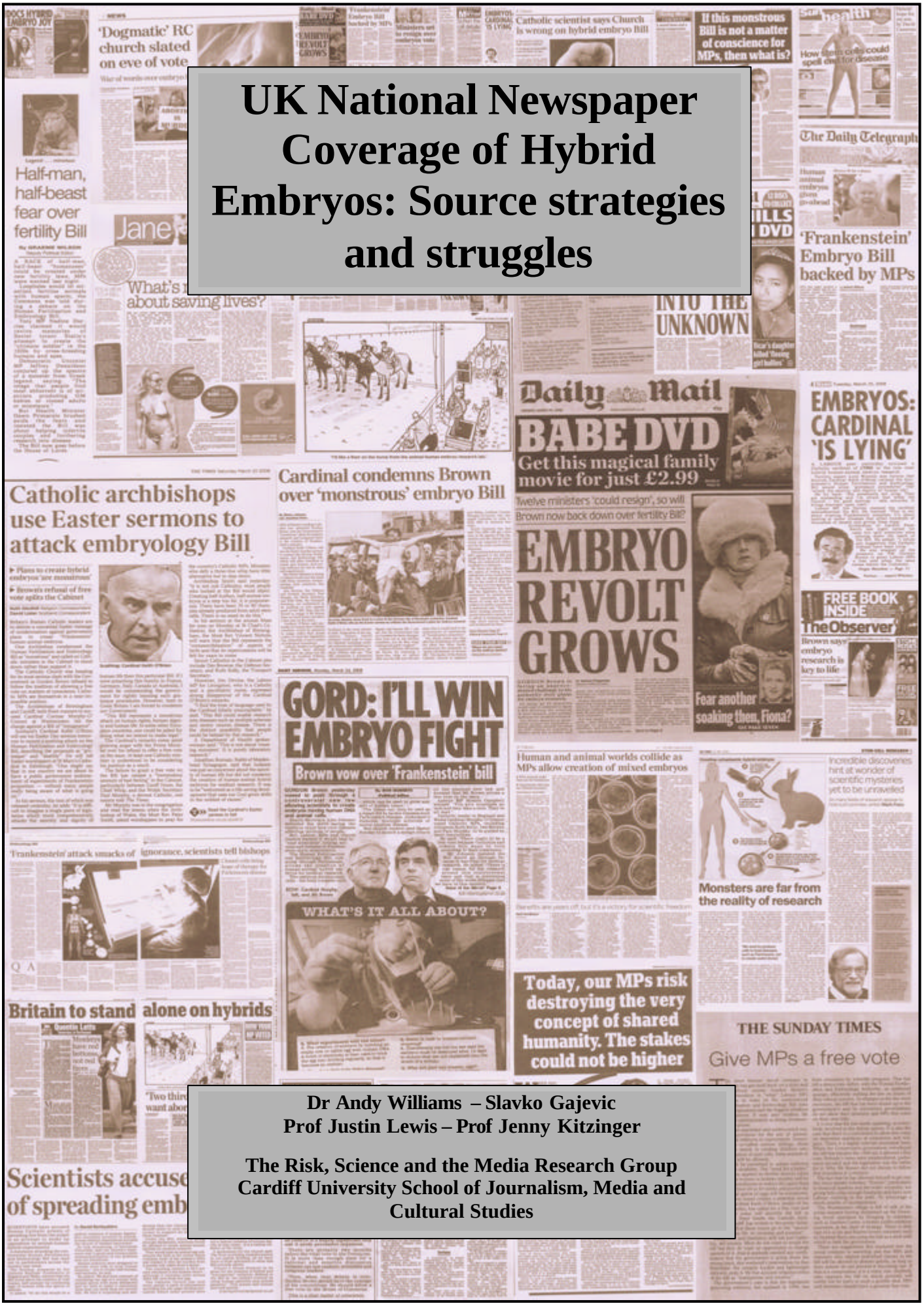

UK National Newspaper Coverage of Hybrid Embryos: Source strategies and struggles

Dr Andy Williams – Slavko Gajevic
Prof Justin Lewis – Prof Jenny Kitzinger

The Risk, Science and the Media Research Group
Cardiff University School of Journalism, Media and Cultural Studies

Executive Summary

This report examines the media debates around animal-human admixed embryos as a struggle for favourable coverage between different groups of news sources. The newspaper reporting of hybrid embryos offers insight into an often bitterly fought war of words between two broad interest groups: a large and powerful coalition of scientists, funding bodies, charities and pro-hybrid politicians on the one hand; and on the other, a less cohesive group of religious figures (principally Catholics), ethicists, campaigners, and anti-hybrid embryo politicians. This study also offers insights into the quiet tactical work of media management that usually underpins such struggles.

Overall, the struggle was won by those in favour of hybrid embryos. Newspaper coverage contained more pro-hybrid sources than anti-hybrid sources: **53% of quoted sources were in favour of allowing admixed embryos to be created for stem cell research, compared with 34% who were against, and 13% who were neither clearly for nor against.** This victory for the supporters of hybrids was also clear from the overall numbers of pro- and anti-hybrid stories in the sample. **Almost half (45%) of news items we analysed were broadly in favour of hybrids, around a third (35%) were neither in favour nor against, and one fifth (20%) were broadly against.**

In both cases, when we look at the figures in more detail some important nuances emerge:

- **Pro-hybrid scientists were the source group quoted most often (they made up 27% of all quoted sources). The largest discrete group of sources quoted against hybrids were religious representatives (14%).**
- **Pro-hybrid sources dominated coverage during 2006 and 2007 more than they did during 2008** after the entrance of the Catholic Church into the source struggle, and after the practice became subject to parliamentary debate and votes
- **Journalists with a science or health specialism were more likely to write stories which quote pro-hybrid news sources** than other journalists, and they were also more likely to write stories which were broadly in favour of the science
- As a proportion of their coverage, the **broadsheets cited more pro-hybrid sources than the popular newspapers**, and also wrote more broadly pro-hybrid stories. Overall, tabloids and mid-market newspapers cited a more equal distribution of pro- and anti-hybrid sources than broadsheets
- **Proportionally, the *Daily Mail* (and the *Mail on Sunday*) cited slightly more anti-hybrid sources than other papers** (50% against and 42% in favour), **and the *Guardian* (and the *Observer*) quoted somewhat more pro-hybrid sources than most others** (60% in favour and 26% against)

Taken together our data paint a picture of press coverage over a three-year period which was very broadly in favour of allowing the creation of hybrid embryos to be used in stem cell research both in terms of the sources quoted, and the reproduction of key messages, arguments, and rhetoric. **In the source struggle between the two broad groups of news sources active in the debate, those who supported hybrids won a clear, if contested, victory.**

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Introduction: source struggles and the media debate around hybrid embryos

The media debate on hybrids

This is a study of the UK national press coverage of animal-human hybrid embryos between the 1st of Jan 2006 and the 1st of December 2008. The sample period included a range of key events and debates relating to research involving admixed embryos. It begins with the coverage immediately following a press conference at the Science Media Centre (SMC) on the 12th January 2006 at which the notion that hybrid embryos might be a solution to the shortage of human eggs for stem cell research was first raised with the press. The next major flurries of news activity occurred when scientists at King's College London and Newcastle University applied to the Human Fertilisations and Embryology Authority (HFEA) for permission to create stem cells from hybrid embryos (November 2006), and the Government's announcement that it would ban hybrid embryos in the wake of a controversial public consultation exercise (December 2006). Coverage in 2007 and 2008 addresses numerous issues including: the HFEA's consultation and subsequent decision to allow hybrid embryos in principle; sustained lobbying and pressure from religious groups (especially the Catholic Church) to outlaw the practice; organised pressure from the scientific establishment arguing that the initial consultation was skewed by hard-line religious groups and emphasising the potential medical benefits of the research; and culminating in MPs eventually voting in favour of allowing admixed embryos for research purposes.

Considering there was significant early political opposition to hybrids the final parliamentary vote in favour suggests the sources representing 'Big Science' won a significant victory on a contentious issue. Those in favour of this scientific practice clearly won the political battle, but did they also win the struggle for media dominance on the issue of admixed embryos? This research seeks to answer this question by providing a multi-stranded analysis.

In this report you will find:

- a baseline understanding of trends in newspaper coverage of admixed embryos between January 2006 and December 2008;
- a systematic account of which sources were most successful at gaining media coverage and setting the news agenda on hybrids;
- an analysis of how different newspapers, and reporters with different specialisms, reported the story in different ways; and
- evidence of which key arguments and rhetoric were reproduced most often in the press coverage.

Newspapers and the mediation of controversial science

The mass media can help to shape public responses to complex scientific issues, but this shaping is rarely as simple as the debates around the public understanding of science sometimes make it out to be. The news media are not neutral conveyors of knowledge to

a public eager to learn of the latest scientific advances, and newspapers do not act like hypodermic needles, injecting neutral information into the bloodstream of public opinion. Journalists do not, and cannot, simply "tell it like it is".[1] For instance, they often work for media organisations with clearly defined ideological biases and conceptual frameworks. Whether they are aware of it or not (like all of us) they are also affected by wider cultural values, norms and ideologies which shape how and what they write. Reporters are also influenced by professional news values which mean they only cover certain kinds of science stories in certain ways. More and more they work in newsrooms which have limited resources, which places them under pressure to produce more copy than previously, and under tighter deadlines. And finally, of course, they present information from a wide range of news sources that have different and competing goals and opposing scientific, ethical, social, and political agendas. Journalists do not simply hold a mirror up to reality when reporting on controversial science stories: all of these factors and more play a part in the mediation and construction of complex science by the news media.

The admixed embryo case study has many of the key ingredients which make for a robust and long-running science story: a controversial and complicated scientific practice involving boundary-crossing procedures such as mixing animal and human DNA; the potential for the development of influential therapies to treat as yet incurable diseases; a series of fraught policy-related events culminating in a high-profile parliamentary vote which tested the authority of the prime minister; and most importantly for this study, the presence of extremely polarised groups on either side of the debate. On the one hand, a coalition of opposition voices coalescing mainly around faith groups was unafraid to use emotive language and analogies (e.g. about "playing God", the creation of "Frankenstein's monsters", or later on in the sample the use of scientific methods akin to those "last seen under the Nazis"). On the other, a highly organised coalition of interested scientists and funding bodies were willing to put their own opposing case vigorously and unremittingly, and also at times use emotive language.

The news as a discursive battlefield between source groups

A set of explicit and unspoken norms govern news journalists' professional practice. One of the most important of these rules is that of journalistic objectivity. Unless a piece of journalism is clearly marked as different (if it is a comment piece, or an editorial, for example) it must provide objective information. Because they are unable to express their own views when reporting the news, what they say is, in theory at least, limited to fairly dispassionate descriptions of events and practices. Consequently, one of the keys to maintaining journalistic objectivity becomes the sourcing of information from elsewhere: getting the raw materials of the news from those with relevant expertise, knowledge, or opinion. In science journalism this becomes doubly important because of the often complicated nature of the news being reported.

But news sources are rarely fonts of pure disinterested information. Different source groups are interested in seeing science reported in different ways, and they each seek to frame an issue in ways that are advantageous for them. In the case of hybrid embryos, on the one hand we have the scientists and their allies, in the main, aiming to present the scientific and medical reasons for allowing the research. On the other hand there are those with an interest in framing this scientific issue primarily in terms of ethics and morality

(with differing degrees of emphasis on religious and humanist world views). A series of secondary problems then arise for journalists: which sources should they use?; who should they listen to when gathering information?; and if they choose to present information from a range of sources with different views, which dominant frames should they apply when reporting an issue?

The study of news sources, then, often involves analysis of the struggles between the competing media-management campaigns carried out by sources and groups of sources. One of the factors that stand out from this story is the organised show of unity by scientists acting to stake a claim for the attention of politicians, the public, and the media with a deliberate and sustained lobbying campaign. Another factor is less immediately obvious but no less important. As the media campaigns and strategies of key source groups in this debate begin to be discussed publicly, the importance of behind-the-scenes public relations work carried out by the Science Media Centre alongside key scientists and funding bodies is beginning to become apparent.

Those who opposed hybrid embryos, however, had no equivalent "grand coalition". Vigorous and effective campaigns were carried out by various opponents. Early on in our sample media dissent largely came from Josephine Quintavalle from Comment on Reproductive Ethics and Dr Callum McKellar from the Scottish Council on Bioethics. Later on they were joined by prominent members of the Catholic Church in Britain in a highly successful series of public interventions and media events designed to garner maximum coverage in the run-up to key votes in Parliament. But these efforts, in the main, were made independently of each other and there was no equivalent body to the SMC executing a long-running coordinated PR campaign for those who opposed hybrids.

Presenting at a retrospective conference on the HFE Bill in March 2009 Dr Stephen Minger of King's College, London, one of the scientists hoping to do research using hybrid embryos, described a meeting of the coalition in favour of the research as a "giant war party".[2] Likewise, in September 2007 an *Independent* editorial used similarly martial language when referring to the scientists' "public relations assault" on the public, the media, and policy makers.[3] Dr Minger's is no doubt a tongue-in-cheek reference, and the *Independent* leader article is clearly an example of journalistic hyperbole. But these military references fit well with a structuring metaphor for this study: that of the media coverage in the hybrid embryo debate as a discursive battlefield, which, when scrutinised, offers valuable information about the successes and failures of competing source groups.

Every war needs its soldiers and generals, of course, and if the reporting of contentious science might be described as a textual battlefield on which an often fierce struggle for column inches, control over the news agenda, and the mediation of science is fought, then public relations practitioners can be seen as important tacticians, marshalling the troops, reacting to events quickly, and working on long-term media-management strategies. At a time when human and financial resources in newsrooms across the UK are at an all time low, the services provided to journalists by PR workers (sometimes referred to as 'information subsidies') are becoming more and more important. The debate over hybrid embryos between 2006 and 2009 offers a fascinating insight into an often bitterly fought war of words between entrenched interest groups, but it also offers fleeting glimpses of the quiet tactical media management that usually underpins such source struggles.

What this study does (and what it cannot do)

Our study provides a systematic understanding of trends in national newspaper coverage of hybrid embryos, and it gives us a clear idea of which sources have been most successful at gaining column inches and setting the news agenda. It also affords valuable insights into which key arguments from both sides were reproduced most often, and provides a wealth of data about the arguments which dominated the debate relating to the science, the ethics, and the politics of hybrid embryos. By contrast with many content analyses, this report moves beyond purely quantitative study, by providing analysis of key arguments and rhetoric. That said a fuller and more nuanced understanding of the struggle for source supremacy in this debate could be obtained by more focussed qualitative discourse analysis of the content. Similarly, more insights into source strategies and the relationships between journalists and sources could be gained from in-depth interviews with key players including scientists, politicians, campaigners, religious representatives, journalists, and PR workers on both sides. These are all directions we hope to take this work in the future.

This is a quantitative content analysis of the coverage of hybrid embryos in UK national newspapers completed over a two-month period in March and April 2009. As such it has certain necessary limitations. Any attempt to systematically categorise complex information such as news stories using the broad coding categories that content analysis demands will inevitably lead to some homogenisation and loss of data when it comes to the fine nuances and differences in meaning which characterise all writing. Also, as a study of national press coverage it is not a comprehensive study of news media coverage of this issue in the UK (it does not look at local news, broadcast news, or internet news, for example). Even in our study of the press we are limited somewhat by our reliance on computerised databases in accessing the news. Some data will also inevitably lost because of our focus only on the textual representation of hybrid embryos in the press at the expense of the often rich and always meaningful visual layout of science stories (especially in the tabloids).

Note on methodology

All coding categories were developed inductively from scrutinising the media coverage, from knowledge of similar previous research, and from our own familiarity with media practices and forms (one member of the core coding team is a media academic with an RCUK research fellowship in science and health reporting, and the other is a media academic who also has 20-years' experience as a newspaper journalist and editor, and the two senior academics on the team have a wealth of experience of media analysis of science and health reporting). Notes were made to ensure consistent categorising of basic details such as format, news hook, and journalist specialism, as well as more complex coding categories relating to sources quoted and arguments/rhetoric used. After reviewing recent academic literature on the media coverage of stem cell science and immersing ourselves in the corpus we produced a draft coding sheet. The validity of our coding categories was tested independently by both researchers using a sub-sample of 40 stories selected to represent the diversity of coverage in the corpus. After further discussion amongst the whole research team, a finalised coding frame was formulated and a detailed

16-page coding manual was written to ensure the consistency of coders. Regular coding review meetings were held and the research team worked in the same room and maintained regular informal conversations to maintain consistency. Overall inter-coder reliability tests showed our reliability rates were very high: most variables were over 90% reliable, and all were more than 80% reliable.

1. Overview

This section offers a baseline understanding of trends in media coverage of hybrid embryos in our sample paying particular attention to the volume of coverage over time, the format of stories (the numbers of straight news items, columns, editorials, etc), the length and prominence of stories about hybrids, what kinds of journalist wrote them, where they were published, and why they made it into print (i.e. identifying the newsworthy event which sparked the coverage).

1.1 The sample

This report is based on an analysis of 427 items in the UK national press which cover the hybrid embryo debate between 1st January 2006 and 1st December 2008. The articles analysed were retrieved from the Nexis media database using targeted keyword searches.[4] Once we had generated a broad collection of articles we checked each for relevance, and coded those which focused on hybrid embryos along with those which were deemed to significantly discuss them in some detail.[5] In all, 343 (80%) of our stories focussed mainly on hybrid embryo research, and 84 (20%) covered them in less detail, but still provided significant discussion of the issue.

