

The worries of weaning: newspaper reporting of infant weaning and its impact on dialogue in online discussion forums

Abstract

Despite infant weaning being one of the most challenging aspects of parenting, there is uncertainty about the right time to start. This research aimed to understand the impact of newspaper reporting of weaning on parents, in particular focussing on the coverage of a scientific report published in the British Medical Journal in 2011. Using a media analysis of weaning articles from UK national newspapers and the 'Mumsnet' Internet discussion forum, the analysis was able to explore how forum members had reacted to the reporting and embellished the communication of the weaning issue by adding their own personal advice and experience. The case study shows the role of discussion forums in science communication and how they can provide a new arena for studying audience effects.

Keywords

Online Discussion Forums, Mumsnet, Science, Health, Communication

Introduction and Background

Infant nutrition is arguably one of the most worrying aspects of parenting. Experts agree that weaning, the transition time when parents stop exclusively feeding their infants on milk and move to introducing 'solid' foods, "...continues to cause more anxiety to mothers, nurses and doctors than almost any other issue in paediatric nutrition" (Davies and O'Hare, 2004, p.84). Parents often struggle to establish when to wean their infants and what foods they should begin to feed them on. Weaning too early, before the age of four months, is associated with increased morbidity (Wright *et al.*, 2004) and the cessation of lactation (Dewey, 2001). Conversely, delaying the introduction of solids beyond the age of six months has been associated with increased risk of malnutrition (WHO, 2002a) and feeding problems (Northstone *et al.*, 2001). Not surprisingly, therefore, research has found weaning to be one of the aspects of parenting, which mothers, and first-time parents in particular, find most challenging (Mikkelsen *et al.*, 2007).

Ten years ago, the World Health Organisation (WHO) conducted an expert consultation on the optimal duration of breastfeeding (WHO, 2002b), recommending exclusive breastfeeding for an infant's first six months. In January 2011, a review of the scientific evidence was published in the British Medical Journal (BMJ) (Fewtrell *et al.*, 2011) suggesting that the proposed time frame be reduced to four months: infants may be at greater risk of developing anaemia and food allergies if weaned after this time.

However, this shift of scientific opinion has created high levels of uncertainty for parents.

The mass media has been shown to play a fundamental role in informing the public about health, science and technology (Pellechia, 1997; Holliman, 2004; Kjærgaard, 2010) and about scientific risks (Rowe *et al.*, 2000). It is conceivable, therefore, that parents use these channels, alongside advice from Health Visitors, GPs and other parents, to make sense of the weaning issue. Little is known, however, about the effect of media coverage on parents and the role of the reporting of weaning in parental decision making.

For many years, researchers have questioned the impact of traditional media on the public's attitude towards health issues (Marks *et al.*, 2007). In fact, for issues such as food safety, the print media has been recognised as the main source of information for the general public (Whaley and Tucker, 2004; Gauthier, 2011). The power of newspapers to inform has led researchers to argue that for many people their reality of science comes from what they read in the press (Nelkin, 1987), and the way that newspaper journalists frame the news creates a reality to which the public responds (Schudson, 2003; Gauthier, 2011). As a result of this, individuals often use information from newspapers to form opinions and make decisions (Pellechia, 1997).

The Internet has now added to this mix and is an interesting contemporary area for the communication of science and health issues (Artz and Wormer, 2011; Shanahan, 2011; Denecke and Nejd, 2009; Malone *et al.*, 2004), with the majority of today's parents searching for both information and social support online (Diaz *et al.*, 2002; O'Connor and Madge, 2004; Sarkadi and Bremberg, 2005; Bouche and Migeot, 2008; Plantin and Daneback, 2009; Johansson *et al.*, 2010). Interestingly, many parents place high levels of trust in the health information they receive from the Internet (Khoo *et al.*, 2008; Lemire *et al.*, 2008; Eysenbach and Köhler, 2002). Particularly popular are parenting forums, which provide a rich and valuable source of health information (Gambles, 2010). Previous research has found that such forums provide "...an innovative form of data collection with significant potential" (Skea *et al.* 2008, p.1383) and offer "...an unusual opportunity for researchers to tap into specific segments of public opinion, and to watch how it forms, as it forms" (Rier, 2007, p.244).

