned. The other reports included comment from Jarrod Bailey, whom the online article described as “science consultant” to BUAV. The television reports relied on captions to describe Bailey, and these simply named BUAV. Neither the three broadcast reports nor the online report gave his title

of Dr, even though he holds a PhD in viral genetics. By contrast, the representative of the Parkinson's Disease Society in the News at Six was referred to as Dr. Whilst this selective use of titles may follow the interviewees' own decisions about whether or not to use their titles, it nevertheless invests scientific authority in some speakers (in this case in someone who, whilst expressing caution about timescales, was welcoming of the research) whilst denying that authority to others (in this case, the person raising more fundamental objections which could be dismissed by some as being anti-science). In other words, even the trivial detail of omitting a title can serve to position opposition to research as coming from outside science and resulting purely from differing value systems, rather than as a scientifically informed viewpoint – an interpretation which was encouraged in two of these packages by the reporter prefacing Bailey's comments with the statement: "Critics say this research is just wrong."

15. Conclusion

The results presented above reveal BBC science coverage to be diverse both in terms of subjects covered and programme types. It is also largely accurate in terms of avoiding misleading factual errors. The coverage is informative but rarely investigative. It is reactive rather than proactive. It celebrates science but rarely critiques it. A range of presenters and journalists are employed, including a number who specialise in science, yet journalists' specialisms are made apparent relatively infrequently in news reporting overall.

There is also diversity in the contributors who appear in science items, but in general science on the BBC is represented by UK-based male scientists. Other voices are heard, but there is rarely any conversation or debate amongst scientists or between scientists and others. Contributors' expertise is implied but its precise nature and relevance is not always made explicit, there are inconsistencies in the use of academic titles, and the funders of research are rarely mentioned. Where alternative voices are heard, they tend to come either from communication professionals who specialise in the issue at hand, or from individuals or institutions with an entrenched position in a polarised debate. Differences of opinion are typically construed as controversies, often irresolvable ones based on differing value systems, and, as some of the examples discussed above have shown, claims are not always tested in a robust manner.

The results of science are reported, and the development of ideas is sometimes described, but the processes of science – the methods, problems and debates – are usually missing. In news

items science is typically presented as a finished product and in non-news it is often presented through dramatic narratives whose closure implies that the scientific questions are also closed. Science is separated from policy, and from politics, and news coverage of research rarely moves far from public relations material.

It is not suggested that any of these features are unique to BBC science coverage. They arise out of a complex interplay of factors including journalists' workloads, perceptions of audience expectations, genre norms, scientists' behaviour towards the media, journal policies regarding press embargoes and the confidentiality of peer review, institutions' PR strategies, and the physical constraints of different media. Which of the features we have identified should be taken as failings and which as successes, and which, if any, have a bearing on the questions of impartiality and accuracy, is open to debate and is not something that content analysis can answer.

APPENDIX ONE – Coding categories

Below are definitions of the key categories used in the coding frame for broadcast news items. The coding frames for non-news and online items were adapted from the news coding frame with some modifications to accommodate medium or genre specific features.

Science prominence

Science item: science (as defined below) is a central component in the item.

Alludes to science: a brief undeveloped reference to science (as defined below). Included in this category are any items which may be inferred to involve science or which may have a potential science angle, but where this has not been developed within the item beyond a brief reference, or which include explanation based on established scientific knowledge but have not met the required criteria for a science item.

No science: no reference to science; use of the word “science” or scientific terminology out of context without reference to scientific claims or activities; reference to facts which can reasonably be ascribed to general knowledge or to the standard knowledge base of professional practitioners (e.g., medical doctors, engineers).

For the purposes of coding, science was defined as:

- activities or findings from the natural sciences, the applied sciences, medical science, or mathematics;
- activities or findings which are referred to as scientific;
- references to scientific institutions (e.g., the Royal Society, research institutes, NASA);
- references to individuals who are identified as having scientific expertise either by virtue of their disciplinary base (e.g., introduced as a “biochemist”, “physicist”, “scientist”, etc.) or by their institutional role (e.g., “Chief Medical Officer”, “President of the Royal Society”);
- references to individuals who are identified as being “experts”, or “researchers”, or equivalent, where the implied subject of their expertise is the natural sciences, the applied sciences, medical science, or mathematics;
- statements made by media professionals who are identified within the item as having a specialism in science (e.g., science journalists);
- the research and development stage of new technologies.