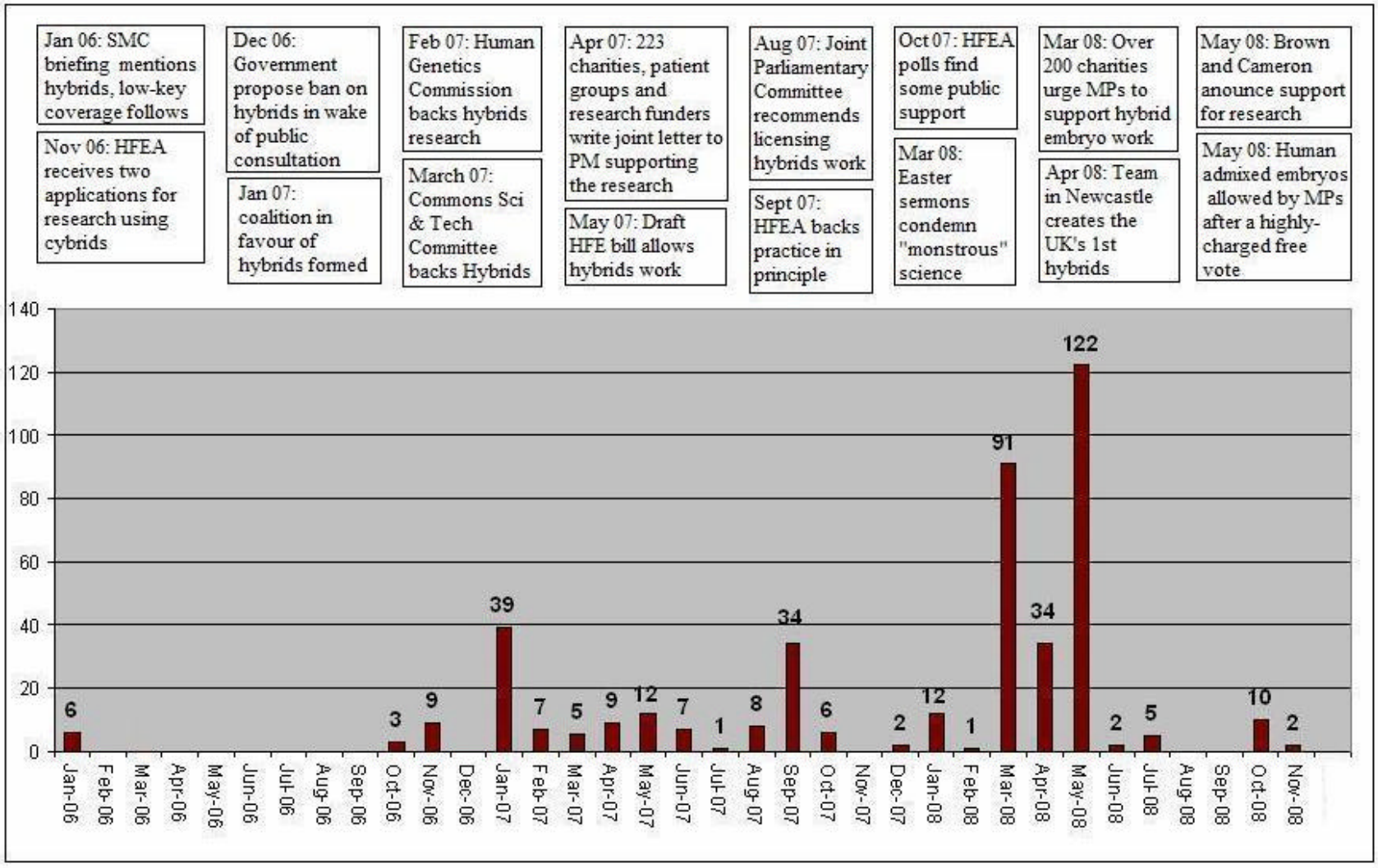
Table 1: Newspapers in the sample

Tabloid and mid-market newspapers	Broadsheet newspapers
Daily Mail and Mail on Sunday	Guardian and Observer
Express and Sunday Express	Times and Sunday Times
Mirror and Sunday Mirror	Telegraph and Sunday Telegraph
Sun and News of the World	Independent and Independent on Sunday
Daily Star and Daily Star Sunday	Financial Times

1.2 The media timeline

The volume of stories about hybrid embryos varied widely across the sample period as events took place which made the subject more or less newsworthy, as is shown in Figure 1.

The issue itself first hit the headlines in January 2006 at the end of a briefing held at the Science Media Centre in London. The briefing itself was organised to talk about the future of embryonic stem cell research in the UK in the wake of the Hwang scandal in Korea, and the use of cytoplasmic hybrids (cybrids) was mentioned in response to a question at the end of the briefing about overcoming the shortage of human eggs for research purposes.



n=427

Figure 1: Timeline of coverage of hybrid embryos, January '06 – November '08

This briefing led to a limited number of stories, some of which were notable for comic and/or sensationalist headlines (the *Daily Star*'s "Frankenbunny" and the *Sun*'s "Moo-tant") and playful images of humans with cow's heads (such as the *Sun*'s mock-up of "Simon Cow-ell", a picture of the music producer holding a glass of champagne with a cow's head superimposed over his own). The overall textual tone of even this coverage, however, was remarkable for its sober assessment of the science and the reasons for carrying it out.

Initial applications (from scientists at King's College London and Newcastle University) for permission to create stem cells from hybrid embryos for research were submitted in November 2006, and these were soon followed by a Government White Paper which stated hybrid embryos should be banned on the basis of a public consultation (which critics claimed was unrepresentative, and had been "hijacked" by interest groups). Both of these events generated small amounts of coverage.

At the beginning of 2007 a coalition of scientists, sympathetic MPs, scientific funding bodies, professional associations, and charities formed a campaigning coalition to disseminate information about the issue of creating cybrids for stem cell research. This coalition was to fight on a number of fronts, and aimed to engage policy makers, regulators, the public, and the media. As mentioned above, the media-relations arm of the group was co-ordinated by the SMC, a public relations body which describes itself as "a press office for science when science hits the headlines".[6] Much of the early coverage in January was generated by events relating to this coalition's fight-back against the proposed ban, including an "emergency" SMC briefing on 4th January, and a letter to *The Times* from leading scientists (including three Nobel Prize winners). This was followed by a delaying tactic from the HFEA which postponed its decisions on hybrids until autumn 2007, and commissioned further public consultation on the matter.

A steady stream of coverage continued throughout the first half of 2007 as the list of those in favour of allowing the research grew, and the coalition continued its media campaign. In February the government advisory body the Human Genetics Commission backed the research, and in March/April the Commons Science & Technology Committee issued a report opposing the proposed ban saying it was unacceptable and potentially harmful to British science. In April a group of 223 medical charities and patient groups – a larger coalition than on any previous issue – signed a joint letter to the prime minister in support of hybrid embryo research, generating a number of headlines in the process.

In May the Government published its draft HFE Bill, performing a U-turn on hybrid embryos, and allowing the creation of human animal hybrids for research. Three months later the Joint Parliamentary Committee on the Bill recommended giving the HFEA power to grant research licenses to scientists wishing to fuse human and animal tissues to create hybrid embryos. These events attracted some press attention, and kept the issue on the media agenda, but it was not until September that we see another spike in coverage. This time the media interest was mainly stirred by the HFEA's "in principle" ruling in favour of hybrid embryo research, and by its subsequent release of public consultation data showing qualified support for the creation of hybrids. The regulator was the origin of

another spate of headlines in January 2008 when it finally granted licenses to create hybrid embryos to teams at Newcastle University and King's College, London.

All the while a parallel and vocal campaign had also been fought by groups who opposed hybrids, and had continued throughout 2007-8. Until spring 2008, however, these groups had been largely limited to providing reactive quotes, had not really set the media agenda, and had struggled to generate any media events of their own. In March 2008 they were joined in earnest in the public and media debate by representatives of the Catholic Church, most notably Cardinal Keith O'Brien the Archbishop of St Andrew's and Edinburgh, who used their Easter sermons to condemn the creation of hybrid embryos in the strongest terms. They continued their campaign with a series of incendiary public interventions such as further sermons and public pronouncements and letters to the Prime Minister. They also involved themselves in the political debates by publicly discussing the advice they had given to Catholic MPs to vote against the Human Fertilisation and Embryology (HFE) Bill even if such a vote, in defiance of a three-line whip, would mean the end of their careers.

The period between March and May 2008 generated more newspaper coverage than any other in the sample, and much of it was down to strong interventions from these religious figures. Much of the coverage in this period is sparked by the high-profile public debates around May's parliamentary vote, and support for hybrids to include such powerful political actors as Gordon Brown and David Cameron. But the Catholic Church's interventions in the run-up to this political event meant that they were well-placed to play the role of antagonist to the scientific coalition in many of the newspaper stories written at this time. As we will see later, it is here that the source struggle becomes most intense.

1.3 How prominent were pieces about hybrid embryos?

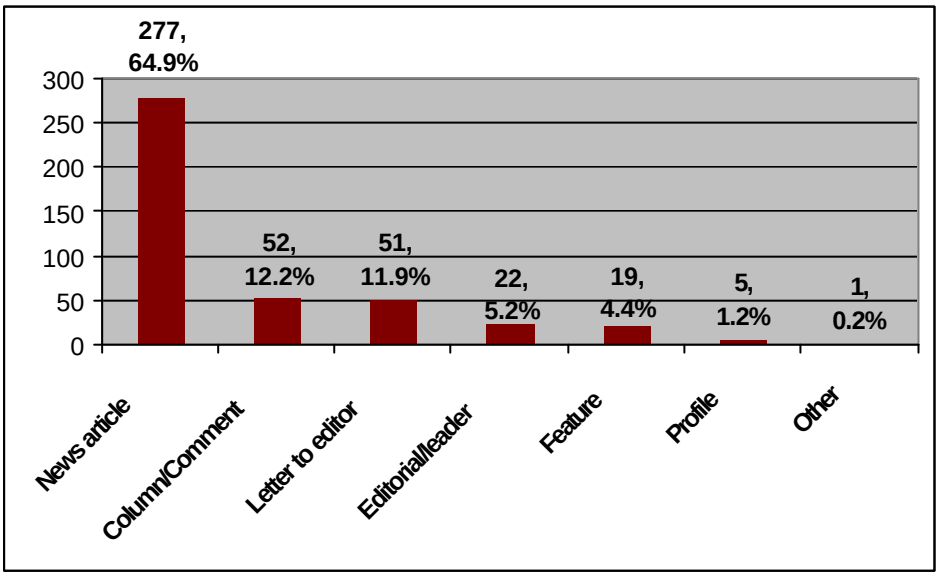
We measured the prominence of coverage of hybrid embryos within newspapers in three different ways: by tracking which page each story was published on, by categorising stories by word-length, and by categorising the formats of news stories.

A clear marker of a story's prominence is, of course, the amount of front-end coverage it receives in newspapers.[7] How much a science story is confined to the back pages, or to specialist science pages, and how often it hits the front pages is a clear indication of the importance attached to it by the media and importance editors think it holds for the public. Out of 255 hard news articles (as opposed to features, columns, and comment pieces, etc), almost one in ten appeared on the front page, and almost three in ten were published on other front-end pages.[8] In all there were 23 front-page news stories about hybrid embryo research (9%), 73 were published on pages two to five (29%), and 159 (62%) were published on page five or above. More than a third of the news articles about hybrids, then, were published on newspapers' most prominent front-five pages. As one might expect, the amount of front-end coverage increased as the volume of coverage of hybrid embryos rose. There was no significant proportional rise or fall of front-end coverage during different periods. This indicates that the "news value" of the story remained relatively consistent throughout the sample period.

It is a marker of the detailed consideration which characterised much of the coverage of hybrid embryos that the largest proportion of the coverage it received was in articles of more than 500 words (183, 43%). Of the 427 pieces which discuss the practice of creating hybrid embryos for stem cell research a further 160 (37%) were between 150 and 500 words in length, and only 84 (one fifth) were news in briefs or short articles under 150 words.

A final indicator of a story's importance and prominence within newspapers can be gleaned from an analysis of the kinds of news items it generates. Figure 2 shows that the large majority of the pieces we analysed were hard news articles (277, 65%). The next largest category was taken up by journalistic columns (52, 12%). Another 12% (51) of the pieces in our sample were letters to the editor, 4% (19) were features, and 5.2% (22) were editorials.

Figure 2: The format of newspaper items about hybridembryo research



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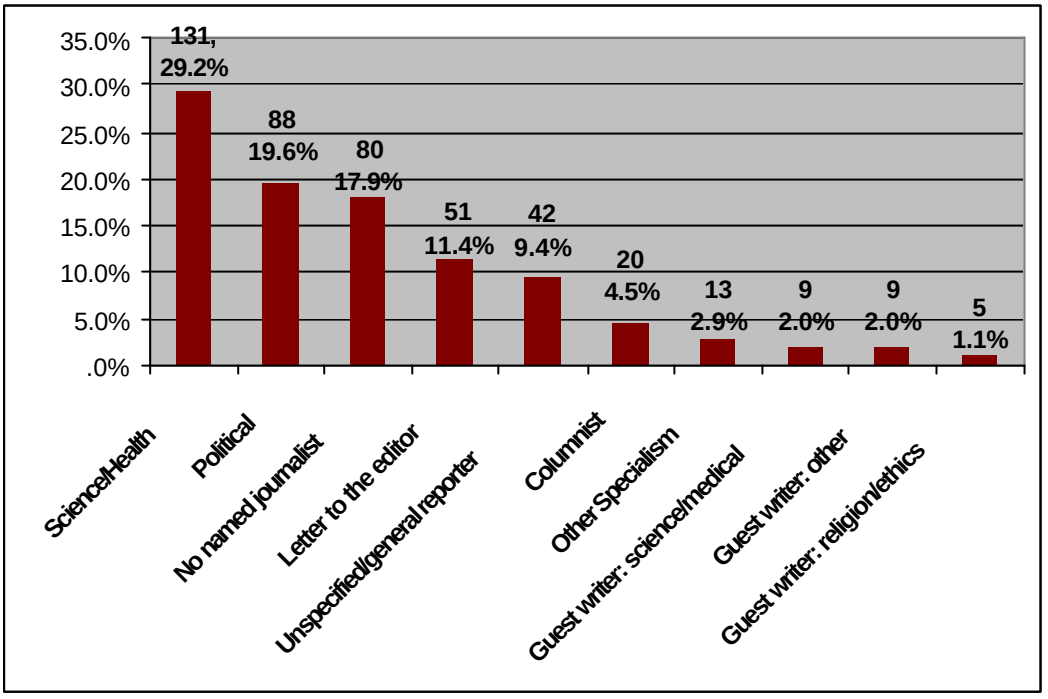
1.4 Who wrote about hybrid embryo research?

Science and health stories written by reporters with specific expertise and/or experience in the field are likely to differ from those written by generalists in a number of respects. Beat reporters who specialise in these areas are usually well-versed in the details of prominent stories because they will often have followed them for a long time, and may have developed trusted sources that can explain complex science to them and help them communicate it to the public. Generally, however, newspaper stories about science are not written by specialist science or health journalists. A Cardiff University study which mapped science and health coverage in the UK media in 2004 and 2006 found that only 10% of stories about science, health and technology are produced by specialists.[9] Under certain circumstances (e.g. when they become politicised, when they involve a perceived

risk to the public, or when they become particularly controversial) science and health stories migrate in even greater numbers from the specialist science pages and become front-page news. When, as was the case with hybrid embryos, they become the subject of high profile votes and political disagreement stories which would normally be given to science or health specialists to cover, end up on the desks of political reporters or generalists who may have little or no previous knowledge of the science. Misleading or sensationalist reporting by non-specialists has become a perennial area for complaint about media coverage of controversial science.

Figure 3: Journalist specialism and by-lines in the hybrid embryo debate [10]



n=448 [11]

As Figure 3 shows, however, in the case of the hybrid embryo debate specialist science and health journalists are the largest category of reporter across the whole sample (131, or 29% of all journalists' bylines in the sample, belonged to them). Unsurprisingly in a sample which covered the passage of the HFE Bill through parliament, political journalists make up the next-biggest group. But it should be noted that they are some way behind. One fifth of by-lines belong to political journalists, compared with almost a third belonging to reporters with a medical or scientific specialism. 80 pieces were written by un-named journalists (it is common to leave news in briefs, and editorials/leader articles unsigned). 42 by-lines belong to generalist reporters with no particular specialism, and a further 20 articles were written by general columnists. [12]

In all 31% of bylines were taken up by writers with specialist knowledge of science or health news, and 69% belonged to generalists, un-named journalists, or reporters with another specialism. The number of science and health specialists who wrote stories about hybrid embryos, then, is somewhat higher than one might expect. In 2004 and 2006 on average 21% of pieces about human genomics and stem cell science were produced by

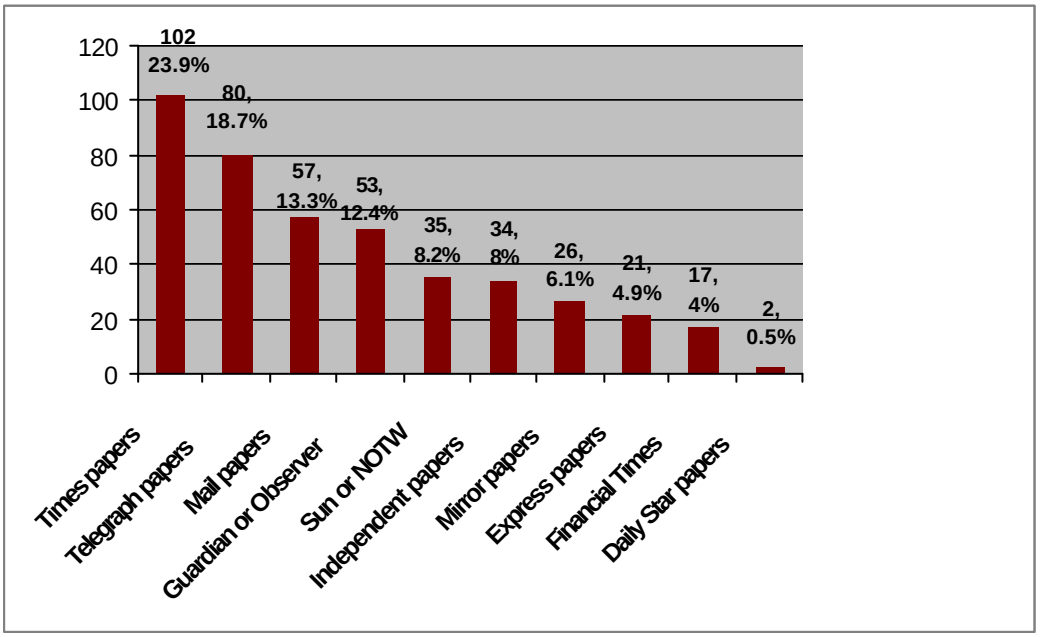
specialists. [13] Around two in ten articles about human genetic research and stem cells are written by science or health journalists compared with three in ten stories about hybrid embryos.

The proportion of articles written by science/health journalists did shrink significantly as the politics of embryos became more of a focus. In the second quarter of 2008 (a three-month period which includes the vote on the HFE bill) 20% of newspaper by-lines belonged to science or health journalists. Even when hybrid embryos had become big news those specialists who had knowledge of the issue from the beginning did continue to report the story. It was not uncommon, for instance, to see science editors and correspondents such a Mark Henderson from *The Times* or Ian Sample from the *Guardian* sharing credit for a story with political journalists and/or religious affairs correspondents. Such shared stories often included boxed sections devoted solely or partly to explaining the science of creating hybrid embryos, and why it is deemed necessary. One consequence of the enduring ability of science journalists to hold on to this story is that those sources (such as the scientists and the SMC) who had cultivated strong links with science journalists from the start were able to maintain some influence over the media agenda even when the main focus had shifted somewhat from the *science* to the *politics* of hybrid embryos.

1.5 Which newspapers covered the hybrid embryo debate?

Overall, there was more coverage of the issue in the broadsheet press than in the "popular" newspapers.