Researchers believe that the online environment is having a considerable effect on science journalism (Secko *et al.*, 2011; Robinson and DeShano, 2011; Fahy and Nisbet, 2011). A new mode of reporting termed "the 'unfinished' science story" (Secko, 2009, p.817; Laslo *et al.*, 2011) means online audiences are now able to get hold of a traditional news story, which once printed was deemed as 'finished', to keep the debate alive. The Internet has certainly created more opportunities for so-called 'citizen

learning' (Krimsky, 2007), with science news no longer a 'one-way street' (Secko *et al.*, 2011).

However, the danger of interest-driven or pseudoscience comments in forums is reflected in the decision to shut off the comments section by the magazine 'Popular Science' (Popular Science, 2013). The role of media forums to engage the public is also questioned by research: a survey of 1,801 adults to investigate the role of social media platforms like Facebook and Twitter found that "social media did not provide new forums for those who might otherwise remain silent to express their opinions and debate issues" (Pew Research Centre, 2014).

Nevertheless, sites such as Mumsnet offer rich potential for research and augment the value of any media analysis since they also allow an examination of the potential effects of media reporting on a specific audience (Pellechia, 1997; Holliman, 2004). To date, there has been very little research on how discussion forums can influence scientific communication. The purpose of this case study is therefore to firstly analyse how the new guidelines for weaning reported in 2011 were 'framed' in UK newspaper coverage, i.e. the way the news content was shaped and contextualised by journalists (Kjærgaard, 2010) and how forum users interpreted and responded to the messages about weaning in the press. In the second part of the study we compared the newspaper reports and

Internet forum comments for the Fewtrell study in order to understand the role discussion forums can play in science communication.

Methods

Newspaper content analysis

The units of analysis for the newspaper study were based on three types of information: basic data (such as newspaper type, date of publication, word-length, speciality of the author); reference in the text to scientists, scientific texts, or previous studies; and reference to ‘frames’ (Nisbet and Mooney, 2007) - such as what types of foods to wean on, when weaning should start, and the breastfeeding versus bottle-feeding debate.

A search of newspapers was carried out using the Nexis database (LexisNexis, 2011). The top nine UK newspapers were selected based on their readership figures (National Readership Survey, 2010). The newspapers include three tabloids (*The Sun*, *Daily Mirror* and *Daily Star*), two middle-market papers (*Daily Mail* and *Daily Express*) and four quality newspapers, (*The Daily Telegraph*, *The Times*, *The Guardian* and *The Independent*) (Anderson *et al.*, 2005). The search was run for a 12-month period from June 2010 to June 2011. ‘Wean!’ was used as a keyword in the search engine: the use of the ‘!’ symbol opens up the search to include any variants of the word wean, such as ‘weaning’, ‘weaned’ etc. Relevant articles were coded and entered into a SPSS (statistical analysis software) database (version 19.0), where analysis of the data took place. A randomly selected subset of 10 articles were double-coded and analysed to

determine intercoder reliability, a measure of how much coders, working autonomously, code articles in the same way (Lacy and Riffe, 1996).

Internet forum content analysis

The parenting site ‘Mumsnet’ was selected as it has an active discussion forum, with archived messages and a powerful search engine and is by far the most visited and influential parenting site on the Internet (Pedersen and Smithson, 2010). The site is also increasingly being used as a rich source for research data on parenting (Pedersen and Smithsen, 2013; Gambles, 2010). The site, created in the year 2000 by two UK mums, claims to have ‘nearly 4 million visits per month’ (Mumsnet, 2011). In the forum, members can start a ‘discussion’ on any topic or add a ‘post’ to an existing conversation. A range of keyword searches were run in the discussion board’s search engine in order to extract the relevant discussions, i.e. wean(ing) and newspaper(s), wean(ing) and media, wean(ing) and news. Archived discussions (including all their individual discussion posts) from the period 27/06/10 to 27/06/11 (the same period as the newspaper search for individual newspaper articles) were then located. A coding of the forum discussions was then conducted (Skea *et al.*, 2008) using SPSS in support. The content analysis recorded basic data for each discussion, such as date, length and number of participants, as well as the different themes present in the posts. The discussions were double-coded to assess percentage agreement.

Combined newspaper and forum analysis

In order to compare newspaper articles covering the Fewtrell paper (2011) and Internet comments that respond to this coverage, categories were created to judge the adequacy of the science reporting based on the method of Schwitzer (2008): i.e. how ‘accurate, balanced and complete’. For each criterion, the article or online discussion was given a rating of ‘satisfactory’ or ‘unsatisfactory’. For example, if there was an exaggeration of risk or an inadequate explanation of the science, then the articles and comments containing any poor, distorting or misleading views would be categorized ‘unsatisfactory’. The classification of the newspaper articles and Internet comments was carried out by a science writer with a BSc in Biology and an MSc in Science Communication following the ‘science journalistic peer review’ method as described for the German “Medien-Doktor” project (Anhäuser & Wormer, H, 2012). Rather than coding articles for analysis, this ‘health-news-review’ also used a system of categories .