Not *sufficient* to define as science, unless also involving one or more of the above, were references to:

- social research, economics, criminology, and all other social sciences;
- archaeology unless pertaining to palaeontology;
- statistics, numbers or graphs;
- claims made by researchers whose expertise is in the social sciences;
- events in medical clinical practice or engineering professional practice except where presented as illustrating research in medical science or engineering science or except where involving statements about recent new knowledge or current lack of knowledge;
- health policy, climate policy, energy policy or environment policy, unless involving claims by scientists or statements about scientific findings;
- statements made by media professionals who are identified within the item as having a specialism in the environment, health or technology;
- the commercial launch of new technologies whose technical feasibility is already established;
- the economics of, or consumer or adoption issues around, new technologies;
- education issues unless explicitly referring to the science curriculum, university science departments or the need for future scientists;
- space industry news unless relating to a scientific research mission or development of a new space technology.

For example, an item about a call for action on public health may cite evidence of how certain behaviours cause ill-health. If the item attributes the call for action to a scientist, the item is coded as a *science item*. If the item attributes the call for action to a non-scientist but presents it as a response to recent research findings, it is coded as a *science item*. If the evidence is only referred to with the statement “research shows lack of exercise causes ill health” and no further reference is made to the evidential base for this or to scientists making such claims, the item is coded as *alludes to science*. If the item makes no reference at all to scientific evidence or to scientists but does make commonsense statements about health and exercise, the science prominence of the item is coded as *no science*.

Scientific field

Physical sciences: all physical sciences excluding engineering and technology and climate science. Items about extraterrestrial life are coded as physical sciences.

Life sciences: all biological sciences excluding medical science and climate science. Items about palaeontology are coded as life sciences.

Medical science & technology: all stories relating to medical developments.

Climate science & technology: all stories relating to climate change, the study of the climate, or climate mitigation technologies.

Engineering & technology: all technology development except medical technologies and climate mitigation technologies. For items about new technologies produced specifically for scientific research, if the item focuses on what the technology will be used for, this is coded as the research field it will be used in; if the item focuses on the construction or development of the technology, this is coded as the scientific field in which the technology will be used.

Mathematics: developments in mathematics research; for applications of mathematics in other scientific fields, code for the latter not as mathematics.

Mixed: stories which refer to more than one different field.

General: stories which relate to science or technology in general (e.g., some stories about science policy or science education may fall in this category).

Other: none of the above apply.

Studies relating to the environment but not referring to climate change are coded as:

- *life sciences* if the story is about eco-systems, wildlife population surveys, impact of pollution on wildlife, GM foods, etc.;
- *physical sciences* if the story is about atmospheric chemistry, geology, radiation levels, etc.

News event

This category is based on the story not the treatment within the item. Sub-stories within long-running stories may have different news events; all items covering sharply time-delimited stories have the same news event.

Research: ongoing or completed research; e.g., publication of a research paper.

Science policy: events concerning policy-making or implementation of policy in science or events concerning the management or conduct of scientific research.

Health policy: events concerning policy-making or implementation of policy in health. Events relating to policy over illegal drugs and substance abuse are coded as *health policy*.

Environment & energy policy: events concerning policy-making or implementation of policy regarding the environment, the climate or energy.

Natural event/accident: an accident, natural disaster or some other unplanned or uncontrolled event has occurred. Stories that involve policy responses to a natural event (e.g., a disease outbreak), are coded under the appropriate *policy* heading.

New technology: development or trial of a new technology.

Other statement by scientist: claims made by a scientist other than those relating directly to that scientist's own research or those relating to a policy event.

Other: any events not covered by the above categories.

Policy is taken as the planned actions or positions of an official body or discussions about what actions or positions an official body should take.

Reporter's beat

Coded as given in the item under the following categories:

Science

Health/medicine

Technology

Environment

Political

Home

World: any correspondent whose beat is a particular country overseas (e.g., India correspondent or Middle East editor) or whose beat is world affairs in general

Economics

Business

Other: if the beat is given but is not in the list above

Unknown

Not applicable: there is no reporter; e.g., the item is presented by the newsreader.