Figure 4: Coverage of the hybrid embryo debate in different newspapers



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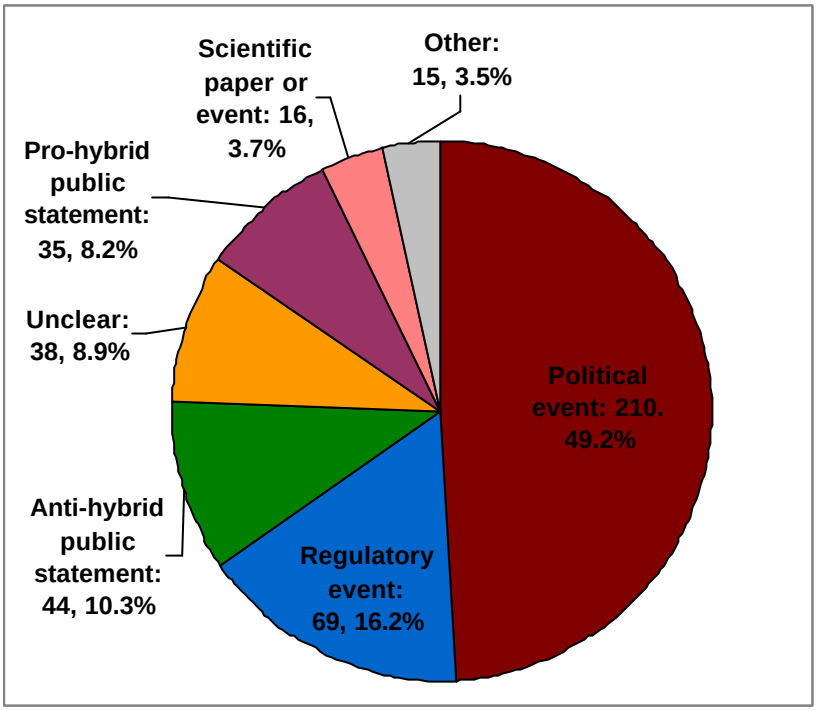
67% (286) of the stories we found came from the broadsheet *Times*, *Guardian*, *Telegraph*, *Independent* and *Financial Times* (or their respective Sunday editions), and 33% (141) were found in the tabloids and mid market papers (the *Mail* and the *Express* or the *Sun*, the *Mirror*, the *Daily Star*, or their respective Sundays). Of course, this data reflects the fact that tabloids are generally shorter overall, and on the whole contain less news coverage than broadsheets anyway. This proportional split in coverage between broadsheets and tabloids/mid-markets is similar to that which one might expect to find on coverage of science in these newspapers anyway. For example, a wide-ranging report written for the government's Office of Science and Innovation found that 37% of newspaper science stories were published in the popular newspapers, compared with 63% in the "quality" press. [14]

As Figure 4 shows there are also some differences in the amount of coverage each newspaper gave to hybrids. The *Times* and *Telegraph* newspapers devoted most space to the issue (24% and 19% of the sample respectively). Stories from the *Mail* newspapers, and the *Guardian*/*Observer*, each make up 13% and 12% of the overall coverage. All of the other papers represent less than 10% of the sample respectively. The *Financial Times* covers hybrids least often of all the broadsheet papers (4%), and the *Sun* covers the debate more often than any other tabloid (8%).

1.6 What news events provided the "hook" for coverage of the debate?

The nature of news production means that most science news stories are prompted by one-off events rather than abstract issues or ongoing scientific investigation (even if these events are sometimes no more than statements made in order to attract media interest). In order to investigate which kinds of events generated the most coverage, each story in our sample was classified in terms of the main reason for its "newsworthiness" – a category that we call the story's "news hook", but which is also sometimes referred to as a news story's "trigger". The overall results are presented in Figure 5.

Figure 5: The "news hooks" of stories about the hybrid embryo debate



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It might initially seem somewhat odd that in a content analysis of science news the smallest category of named news hook is that of scientific events. Indeed, stories prompted by scientific research usually make up a large proportion of science and health newspaper coverage.[15] But it should be remembered that this category was there to list stories which report on hard science, and which are prompted by peer-reviewed papers, scientific conferences, symposia or academic workshops. One of the reasons so few stories relate to events like this is that much of our sample deals with coverage of the debates around hybrid embryos before much of the actual science had been carried out in this country. Those few we did find mainly came around the time scientists at Newcastle University announced the first successful generation of animal-human admixed embryos in the UK in April 2008.

Most of the stories about hybrids were written because they related to political events around the passage of the HFE Bill through parliament, or others relating to parliamentary committees or reports (49% of stories). Another important category of news hook was that containing regulatory events around the decisions (or non-decisions) of the HFEA (16%).

The next-largest named categories are also interesting for a study of the source struggles in this media debate. Taken together, almost one fifth of stories about hybrid embryos were generated by events orchestrated by either those who oppose the practice or those who support it. This statistic shows us that both source groups were quite successful at planning and orchestrating public and media events and setting the news agenda. The anti-hybrid embryo side of the debate, however, managed to generate more newspaper

pieces than the pro-hybrid camp (10% compared with 8%). Pro-hybrid public pronouncements included public letters and commissioned reports, often written by scientists, politicians, charities or coalitions of all of the above. This category also includes Science Media Centre briefings and interventions, although it should be said that these were rarely explicitly mentioned in news coverage. Anti-hybrid public pronouncements included public letters from religious figures, sermons, and other similar interventions from politicians, think tanks or campaigning groups. The majority of anti-hybrid pronouncements which were picked up by the media occurred after the cardinals' denunciatory sermons in Easter 2008. The pro-hybrid interventions, on the other hand, are much more evenly spaced within our sample, suggesting a more considered long-term campaign of media management.

On the face of, then, it appears the anti-hybrid source groups won a marginal victory over the pro-hybrid coalition. When it came to staging newsworthy events those who opposed hybrids clearly won a skirmish on the discursive battlefield. They were no doubt aided in this win by the fact that conflict and negativity are key news values in the reporting of science and health. It is simply more newsworthy to cover high-profile disagreement than a broad scientific consensus. When we look at different elements of the source struggle in detail we will find that the anti-hybrid sources might have been better at creating news stories, but the pro-hybrid sources were more effective at framing the story overall.

There are some differences between the news hooks invoked in different newspapers, and by reporters with different specialisms. Tabloids and mid-markets are somewhat more likely to base stories on anti-hybrid public pronouncements than broadsheets: 15% of coverage in the popular press was triggered by anti hybrid public pronouncements of some kind, compared with 8% of broadsheet coverage. There was no major difference between these groups when it came to stories based on pro-hybrid public pronouncements. The *Guardian* and the *Observer* are most likely to write stories with pro-hybrid pronouncements as their news hook (15% of its overall coverage compared with 8% overall). The *Daily Mail* and the *Times* newspapers are most likely to base stories around anti-hybrid pronouncements (19% and 16% respectively). Science and health reporters, and generalists, are somewhat more likely to write stories with pro-hybrid pronouncements as their news hooks than other groups of journalists (14% and 13% of their overall coverage respectively compared with 8% overall). General reporters are also most likely to write stories triggered by anti-hybrid pronouncements (24% of their coverage, compared with 10% overall).

2. The Source Struggle

An important way we can measure how successful different source groups were at obtaining media coverage is by tracking the frequency with which they are quoted in news coverage. This section offers an analysis of which source groups were most successful at gaining media coverage around the hybrid embryo debate.[16] It presents the numbers of pro- and anti-hybrid sources quoted overall and analyses how the inclusion of specific source groups differs over time, between newspapers, and between the outputs of different kinds of specialist journalists. It also presents separate data on the number of politicians from different parties that were quoted in the coverage.

2.1 How many pro- and anti- sources were quoted in the coverage?

There were 646 quotations from sources in the newspaper items we analysed, and the majority were in favour of hybrid embryos (345, 53%). Anti-hybrid-embryo sources made up 34% of the total (218), and a further 13% (83) were classified as being neither for nor against. In sum, more than half of all quotations which appeared in print were broadly in favour, compared with a third which were broadly against.

Table 2: Broad source affiliation in the hybrid embryo debate

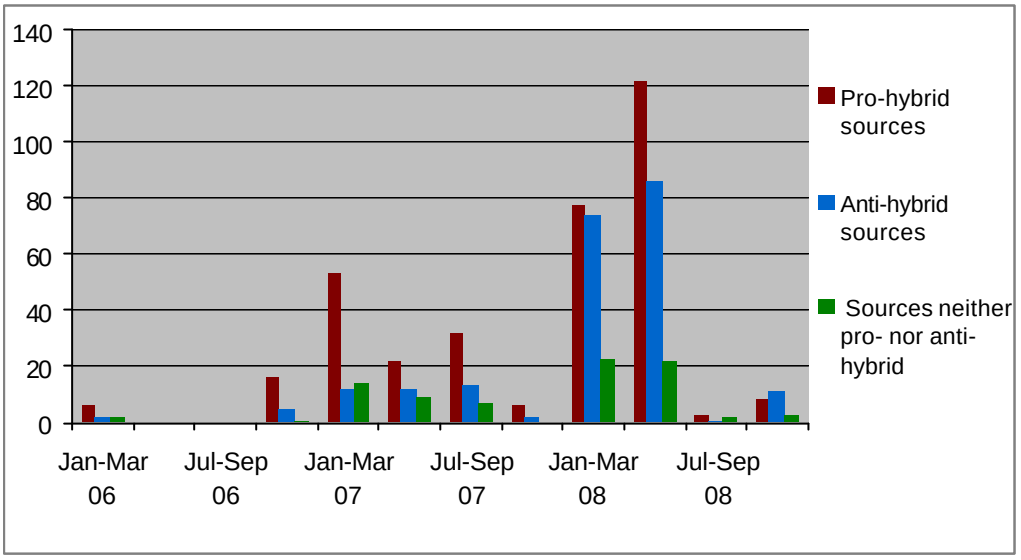
	Frequency of quotation	Percentage of sources
Pro-hybrid sources	345	53.4%
Anti-hybrid sources	218	33.7%
Neither pro- nor anti-	83	12.8%
Totals	646	100.0%

The media coverage of sources in the debate was very polarised, with far more quoted sources taking a stance one way or another than not expressing an opinion on hybrids either way. To an extent, this data masks a spectrum of nuanced opinions on hybrid embryos in each of the above categories; any categorisation of broad swathes of news coverage is inevitably reductive. But the spectrum of opinion behind these overall figures are not as wide as one might expect. Firstly, news journalists have a tendency to present views about complex and controversial science in polarised, somewhat simplified, often binary terms, and this story was no exception. Secondly, opinion on this matter really was largely grouped into those who oppose and those who support allowing scientists to create animal-human hybrid embryos for research purposes. The two (broadly defined) source groups in the debate were quite clearly marked by their strongly opposing views on the matter: in many cases there actually was a fairly simple, and often strongly expressed, opposition between these parties. Thirdly, the fact that much of the coverage was related to a parliamentary vote in which politicians were being lobbied by different interest groups to come out either for or against the hybrids exacerbated the binary nature of the public and media debate.

2.2 How did the source struggle develop over time?

However, the figures presented above do not tell the whole story. For instance, there are some key differences in the numbers of pro- and anti- sources cited at different periods during the debate.

Figure 6: Changes in citation of pro- and anti- sources over time



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This chart shows us that early on in the coverage the coalition of scientists and others in favour of hybrids clearly dominated the media debate. The proportion of pro-hybrid sources quoted throughout 2006 and 2007 was significantly higher than the proportion of quotations from those who oppose the science. As a proportion of all quotations coded from 2006 and 2007, 63% were in favour of allowing scientists to create hybrids and 21% were against. By 2008 the source struggle had increased in intensity and the gap between the groups had narrowed considerably, with 49% of sources in favour and 40% against overall. But it should be noted that even during the periods in our sample when the religious and political attacks on the science were most effective, the scientists and their allies were still cited by newspapers more often than their opponents. In fact, it was not until the final two months of our sample, when media interest had subsided, that we find the opponents of the science dominating coverage in terms of the volume of quoted sources. By this time it was a "done deal" that scientists would be allowed to create animal-human admixed embryos, but nonetheless the anti- camp launched a few final salvos: for instance, a number of stories covered Cardinal O'Brien's comparison of the science covered by the HFE bill to "the work of the Nazis"; and some articles accused scientists of wanting to create half-man, half-beast "humanzees" after the October Commons debate on the HFE bill.

2.3 Which source groups were cited most on either side of the debate?

As well as collecting data on the broad stance of quoted sources on the issue of hybrid embryos, we looked at what kinds of sources were quoted in the news coverage. A full table of what we found is included as Appendix 1, but the top five quoted source categories on either side are detailed in the table below.

Pro-hybrid scientists and representatives of scientific funding bodies were cited more often than actors in any other category. They represent 27% of all sources quoted in newspaper coverage, a much larger figure than that pertaining to religious representatives opposing the practice (who at 14% constitute the largest discrete group of quotations from opponents). Apart from the politicians on either side it is clear from this table that this really was a debate dominated by voices representing science and religion.

Table 3: The most frequently cited sources in the hybrid embryo debate[17]

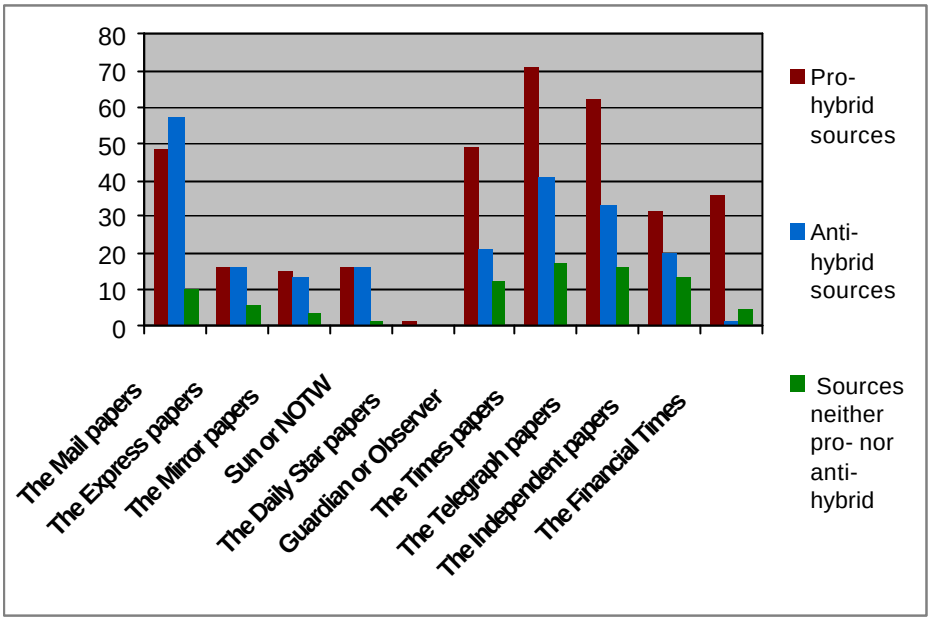
Top pro-hybrid sources	Frequency of quotations	% of total quotations
Scientist/Funding Body	177	27.4%
Politician (government)	77	11.9%
Politician (other)	54	8.4%
Industry spokesperson (e.g. biotech, etc)	8	1.2%
Religious Representative	7	1.1%
Patient (or other affected person)	6	.9%
Top anti-hybrid sources	**Frequency of quotations**	**% of total quotations**
Religious Representative	93	14.4%
Politician (other)	55	8.5%
Anti-Hybrid Embryo Activist	43	6.7%
Politician (government)	11	1.7%
Physician (medical doctors, etc)	9	1.4%
Scientist/Funding Body	3	.5%

Comparing the volume of politicians quoted on either side of the debate is also instructive. Politicians were quoted 131 times in favour of allowing the creation of hybrid embryos (20% of all sources quoted), whereas politicians opposing hybrids were only cited 66 times (10%).[18] The final significant group of opposition sources, of course, were the anti-hybrid embryo activists, who made up 7% of all citations in the newspaper coverage.[19]

2.4 How did the source struggle play out in different newspapers?

If we look in more detail we can see some clear differences between the volume of pro- and anti-hybrid embryo sources that were cited by individual newspapers in the sample.

Figure 7: Pro-hybrid, anti-hybrid, and neutral sources in different newspapers



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In terms of overall coverage the tabloids and mid-market newspapers cited a more equally distributed range of pro- and anti- sources than the broadsheet press. In other words, the coverage in the "popular" newspapers provided a more equally distributed selection of sources across the whole sample than the broadsheet press. Of the sources quoted in the tabloid coverage 44% were pro-hybrid and 47% were anti-. This compares with 58% of sources in favour of hybrids in the broadsheet press, and 27% against.

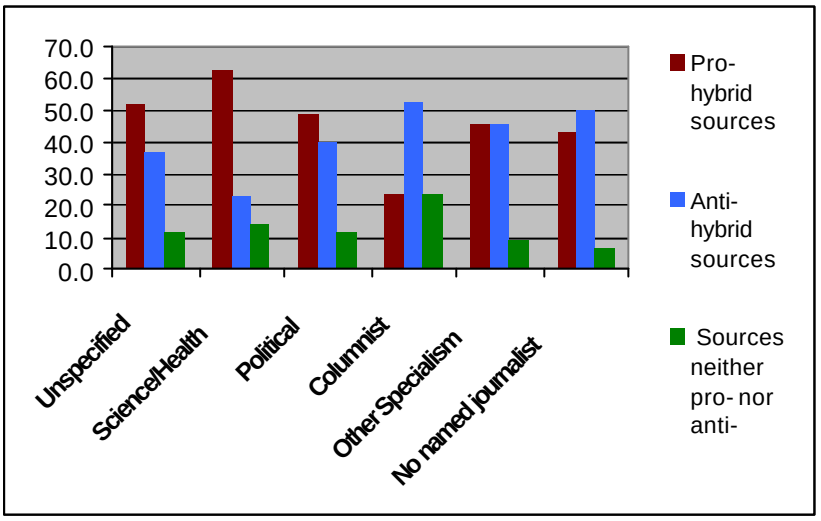
As the chart shows, the *Mail* and *Mail on Sunday* are the only newspapers to have cited more anti-hybrid than pro-hybrid voices (50% against and 42% in favour). The other tabloid papers are fairly balanced in their overall presentation of sources from both sides of the debate.[20] By contrast, all of the broadsheet newspapers cited considerably more sources in support of hybrid embryos than those against. The *Financial Times*, which did not cover the story very often during the sample, hardly presented any dissenting voices at all (this paper was also the only one to consistently use sources from the pharmaceutical and biotech industry). 86% of the sources it quoted were in favour compared with just 2% who were opposed. The *Guardian* (60% for, and 26% against), *The Times* (55% for and 32% against), and the *Telegraph* (56% for and 30% against) all favoured pro-hybrid sources by significant margins. The *Independent* was the most balanced of the broadsheet newspapers in this respect, with 48% of the total number of sources it quoted in favour and 31% against.

2.5 How did different kinds of reporters quote sources?

As might be expected, reporters with different specialist patches rely on different kinds of sources. Science and health journalists in our sample, for example, quote far more

scientists than other kinds of sources and political journalists cite more politicians than anyone else. A consequence of this is that specialist science and health reporters quoted more sources who favour hybrid embryos than any other group of journalists. This is in part because the scientists mobilised in this debate were much more unified in their support for hybrid embryos than politicians, who were more divided on the issue. But it also likely to be in part influenced by the close relationship which was cultivated from the beginning of the news coverage of hybrids between the scientists and their allies and the specialist science and health journalists at national newspapers.

