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Abstract

For several decades scholars have studied media reporting on scientific issues that involve controversy. Most studies so far have focused on the western world. This article tries to broaden the perspective by considering China and comparing it to a western country. A content analysis of newspaper coverage of vaccination issues in the UK and China shows, first, that the government-supported 'mainstream position' dominates the Chinese coverage while the British media frequently refer to criticism and controversy. Second, scientific expertise in the British coverage is represented by experts from the health and science sector but by experts from health agencies in the Chinese coverage. These results are discussed with respect to implications for risk communication and scientists' involvement in public communication.

Keywords

risk communication, scientific controversies, science experts, science journalism

1. Introduction

Public controversies over science, technology, environmental and health risks in North America and Europe have been studied extensively since the 1970s (e.g. Mazur, 1973). Scholars were particularly interested in the involvement of scientists in these controversies (e.g. Nowotny, 1982) and in the role of the mass media. Specifically, the media were criticized for distorting the position of science in these controversies by their tendency to unfold and overstate controversy rather than to

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focus on the majority position of scientific communities, thus paying scientific outsiders and minorities too much attention (e.g. Boykoff and Boykoff, 2004; Clarke, 2008; Rothman 1983).

In this article we aim to make a modest contribution to the globalization of research on such controversies by taking China into consideration and comparing it to a western country, raising some questions and presenting some limited evidence. As a case study we analyze media coverage of measles vaccination in Chinese and British newspapers. In both countries measles vaccination is related to social controversies – about the triple vaccine against measles, mumps and rubella (MMR) in the UK and, more recently, about the ‘intensified measles vaccination campaign’ in China.

In the UK, the controversy over MMR began in the late 1990s after Andrew Wakefield, a gastroenterologist at the Royal Free Hospital in London, had suggested a link between MMR and autism based on a scientific paper he had published with several co-authors (Wakefield et al., 1998). The British media, in particular the tabloids, reported his criticism giving rise to a public debate on the safety of MMR (see Boyce, 2007, for a comprehensive analysis of the controversy). While Wakefield’s claim has been refuted by the medical science community and the British health authorities, his criticism resonated with concerns of parents and is thought to have caused a drop in immunization rates (Speers and Lewis, 2004: 171).

In 2010 the Chinese government launched a national ‘Intensified Measles Immunization Campaign’ that included cooperation with the media by organizing news events, press briefings and training for journalists. During that campaign an immunologist from Beijing University raised doubts about the safety of the vaccine in his blog, mentioning the possibility that it might cause autoimmune diseases. Although he soon deleted his more explicit blog entries and revised his position on the issue publicly, his initial critical blog entry was copied to other internet locations and fed rumors that became more and more extreme, finally resulting in the speculation that the vaccines used in the immunization campaign were poisonous and manufactured in the United States (*Beijing Daily*, 7 September 2010).

Although the details of the British and Chinese issues of measles vaccination differ, several common aspects make a comparison meaningful. Authorities responsible for public health in both countries – the British Department of Health and the Chinese Ministry of Health – strongly advocate programs for measles vaccination.¹ In the UK as well as in China outsider medical experts have publicly criticized the vaccine routinely used. Parts of the populations in western countries (e.g. Salmon et al., 2009) as well as in China (e.g. Xiong et al., 2011) have a critical attitude towards vaccination. Finally, media reporting on measles vaccination is thought to have an impact on parental decision making in both countries (e.g. Speers and Lewis, 2004; Wang et al., 2011).

Yet journalism in the UK and China is very different. Without ignoring the current discussion about the quality of British journalism (e.g. Lewis et al., 2008), we would argue that its principles are autonomy, professionalism and audience orientation. Critically scrutinizing those in power – including government and mainstream science – is one of the professional norms of British journalism (Köcher, 1986). While professionalism and audience orientation are not absent from Chinese journalism, the media in China are owned and controlled by the Communist party or government, which provides a media control which is rigid in some ways and flexible in others (Zhao, 2008: 30). Chinese journalism is characterized by ‘double clientelism’ (Yu, 2009: 94) as it has to provide information the audience considers relevant (and, in the case of newspapers, worth paying for) while being constrained by the need to conform to government expectations. As the audience knows that it is confronted with a government-controlled image of the world, alternative means of communication that are more difficult to control in advance – the blogosphere and rumors

spread by interpersonal communication via the internet and mobile phones – play a large role in the Chinese society (e.g. Yu, 2009: 62–80).