If the reporter's specialism is not stated in the item, the beat is coded from the list below or, if not listed below, coded as *Unknown*.

David Shukman: environment

Fergus Walsh: health/medical

Jonathan Amos: science
 Pallab Ghosh: science
 Richard Black: environment
 Roger Harrabin: environment
 Rory Cellan-Jones: technology
 Sarah Mukherjee: environment
 Susan Watts: science
 Tom Feilden: science
 Victoria Gill: science

News contributors

These are named or unnamed individuals who speak directly to camera/mic during an item. (For online items, institutions quoted directly without reference to an individual are also included as contributors. In addition, for online items, news participants paraphrased or referred to but not quoted directly are recorded under additional categories.)

The following are not included as news contributors:

- generic references to types of people or groups;
- journalists, reporters or news presenters;
- non-human agents such as animals or machines;
- anyone speaking in clips of other media output (e.g., feature films, adverts) embedded within an item.

Contributor gender

Male

Female

Unknown: the gender of the contributor cannot be discerned.

Contributor expertise

This category seeks to identify whether or not a contributor is presented within the report as having some form of institutionally legitimated expertise, and if so, what form of expertise this is. This list is hierarchical. The categories *explicit scientific* and *implicit scientific* were included separately to facilitate coding but were combined into one *scientific* category for the purposes of analysis.

Explicit scientific: anyone who is identified within the item as a “scientist” or as belonging to a scientific discipline or who holds an office that is perceived as relating to science (e.g., Chief Medical Officer) or who explicitly refers to their own involvement in scientific research.

Implicit scientific: anyone who appears to have scientific expertise but is not explicitly identified as a scientist within the item; e.g., a contributor who has the title of professor or works at a university and who is talking about the science but has not been explicitly labelled as scientist, or a laboratory head or director of an institute who is talking about the science. Members of advisory committees whose work draws on scientific evidence should be coded as *implicit scientific* unless their scientific status is made explicit.

Clinical: a medical doctor or other healthcare provider who is not a research scientist and who speaks in their capacity as a healthcare provider or clinical practitioner. Medical doctors given the title professor and a university affiliation are coded as *scientific*.

Non-science academic: anyone who is identified within the item as being an academic or researcher in a field other than the natural sciences, medicine or engineering; e.g. a social scientist, an ethicist, etc.

Other professional expertise: anyone who speaks in a professional capacity but does not belong to any of the above categories. All those affiliated to a charity or NGO and not given an academic title are coded as *other professional*, as are all those with governmental affiliations.

Lay: someone who is either not presented as having expertise or someone whose expertise is denoted as non-scientific and non-professional (e.g., a hobbyist, a parent).

Unknown: the item implies professional expertise on the part of the speaker but gives insufficient information to identify the nature of their expertise.

Title of contributor

Dr

Professor

Other: this includes titles such as Lord, Sir, Dame, Justice, Reverend.

None: no title is given within the item or the title given is Mr, Ms, Mrs, Miss.

Where a contributor is referred to as both Professor and another title, this is coded as Professor.

Institutional affiliation of contributor

Advisory body: a body (usually of experts) set up by the government to advise on policy. The institutional affiliation of government advisors is coded as *advisory body*.

Charity/NGO: a non-governmental non-commercial organisation that is formally constituted; i.e., an organisation that is likely to have charitable status or be not-for-profit such as a patient support group or an action group or lobby group.

Religious: any religious institution.

Government/political: local or national government, or the EU Commission, and departments or units within, or attached to, these organisations; a member of a local council, a national parliament, or EU parliament other than those who belong to the government, or a group that is presented as a political party. Lords are only coded as having a *government/political* affiliation if they are either speaking as members of political parties or if they are speaking in their capacity as members of the House of Lords or members of parliamentary select committees.

Healthcare provider: the NHS, a hospital, or other institution providing healthcare. Medical schools are coded as *university*.

Industry: any commercial company, other than media organisations, or manufacturer or industry association.

International body: any international public body that operates with the sanction of member states; e.g. the UN and UN organisations, NATO, G8, the IPCC.

Media: any media company or organisation whose role is communicating to public audiences, including museums unless the museum is referred to in its capacity as a research organisation.