Figure 8: Proportional percentage of pro- anti- or neutral sources quoted by different kinds of reporter



As a proportion of the overall number of people quoted by science journalists, six out of ten were in favour of hybrids, and two out of ten were against. This stands in contrast with the practice of political reporters, the second-largest speciality group in our sample. Five out of ten of their quoted sources were in favour of hybrids compared with four out of ten who were against (even in this case, however, more pro-hybrid than anti-hybrid sources were quoted overall). General reporters without any specialism were also somewhat more likely to cite sources in favour of the issue, and journalists with other areas of expertise produced material that, on the whole, was balanced in its use of sources from both sides of the debate. The only specialist area where anti-hybrid sources dominated in the source struggle was columns written by columnists with no specific interest in science or health, where five out of ten of those quoted were against hybrids, compared with just two out of ten in favour (it should be remembered, however, that only 20 stories by such authors were found in the sample).[21]

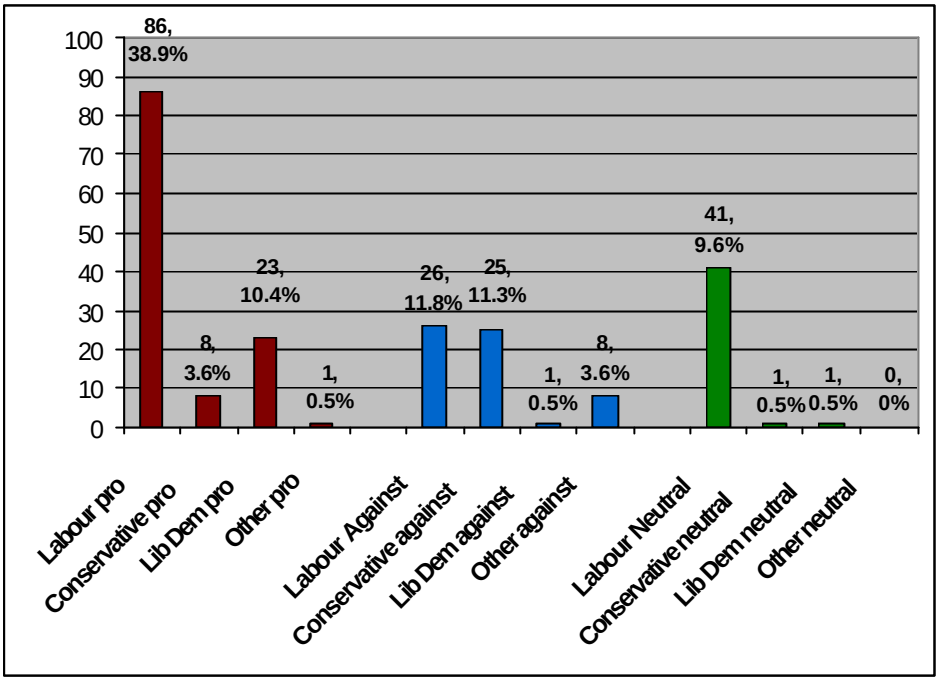
2.6 Party politics and the source struggle

The hybrid embryo media debate was, in many ways, a party-political debate, and the role of politicians was an important one almost from start to finish. For instance, it was the prospect of a ban on creating animal-human admixed embryos which initially prompted the scientists and their allies to organise a coalition in favour of hybrids in

January 2007. Throughout the following two years media interest in the topic was fed by a steady stream of political events such as reports from parliamentary committees, statements from senior government advisors such as the Chief Scientific Advisor and the Human Genetics Commission. All the while an increasing number of high-profile (as well as rank-and-file) politicians made public interventions either in favour of hybrids or against them. While still Prime Minister, Tony Blair was one of the first heavy hitters to intercede. He made a lukewarm suggestion that the government was "not dead set against" hybrid embryos, despite plans to ban them. He was, of course, later joined by Prime Minister Gordon Brown and opposition leader David Cameron, both of whom spoke to the media in favour of the practice. Both men invoked their personal experiences of living with children with serious illnesses. Throughout the sample period a group of MPs led by Liberal Democrat science spokesman Evan Harris campaigned vigorously in favour of hybrids. For opponents of the issue, too, the politics of hybrid embryos were incredibly important. A key weapon in the Catholic Church's armoury was its ability to appeal to Catholic MPs in cabinet to vote with their consciences and rebel against the three-line-whip.

In terms of media coverage, the main political event during the sample was, of course, the second reading of the HFE bill in May 2008. When it came to MPs actually voting in the Commons at the various stages of the bill MPs, by and large, remained loyal to the traditional allegiances of their party (in the main, the Tories voted against hybrids, Labour voted in favour, and so did the Lib Dems). As Phil Cowley has shown, despite the fact that there was a free vote on all of these occasions the majority of MPs of all political persuasion voted with their party. "The whip may be taken off", he says, "they may be given a free vote, but party determines where they go on the whole". [22] Despite this relative party unity at the ballot, as is common when reporting highly politicised scientific issues, much of the media coverage at this time focussed on political splits, confrontations, and disharmony. At the beginning of our sample period the principal conflicts were between scientists and funding bodies who accused the government of caving in to uninformed public opinion, sensationalist news headlines, and "luddite" interest groups. As the period progresses the news media shifted attention to actual and potential splits within the Labour Party (especially the possibility of ministerial resignations by Catholic MPs). The emphasis on splits within Labour is shown clearly in the breakdown of which MPs were quoted in the press. 86 Labour MPs who supported the issue were cited, but so were 26 who opposed it. A range of views on hybrids were also represented by Tory MPs quoted in the newspapers, although far less attention was paid by the press to ideological dissonance within the ranks of the Conservative Party.

Figure 9: The party affiliation of MPs quoted in the hybrid embryo debate



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As Figure 9 shows, MPs were quoted as sources on 221 occasions in our sample, and again, those in favour are quoted more frequently overall than those against hybrids. Almost twice as many supportive MPs were quoted than opponents of the issue (118 compared with 60). In terms of party-political support in the media, then, the pro-hybrid alliance seems to have won the struggle for source supremacy.

Despite the early controversy over the proposed ban on hybrids by far the most MPs who were quoted in favour of the research come from the Labour Party. This early opposition was replaced by strong support by mid-2007, and after this time a wide variety of Labour supporters were quoted in the press. The next-largest party group of supporters are the Liberal Democrats: most of these instances are taken up with statements to the press by Evan Harris MP and Phil Willis MP, a firm supporter who chaired the Commons Science and Technology Select Committee and later the Joint Committee on the Human Tissue and Embryos Bill. Only eight Tories were quoted in favour of hybrids across our three-year sample period, despite late support at the highest level in the form of David Cameron's intervention.

Quotations from sources who opposed to hybrids came mainly from MPs who identified as Catholics, although the most of the high-profile Labour rebels (such as Transport Secretary Ruth Kelly, Defence Secretary Des Browne, and Welsh Secretary Paul Murphy) were not quoted often talking about their opposition to hybrids.

3. Key arguments and rhetoric in the hybrid embryo debate

As well as looking at overt source activity we sought to track the key arguments and rhetoric from either side of the hybrid embryo debate which were reproduced in the news coverage. This allowed us to follow, categorise, and begin analysing the kinds of opinions and facts the pro- and anti-hybrid embryo camps sought to disseminate in the press, and the overall ways of framing the subject which dominated coverage. We approached this task in a number of different ways. Firstly, we coded each story for its mentions of the ethical implications of hybrid embryos, and for mentions of medical repercussions.[23] Secondly, on a detailed micro-level of analysis we coded instances of important recurring pro- and anti-hybrid arguments and rhetoric mentioned, and gathered fine-grained data on the content and context of recurrent discursive formulations on either side of the debate.[24]

This chapter looks in some detail at the kinds of arguments and rhetoric that were recycled and reproduced most often. It is split into three sections which each address a different broad field under which common arguments and rhetoric might be grouped:

- the first section deals with discourses of *science* around the hybrid embryo debate;
- the second gives critical attention to the *ethics* of hybrid embryos; and
- a final section reflects on the *implications* of these data for the source struggle, and analyses instances where figures on either side of the debate *critiqued the arguments and rhetoric of their opponents.*[25]

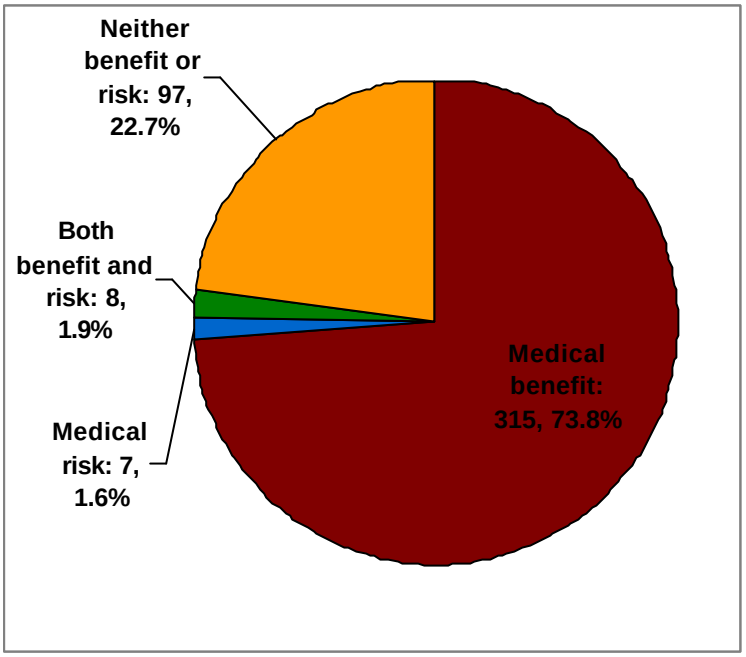
3.1 The science of hybrid embryos in the press

As we saw when examining the distribution of sources, it is clear that pro-hybrid embryo scientists and their allies were covered most in the press coverage of hybrid embryos.

3.1.1 The medical repercussions of research involving hybrid embryos

The extent of this source domination is indicated further by the way the press treated the promise of medical benefits and future therapies when writing about hybrids. A key aim of those who supported hybrids was to emphasise that the reason they wanted to create hybrid embryos was so they could harvest stem cells to do research which might aid understanding of incurable conditions such as motor neurone, Parkinson's, and Alzheimer's disease, and may eventually lead to the development of treatments or even cures. As Figure 10 shows, almost three quarters of all news items about hybrid embryos mention the potential medical benefits of the science.

Figure 10: Proportion of news items which mention medical benefits or risk



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Almost a quarter did not mention medical benefits or risk, and only around 2% of cases broached the possibility of medical risk. Whereas mentioning the potential future cures that might be enabled by the creation of hybrids was almost routine, mention of medical risk was a very marginal affair. The few examples of risks that were cited in newspapers tended to be unspecific and general in nature and mention fears for potential medical risks in the future alongside points about the potential risks involved in tampering with human life. A number also framed the destruction of embryos in terms of medical risk to human children. Many of these arguments were made by members of the public on the letters pages rather than in news articles.

3.1.2 Common scientific arguments in favour of hybrid embryo research

The prominence of arguments which mention cures and therapies can also be seen when one turns to the most commonly expressed scientific arguments and rhetoric used in favour of hybrids. Other arguments include the guarantee that embryos would be destroyed before they were two weeks old, the justification that hybrids were needed to overcome a severe shortage of human eggs, the suggestion that the hybrids were mainly human in terms of their DNA (to counter arguments about creating monsters, and desecrating nature by mixing animal and human species), and the reassurance that the embryos would never be placed in animal or human wombs and/or allowed to develop.

Table 4: Common scientific arguments and rhetoric used in support of hybrids

Scientific arguments in favour of hybrid embryo research	Frequency	present in % of pieces
Promise of potential or actual therapies/cures	315	73.8

Embryos destroyed after 14 days (or sooner)	124	29.0
Shortage of eggs justification	109	25.5
Embryos still mainly human (e.g. Containing 99.9% human DNA)	99	23.2
Embryos won't be placed in humans/animals	82	19.2
Weight of scientific opinion/scientific consensus exists	55	12.9
Enemies are scaremongering/lying/being deliberately inflammatory	43	10.1
Hybrids are already being created	38	8.9
Opposing views are 'irrational', 'luddite', or based on m isunderstanding	36	8.4
Personal account from sick patient	25	5.9
Reference to the small size of the embryos	24	5.6
Other kinds of human/animal fusion are accepted (e.g. transplants)	8	1.9

These arguments were coded if they were directly attributed to sources, or if they were reported by journalists as un-attributed facts. In most cases, examples in these categories were cited almost as often by journalists in the general flow of news articles as they were attributed to named or un-named sources. Key arguments and rhetoric that were used repeatedly throughout by pro-hybrid sources were also absorbed over time into a commonly applied stock of descriptive journalistic language. In other words, it became acceptable for reporters to reproduce these discursive formulations without flagging them up as normative or value-laden arguments in favour of one side in the debate.

In pointing this out we do not mean to criticise journalists for a lack of objectivity. Nor do we imply any criticism of anti-hybrid sources for failing to get their argument treated in the same way. Clearly the pro-hybrid camp were at an advantage in this regard because the arguments they employed most often were usually phrased as though they were observable facts rather than abstract ethical concepts rooted in opinion or faith. In short, journalists are simply more likely to reproduce a statement from a scientist that a cytoplasmic hybrid contains only 0.01% of mitochondrial animal DNA as an un-attributed fact than they are to do the same for a statement about human dignity from a bioethicist or a bishop. Nonetheless, this is further evidence that those who were in favour of the science were able to effectively influence the overall media discourse on hybrids more than their opponents.

Further explanations of each of these categories can be found in the following table.

Table 5: Explanation of commonly cited science-related arguments and rhetoric used in support of hybrids

Potential medical advances/cures
This was the key scientific argument in favour of hybrids. Examples of this in news stories often mentioned attempts to find cures for degenerative diseases such as Alzheimer's and Parkinson's, Cancer, or other conditions such as spinal cord injuries.
Embryos will be destroyed within 14 days
Existing regulation of all embryo research demands this. The argument was often used as a justification in favour of hybrid embryo research. Sometimes other shorter life-spans were quoted, such as 6 days.
Shortage of eggs justification
Supporters often argued the research is necessary because there is a dire shortage of human eggs for use in stem cell research. This shortage, they claimed, could be overcome by using the eggs of non-human animals as a casing in which human genetic material can be developed. Variations on this argument included mentions of the fact that animal eggs are plentiful and freely available, that there is an ethical imperative to save human eggs for women undergoing IVF, and that the process of extracting human eggs

is unreliable and invasive.
Embryos are still mainly human (e.g. 99.9% human DNA or analogous figure)
Numerous variations on this figure were quoted – most state that hybrids contain 99.9% human DNA. This argument was used to minimise the impact of those arguing against hybrids. Sometimes also mentioned was that the tiny amount of animal DNA that remains is *mitochondrial* (i.e. it exists in the mitochondria, the energy-generating "powerhouses", of the cells and not in the nuclei), and so does not contribute to the embryo's core genetic makeup.
Embryos won't be placed in humans/animals
This was used as an argument against those who say this practice is unnatural, and might lead to monstrous new animal/human species. The key point being made is that the embryos will not be placed in human or animal wombs, and that even if they were they would be rejected by the host because of the presence of alien DNA.
Weight of scientific opinion
Often mentioned was the fact that there was a very large coalition of scientific, medical, and charitable bodies behind the research. In this code we only included references to large or very influential groups of experts. An unspecific "British experts think…" was not enough, for example, but mention of a letter from a coalition of charities and funding bodies, or a number of top scientists including multiple Nobel Prize winners was.
Enemies are scaremongering/lying/being deliberately inflammatory
This charge was used to attack the often extreme accusations made by opponents about the nature of the science of creating hybrid embryos (e.g. the Catholic Church's numerous attacks on Frankenstein science or Cardinal O'Brien's analogies with science in Nazi Germany and Stalinist Russia).
Hybrids are already being created
Before the Newcastle University team announced it had successfully generated admixed embryos in April 2008, in the first experiment of its kind in Britain, most instances of the application of this code referred to the creation of embryos abroad (principally in China). The explicit or implied argument in these cases was usually employed to reduce the somewhat startling novelty of the practice in the eyes of the public and opponents.
Opposing views are misunderstand the science, are "irrational", or "Luddite"
Sometimes opponents in the debate were characterised as irrational, ignorant or the enemies of reason, science, and progress. This was often closely linked to (but separate from) the accusations of scaremongering mentioned above.
Personal account from sick patient (or other affected person)
This was clearly not as common as some other key arguments and rhetoric used by the pro-hybrid camp, but articles sometimes use the testimony of sufferers of a disease to lend weight to support for the science that might lead to a treatment/cure. The function of such testimony was almost always to argue implicitly or explicitly for the research to be allowed in the hope that treatments and therapies could be developed (often for incurable diseases. We also included statements which invoked the suffering of family members as a reason for legalising the creation of hybrid embryos.
Reference to the small size of embryos
Linked to, but separate from the argument that the embryos will be destroyed after 14 days are arguments which invoked the diminutive size of the embryo before it is destroyed, presumably to allay fears about the taking of human life. Common analogies included claims that blastocysts would be about the size of a pin head.
Other kinds of human/animal fusion are widely accepted (e.g. transplants)
Instances of arguments categorised under this code consisted mainly of mentions of Xenotransplantation (especially of pig hearts) which implicitly or explicitly served to normalise the process of creating animal-human admixed embryos.

3.1.3 Common scientific arguments against hybrid embryos

Those who opposed hybrid embryos did not, on the whole, choose to engage their opponents in arguments about science. There are some exceptions to this trend, however, and they are detailed below.

Table 6: Scientific arguments and rhetoric used against hybrids

Scientific arguments against hybrid embryo research	Frequency	present in % of pieces
Unlikely to lead to benefits/exaggerated claims from scientists	45	10.5
Other ways of getting stem cells preferable (e.g. adult stem cells)	24	5.6
Practice is medically risky (potentially or actually, in process or outcomes)	14	3.3
Practice is irrational (e.g. crazy, mad scientists, etc)	14	3.3

It is clear from the frequency of these arguments within the sample that they were made far less often than scientific arguments in favour. The most common scientific argument against was that scientists in the pro-hybrid camp were "talking up" the potential medical advances that hybrids could facilitate. This allegation was often accompanied by the claim that research into stem cells taken from adults had already generated far more cures and therapies than embryonic stem cell research, and that consequently this field is where scientists should be directing their enquiries.

Table 7: Explanation of commonly cited science-related arguments and rhetoric used against hybrids

Unlikely to lead to medical benefits/exaggerated claims from scientists
Variations on this argument were sometimes made when scientists who disagree with the practice were cited as news sources, but they were also used by a range of different anti-hybrid figures. Such arguments served to draw attention to dissenting voices within the scientific community, and to undermine the notion of a scientific consensus in favour of the practice, which had been successfully promoted by the proponents of hybrids. Arguments used included suggestions that the science is too complicated and technically difficult to work, allegations that the benefits of the practice are being over-estimated by its proponents, suggestions there is no evidence the process will actually work, repeated suggestions that embryonic stem cell research has not yet yielded any significant breakthroughs in terms of treatments or therapies , and the argument that patients are being given false hope by scientists.
Other ways of getting stem cells more beneficial (ethically or medically)
One of the only medical arguments commonly used is that there are more beneficial ways of harvesting stem cells (either more medically, or ethically beneficial, or both) than using embryos (e.g. from umbilical cords, from bone marrow, or from skin cells, etc).
Practice is medically Risky/Dangerous
Direct or implicit claims that the practice is medically risky (potentially or actually, and with reference to scientific process or outcomes) were included in this category. As stated above, such arguments were normally very general in nature, and they were rarely substantiated with reference to scientific evidence.
Practice is irrational (crazy, mad scientists, etc)
Sometimes opponents simply argued that the practice is irrational, crazy, or mad without giving any real justification or explanation for this opinion. This category is included with arguments about science because it attacks the scientists for their lack of reason.