The analysis presented in this article compares newspaper coverage of measles vaccination in the UK and China. Two research questions have guided our comparison: how the ‘mainstream positions’, i.e. the policies of the public health authorities and the broad consensus within the medical community, are presented in the newspapers relative to criticism, and how science and health expertise is covered.

2. Methods

The empirical study consists of a content analysis of British and Chinese newspaper coverage of measles/MMR vaccination in the five-year period 2006–10. During that time the Chinese media coverage of measles vaccination was reflecting the immunization campaign described above while the British media were still referring to the MMR controversy. In total, 328 articles – 164 articles from each country – were selected for the analysis from six British national newspapers (*Daily Mail*, *The Mirror*, *The Sun*, *Guardian*, *Daily Telegraph* and *The Times*) and 26 Chinese newspapers (the national newspapers *Xinhua Daily Telegraph*, *Guangming Daily* and *People's Daily* plus 23 regional newspapers). The British newspaper sample is similar to that used by Boyce (2007) in her analysis of the MMR issue. Because of the less frequent coverage of vaccination in Chinese newspapers, we selected a larger number of Chinese than British newspapers.

Relevant articles were identified by keyword search in LexisNexis and the China National Knowledge Infrastructure (CNKI) database, respectively. Search terms were ‘MMR’ for the British and ‘麻疹疫苗’ (measles vaccine) for the Chinese newspapers. We identified 164 relevant Chinese and 1047 British newspaper articles and took a random sample of 164 articles from the British search result for the analysis. Based on the number of newspapers included, the number of newspaper issues per year, and the number of relevant articles identified in the search, we can calculate the average number of articles per year and newspapers dealing with vaccination. On average, newspapers in China published little more than one relevant article per year but about three articles per month were published in the UK. Measles vaccination thus received much more media attention in the UK than in China.

The content analysis focuses on two subject areas: the representation of mainstream vs. critical positions towards vaccination in the coverage and the use of scientific/expert sources and scientific/expert authority to support or challenge the mainstream position. The coding was done using predefined category systems that allowed the coding of all supporting or critical arguments about measles/MMR vaccination in a given article, as well as the respective sources of these arguments. Further category systems were used to code the type of individuals presented as experts in the articles and references to controversy and uncertainty regarding vaccination.

All articles were coded by the first author who is fluent in Chinese and English. Inter-coder reliability checks were thus not possible, but a random sample of 90 articles was coded a second time. Intra-coder reliability was very high (Cohen's Kappa for all category systems > 0.90). To avoid learning effects in the course of the coding process compromising the validity of the comparison between the countries, the articles were coded in a random order.

3. Results

Coverage of controversial vaccination issues

In both countries the majority of articles explicitly mention the mainstream position towards the vaccination in question (MMR in the UK, intensified measles vaccination in China). Of these

articles about the same proportion, 58% and 56%, respectively, include arguments supporting the mainstream position (see Table 1 for a list of arguments). The proportion of articles with critical arguments differs greatly, however: 44% of the British articles include critical claims, compared to only 5% of the Chinese articles.