Military: any of the armed services.

Public body: any autonomous national public body that is funded by government but is not part of the government itself; this includes regulatory bodies, executive agencies, official watchdogs, etc. E.g., Ofcom, Schools Inspectorate, HEFA.

Research institute: a research institute other than those labelled as belonging to a university.

Scientific society: a membership or fellowship organisation representing scientists, such as the Royal Society, Institute of Physics, US National Academy, etc.

University: any higher education institution or department or institute attached to a higher education institution.

Other: an organisation that does not fit any of the above categories.

None given: no institutional affiliation is given within the item.

Cautionary comments

Where speakers express an attitude towards scientific claims or statements made by scientists, does the contributor make any cautionary comments? Note that this is an assessment of the contributor's attitude to the claim being made, not an assessment of their attitude towards science in general. Coded as *yes* or *no*. Where speakers do not express an attitude towards scientific claims or statements made by scientists, or where no attitude could be discerned, coded as *not applicable*.

Cautionary comments are where the contributor notes some problems or limitations but does not challenge the events, findings or statements being reported on a more fundamental level. For example, for proposed new technologies, this may mean costs are posed as a problem; for research findings, the limitations of the study – small sample size, etc. – may be noted. If the contributor is ambivalent, both making supportive comments and noting limitations, this is coded as *cautionary*.

Oppositional comments

Where speakers express an attitude towards scientific claims or statements made by scientists, does the contributor make any oppositional comments? Note that this is an assessment of the contributor's attitude to the claim being made, not an assessment of their attitude towards science in general. Coded as *yes* or *no*. Where speakers do not express an attitude towards scientific claims or statements made by scientists, or no attitude could be discerned, coded as *not applicable*.

Oppositional comments are where the contributor challenges the intentions of the news source, the validity of the claims being made, the desirability of the goals aimed for, or the assumptions on which the news events are based. For example, for proposed new technologies, the contributor may reject the need for the technology or may claim that the technology brings unacceptable or unforeseen risks; for research findings, the contributor may question the theoretical framework on which the study is based.

Approach of item

What was the overall approach of the item?

Informational: the item or programme conveys information about the events or ideas presented. This may include seeking, or giving, clarifications or explanations about the events or ideas. This option applies only if neither of the other two categories applies.

Questioning/investigative: the item calls news participants to account, challenges contributors' claims, or claims to uncover otherwise hidden information or activities.

Light-hearted: the item is signalled as light relief, or the reporter or interviewer appears amused by the topic of the item or by the contributors.

Tone of item

What is the overall tone of the item?

Positive: overall, the tone is upbeat with the story presented as good news, implying that the news events are to be welcomed or applauded, or the news events are presented as a significant contribution or are described with enthusiasm.

Neutral: either there is no discernable positive or negative tone, or positive and negative points are equally weighted giving a sense of a neutral report.

Negative: overall, the story is presented as bad news, implying that the news events are of concern.

Interviewer humour

Is the interviewer joking, laughing or speaking in a jocular fashion, even if only very briefly? Coded as *yes* or *no*. Coded as *not applicable* if there is no studio interview.

Interviewer aggression

This category refers to the tone or attitude of the interviewer rather than the content of what they say. Is the interviewer aggressive or dismissive in their manner towards the interviewee? Coded as *yes* or *no*. Coded as *not applicable* if there is no studio interview.

Links to website

Does the item direct the viewer/listener to the BBC website for further sources of information? Coded as *yes* or *no*.

Experimental design mentioned

Is any mention made of the experimental design through which the scientific results were obtained or the technology developed or tested? Coded as *yes* or *no*. Coded as *yes* even if the mention is very brief and superficial; for instance, if there is any mention of sample size, double-blind trials (or lack thereof), replication, statistical tests, etc.

A reference to what the scientist did is not coded as *yes* unless it gives some insight into how reliable or robust the experiment or test was.

Controversy indicated

Is there any indication that the science or technology being reported is a matter of controversy? Coded as *yes* or *no*. If no research or technology is reported in the item, coded as *not applicable*.

Controversy may be indicated by the presence of contributors with opposing views; or it may be indicated by the use of words such as “controversy”, “controversial”, “debate”, “disagreement”, “conflict”.