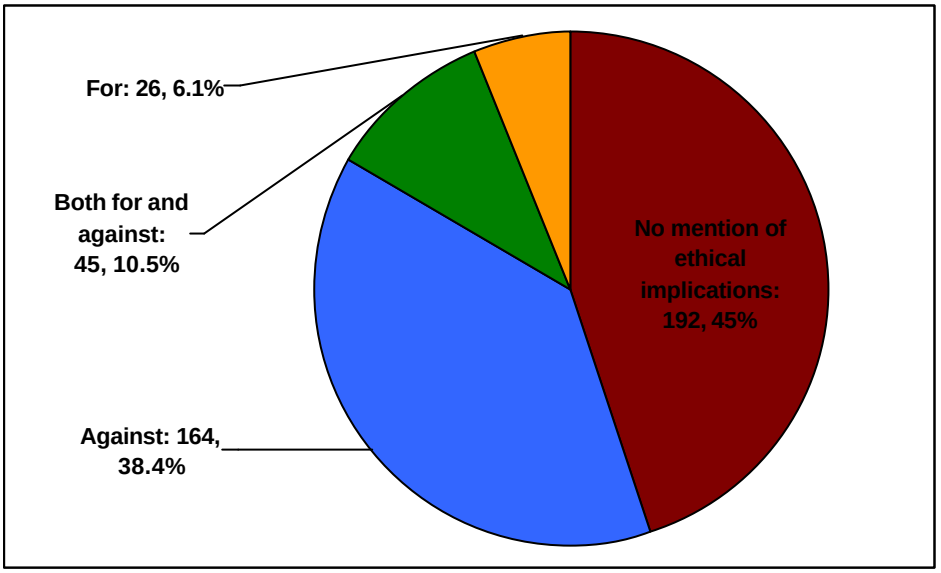
3.2 The ethics of hybrid embryos in the press

In the same way as the scientists and their allies largely dominated the discursive tussle over the science of hybrid embryos, anti-hybrid sources seem to have won the source struggle over ethics. It should be noted, however, that the scale of this victory on ethics is not as large as that won by the pro-hybrid sources on science. There is, of course, an implicitly "ethical" motivation behind the search for cures, but this is dealt with separately in the above section unless the ethical imperative was *explicit* in the text.

3.2.1 The ethical implications of research involving hybrid embryos

We systematically categorised stories which mentioned ethical arguments for and against in the same way that we looked at medical benefits and risk.

Figure 11: Proportion of news items which mention ethical implications



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The largest category of news items (192, 45%) did not draw on any ethical arguments (whether in favour or against hybrid embryos). Thirty eight per cent (164) contained only ethical arguments against, 10.5% (45) referenced arguments both for and against, and just 6% of articles contained explicitly ethical arguments solely in favour.

Whereas a lot of the scientific arguments and rhetoric were cited by reporters as simple points of fact, and were integrated seamlessly into the common stock of journalistic formulations used to describe hybrids, the *ethical* arguments made against the science were usually directly attributed to individual sources or source groups. They may have been cited fairly often, but they were rarely naturalised into journalistic discourse when reproduced in news items.

As a proportion of all coverage in each category tabloids and mid-market newspapers are somewhat more likely than the broadsheets to publish articles containing only ethical arguments against hybrids (49% of tabloid compared with 34% of broadsheet stories). Broadsheets, on the other hand are more likely to publish items containing only ethical arguments *in favour* of hybrids (8% of broadsheet coverage compared with 3% of tabloid). Broadsheets also publish a higher proportion of items which refer to no ethical arguments at all (48% compared with 40%).

We also looked at which journalists are most likely to cite only ethical arguments against hybrids. Science journalists are significantly less likely to do this than non-specialists, or journalists with other specialisms.

3.2.2 Common ethical arguments against hybrid embryo research

Our results suggest that the anti-hybrid side of the argument benefited most from discussions of the ethics of hybrid embryos in the press. This is unsurprising given the fact that the most common reasons for opposing the research are rooted in deep and firmly-held ethical and moral concerns about creating life-forms (even though they might not be entirely human) in order to experiment on them and destroy them, and equally serious concerns about "tampering with human life" by mixing human and animal species. In short, one would expect those who oppose hybrid embryo research to oppose it in the press on ethical grounds, and one would expect the most widely reproduced arguments and rhetoric used by the anti-hybrid side to be related to ethics and morality, too.

Table 8: Common ethical arguments and rhetoric used against hybrids

Ethical arguments against hybrid embryo research	Frequency	Quoted in % of pieces
Hybrids are morally/ethically wrong	90	21.1
Hybrids are inhuman (e.g. they are "an attack on human dignity")	84	19.7
Negative reference to monsters (Frankenstein's monster, etc)	83	19.4
Hybrids are unnatural (e.g. tampering with nature, "species bending")	45	10.5
The 'yuk factor' (hybrid embryos are disgusting, repulsive, etc)	44	10.3
Hybrids are ungodly (e.g. against the "sanctity of human life")	39	9.1
Research destroys human life (all pro-life arguments)	35	8.2
Hybrids represent an attack on human rights	24	5.6
Consent (e.g. cells may be taken without consent)	11	2.6
Comparison with science in authoritarian regimes (e.g. the Nazis)	8	1.9

One immediate striking fact is that the most prominent recurring ethical arguments and rhetoric draw mainly on secular rather than religious ethical discourses. Despite the fact that most of the sources quoted against hybrid embryos opposed them for religious reasons (whether they were representatives of organised religion, Catholic MPs, or Catholic scientists) only 39 out of 463 instances of ethical arguments and rhetoric counted were overtly religious statements. Most of the rest were either unspecific (statements that hybrids are ethically or morally wrong, attacks on life itself, or allegations of provoking visceral "disgust"), broadly humanist (attacks on "humanity" or "human dignity", human rights, or comparisons with Nazi or soviet science), literary or mythological (crossing ethical boundaries by creating monsters such as minotaur, chimeras, or Frankenstein's monsters), or broadly ecological (in the Romantic sense of an attack on a fragile and pristine Nature). This trend suggests a conscious decision to engage in the source struggle around largely non-religious language in order to appeal to secular public opinion as well as "the usual suspects".

More detail on how these arguments were invoked in the corpus can be found below.

Table 9: Explanation of commonly cited ethics-related arguments and rhetoric used against hybrids

Hybrids are ethically/morally wrong
This code was employed whenever there was an explicit statement that hybrid embryos should not be allowed because they were ethically or morally wrong.
Hybrids are inhuman
Rhetorical interventions that were placed in this category include suggestions that the creation of hybrid embryos polluted, violated, or transformed the essence of humanity. The most common formulations in this category, however, were suggestions that hybrids were "inhuman" and/or "undermined human dignity". This code is a more abstract one than suggestions that the practice physically endangers human life (see pro-life arguments, below). It is striking that even though most of the quoted sources opposing hybrids did so for religious reasons, one of the most commonly referenced pieces of opposing rhetoric drew more on discourses of humanist than religious ethics.
Negative reference to monsters (Frankenstein's monster, etc)
Other monsters invoked to negatively characterise hybrid embryos were Minotaur, human-zees (allegedly the result of unethical experiments to breed a race of "super soldiers" in Stalin's Russia), mythical chimeras, mutants, moo-tants (in the *Sun*), and Franken-bunnies (in the *Daily Star*). This code was mainly applied to statements which invoked monstrous figures in a negative or sensationalist (albeit often humorous) way. It could also apply to critics invoking "monstrous" or "Frankenstein" science, or to popular newspapers using humorous sensationalist formulations such as those cited above. Caution was applied by the research team to ensure that the less value-laden scientific uses of the term "chimera embryos" were not placed in this category.
Hybrids are unnatural (e.g. playing with nature)
This code included arguments about hybrids being against the "natural order of things" or being an attack on "Nature", often with reference to a blurring or destruction of the boundaries between species. Such criticism rarely goes past a bald statement that hybrids are unnatural. This broadly Romantic discourse of an unspoiled nature under attack by progress, man, and scientific rationality was another common secular ethical argument.
The 'yuk factor' (hybrid embryos are simply disgusting, repulsive, etc)
This category was used to group together all references which invoke simple unreflecting disgust at the practice of using hybrid embryos. Examples often implied that right-thinking people find the mixing of species revolting no matter what regulation or safeguards are in place.
Ungodly (against religion or God)
Rhetoric invoking God or less specific religious ethical disapproval was employed fairly often, usually by religious figures of different faiths. However, it is significant that such language was not employed as often as other broadly secular ethics mentioned elsewhere. Examples of rhetoric included in this category include references to the sanctity or sacred nature of life. This language was not limited to formal religious representatives, although figures from the Catholic Church do predominate in this category.
Research destroys life
All references to explicitly pro-life arguments in relation to hybrid embryos were coded in this category. Most commonly, such arguments took issue with the creation of embryos only for them to be killed soon after. Almost all instances of these arguments spoke of the hybrid embryos as if they were human.
Hybrids represent an attack on human rights
The discourse of human rights is sometimes employed by opponents of hybrid embryo science. They usually refer to the rights of the embryo, and afford it the same rights as they do fully grown humans. An important example of this kind of argument was Cardinal O'Brien's statement that the HFEA bill "represents a monstrous attack on human rights, human dignity and human life."[26]
Comparison with science under authoritarian regimes (e.g. the Nazis or Stalinism)
Sometimes used by opponents of the practice, although not often. This language was most notably employed by Cardinal O'Brien, but also by other commentators and columnists.
Consent (e.g. cells may be taken without consent from children, etc)
Opponents sometimes alleged the HFE Bill sought to allow cells to be taken from vulnerable adults and children on the basis of presumed consent to be used for embryo research. Some instances of arguments in this code also refer to the inability of embryos to give consent.

3.2.3 Ethical arguments in favour of hybrid embryo research

As the table below shows, those in favour of hybrids did not make a major attempt to draw on overtly ethical discourses, rhetoric, or arguments. It could be reasonably argued, of course, that the wish to create cures for currently incurable diseases is an inherently ethical endeavour. This is no doubt true, but out purpose here was to track language which invokes explicitly ethical meanings.

Table 10: Ethical arguments and rhetoric used in favour of hybrids

Ethical arguments in favour of hybrid embryo research	Frequency	Quoted in % of pieces
Hybrids are ethically right/not ethically wrong	61	14.3
Hybrids avoid tampering with human life/embryos	17	4.0
Consent will be gained from cell donors	3	0.7

The most frequently cited ethical arguments in favour of hybrids were unspecific claims or counter-claims about the ethical value of carrying out the research. Also included in this code were claims that creating hybrids is "not ethically wrong", usually framed as a response to frequently-cited claims from opponents of hybrids that their creation breached ethical boundaries. A number of these instances derive from a statement by Dr Stephen Minger in a Science Media Centre press release in which he stated: "the use of non-human oocytes for SCNT [somatic cell nuclear transfer] is currently the only ethically justifiable option given the large numbers of eggs required to derive cloned human stem cell lines from individuals with incurable and highly progressive neurological disorders".[27] However this kind of rhetorical linkage between the medical quest for therapies to treat incurable diseases and explicit mentions of ethical arguments is relatively rare.

The second-most commonly used ethical argument in favour of the science was that creating hybrid embryos avoided the need to experiment using fully human embryos. This argument was usually used as an implicit critique of anti-abortion campaigners who oppose embryonic stem cell research, and are also opposed to the creation of admixed animal-human embryos. It was not employed very often, however, probably because its suggestion that admixed embryos are not "as human" as (and are by implication more "expendable" than) fully human embryos stands in contradiction with the widely used scientific argument that hybrids are almost completely human. The final, rarely-used, argument about consent existed as a counter-argument to claims from opposition source groups that the human cells needed to create hybrid embryos might be taken from children or vulnerable people without their consent.

3.3 The politics of hybrid embryos in the press

Despite the fact that much of the coverage of hybrids in our sample was prompted by political events, most of the important arguments and rhetoric employed by both broad

source groups were not overtly political. But there is some interest in analysing the key arguments and rhetoric employed in news coverage which invokes what might broadly be called the politics of hybrid embryos.

3.3.1 Political arguments against hybrid embryo research

Anti-hybrid rhetoric of a broadly political nature was slightly more common than equivalent or similar arguments from the supporters of the science. This was mainly because of the common practice of referring to the politically controversial nature of the issue.

Table 11: Political arguments and rhetoric used against hybrids

Political arguments against hybrid embryo research	Frequency	Quoted in % of pieces
Practice is controversial	48	11.2
Public opinion is opposed (projections of negative public opinion)	40	9.4
Practice is/should be illegal (e.g. hybrids banned in other countries, etc)	23	5.4
Hybrids are against the national interest/reputation of UK science/economy	14	3.3
Chief Medical Officer Liam Donaldson is against hybrid embryos	11	2.6
Policy makers are ignoring results of the first government consultation	6	1.4

Other common arguments included suggestion that that the practice should be illegal (often accompanied by claims that it is already illegal to create hybrids in countries such as Italy, Germany, and France). Sometimes closely aligned to this point was the argument that Britain's reputation and/or international standing is being damaged by our lenient regulatory framework on embryo research. A small number of political arguments were made which drew on the opposition to animal-human admixed embryos in the Donaldson report produced for the government in the year 2000, and a few complained about the government ignoring the results of its 2006 public consultation into the HFE Bill.

The second-most common argument is that public opinion is against the creation of hybrids and that allowing them would be a political "step too far" for most British people. "The public" is a slippery signifier in the news coverage of hybrid embryos, as both sides of the debate claimed to represent "public opinion" at different times during the sample. Early on, for example, it was quite common to read anti-hybrid embryo activists suggesting that "most people" will find the science repulsive. For a number of months after the publication of the first government public consultation in late 2006 it was also common for opponents of the science to use this evidence to assert that the public were on their side. During this period pro-hybrid sources seldom claimed the public were on their side outright, but preferred to attack the methodology of the consultation process (there was no representative polling done, for example, and it was criticised for relying on data submitted by a small group of "self-selecting" activists). References made about public support for the science tended to be tentative, and suggest qualified support such as the suggestion that "if the public had the full facts" they would be in favour of the work.

After the HFEA had commissioned and published its own public consultation (which had included evidence from representative surveys) the pro-hybrid sources were able to claim public support with more confidence. Most of the coverage of the results of this consultation quoted the figure that 61% of the public stated support for hybrids once they had been told the reason for experimenting on them was to find treatments for incurable diseases. Some newspaper articles, however, pointed out that this support was very qualified and that when the potential therapeutic benefits were not mentioned levels of public support were far lower. The lack of clear evidence either way in the public opinion data, and the fact that there was no serious mobilisation of the general public either in favour of or against hybrids, meant that both sides of the debate were able to rhetorically lay claim to public support throughout the second half of our sample period (or at least, in the case of opponents of the science, to assert a widespread public unease and uncertainty about hybrids). For this reason "the public" remained a very ambiguous formulation throughout.

Further information about all of these coding categories can be found in the table below.

Table 12: Explanation of political anti-hybridembryo arguments and rhetoric

The practice is controversial
This code included all reference to the controversial nature of the science. The rhetoric of controversy was often used by anti-hybrid embryo sources, but it was used more often in journalistic discourse. The construction of scientific issues as controversial is a key element in descriptions of scientific practice more generally in the news media.
Public opinion is opposed to hybrids
This code was applied where public opposition or unease is mentioned in relation to hybrid embryos (this could be proven, unproven, a projection on the part of speaker, and it could relate to public opinion in the past, present, or future). It was not limited to formal pronouncements about public opinion as a whole; the team also included references to what "most people" think in this category. It also captured conditional suggestions that the public would be against hybrid embryos if it had better information about what the practice entailed.
Practice is/should be illegal
This category mainly included references to the fact that creating hybrids is illegal in many countries (such as France, Germany, and Italy). The implication is usually that it should also be illegal in the UK. This code was applied on numerous occasions to Cardinal O'Brien's suggestion that "In some other European countries, one could be jailed for doing what we intend to make legal".[28]
Hybrids are against the national interest/reputation of UK science/the economy
This code was applied where arguments were made about existing or potentially damaging effects on the national interest of this research. We took a broad view of the national interest to include the reputation of the UK as an effective regulator of science, the UK's economy and business/industry, and/or the general standing of Britain in the international community. Examples of arguments that were categorised using this code include a number of suggestions that our European neighbours have begun to characterise Britain with disdain because of the government's light-touch regulation of controversial science.
Chief Medical Officer Liam Donaldson is against
Most of these references were to Liam Donaldson's high-profile opposition to the practice of creating hybrid embryos refer to the Donaldson report (2000), which states, "The use of eggs from a non-human species to carry a human cell nucleus was not a realistic or desirable solution to the possible lack of human eggs for research or subsequent treatment."
Ignoring results of government consultation
The government consultation in late 2006 was overwhelmingly hostile about hybrid embryos, and led to MPs imposing a ban on the practice of creating them which was later overturned. Pro-hybrid voices often argued that it had been hi-jacked by faith groups, but, perhaps unsurprisingly,

opponents of hybrids sometimes used the results of this consultation as a political argument against the government's later acceptance of the science.

3.3.2 Political arguments in favour of hybrid embryo research

Arguments and rhetoric related to the politics of hybrid embryos were also found in the sample on occasion.

Table 13: Political arguments and rhetoric used in favour of hybrids

Political arguments in favour of hybrid embryo research	Frequency	Quoted in % of pieces
Hybrids are good for the national interest/UK science/the economy	39	9.1
Public opinion is in favour of hybrids	34	8.0
Government consultation exercise invalid/hijacked	26	6.1
Politicians are weak/fear the media and public opinion	23	5.4
Reference to HFEA approval	17	4.0

The political point that recurs most often relates to the effect of allowing hybrid embryos to be created on a broadly defined British national interest. This code was applied to categorise arguments that were made about existing or potentially positive effects of this research on Britain's national interest, either in terms of the reputation of British science, or the economy (including the pharmaceutical and biotech industries). Most arguments placed in this coding category referred to the positive standing and reputation of Britain in general, British science, and the UK regulatory framework, within the international community.