The argument most often used in both countries to support the mainstream position on vaccination states the seriousness of the infectious disease fought by the vaccine (Table 1):

Unbelievable, the number of cases of mumps is up a staggering 1,300 per cent this year, according to recent reports. The viral infection can pose quite a serious threat to men and can even lead to infertility problems. (*The Sun*, 16 March 2009)

Despite the record low measles morbidity in China in 2009, there were still as many as 50,000 cases of the disease. In order to speed up measles elimination, China's Ministry of Health [...] decided to launch a nationwide intensified measles immunization campaign in September 2010 [...]. (*Beijing Daily*, 8 September 2010, translated)

The second most important supporting argument in the Chinese newspaper coverage is emphasizing the effectiveness of the vaccination:

Since the intensified measles immunization campaign began, the vaccination rate in Henan province has reached 98.1%, accomplishing one fifth of the overall national goal, and the measles morbidity has dropped to a record low. (*Henan Daily*, 30 December 2010, translated)

In the British media, coverage disputing the credibility of the scientific criticism of MMR (by Wakefield) ranked second as argument supporting the mainstream position:

The doctor who first claimed there was a link between the MRR jab and autism faces a disciplinary hearing today. Dr. Andrew Wakefield and two colleagues are accused of serious professional misconduct and could be struck off. (*The Mirror*, 16 July 2007)

Table 1. Arguments in the media coverage supportive or critical to the mainstream position on vaccination rank ordered by frequency.

United Kingdom (n = 123 articles)	%*	China (n = 150 articles)	%*
Supporting arguments		Supporting arguments	
Measles/mumps/rubella situation serious	26	Measles/mumps/rubella situation serious	24
Scientific basis of criticism faulty	18	Vaccination is effective	21
Vaccination is effective	8	Vaccination is safe	6
Vaccination is safe	4	Freedom of choice	4
Inferiority of single vaccine	2	Widespread public support/compliance	4
Other supporting argument	1	Other supporting argument	2
Critical arguments		Critical arguments	
Side-effects of vaccination	31	Shanxi vaccine incident	2
Personal choice of Blair unclear	9	Doubts about quality of vaccines	2
Single vaccination superior	7	No freedom of choice	1
Other disputing argument	1		

*Proportion of articles containing the argument (multiple coding possible).

In the UK most of the claims critical towards MMR refer to assumed side-effects of the vaccination, as in the following example:

Thousands of U.S. parents who blame the MMR vaccine for their children's autism yesterday went to court to demand multimillion dollar compensation. [...] The parents claim their children developed the condition as a result of the triple jab, which protects against measles, mumps and rubella. (*Daily Mail*, 13 May 2008)

Some claims also refer to an unclear personal position of then UK Prime Minister Tony Blair and his wife regarding MMR for their own children and some to the superiority of single vaccination. The very few Chinese claims critical of measles vaccination mention an incident leading to severe sickness and even the death of some children in the province of Shanxi, and 'rumors' about the poor quality of the vaccines circulating among concerned Chinese parents:

According to media reports, there are seven children in the city of Lvliang, Shanxi, who 'claim to be vaccine victims'. At present, an expert group is investigating other children's health condition. (*Shanxi Daily*, 29 March 2010, translated)

Yesterday, there was talk in some online forums that the vaccine to be used on children was a slow poison given as a gift by a foreign country, and some citizens also received text messages to this effect. To promptly clear away the confusion caused by such rumors, China's Ministry of Health made it clear that the measles vaccines used in the current immunization campaign were all produced in China [...]. (*Beijing Daily*, 7 September 2010, translated)

The media in both countries differ in the spectrum of sources to which they attribute the claims (Table 2). The Chinese media attribute three quarters of the claims to a government agency or speaker, while the British media use a broader selection of sources: government sources, parents and also comments from the journalists themselves. Health professionals and scientists/expert sources are mentioned in both countries but relatively more often in the UK than in China.

Table 2. Sources of claims supporting or critical towards the mainstream position on vaccination in British and Chinese newspapers.

	United Kingdom		China	
	Supporting %*	Critical %*	Supporting %*	Critical (n)**
Government sources	46	3	81	(1)
Parents	4	42	3	(2)
Journalists	29	39	5	(1)
Scientific/expert sources	14	5	6	
Health professionals	7	9	3	
Netizens/rumors				(3)
Other sources		2	2	
	100 (n = 72)	100 (n = 59)	100 (n = 88)	(n = 7)

*Percentage figures are based on the number of claims.