Uncertainty indicated

Is any reference made to science or technology being uncertain? For instance, is the science or technology being reported referred to as provisional, tentative, a pilot study, preliminary results, etc.? Are limitations of the experimental design or the feasibility of a technology mentioned, or is the hypothesis of the research study questioned? Or is any reference made to the provisional nature of science in general? Coded as *yes* or *no*. Note that since this category covers any comments about uncertainty in science in general as well as comments about any specific research being reported, *not applicable* was not an option.

Funder mentioned

Does the item explicitly state who funded the research or technology being reported? Coded as *yes* or *no*. If no research or technology is reported in the item, coded as *not applicable*.

Publication mentioned

Does the item refer to a formal print publication (already published or forthcoming) as the source of any scientific claims or findings mentioned in the item? A formal print publication might be a report from an institution such as government, a journal article, a book, etc. Blogs or other self-published material are not counted as publications. Coded as *yes* or *no*.

Peer review mentioned

Is peer review mentioned? Coded as *yes* or *no*.

Inaccuracy

Drawing on their knowledge of science, coders were asked if they were aware of any factual inaccuracies, or any statements that were materially misleading, within the item's coverage of the science. If *yes*, they gave a short free text summary of the inaccuracies as they perceived them. Any omissions, simplifications or changes in emphasis which may have been technically unsatisfactory but which were not factually incorrect and were not likely to mislead the intended audience (i.e., non-scientists) were not counted as inaccuracies.

APPENDIX TWO – Intercoder reliability statistics

	% agreement
Number of items	98
Date	99
Platform	97
Programme	100
Science prominence (science items)	89 (94)
Scientific field	90
Name of reporter	97
Reporter's beat	90
Speaking order of contributor	100
Name of contributor	100
Gender	100
Expertise	91
Title	99
Name of institution	99
Cautionary comments	86
Oppositional comments	98
Total time in package (to within a second)	92
Total number of speaking contributors	98
Approach of item	99
Tone of item	78
Interviewer humour	97
Interviewer aggression	100
Links to website	99
Experimental design mentioned	84
Controversy indicated	98
Uncertainty indicated	82
Funder mentioned	95
Publication mentioned	93
Name of publication	100
Peer review mentioned	100
Inaccuracy	99
Item duration (to within 5 seconds)	96

Table 13: Intercoder reliability statistics.

N.B. News events and institution types were categorised by the project leader on the basis of a free text description of the story topic and the institution name provided by the coders and, if required, after additional viewing of the item.

APPENDIX THREE – Data tables for news items

Programme	Science			Alludes to science			No science			Total no. of items
	2009	2010	Total	2009	2010	Total	2009	2010	Total	
BBC One Breakfast	28	16	44	19	14	33	371	369	740	817
BBC One News at One	13	9	22	10	8	18	212	207	419	459
BBC One Newsround	10	1	11	6	3	9	74	76	150	170
BBC One News at Six	19	12	31	8	5	13	180	192	372	416
BBC One News at Ten	13	7	20	8	3	11	180	176	356	387
BBC One Weekend Evening News	5	3	8	1	2	3	50	43	93	104
BBC Two Newsnight	6	6	12	7	3	10	125	122	247	269
BBC News Channel at 5pm	21	7	28	19	14	33	370	375	745	806
BBC News Channel Click	2	2	4	0	0	0	17	15	32	36
<i>Total BBC television</i>	<i>117</i>	<i>63</i>	<i>180</i>	<i>78</i>	<i>52</i>	<i>130</i>	<i>1579</i>	<i>1575</i>	<i>3154</i>	<i>3464</i>
Radio 1 Newsbeat 12.45	4	3	7	4	4	8	150	143	293	308
Radio 1 Newsbeat 17.45	3	4	7	5	5	10	155	139	294	311
Radio 4 Today	33	42	75	26	22	48	408	426	834	957
Radio 4 World at One	3	6	9	9	2	11	187	215	402	422
Radio 4 PM	16	8	24	15	8	23	392	413	805	852
Radio 4 Six O'clock News	10	10	20	10	8	18	345	351	696	734
Radio 5 Live Breakfast	23	14	37	12	12	24	368	377	745	806
<i>Total BBC radio</i>	<i>92</i>	<i>87</i>	<i>179</i>	<i>81</i>	<i>61</i>	<i>142</i>	<i>2005</i>	<i>2064</i>	<i>4069</i>	<i>4390</i>
<i>Total BBC</i>	<i>209</i>	<i>150</i>	<i>359</i>	<i>159</i>	<i>113</i>	<i>272</i>	<i>3584</i>	<i>3639</i>	<i>7223</i>	<i>7854</i>
ITV News at Ten	-	5	5	-	0	0	-	173	173	178
Channel 4 News	-	16	16	-	7	7	-	377	377	400
Sky News at 5pm	-	7	7	-	9	9	-	329	329	345
<i>Total commercial television</i>	<i>-</i>	<i>28</i>	<i>28</i>	<i>-</i>	<i>16</i>	<i>16</i>	<i>-</i>	<i>879</i>	<i>879</i>	<i>923</i>
<i>Total</i>	<i>209</i>	<i>178</i>	<i>387</i>	<i>159</i>	<i>129</i>	<i>288</i>	<i>3584</i>	<i>4518</i>	<i>8102</i>	<i>8777</i>