Public support is also claimed by the pro-hybrid coalition. The public opinion referred to by this code could be evidence-based, unproven, tacit, actual, a projection on the part of speaker, or it could relate to public opinion in the past, present, or future. Included in this category are references to actually existing public support, but also instances where it is claimed that the public would be in favour of hybrids given adequate information about the science and the possible therapies and cures which could be the result of working with animal-human admixed embryos. As Table 13 shows, this argument was not used as often in favour of hybrids as it was against them. But there was an upsurge in occurrences of this kind of rhetoric after the HFEA's consultation found qualified support for hybrids (the centrepiece of this consultation was a representative survey of public opinion). Even though the evidence of this consultation did not show a public overwhelmingly in favour of the science, most of the press coverage reported the polling evidence as proving the public were behind the practice. In terms of the source struggle over discursive constructions of public opinion, the pro-hybrid camp clearly won when it came to the reporting of the results of this consultation.

The government public consultation in late 2006, on the other hand, had found clear and overwhelming hostility to the practice of creating hybrid embryos, and led to MPs seeking to impose a ban on their creation. This was one of the catalysts for a number of scientific bodies grouping together in a coalition to lobby politicians and the public and

pool media-management resources. As such, arguments that the first public consultation was hijacked by interest groups who are already predisposed to oppose all embryo research are clustered around the early coverage in our sample. Most examples of this argument were found in the first quarter of 2007, and did not recur throughout the later stages of the sample.

Variations on the argument that politicians were weak, and feared a backlash from conservative groups and the tabloids recur fairly often early on in the debate, before the government U-turn on its proposed ban. Such arguments accused the government of letting science suffer because they were afraid of criticism from an uninformed public and pro-life religious social conservatives. Variations on this argument include the notion that the government bowed to pressure caused by inflammatory headlines in the tabloid press.

References to HFEA approval for the science are also very time-specific within the sample, hence the low frequency of these arguments overall. The HFEA finally offered one-year research licences to King's College London and Newcastle University to carry out research using cytoplasmic hybrid embryos ('cybrids') in January 2008, more than a year after the initial applications. This fact was subsequently sometimes used as an argument in favour of granting formal legal approval of the science by its political supporters.

3.4 Source strategies and clashes on the discursive battlefield

As well as allowing us to understand the nature and content of the newspaper coverage of hybrids, these data provide further insight into the success of the key players' source strategies.

3.4.1 The source struggle and direct criticism of opponents' arguments

Insight into source strategies can be obtained by looking at where those on one side of the debate were willing, and felt able, to criticise the arguments and rhetoric of their opponents. As might be expected, participants in the discursive battle over hybrids did not simply rely on the weight and power of their own arguments. They also critiqued, argued against, and in some cases outright attacked the points made by their opponents.

As well as looking at straightforward examples of the above-listed arguments which were reproduced in press coverage, then, we also separately categorised instances where opponents criticised rhetoric commonly used by opponents. Tracking the frequency of such attacks can give us valuable insights into the overall strengths and weaknesses in the rhetorical strategies of each side in the debate. For example, we might have read a member of the Church of England being quoted as saying that embryonic stem cell research should be abandoned in favour of work on adult stem cells because of the higher success rate of developing therapies from the latter. This would have been coded as a simple instance of our "other ways of getting stem cells preferable" code. If, on the other hand, a representative of the Parkinson's Disease Society is cited in an article attacking

such a point of view, perhaps by pointing out that the reason there have been more therapies developed from adult stem cells is that such research has been done for longer, or that embryonic stem cell research has not received US federal funding for so long, or that the benefits of bone-marrow transplants have been retrospectively classified as being down to adult stem-cells, then it would have been classified as a critique (or "critical attribution") of the commonly used anti-hybrid argument. Similarly, if a journalist references the fact that all animal-human admixed embryos will be destroyed before they are 14 days old then it was coded as a normal example of this commonly reproduced pro-hybrid argument. But if a member of a campaigning group such as Comment on Reproductive Ethics states the fact the admixed embryos will be destroyed after a few days is, in fact, a reason to oppose the issue on pro-life grounds, and not a valid argument in favour of creating hybrids, then it would be separately coded as a "critical attribution" of this common argument.

3.4.3 Pro-hybrid sources on the attack: criticising anti-hybrid arguments

The most striking result of our enquiry into which anti-hybrid embryo arguments and rhetoric were criticised most by the pro-hybrid camp was the number of critical attributions of arguments relating to the creation of monsters, mutants, Minotaur, and allegations of "monstrous" or "Frankenstein" science. As we show above, such anti-hybrid rhetoric was found in 83 (19%) different news items. But instances of such arguments were also criticised, or critically attributed, in 56 (13%) further news items.[29]

Table 14: Anti-hybrid embryo arguments commonly criticised by pro-hybrid speakers

Anti-hybrid embryo arguments most commonly criticised	Frequency	Quoted in % of pieces
Negative reference to monsters (Frankenstein's monster, etc)	56	13.1
The 'yuk factor' (hybrid embryos are disgusting, repulsive, etc)	16	3.7
Hybrids are morally/ethically wrong	12	2.8
Hybrids are inhuman (e.g. they are "an attack on our common humanity")	12	2.8
Public opinion is opposed (projections of negative public opinion)	9	2.1
Unlikely to lead to benefits/exaggerated claims from scientists	8	1.9
Research destroys human life (all pro-life arguments)	8	1.9
Practice is/should be illegal (e.g. hybrids banned in other countries, etc)	7	1.6
Hybrids are ungodly (e.g. against the "sanctity of human life")	7	1.6
Other ways of getting stem cells preferable (e.g. adult stem cells)	5	1.2

In this case the pro-hybrid lobby were able to turn one of the most important anti-hybrid arguments against its owners. The rhetoric of monstrosity, used most often during and after the Easter sermons from the Catholic Bishops, might in this respect be seen as a media-management "own goal". Even though these instances of often fairly extreme rhetoric from high-profile church figures generated a lot of column inches, they also allowed the pro-hybrid scientists (and other sympathisers) to go on the offensive. As well as repeating the (by now finely honed) arguments they had been making in favour of hybrid embryos for over a year, after these interventions from the Bishops, they were also

able to intervene in the media debate by claiming that they were being unfairly and inaccurately attacked by the exaggerations of the church hierarchy.

The church was undoubtedly in a very difficult position before the cardinals' interventions. As we have seen, the media's framing of hybrid embryos had, for a long while, been influenced by the effective media management of the pro-science coalition. The media had, up until this point, been used to presenting largely pro-hybrid coverage. There was no guarantee that a less strident intervention from the Catholic Church would have dented the media agenda, and generated as much press attention as a more vigorous approach to opposing hybrid embryos. Indeed, the lukewarm opposition stance taken by the Archbishop of Canterbury Rowan Williams did not gain anywhere near the same levels of coverage as Cardinal O'Brien's vociferous attacks. The danger they faced, however, was that in condemning the scientists in such colourful terms they would end up looking more "extreme" than the "extreme science" they were hoping to condemn.

There were a number of similar attacks from various members of the Catholic Church, but Cardinal Keith O'Brien's Easter Sermon in March 2008 was the most influential. In it he stated:

> The norm has always been that children have been born as the result of the love of man and woman in the unity of a marriage. That belief has of course long been challenged. However I believe that a greater challenge than that even faces us – the possibility now facing our country is that animal – human embryos be produced with the excuse that perhaps certain diseases might find a cure from these resulting embryos. […] What I am speaking of is the process whereby scientists create an embryo containing a mixture of animal and human genetic material. If I were preaching this homily in France, Germany, Italy, Canada or Australia I would be commending the government for rightly banning such grotesque procedures. This Bill represents a monstrous attack on human rights, human dignity and human life. […] One might say that in our country we are about to have a public government endorsement of experiments of Frankenstein proportion – without many people really being aware of what is going on.[30]

Forceful Catholic condemnations of the "monstrous" nature of hybrid embryos provided a very newsworthy clash of high-profile interests in the hybrid embryo story which had hitherto been far less intense. As such, the intervention was very effective at framing the science in a newsworthy way (for example, it displayed a shrewd understanding of the "news value" to journalists of a conflict between powerful social groups). But the scientists, through their relative domination of the media coverage and the repetition of their altruistic motives for wanting to create hybrids (i.e. providing cures for serious diseases), had also effectively dominated the moral high ground.

This can be shown with reference to the news coverage of hybrids the week after O'Brien's remarks. The church were not alone when it came to stirring up media interest and setting the media agenda. In the days following the Easter Sunday broadside a Science Media Centre press release included strong statements from Dr Stephen Minger ("the Catholic Church is misrepresenting science because it doesn't understand the basic

facts"), Prof Robin Lovell-Badge ("Science progresses by refuting falsehood. The Bishops of the Roman Catholic Church apparently want to promote it"), Prof Chris Shaw (the Bishops are "using scaremongering tactics in an attempt to block important medical research aimed at understanding and developing treatments for incurable diseases"), and Dr Lyle Armstrong ("this is a gross and irresponsible misrepresentation of our position and our intentions in carrying out our work").[31] These statements generated headlines throughout the week as the press initially quoted Dr Minger's claims of "misrepresenting science", and later ran with Prof Lovell Badge's suggestion that church figures might be lying, or "promoting falsehood".

On the one hand, then, the Cardinals scored a significant media victory. On the other, however, the Catholic Church's intervention also gave the pro-hybrid alliance another valuable PR weapon to be employed on the discursive battlefield.

3.4.2 Anti-hybrid sources on the attack: criticising pro-hybrid arguments

Those who opposed hybrid embryos had no equivalent major arguments or rhetorical tropes to criticise on the other side of the debate.

Table 15: Pro-hybrid embryo arguments commonly criticised by anti-hybrid speakers

Pro-hybrid arguments most commonly criticised	Frequency	Quoted in % of pieces
Promise of potential or actual therapies/cures	17	4.0
Opposing views are 'irrational', 'luddite', or based on misunderstanding	10	2.3
Enemies are scaremongering/being deliberately inflammatory	10	2.3
Hybrids good for the national interest/UK science/the economy	6	1.4
Embryos destroyed after 14 days (or sooner)	3	0.7
Shortage of eggs justification	2	0.5
Embryos still mainly human (e.g. Containing 99.9% human DNA)	2	0.5
Personal account from sick patient	2	0.5
Weight of scientific opinion/scientific consensus exists	2	0.5
Hybrids are ethically right/not ethically wrong	2	0.5
Reference to the small size of the embryos	1	0.2

As this table shows, the most commonly criticised of the pro-hybrid camp's arguments was the claim that the research would (or could) lead to therapies to treat incurable diseases. But this criticism was only made 17 times, compared to with the 315 instances in which the original argument was made (see Table 4 above). The next most criticised arguments do not relate to positive claims about the science of hybrid embryos, but are reactions to the "knocking copy" of the pro-hybrid alliance (namely the claims that the anti-hybrid sources had misunderstood the science, were Luddite in their anti-progress mentality, and/or had deliberately set out to inflame public opinion with scaremongering tactics.

3.4.3 Source strategies and public relations

Another kind of insight into the source struggle can also be gained by tracking key arguments and rhetoric. The frequently recurring pro-science arguments listed throughout this chapter are testament, at least in part, to the efficiency of the coalition's media strategy. For instance, the top five arguments reproduced in the press coverage (about potential therapies, the short life-span of the embryos, the shortage of human eggs, the argument about 99.9% human DNA and the promise not to let embryos develop in the womb) also happen to be the key points in a Science Media Centre guide to hybrid embryos that was produced early on in the campaign to aid journalists in effectively communicating the science.[32] Of course, there is a sense in which this could be represented as the simple transfer of information and "fact" from scientists to journalists. At the same time, however, it cannot be ignored that briefing documents like this one are also tools of media management. They may be valuable information resources, but they are also weapons in use on the discursive battlefield. As well as conveying information they frame the debate in ways that are advantageous to the pro-hybrid source group, and that are easily digestible and reproducible by journalists working to tight deadlines. The same can be said for many of the most prominent ethical, medical, and political arguments that recur on the anti-hybrid side of the debate. Many of the most important anti-hybrid arguments and rhetoric in the above lists, for example, feature in the Easter sermons of UK bishops, and in a series of subsequent public interventions, statements, and press releases.[33]

4. The overall news agenda on hybrids: which source groups benefited?

This final chapter combines the approaches employed so far in order to obtain a broad picture of which source groups benefited most overall in the media coverage of animal-human admixed embryos. So far we have looked at the volume of sources quoted from both camps in the hybrid embryo debate, and begun to analyse the most prominent language and rhetoric employed by actors in these groups. We have suggested that although journalists may strive for objectivity and balance when reporting the news, the influence of the strategies of competing source groups (alongside other important factors), means that achieving either can usually only ever be an aspiration.

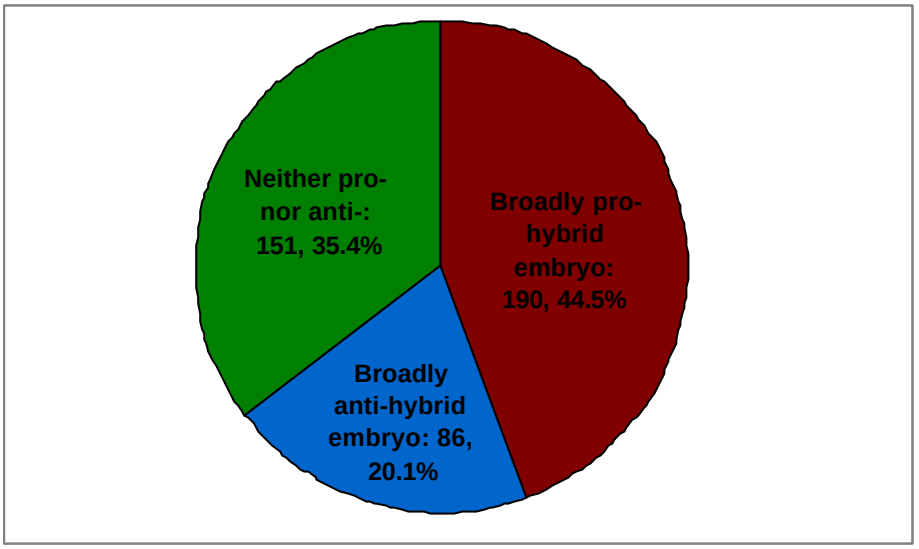
Up until this point we have mainly been describing what we found in the coverage of hybrids. The final task in our content analysis of each news item involved making a judgement about its broad stance on the hybrid embryo debate. Was it: broadly in favour of allowing the creation of hybrid embryos; broadly against; or neither broadly for nor broadly against? Content analysis is best used as a method for the systematic investigation of large amounts of manifest meanings in textual or audiovisual data in an objective and reproducible way. It is therefore difficult to devise codes which measure something as seemingly subjective as whether a news item is in favour or against the subject it covers. The seemingly subjective nature of this decision is complicated by the fact that journalistic ethics relating to bias usually preclude a news reporter taking a stance on an issue one way or another.

For these reasons it was important that we devise a transparent method for deciding on a story's broad stance that was both reproducible between members of the research team (as well as anyone else who wants to employ this coding frame after us), and rooted in the methodological framework governing the rest of our study. For every news item coded the number of pro- and anti- sources, along with the number of pro- and anti-arguments, were totalled up. If there were two or more sources and/or arguments in favour, then a piece was coded as broadly in favour. If there were two or more sources and/or arguments against allowing the creation of hybrid embryos, then it was coded as broadly against. And if a story contained the same amount of pro- and anti- sources and arguments, or only one more or less of either, then it was coded as neither for nor against.[34]

4.1 How many news items were pro- and anti-hybrid overall?

The picture that has emerged so far of a source struggle where those in favour of hybrid embryos have come out on top is confirmed by these overall figures. The largest category by a margin of around 11% is that of stories which are broadly pro-hybrid: 45% of all the news items we analysed were in favour of hybrids. 20% of news items in our sample were broadly against the science, and a further 35% were neither for nor against, but were more or less balanced in the amount of pro- and anti-hybrid sources and arguments they presented.

Figure 12: Numbers of pro- and anti-hybrid stories



n=427

It is noticeable that format was a key variable here. A large proportion of the anti-hybrid news items we found were clustered around letters to the editor, comment pieces and columns.

Table 16: Broad stance of different story types

	Broadly pro-hybrid embryo	Broadly anti-hybrid embryo	Neither pro- nor anti-hybrid embryo	Totals
News article	122	36	119	277
Column/Comment	26	16	10	52
Editorial/leader	12	3	7	22
Letter to editor	15	27	9	51
Feature	11	3	5	19
Profile	3	1	1	5
Other	1	0	0	1
Totals	190	86	151	427

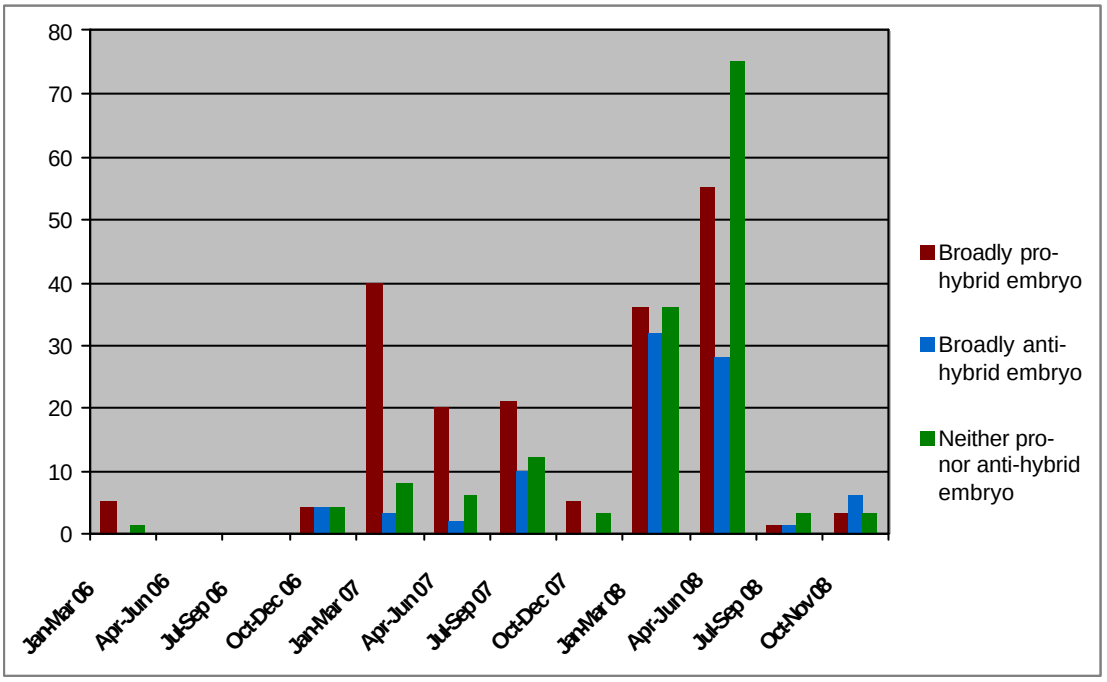
Around a third of all anti-hybrid pieces (27 out of 86) are letters to the editor, and a further 20% are comment pieces or columns. Anti-hybrid sentiment, then, was in large part found in the letters pages, and to those journalistic formats where the expression of opinion is most acceptable. Most pro-hybrid pieces (64%), by contrast, are hard news items. This could be claimed as a victory by either side in the debate. On the one hand it could be argued that the fact anti-hybrid sentiment is found most in the letters pages suggests it has been relegated to an area of a newspaper set aside for the expression of

extreme opinion. Proponents of the science could also point to the fact that more editorials came out broadly in favour of hybrids than against them. On the other hand the anti-hybrid camp could claim with some legitimacy that letters to the editor are important and influential media in themselves, and to have generated more letters in against the issue than were printed in favour represents a very real media-management win.