**Absolute numbers rather than percentages given because of the low frequency of occurrence.

A look at the sources of supporting vs. critical arguments reveals the social structure of the controversy about MMR in the British media: the national health authorities (e.g. the Health Protection Agency and the General Medical Council) vs. concerned parents. Journalists present supporting and critical arguments. Scientific/expert sources and health professionals are also found on both sides but most of their arguments support the mainstream position. Government sources dominate the coverage about the measles vaccination program in China and support it; critics are rarely represented.

To summarize, the British newspapers reflect the diverse spectrum of opinions and sources involved in the social controversy thereby confronting their readers with an ambivalent message regarding MMR. The Chinese newspapers in contrast disseminate a clear message about the safety and benefit of vaccination to their audience.

Use of expert sources

In both countries, a considerable proportion of articles – 54% (UK) and 43% (China), respectively – refer to one or more experts. The relative frequency of expert voices in UK and China is thus rather similar but the type of expert mentioned differs greatly (Table 3). British articles mostly mention experts from the health system, e.g. doctors, or from science, e.g. biomedical researchers. (As the distinction between medical and scientific experts was often difficult to make on the basis of the information given in the articles, we merged them into one category.) More than one third of the British articles contained references to named or unnamed medical/scientific experts but only less than 10% of the Chinese articles did so. Conversely, experts from government agencies responsible for public health were more often mentioned in the Chinese than in the British media. Science writers/columnists who take a role as ‘health experts’ are a further expert type in the British coverage.

References to scientific controversy and uncertainty

Given the high reputation of science in the UK (Ipsos MORI, 2011) as well as in China (Zhan et al., 2011: 188), references to science and expertise in the coverage of vaccination issues may create trust in vaccination. This persuasive function of expertise may be undermined by controversial expert opinions and uncertainties in medical knowledge, however. We therefore analyzed the coverage for references to controversy and uncertainty about science and expert opinions. Such references are rare in the Chinese media – only 10% of the articles mention controversy and 2% uncertainty – but frequent in the British media. Almost two thirds (64%) of the British articles refer to controversy and more than half of the articles (54%) mention

Table 3. Types of experts mentioned in the coverage.

	UK %*	China %*
Government experts	4	36
Medical or scientific experts	37	9
Journalists/columnists	13	1
Other experts	1	1
N of articles	(n = 164)	(n = 164)

*Proportion of articles referring to that source (multiple coding possible).

uncertainty. In most of these cases the British articles point to the controversy about a link between MMR and autism/bowel disease and refer to uncertainty about the safety of MMR:

The families point to the fact that their once healthy children developed autism after being given the jab. But vaccine experts stress the [link] has never been proven and say the timing is coincidental, with children vaccinated at an age when autism is often first diagnosed. (*Daily Mail*, 12 June 2007)

The few references to controversy and uncertainty in the Chinese newspapers mostly concern the quality of the vaccine and the safety of repeated measles vaccination.

While references to science and expertise are frequent in both the British and the Chinese coverage, they are represented differently in both countries. In the British coverage, scientists and doctors are the main expert sources, and the image of expertise presented in the coverage includes controversy and uncertainty. The Chinese media mostly refer to experts from government agencies and present an image of unchallenged sound medical expertise.

4. Discussion

Our analysis shows clear differences between the UK and China in how biomedical expertise is represented in public communication of a health issue that is related to social controversy. First, in contrast to the British media, existing criticism of the mainstream position on vaccination is hardly mentioned in the Chinese newspapers. The Chinese newspapers present the mainstream position as unchallenged and refer to criticism rarely and only when refuting it. Second, academic scientists and experts from the medical system, including those critical to the mainstream position, ‘speak for themselves’ in the British media – i.e. they are quoted or their statements are paraphrased by journalists. In China, biomedical science and medical expertise are represented in the newspapers mainly mediated through government health authorities who present expertise compatible with their policies.