Table 14: Number of broadcast news items sampled.

	Total duration (sec)	Number of items	Average duration (sec)	Average duration (min)
BBC One Breakfast	5164	44	117.4	1.96
BBC One News at One	3054	22	138.8	2.31
BBC One Newsround	1078	11	98.0	1.63
BBC One News at Six	3743	31	120.7	2.01
BBC One News at Ten	3500	20	175.0	2.92
BBC One Weekend Evening News	665	8	83.1	1.39
BBC Two Newsnight	7340	12	611.7	10.19
BBC News Channel at 5pm	5862	28	209.4	3.49
BBC News Channel Click	961	4	240.3	4.00
<i>Average BBC television</i>			<i>174.3</i>	<i>2.90</i>
Radio 1 Newsbeat 12.45	991	7	141.6	2.36
Radio 1 Newsbeat 17.45	775	7	110.7	1.85
Radio 4 Today	10031	75	133.7	2.23
Radio 4 World at One	2660	9	295.6	4.93
Radio 4 PM	5402	24	225.1	3.75
Radio 4 Six O'clock News	2346	20	117.3	1.96
Radio 5 Live Breakfast	3320	37	89.7	1.50
<i>Average BBC radio</i>			<i>142.6</i>	<i>2.38</i>
<i>Average BBC</i>			<i>158.5</i>	<i>2.64</i>
Channel 4 News	2578	16	161.1	2.69
ITV News at Ten	670	5	134.0	2.23
Sky News at 5pm	1217	7	173.9	2.90
<i>Average commercial television</i>			<i>159.5</i>	<i>2.66</i>

Table 15: Duration of broadcast news items about science; the total duration is the sum of the duration of all science items in the sample for each programme.

Originating web site	Science	Alludes to science	No science	Total no. of items
News	15	12	269	296
Health	47	7	80	134
Science & Environment	82	26	31	139
Technology	10	2	112	124
<i>Total unique items</i>	<i>130</i>	<i>41</i>	<i>469</i>	640

Table 16: Number of BBC online news items sample. Totals in the bottom row are less than the sum of the rows above because some items appear in more than one section. Items appearing on more than one day within one section are counted only once.

APPENDIX FOUR – Transcript of Newsnight studio interview, 7 July 2010, on the Independent Climate Change E-mails Review

Gavin Esler: I'm joined by Yvo de Boer, who led the UN negotiations on climate change until a week ago, by the former chancellor Lord Lawson of the Global Warming Policy Foundation who campaign about what they say is the domination of the climate change debate by those who believe strongly in its existence, and by Bob Watson Chief Scientific Advisor at the Department of Environment who also worked with the UN panel on climate change. Lord Lawson, you heard there in that report the Vice-Chancellor of the university saying it was a complete exoneration of the scientists involved. Do you accept that?

Nigel Lawson: No of course not, and you've already had a number of things on the programme already that have shown that there are a lot of things that went wrong and the matter is not over. I am quite sure that the scientists believed that when they were being secretive when they were manipulating the key graph and chart in a way that they shouldn't have done

GE [interrupts]: And that – that's hugely important in your view, that graph?