4.2 How did news items' stance on hybrids change over time?

From Figure 13 it is clear that, echoing our findings on news sources in Chapter 2, for most of 2006 and 2007 the coverage of hybrid embryos was largely positive. It was not until the first and second quarters of 2008, when the Catholic Church entered the debate in earnest and hybrids started to become a hot political subject that significant numbers of anti-hybrid stories start to be published. Again, however, even during these periods there are still more pro- than anti hybrid pieces. Another development worth noting is the sharp increase in the number of stories with no clear stance in favour or against hybrid embryos during this period.

Figure 13: News items' stance on hybrids over time



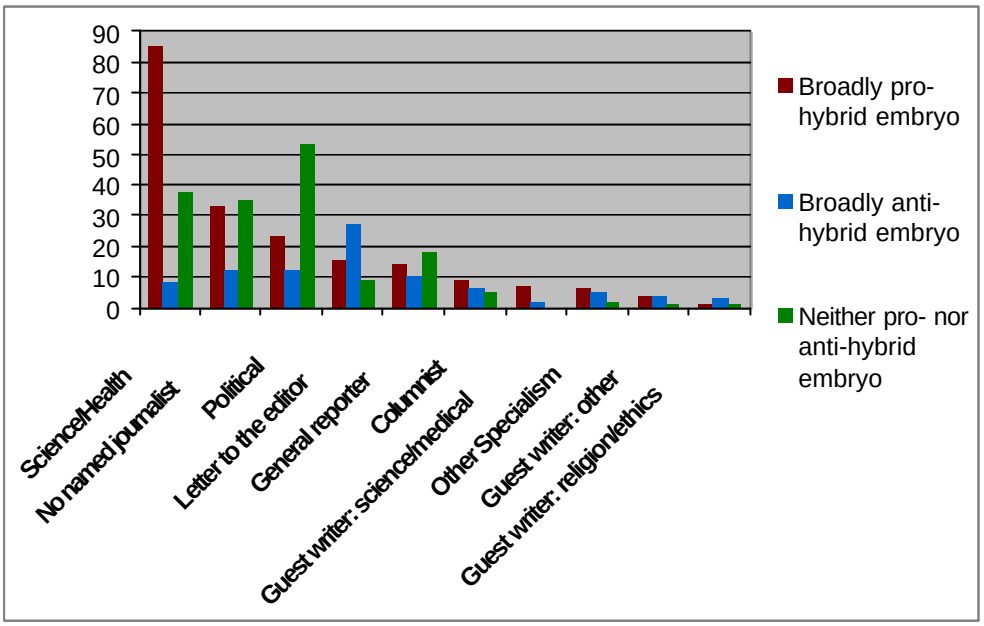
n=427

One explanation for this involves the fact that the first six months of 2008 also saw by far the highest concentration of news items written by political correspondents, columnists, general reporters, and un-named journalists. For instance, in the first two years that this story ran in the newspapers only four articles carried by-lines by political reporters. In the first six months of 2008, however, 45 were written by journalists who specialise in politics. Many articles were still written by science and health journalists, but their coverage now sat side by side with that of their colleagues.

4.3 How did journalists' specialisms relate to coverage?

Just as they are more likely to write stories which include more pro-hybrid new sources, so are science and health journalists more likely to write articles which are pro-hybrid overall. Science journalists wrote the largest number of pro-hybrid articles, and they were also least likely to write broadly anti-hybrid articles (or pieces with no clear stance either way) as a proportion of their own coverage. Political writers, on the other hand, wrote more stories with no clear pro- or anti- stance than any other group.

Figure 14: Journalist specialism and story stance



n=427

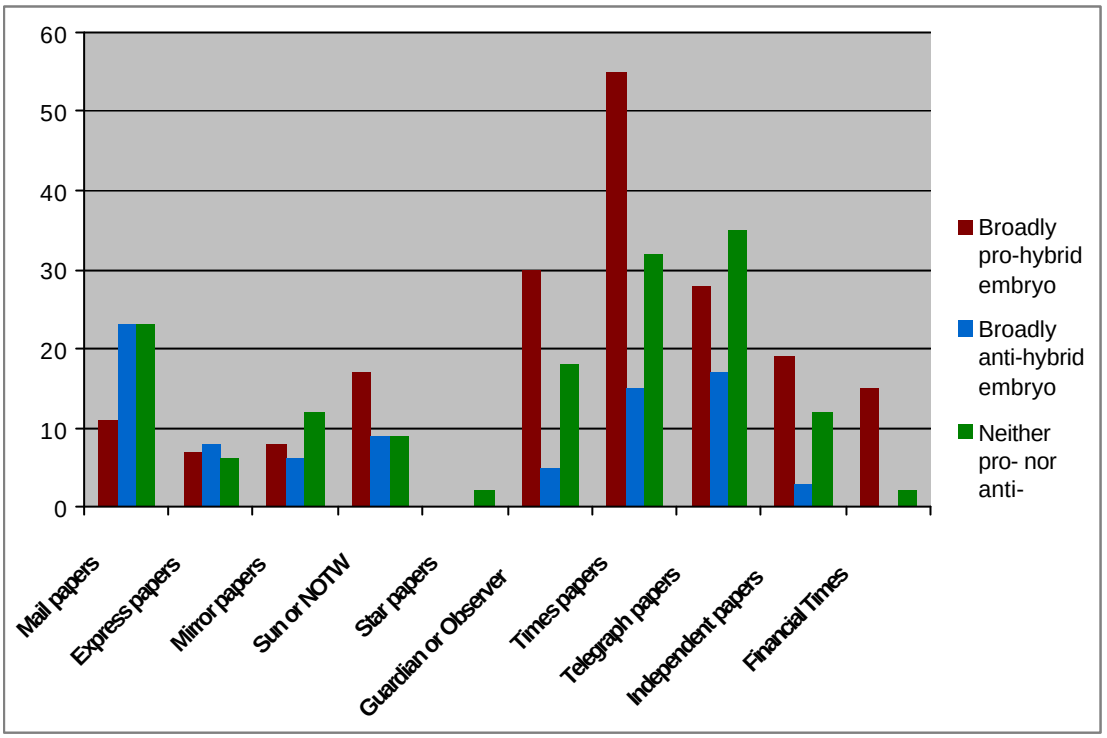
The reasons for this are many and multi-layered. But an important one is likely to be the strong relationships (based on mutual interest and trust) which developed between the science journalists and their pro-hybrid sources throughout this period. When hybrid embryos became a "political story", there was no equivalent set of relationships between the scientists and the political reporters or generalists who also began writing about hybrid embryos. Stories which rely on a broader range information, arguments, and sources not linked to the pro-hybrid camp were therefore far more likely to be drawn on in the news production process at this time.

4.4 Which newspapers published the most pro- and anti-hybrid embryo stories?

It is clear from Figure 15 that broadsheets all published significantly more news items broadly in favour of hybrids than tabloids. The *Times* newspapers printed the most (55), and the *Guardian* and *Telegraph* papers came next in line (with 30 and 28 respectively). The *Guardian* and *Independent* papers also published the least anti-hybrid items overall.

Most of the quality papers also published proportionally large amounts of stories which were neither broadly in favour of nor broadly against hybrids. As an average proportion of overall broadsheet coverage, roughly five out of ten stories were in favour of allowing hybrid embryos to be created, four out of ten did not take a stance either way, and only one out of ten was against the science.

Figure 15: Numbers of pro- and anti-hybrid stories published by newspaper



n=427

The tabloid and mid-market newspapers offer up a slightly different narrative. In these the numbers of stories of all three broad stances are far more evenly balanced. The *Daily Mail* and the *Mail on Sunday* along with the *Express* papers were the only ones to print more anti-hybrid than pro-hybrid items. The newspapers in the *Sun* and the *Mirror* stables, on the other hand, both published more pro- than anti-hybrid stories. Taken overall, as a proportion of all the coverage in the tabloids and mid-markets around one third are pro-hybrid, another third are anti-hybrid, and another third are neither in favour nor against.

4.5 The role of headlines in constructing pro- and anti- messages

A recurrent complaint from scientists and media academics about newspaper coverage of science is that even when journalists do a good job of presenting the relevant information in the stories they write, this work is often undone by sensationalist headline writers. This disapproval was most commonly levelled at media coverage of hybrid embryos during the early stages of our sample. In particular, a small group of stories published at the beginning of October 2006 with headlines such as "Moo-tant", "Human Rabbit is Step

Nearer", and "Frankenbunny: Coming soon to a lab near you" came under particularly heavy fire.[35] When you look at the body of these news pieces it soon becomes clear that in their content they are actually relatively balanced in terms of the sources and arguments invoked from both sides of the debate. The *Sun* article, for instance talks at length about the science of hybrid embryos and quotes Dr Lyle Armstrong of Newcastle University first, before a very cursory mention of opposition to the science by the charity LIFE. Nonetheless, they prompted much criticism from the pro-hybrid camp.

One critical comment article by *The Times*' science editor Mark Henderson clearly suggests that these headlines played a role in turning politicians' against hybrids. Its headline was "Ministers have been spooked by 'Frankenbunny' headlines", and it argued that after being unduly influenced by an unrepresentative public consultation, ministers had also been scared off by sensationalist tabloid news stories. Henderson writes: "Once the consultation [had] created a bogus impression that the public was overwhelmingly opposed to this research, this was reinforced in the ministers' minds by another less than representative group: the red-top press".[36] Fiona Fox, the head of the Science Media Centre has gone as far as to suggest that the government initially proposed to ban hybrids in the draft of the HFE bill largely in response to this coverage. She has said, "I'm absolutely convinced that the threat in the first draft to ban this area of research was a direct reaction to these scary headlines and these images and the whole yuck factor, and to be quite honest the government didn't really deny that".[37]

We piloted assessing whether each story's headline was in favour of hybrid embryos or not, but we found that it was impossible to do this with a high level of inter-coder reliability. Our broad sense was that most of the headlines in the sample are neither in favour of nor against hybrids. We did, of course, find a number of headlines that did make value judgements and use sensationalist language to decry the science, but we also found many headlines that could be called broadly pro-hybrid.

Table 17: Selected pro- and anti-hybrid embryo headlines

20 broadly pro-hybrid embryo headlines:
How stem cells could spell end for disease (*Sun*, May 22, 2008, Byline: Ellie White)
Cameron: Embryos could help my son (*Express*, May 21, 2008, p. 4)
Benefits are years off, but it's a victory for scientific freedom (*The Times*, May 20, 2008, p. 4, Byline: Mark Henderson)
Brown says embryo research is key to life: PM defends science on eve of key vote: Creating hybrids 'is morally right' (*Observer*, May 18, 2008, p. 1, Byline: Gaby Hinsliff, Political Editor)
This bill gives me hope: Sensationalist objections to using hybrid embryos ignore the huge benefits such research can bring (*Guardian*, May 12, 2008, p. 27, Byline: Geraldine Peacock)
'Dogmatic' RC church slated on eve of vote (*The Sunday Times*, May 11, 2008, p. 4, Byline: Sarah-Kate Templeton Health Editor)
Monsters are far from the reality of research (*The Times*, May 10, 2008, p. 5, Byline: Mark Frary)
First British human-animal hybrid embryos created by scientists: Breakthrough could pave way for stem cell supply: Move will aid research into untreatable conditions (*Guardian*, April 2, 2008, p. 4, Byline: Alok Jha, Science correspondent)

Catholic scientist says Church is wrong on hybrid embryo Bill (*The Times*, March 29, 2008, p. 4, Byline: Mark Henderson, Science Editor)
Embryos: Cardinal 'is lying' (The *Sun*, March 25, 2008)
'Frankenstein' attack smacks of ignorance, scientists tell bishops (*Times*, March 24, 2008, p. 6, Byline: Mark Henderson, Ruth Gledhill and Francis Elliott)
Scientists accuse priests of spreading embryo 'lies' (*Daily Mail*, January 26, 2008, p. 21, Byline: David Derbyshire)
Docs hybrid embryo joy; Stem cell study to heal diseases (*Mirror*, January 18, 2008, p. 33, Byline: By Emily Cook, Health Correspondent)
Hybrid embryo ban 'would cost lives of patients' (*Daily Telegraph*, January 5, 2007, p. 10, Byline: Nic Fleming Science Correspondent)
Cloning 'can beat disease' (*The Times*, January 5, 2007, p. 6, Byline: Mark Henderson Science Editor
Embryo ban 'will damage stem cell research' (*Daily Mail*, January 5, 2007, p. 38, Byline: Julie Wheldon)
Cloning pioneer fears Britain will lose out (*The Sunday Times*, January 7, 2007, p. 10, Byline: Mike Wade)
Medicine needs hybrid embryos, scientists say (*Independent*, April 5, 2007, Byline: Steve Connor Science Editor)
A victory for common sense (The Independent, May 18, 2007, p. 48, Leading Article)
Stem cell ban is a death sentence for people like me (The Sun, January 6, 2007, p. 45, Byline: Andrea Hammett and Michael Day)
20 broadly anti-hybrid embryo headlines:
Legal loophole that raises the spectre of the first 'humanzee' (*Daily Mail*, October 23, 2008, p. 9, Byline**:** Kirsty Walker)
Bishop: labour has death wish (*Sun*, July 14, 2008, Byline: Andrew Nicoll Scottish Political Reporter)
Huge Step Into Unknown: **In momentous vote MPs back the creation of human-animal hybrids** (*Daily Mail*, May 20, 2008, p. 1, Byline: James Chapman)
'Frankenstein' Embryo Bill backed by MPs (*Express*, May 20, 2008, p. 11, Byline**:** By Gabriel Milland Political Correspondent)
Williams: My fears on embryo research (*Mail on Sunday*, May 11, 2008, p. 2)
Cardinal condemns Brown over 'monstrous' embryo Bill (*Daily Telegraph*, March 22, 2008, p. 2, Byline: Simon Johnson and Jonathan Petre)
Now Cardinal O'Brien compares embryo Bill to 'work of Nazis' (*Daily Mail*, October 29, 2008, p, 16, Byline: Ian Drury)
Cardinal calls MPs 'barbaric' (*Sunday Mirror*, October 26, 2008, p. 15)
Embryo law 'monstrous' (*Sun*, March 22, 2008, Byline: Michael Lea Political Correspondent)
Pope condemns cloning as an assault on human dignity (*Daily Mail*, February 1, 2008, p. 21, Byline: Simon Caldwell)
Part-human embryos are a chilling step closer (*Daily Mail*, September 4, 2007, p. 8, Byline: Fiona MacRae)
Farmer warns of 'Nazi' science (*The Sunday Times*, July 29, 2007, p. 6, Byline: Tom Gordon and Sarah-Kate Templeton)
'Human rabbit' is a step nearer (*Daily Mail*, October 6, 2006, p. 25, Byline: Julie Wheldon)
Mootants (*Sun*, November 7, 2006, Byline: Emma Morton)
Hybrids: The controversy (*Mirror*, September 6, 2007, p. 10, Byline: by Mike Swain, Science Editor)
Hybrid embryo shock (*Express*, October 6, 2006, p.39)
Human-animal embryos move nearer to reality; About-turn by ministers opens door to 'chimeras' for medical research (*Daily Mail*, May 18, 2007, p. 4, Byline: Jenny Hope)

I have a disability, yet I still think it's wrong to destroy embryos: Medical conditions such as Parkinson's can be treated by ethical sources of stem cells, says Alison Davis (The Guardian, May 20, 2008, p. 31, Byline: Alison Davis)
Today, our MPs risk destroying the very concept of shared humanity. The stakes could not be higher; The Melanie Phillips Column (Daily Mail, May 19, 2008, p.14, Byline: Melanie Phillips)
Ministers set to resign over embryo vote; Cabinet Catholics' alarm at 'Frankenstein' law (*Express*, March 22, 2008, Byline: By Sarah O'Grady, Social Affairs Correspondent)

The sheer volume of headlines with a broad pro-hybrid bias that we found suggests that any influence the early sensationalist tabloid headlines might have had would have been balanced out within the overall sample period. We believe that any future consideration of the role of anti-hybrid embryo headlines should also take into account the presence of a large number of headlines which are manifestly in favour of hybrids.

Conclusion

Throughout this report we have suggested that pro-active media management and public relations on both sides were an important part of attempts to control the discursive battlefield over hybrids. This is not to suggest, however, that PR was the overwhelming determining factor in how the hybrid embryos story was mediated by the press. We are also reticent to suggest that the kind of qualified media-management victory we identify here could be easily replicated when it comes to source struggles in the media over future examples of controversial science. A comment piece headlined "White Coats Defeat Grey Suits in a Battle Between Science and Whitehall" by *The Times'* science editor Mark Henderson in October 2007 discussed the victory the pro-hybrid coalition scored after the government U-turn on banning animal-human admixed embryos. At one point he states: "The concessions are the culmination of a remarkable campaign that shows how scientists are starting to acquire the political and media savvy that they lacked in the controversies over GM crops and the MMR vaccine."

Towards the end of the piece Stephen Minger was quoted as saying: "To be fair to the Government, it has listened, […] but we had to make sure it listened. What would have happened if the same thing had been done for GM foods and the triple vaccine is a very interesting question." Both are careful not to suggest outright that a similar coalition of powerful scientific interests with a clear message and well-thought-out media campaign could have changed the overwhelmingly negative media coverage of GM foods or the MMR vaccine. But the suggestion is that things might have been different if the scientific establishment had got its act together when it came to these recent high-profile media defeats.

However, the media coverage of science is not as simple as this suggestion might imply. There is no straightforward recipe for guaranteeing favourable media coverage. We would note that in terms of the source strategies of opponents to the science there are a number of key differences between these cases that are crucially important. The pro-hybrid lobby were highly organised from the outset and clearly had a very effective communications strategy. For most of the time that hybrids were being discussed in the media their opponents seemed somewhat fragmented, and seem not to have co-ordinated their media strategies. It was not until the Catholic Church intervened in March 2008 that the source struggle was balanced out somewhat in terms of power and planning. It should also be noted that there was no real visible dissent and disagreement *between scientists* over hybrids.

When one looks at media coverage of the MMR vaccine and GM crops, however, one finds a different picture. Firstly, the opposition source groups were much more effective. In the case of GM crops anti-GM NGOs such as Greenpeace and Friends of the Earth were extremely organised and ran very tight media-management operations which were very successful at seizing the media agenda and mobilising public support. Secondly, in the cases of both MMR and GM, there were not only vocal lay opposition groups, but there were also critics of the mainstream scientific view in the shape of maverick scientists such as Andrew Wakefield and Arpad Pusztai. Their scientific credibility aside, for long periods of time they were obviously considered credible sources to many media

outlets. With a few low-profile exceptions there were no scientists willing to repeatedly counter the scientific claims of the likes of the articulate and media-savvy Dr Minger, Dr Armstrong, Dr Lovell-Badge, and Dr Wilmott on hybrid embryos.