From a risk communication point of view, government control of journalistic reporting in China leads to a pattern of media coverage of measles vaccination that conforms to expectations also of western health experts (even if they would not agree with the means of how that pattern is produced). For example, referring to an example of a controversy between the scientific mainstream and a dissent practitioner regarding HPV vaccination (against cervical cancer) reported in a BBC program, the BBC Trust review of impartiality and accuracy of the BBC’s coverage of science states that ‘one might question whether the interests of balance are more important than the risk that his [*i.e. the dissent practitioner*’s] eloquently stated opinions might have persuaded some parents to deny their daughters protection against cervical cancer. MMR should remind us that in medical matters caution should sometimes take precedence over journalistic inquiry’ (BBC Trust, 2011: 62) While the political autonomy of the media is of course undisputed in the UK, British journalism is subject of moral persuasion to adopt a more educational perspective on issues such as vaccination rather than giving medical outsiders a voice.

Scholars have argued that in risk communication a dilemma exists between the media functions of informing the media audience about rational risk behavior, and providing an arena for public deliberation about risk (e.g. Peters, 1994). Optimizing the information function would suggest that media provide clear, unanimous advice without creating confusion by reporting uncertainty and controversy. Optimizing the deliberative function, in contrast, would require media to include different (even contradictory) voices. A similar dilemma exists between incompatible expectations of different fractions of the audience (cf. Peters and Hennen, 1990: 303). Part of the audience may

trust the media to provide the best available advice. These audience members may be prepared to take the mediated advice at face value, not wanting to be unsettled by controversy and uncertainty. But another part of the audience may prefer to learn about the full spectrum of opinions, including outsider views, and may want to develop their own conclusions on whom to trust and whose advice to follow. Presenting only the mainstream view may motivate members of that part of the audience to seek information in alternative channels – such as blogs or rumors.

The different media functions and audience expectations cannot be fully met at the same time. Although these dilemmas exist in both countries, British and Chinese journalism differ in how they respond to them: Chinese journalism focuses on the information function and assumes a paternalistic relationship with its audience. British journalism gives the deliberative function more weight and assumes a mature audience that is able to make sense of contradictory information.

These findings are not only of academic relevance but have consequences, for example, for the provision of health information to the population and for the relationship between science and the public. Our preliminary results suggest two more general hypotheses for further research: first, that the Chinese more than the British media report on controversial issues in a paternalistic way and, second, that ‘science mediators’ (such as health agencies) play a more important role in the Chinese than the British coverage of biomedical expertise while the British more often than the Chinese journalists use researchers and doctors as information sources.

The different role of science mediators, i.e. institutions outside the academic system that represent scientific expertise in the media, may give rise to questions that go far beyond the case study analyzed and the comparison between China and the UK. Who speaks for science? Who selects and interprets scientific findings for the public? Under which conditions do mediating institutions gain weight in public communication as compared to the voice of academic science itself? With respect to the comparison of Chinese and western patterns of public communication of science, technology and risk, a number of questions concern the involvement of Chinese scientists. Do they as frequently talk to journalists as researchers in other major knowledge-producing countries (e.g. Peters et al., 2008) or are the contacts of Chinese scientists more restricted? When and how does the ‘double clientelism’ of Chinese journalism interfere with the relationship between researchers and the mass media?

The results presented in this article are based on a content analysis that is limited in several respects: It is confined to newspapers, uses a small media sample, and looks only at a single issue. The generality of our results must therefore be considered with caution. But even so the case study leads to some interesting observations about differences regarding journalistic approaches to covering controversies related to science and the participation of researchers in public communication that are worth analyzing in greater width and depth in further studies.

Note

1. See the leaflet ‘MMR – the facts’, published by the UK Department of Health (2004) and the ‘National Measles Elimination Action Plan for 2010–2012’ [translated], published by the Chinese Ministry of Health (2010).

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Hans Peter Peters is a senior researcher at the Research Center Jülich, Germany, and Adjunct Professor of Science Journalism at the Free University of Berlin. His research deals with public communication of science and technology, and the formation of public opinion on science, technology and science-related issues in a media society. In particular he studies the science–media interface and the interactions between scientists and journalists.

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