NL: Hugely important. I'm quite sure they were motivated by the fact that they thought this was an important cause they were pursuing but they did not behave in an appropriate manner

GE [interrupts]: I'm sorry to interrupt, but you make it sound like a religion – they believed in the cause.

NL: It is for them and that is one of the things I'm opposed to. I think we need to look objectively, not merely at the science which is – which is – has a number of uncertainties and some things which are clear but there are a number of things also that are uncertain, but also what are the impacts and you heard already about the Dutch finding, the Dutch environmental council finding that the IPCC have produced a very unbalanced account of the impacts. And finally is the question of the policy. You mentioned that I'm chairman of the Global Warming Policy Foundation. Policy is in the name because this decarbonisation policy, which the world is officially on, I don't think it's going to happen but the world is officially on that track, simply does not make economic sense.

GE: Do you accept that this has been, even though the scientists have been called honest and rigorous and so on, that this has actually been quite disastrous for their campaign because it casts huge doubts, which people still talk about, they talk about it in the pubs, they talk about it in the newspapers, and they talk about it in learned journals too?

Bob Watson: The first thing that is very important is not only this report but Lord Oxburgh's report, the House of Commons report, all stated there is no reason to question the science. Not only is the integrity of these scientists completely honest but also their data is honest and they did not in any way adversely influence IPCC

GE [interrupts]: But they did act very unwisely did they not?

BW: They should have had more openness and transparency in their data and in their computer codes, there is no question whatsoever, and it has indeed had damage in the way it's been portrayed to the public and we have to regain the trust, we have to make sure the public understand what do we know, what are the uncertainties and what the implications are of what we know and where the uncertainties are.

GE: But you presumably would welcome that debate, you'd welcome more transparency and that would allow you then to move forward to talk about the policy impacts, different [unclear]?

NL [interrupts]: Absolutely, absolutely. There needs to be more debate and more openness and indeed my foundation will be publishing quite shortly an informed evaluation of all three reports because, er, which are not completely as Bob Watson says because there are a number of serious criticisms made of the CRU scientists in the House of Commons reports.

BW [cuts in]: But also recently the US National Academy of Sciences has also issued a series of reports. One of them was on the basic science of climate change and it completely confirms the key findings, the most important findings of the IPCC. That is to say, we humans are changing the composition of the atmosphere, the earth's climate is changing and the only way we can explain the majority of the observed changes is human activity.

GE: Let me bring in Yvo de Boer then. Did this background help torpedo any kind of real deal at Copenhagen?

Yvo de Boer: I don't think it helped to torpedo a deal in Copenhagen. In fact, I would argue that there was a good deal in Copenhagen but I, you know, addressing the threat of climate change means a fundamental change in the direction of global economic growth. And to convincingly bring about that change you need to base the policy on strong science and I think that the scientific message has suffered as a result, perhaps not so much of what happened in the University of East Anglia but the broader criticism of the IPCC.

GE: But I wonder whether, we'll get on to full policy implications in a moment as Lord Lawson suggested, but I wonder if it took the foot off the neck of the politicians? They didn't feel that somehow all the people of the world were breathing down their neck or holding them to get a deal. They could relax a bit because suddenly there was this doubt about whether the scientific evidence with these huge policy changes was correct?

YB: Well a hundred and twenty heads of state and government came to Copenhagen. They agreed a long-term goal in terms of maximum temperature increase. They mobilised hundreds of billions of dollars for support to developing countries. Many of them since then have signed up to the Copenhagen accord and have set national targets

GE [interrupts]: You see this as a success because there are many many people who thought it was a fairly abject failure?

YB: I saw it as a success in terms of a political commitment on the part of all of the major countries of the world to set goals for 2020 in terms of limiting their emissions.

GE: What do you make of the comment by your successor Christina Figueres who says "I do not believe we will ever have a final agreement on climate change, certainly not in my lifetime."?

YB: What she was talking about there is that if you look at what the science community is telling us, namely that we need an 80% reduction of emissions by industrialised countries by the middle of this century and a global reduction of 50% by the middle of this century, then it's going to take many negotiating rounds to get to that final result. She was not giving up on the process as a whole.