It should also be remembered that source struggles are not the only determining factor in play in news coverage. Even though we have concentrated on analysing news source activity in this report, media representations of complex science are influenced by multiple, overlapping, and sometimes contradictory factors. Another key difference is the lack of any significant public opposition to the science which journalists could tap into. Public concern played a real part in constructing the very negative media images of MMR and GM foods, for example. With these previous examples of contentious science the public perceived real risks (either to their own health, that of their family members, or to the environment). Whether justified or not, fear of these risks played a very real part in motivating public opinion and setting the tone of press coverage. No such equivalent risks were associated with hybrid embryos. The rhetoric of medical risks associated with the science was sparse and fragmentary. And when it did rear its head it was usually with reference to abstract concepts. It is relatively easy to be afraid (or to stir up fear) of autism and environmental degradation; but it is not so simple to motivate oneself to be afraid of attacks on figurative notions such as human dignity or the sanctity of life. One very real consequence of the absence of a material "risk-factor" around hybrids was that there were no real crusades against the science in the press. At the height of the press coverage of both the MMR and the GM foods affairs key newspapers took a strong campaigning line – their coverage was coloured by their political interventions either in favour of or against the science. Despite the presence of Frankenstein-related rhetoric across the board in the hybrid embryo debate there was no equivalent of the *Daily Mail*'s highly effective "Frankenstein Foods" anti-GM drive, or the numerous destructive anti-MMR newspaper campaigns.

The reproducibility of the media victory aside, however, there is no doubt that the coverage of hybrids was pro-science overall, and favoured the messages disseminated by those in favour of hybrid embryos. Taken together our data paint a picture of press coverage over a three-year period which was broadly in support of allowing the creation of hybrid embryos to be used in stem cell research both in terms of the sources quoted, and the reproduction of key messages, arguments, and rhetoric. In the source struggle between the two broad groups of news sources active in the debate, those who supported hybrids won a clear, if contested, victory.

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[1] Of course, neither can scientists, clergymen, or media academics. In saying this we are making a broad point about the nature of language and communication in a media setting, and not singling journalists out as in some way intentionally duplicitous.

[2] Stephen Minger, "Coalitions, Campaigns, and Turning Points" panel at *The Human Fertilisation and Embryology Act: A Retrospective*, a one-day workshop organised by the ESRC Genomics Network, London, March 12th 2009.

[3] Editorial, "The Arguments For Hybrids", *Independent*, 6th September 2007.

[4] This is search string we used for our Nexis database "power search": hybrid embryo OR admixed embryo OR animal human hybrid OR human animal hybrid OR human animal embryo OR animal human embryo OR chimera OR parahuman OR cybrid OR centaur OR Mootant OR Franken* OR Humanzee OR chimpmanzee OR minotaur.

[5] Articles were coded as 'focussing' on hybrid embryos if they were referred to directly or indirectly in the headline and/or the first three sentences and/or the first paragraph, or when more than half of the story was devoted to discussion of hybrids. A story was coded as 'discussing' hybrids if it did not comply with the description above, but mentioned or discussed hybrids in at least three sentences overall.

[6] More information about the Science Media Centre can be found at: http://www.sciencemediacentre.org/pages/about/, last accessed April 2009.

[7] We define "front-end" coverage as newspaper stories which were printed on the front pages, or on pages two to five.

[8] The total number of news stories in the sample is 277, but we only have data for prominence on 255 of these articles. This is because Nexis does not give information on page numbers for most articles published in the *Sun* or the *News of the World* and some articles published in the *Independent* or the *Independent on Sunday*. Although these figures on pagination are based on incomplete figures we deemed them important enough to be published anyway, with this caveat.

[9] Boyce, Tammy, Kitzinger, Jenny, and Lewis, Justin (2006) *Science Is Everyday News: Review of UK Media Trends for the Office of Science and Innovation*, Cardiff University, p.19.

10 The Nexis database is not reliable at listing reporter specialism, so it was necessary for coders to Google the name of reporters if no specialism was listed in order to find out if they did indeed have a speciality, or to see if they were guest writers, general reporters, etc. If an author was listed as having another occupation (e.g., academic, lawyer, doctor, etc.) one of the "Guest Writer" categories was used. If an author has a specialism that was not listed in our coding frame the category "Other Specialism" was used. If no specialism was clear after internet searching a journalist's name then the category "Unspecified/ General reporter" was used. If there was more than one author, we coded the specialism of all named authors.

11 There are more journalists than articles because sometimes articles are written by more than one reporter. Letters to the editor, however, were all coded only once even if they were penned by multiple authors.

[12] Columnists with special knowledge of science or health were included as science or health specialists

[13] Boyce, Tammy, Kitzinger, Jenny, and Lewis, Justin (2006) *Science Is Everyday News: Review of UK Media Trends for the Office of Science and Innovation*, Cardiff University, p.20.

[14] Boyce, Tamy, Hogben, Susan, Moreland, Iain, and Kitzinger, Jenny (2005) *A Review of Media Trends for the Office of Science and Innovation*, Cardiff University, p.13.

[15] Indeed, the Cardiff University study of media trends for the OSI found that such stories made up the largest single group of news hooks (31% of all stories found in the 2004 and 2006 samples). Boyce, Tammy, Kitzinger, Jenny, and Lewis, Justin (2006) *Science Is Everyday News: Review of UK Media Trends for the Office of Science and Innovation*, Cardiff University, p.22.

[16] We coded sources in order to map who gets access to which media under what circumstances. We only included explicit citations of named or un-named sources contained in quotation marks in our analysis. We coded each source according to who was quoted in what order, and whether they were in favour of the creation of hybrids, against the practice, or whether they were neither in favour nor against. Decisions on sources' opinions on the practice were always based inductively on the content of what they are reported to have said and how they are described in a news piece, and not on what a coder might already know about a given individual's opinion.

[17] When analysing news sources we used a large set of codes which incorporated sources which were for-, against- or broadly neutral in 17 different categories. The full table detailing what we found can be seen in Appendix 1.

[18] The "Politician Government" code includes all representatives of the government, and not only MPs (ministers, ministerial spokespeople, and Department of Health spokespeople were also included, for example). The "Politician Other" code includes all MPs not directly involved in government (including opposition MPs, back bench MPs of all parties, and politicians who sit on parliamentary committees involved with scrutinising the work of government).

[19] In this category we included all activists who argued against allowing the creation of hybrids. In labelling them this way we do not wish to suggest that there is an already existing group of people who self-identify as "anti hybrid embryo activists". In fact, most people who were coded in this category were members of campaigning groups who are active on a range of issues including abortion and embryonic stem cell research more generally.

[20] When we talk about balance here we are only referring to the balancing of sources from either side of the debate, and not making a judgement about any other kind of balance.
[21] Columns by authors with medical or scientific knowledge, experience, or interest were coded under the science/health journalism specialism. Examples of such columnists would be the *Guardian*'s Ben Goldacre or Anjana Ahuja of *The Times*.
[22] Phil Cowley, "Democracy in Practice" panel, at *The Human Fertilisation and Embryology Act: A Retrospective*, a one-day workshop organised by the ESRC Genomics Network, London, March 12th 2009.
[23] Our hypothesis was that medical benefits are routinely mentioned in coverage of hybrid embryos, but we also wanted to find out how often potential medical/scientific risks were brought up. In order to explore this within the sample every item was coded for references to either medical benefits or risks individually, but also for whether they mentioned both, or none at all. We also hypothesised that arguments against hybrids would be dominated by references to ethical or moral reasons why they should not be created. To test this assumption we included a separate category containing the codes: "ethical argument(s) mentioned in favour", "ethical argument(s) mentioned against", "both for and against", and "neither".
[24] A series of the most commonly occurring categories of pro- and anti-hybrid embryo arguments and rhetoric were devised inductively during the pilot coding exercises. Each member of the coding team made a collection of recurrent arguments and discursive formulations was compiled by each coder, and a final list of 20 from both sides was agreed on. We coded the first instance of each of these arguments which occurred in every news story. We did not code repeated instances of arguments in individual articles as it was decided that we were more interested in tracking the presence of such arguments in news items, rather than the overall frequency in the sample. We coded all mentions of these arguments whether they were made by sources in quotations, attributed to sources without quotations, or mentioned in journalistic discourse as facts. A table listing the frequency of all of these recurrent arguments can be found in Appendix 2.
[25] We also coded for instances in which commonly used arguments and rhetoric on either side of the debate were critiqued by, or "critically attributed" to, opponents in either source camp. An example of a speaker critically attributing an argument to opponents would be a scientist ironically dismissing the validity of an anti-hybrid bishops' invocation Nazi death camp science when discussing the creation of hybrid embryos. Another would be an anti-hybrid embryo activist claiming that scientists are wrong to use the fact that a blastocyst will be destroyed before it reaches the age of 14 days as a reason to carry out the research. As we only coded the first instance of each occurrence of these arguments or rhetoric in each news story, we did not include critical attributions which occurred after an argument had already been mentioned in a more conventional way in an article. This allowed us to analyse only those instances where members of an opposing source group are allowed by a news article to set the agenda while criticising the arguments and rhetoric of their opponents. In short, it allows us to track examples where people from either broad group, either by virtue of their own efforts as sources, or because of the way in which journalists arrange the voices in any given story, "get their retaliation in first", by attacking the arguments of their opponents. . A table listing the frequency of all of these recurrent critically attributed arguments can be found in Appendix 3.
[26] "Cardinal Attacks 'Human Fertilisation and Embryology Bill'", 20th March 2008, press release, Scottish Catholic Media Centre, available at: http://scmo.org/articles/493/1/Cardinal-attacks-Human-Fertilisation-and-Embryology-Bill/Page1.html, last accessed April 2009.
[27] "Scientists respond to HFEA announcement of policy on human animal hybrid embryos", SMC press release, available at: http://www.sciencemediacentre.org/pages/press_releases/07-09-03_hfea_policy_on_hybrids.htm, last accessed April 2009.
[28] "Scientists respond to HFEA announcement of policy on human animal hybrid embryos", SMC press release, available at: http://www.sciencemediacentre.org/pages/press_releases/07-09-03_hfea_policy_on_hybrids.htm, last accessed April 2009.
[29] We only coded the first instance of each kind of argument/rhetoric in each news item. If the first instance in a piece was a critical attribution of an argument or rhetorical trope then no further examples of that rhetoric were coded in that news item. Likewise, if the first instance was a straightforward argument in favour of, or against hybrids, no further instances were coded, even if there were critical attributions of the same argument later on in the piece. The purpose of this coding practice was (as suggested in note 17 above) to code the most prominently placed, agenda-setting, instance of any particular argument in each story.

[30] "Cardinal Attacks 'Human Fertilisation and Embryology Bill'", 20th March 2008, press release, Scottish Catholic Media Centre, available at: http://scmo.org/articles/493/1/Cardinal-attacks-Human-Fertilisation-and-Embryology-Bill/Page1.html, last accessed April 2009.

[31] "Scientists condemn Catholic Church's attack on embryo research", SMC press release, available at: http://www.sciencemediacentre.org/pages/press_releases/07-09-03_hfea_policy_on_hybrids.htm, last accessed April 2009.

[32] "Science Media Centre guide to embryonic stem cells and admixed (human-animal hybrid) embryos", London, 2007, a document prepared with help from the Academy of Medical Sciences and the Association of Medical Research Charities. Available at: http://hfebill.files.wordpress.com/2008/05/smc-es-cells-hybrids.pdf, last accessed April 2009.

[33] An archive of relevant press statements and media releases from the Catholic Church can be found in the online press release archives of the Catholic Church in England and Wales (http://www.catholic-ew.org.uk/ccb/catholic_church/media_centre2/press_releases/press_releases_2008 last accessed April 2009), as well as those of the Scottish Catholic Media Office (http://scmo.org/categories/News-Releases/ last accessed April 2009).

[34] In the large majority of cases this system corresponded with the individual coder's subjective judgement of how a story should be categorised. When this was not the case, for example on some rare occasions when there is a very long discussion of one pro-hybrid argument followed by three brief mentions of anti-hybrid arguments in the final paragraph coders were asked to revisit the story and to make a judgement based on the number of words devoted to pro- and anti-hybrid arguments and sources instead.

[35] Emma Morton, "Moo-tants", *Sun*, 7th October 2006; Julie Wheldon "Human Rabbit is Step Nearer", *Daily Mail*, 6th October 2006; and Olivia Matthews, "Frankenbunny: Coming soon to a lab near you", *Daily Star*, 6th October 2006.

[36] Mark Henderson, "Ministers have been spooked by 'Frankenbunny' Headlines", *The Times*, 5th January 2007.

[37] Fiona Fox, "Coalitions, Campaigns, and Turning Points" panel at *The Human Fertilisation and Embryology Act: A Retrospective*, a one-day workshop organised by the ESRC Genomics Network, London, March 12th 2009.

Appendix

Appendix 1: The frequency of different source types quoted in the sample.

Quoted Sources Overall	Frequency	% of overall sources
Scientist/Funding Body pro	177	27.4%
Scientist/Funding Body anti	3	.5%
Scientist/Funding Body neutral	8	1.2%
Physician (medical doctors, etc) pro	2	.3%
Physician (medical doctors, etc) anti	9	1.4%
Physician (medical doctors, etc) neutral	1	.2%
Religious Representative pro	7	1.1%
Religious Representative anti	93	14.4%
Religious Representative neutral	1	.2%
Politician (government) pro	77	11.9%
Politician (government) anti	11	1.7%
Politician (government) neutral	29	4.5%
Politician (other) pro	54	8.4%
Politician (other) anti	55	8.5%
Politician (other) neutral	23	3.6%
Patient (or other affected person) pro	6	.9%
Patient (or other affected person) anti	1	.2%
Anti-Hybrid Embryo Activist (including anti-abortion activists) pro	2	.3%
Anti-Hybrid Embryo Activist (including anti-abortion activists) anti	43	6.7%
Industry spokesperson (e.g pharmaceutical, biotech, etc) pro	8	1.2%
Industry spokesperson (e.g pharmaceutical, biotech, etc) neutral	1	.2%
Member of the Public pro	1	.2%
Member of the Public anti	1	.2%
Other expert (e.g. ethics philosopher) pro	3	.5%
Other expert (e.g. ethics philosopher) neutral	2	.3%
Regulator (e.g. HFEA spokesperson) pro	3	.5%
Regulator (e.g. HFEA spokesperson) anti	1	.2%
Regulator (e.g. HFEA spokesperson) neutral	14	2.2%
Other activist pro	1	.2%
Civil servant pro	1	.2%
Civil servant anti	1	.2%
Civil servant neutral	1	.2%
Other pro	3	.5%
other neutral	3	.5%
Total	**646**	**100.0%**

Appendix 2: Common pro- and anti-hybrid embryo arguments and rhetoric

Common pro-hybrid arguments	Frequency	present in % of stories
Potential medical advances/cures	315	75.9
Embryos destroyed after 14 days (or sooner)	124	29.9
Shortage of eggs justification	109	26.3
Embryos still mainly human (e.g. 99.9% human DNA or analogous figure)	99	23.9
Embryos won't be inseminated in humans/animals	82	19.8
Hybrids are ethically right/not ethically wrong	61	14.7
Weight of scientific opinion is in favour	55	13.3
Enemies are scaremongering/lying/being deliberately inflammatory	43	10.4
Hybrids are good for the national interest/UK science/the economy	39	9.4
Hybrids are already being created	38	9.2
Opposing views misunderstand the science, are "unreasonable", or "luddite"	36	8.7
Public opinion is in favour	34	8.2
1st government consultation exercise was invalid, hijacked, etc	26	6.3
Personal account from sick patient (or other affected person)	25	6.0
Reference to the small size of the embryos (e.g. no bigger than a pin-head)	24	5.8
Politicians are weak/fear the media and public opinion	23	5.5
Reference to HFEA approval	17	4.1
Hybrids avoid need to tamper with human life/embryos	17	4.1
Other kinds of human/animal fusion are widely accepted (e.g. transplants)	8	1.9
Consent will be gained from cell donors	3	0.7

Common anti-hybrid arguments	Frequency	present in % of stories
Hybrids are wrong (clear moral/ethical argument)	90	21.7
Inhuman/Against humanity	84	20.2
Negative reference to monsters (Frankenstein's monster, etc)	83	20.0
Practice is controversial	48	11.6
Unnatural (e.g. playing with nature)	45	10.8
Unlikely to lead to benefits/exaggerated claims from scientists	45	10.8
The 'yuk factor' (hybrid embryos are disgusting, repulsive, etc)	44	10.6
Public opinion is opposed (projections of public opinion)	40	9.6
Ungodly (against religion or God)	39	9.4
Research destroys life (pro-life argument)	35	8.4
Other ways of getting stem cells more beneficial	24	5.8
Hybrids mean an attack on human rights	24	5.8
Practice is/should be illegal (e.g. HFEA act 1990, banned in other countries)	23	5.5
Practice is irrational (crazy, mad, irrational, etc)	14	3.4
Bad for the national interest/reputation of UK science/the economy	14	3.4
Practice medically risky (potentially or actually, in process or outcomes)	14	3.4
Consent (e.g. cells may be taken without consent from children, etc)	11	2.7
Chief Medical Officer Liam Donaldson against	11	2.7
Comparison with authoritarian regime (e.g. the Nazis, Stalinism, etc)	8	1.9
Ignoring results of government consultation	6	1.4

Appendix 3: Common pro- and anti-hybrid embryo arguments which were critiqued by opponents

Commonest critically attributed arguments in favour of hybrid embryo research	Frequency	present in % of stories
Promise of potential or actual therapies/cures	17	4.0
Opposing views are 'irrational', 'luddite', or based on misunderstanding	10	2.3
Enemies are scaremongering/being deliberately inflammatory	10	2.3
Hybrids good for the national interest/UK science/the economy	6	1.4
Embryos destroyed after 14 days (or sooner)	3	0.7
Shortage of eggs justification	2	0.5
Embryos still mainly human (e.g. Containing 99.9% human DNA)	2	0.5
Personal account from sick patient	2	0.5
Weight of scientific opinion/scientific consensus exists	2	0.5
Hybrids are ethically right/not ethically wrong	2	0.5
Reference to the small size of the embryos	1	0.2

Commonest critically attributed arguments against hybrid embryo research	Frequency	present in % of stories
Negative reference to monsters (Frankenstein's monster, etc)	56	13.1
The 'yuk factor' (hybrid embryos are disgusting, repulsive, etc)	16	3.7
Hybrids are morally/ethically wrong	12	2.8
Hybrids are inhuman (e.g. they are "an attack on our common humanity")	12	2.8
Public opinion is opposed (projections of negative public opinion)	9	2.1
Unlikely to lead to benefits/exaggerated claims from scientists	8	1.9
Research destroys human life (all pro-life arguments)	8	1.9
Practice is/should be illegal (e.g. hybrids banned in other countries, etc)	7	1.6
Hybrids are ungodly (e.g. against the "sanctity of human life")	7	1.6
Other ways of getting stem cells preferable (e.g. adult stem cells)	5	1.2

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