GE: But given the economic impact, I'm going to come back to the others on that in just a second, given the economic impact on all our lives if there is any kind of doubt about the good faith of the scientists or how they put things together, or whether they were

unintentionally misleading, whatever the phrase you want to use, if people's jobs and the economies of the world are at risk, that puts much less pressure on the politicians to come to a deal, doesn't it?

YB: Yes, but the risk there is that if you look at the Stern Report on the economics of climate change that basically told us that the risk of failing to act on climate change in economic terms is much bigger than the cost of acting on climate change. [Cut to Bob Watson nodding.] And the problem we are in at the moment is that the question marks that have been raised against the scientific findings are making it more difficult for politicians to make some of the fundamental changes possible that need to be made.

GE: Do you accept some of that? First of all, that it makes it more difficult for politicians to make these fundamental changes, and secondly that as the Stern Report says our economic future is dependent upon doing something about climate change rather than suggesting it doesn't – it's not manmade and it's not as serious an issue?

NL: I have yet to discover a reputable environmental economist who accepts the Stern alarmism. Not one. They have, in all the learned journals it has been completely rubbished. There is a more interesting economic analysis actually in the IPCC's most recent report and the IPCC, and this helps us to get things into perspective, the IPCC if you take their worst estimate of warming, the highest end of warming, their worst economic scenario, they still say that all the consequence will be is that living standards in the developing world in a hundred years time, instead of being a little more than nine times as high as they are today, will only be a little more than eight times as high as they are today. That's hardly a disaster I hope, it won't be bad and if you look at the cost of decarbonisation, the cost is massive. And as for Copenhagen, I think Mr de Boer is the only person in the whole world who thinks Copenhagen was a success. [Cut to de Boer laughing.] In fact it was a complete fiasco.

BW: No, first Copenhagen was a step in the right direction. It was only a step in a long journey. There was progress in a number of areas, but clearly less than some would have hoped for. It's not just Stern who's argued the cost of action is actually less than the cost of inaction. The cost of inaction is quite considerable, even by some of the IPCC analyses. The rate of slow down of economic growth even by the IPCC analysis is quite modest compared to the risks we're putting ourselves at. So we have to look at the issues of how could climate change, almost certainly caused by human activity, how will it affect food security, energy security, security as a whole, and clearly we need to make steps to a low carbon economy and

there are opportunities in these for the private sector in green technologies, and so there is a whole area where we can look at the whole issue of environmental technologies.

GE: Do you think that this report today does draw a line and that people will move on from whatever Copenhagen was, failure or success – small success – depending on your views?

YB: Well it draws a line, but it doesn't draw a line on the whole story. I mean there were other criticisms of the IPCC, for example on this question of how will rain-fed agriculture in Africa be affected, how will the disappearance of the Himalayan glaciers affect water supply? Those are some of the questions that are still outstanding I think in the minds of many people

GE [interrupts]: You are said to have talked recently to Sir David King the former chief scientist here who is certainly no climate change denier and he says setting what he calls impossible targets is actually counter-productive because it turns people off, and this is a time when people are most concerned about their jobs?

YB: Well, I absolutely agree that this is not the time, it's never the time, to set impossible targets, but Lord Lawson just said

GE [interrupts]: He said the EU targets were virtually that, 30% reduction by 2020.

YB: Lord Lawson said that I'm the only person who believes in the success of Copenhagen. A hundred and twenty seven countries have signed up to the Copenhagen accord, all industrialised countries have submitted targets for the year 2020, 35 developing countries, all of the big ones, have submitted national action plans. So I think we saw in Copenhagen a sea change in terms of climate change policy.

GE [off camera, overlapping]: Sea change?

NL: Let's look at the reality. It is not simply a question of people being concerned about the costs in terms of what it means for jobs, employment and so on. If you look at it from the perspective of the developing world, particularly big developing countries like China and India, China's being going ahead very very fast, India a great deal, their priority and they refused the binding deal at Copenhagen, that's the main reason why it all fell apart and they were absolutely right to do so in my judgement because their priority is economic development. They still have tens of millions of their people without electricity, tens of

millions of their people suffering disease, malnutrition, premature death, and therefore they don't want to move from cheap energy to more expensive energy which will slow down.

GE: OK, we'll leave it. Thank you all very much.