< Insert Table 1 about here >

Results

Newspaper content analysis

The Nexis search found 46 relevant articles (see Figure 1) with a sharp peak in the reporting of weaning in January 2011. Twenty of the articles written between the 14th

and 18th of January were a reaction to the BMJ paper on weaning (Fewtrell *et al.*, 2011). At this time, all the quality newspapers and the Daily Mail covered the BMJ paper on weaning; however the tabloids and the Daily Express did not.

<Insert Figure 1 about here>

Three smaller peaks of reporting also occur in March, April and May 2011. These were articles based on a range of scientific reports covering weaning and obesity, weaning and IQ levels, and weaning and food toxins. Interestingly, unlike the Fewtrell paper (which was covered by a range of publications) these reports were only picked up by single papers.

29 of the articles (63%) dealing with the weaning issue were from the quality papers. Almost a third of these articles came from The Telegraph newspaper. The middle-market papers had seven articles on weaning (15%) and the tabloid papers had 10 articles (22%). The quality papers had a higher percentage of articles over 500 words (48%), whereas the tabloid papers had a higher percentage of shorter articles (70%) for 101-500 words. There was a large spread in terms of where the article actually occurs in the newspaper, though weaning stories rarely made the front pages.

The majority of the articles were either news articles or feature articles (n = 18, 39% and n = 18, 39% respectively), with a large proportion of the quality paper articles 'news' style articles (48%). Whereas the largest proportion of the middle-market and

tabloid articles were feature articles (71% and 70% respectively). Although commentary articles were present in some newspapers, these were only six out of the total 46 articles (13%); and only three articles (7%) were 'letters' from readers.

Previous research has found that newspapers differ dramatically in their selection of topics and their narrative styles (Entwistle and Hancock-Beaulieu, 1992; Hilton *et al.*, 2010). This was certainly the case in this research, as the following quotes from different papers demonstrate. The Daily Mail warns parents about the dangers of introducing solid foods too late:

“Parents who wait until six months to wean their baby might not be giving their child the best start in life, according to health experts.”

Daily Mail, January 18th 2011

Whilst a more measured tone is taken in The Daily Telegraph newspaper:

“...a review conducted by the European Food safety Authority concluded that complementary foods may be introduced safely between four to six months...”

The Daily Telegraph, 14th January 2011.

The use of personal testimonies was also favoured in newspapers such as the Daily Mail, suggesting the power and persuasiveness of including personal stories in the light of the public's mistrust of authority (Hilton *et al.*, 2010).

Both the quality and middle-market papers used specialised ‘health correspondents’ or ‘science journalists’ to report on the weaning issue: 54% of the quality paper articles were written by experts in the health/science field: authors who are likely to have a better understanding of health issues than journalists with no specialism (Entwistle and Hancock-Beaulieu, 1992). However, in the tabloid articles, only two types of authors were found, either general journalists or well-known TV/media personalities.

The articles on weaning covered a range of different frames (Table 2). The time frame issue was covered by 55% of the quality papers, whereas only 20% of the tabloid articles covered this subject.

< Insert Table 2 about here >

Many of the articles however mentioned that there was a ‘risk’ to infants if they were not weaned at the correct time. Depending on the article, this health risk was obesity, poor nutrition, behavioural and IQ problems etc. Articles that did not talk about ‘risk’ directly still used words such as ‘harm’ or ‘danger’ to imply that a risk was present. However, no articles put the ‘risks’ into context by providing any specific supporting data or figures, nor did they mention that the findings presented in Fewtrell *et al.*, (2011) were from one single published review. A large proportion of the quality paper articles reported on the change in scientific consensus on the weaning issue (15/29), compared to 2/7 and 1/10 for the middle-market and tabloid articles respectively.

There was also a clear difference in the way that the newspapers use background information to present the weaning issue. 55% of the quality paper articles based their articles on a scientific study that had recently taken place. This compares to 57% of the middle-market articles but only 20% of the tabloid articles.

Internet forum content analysis

A total of 12 separate discussions were found using the key word search, which included posts that referred to the specific topic of weaning and its reporting in the newspapers. The number of posts associated to discussions ranged from five to 714 presented in Table 3. As the number of total posts was very large (over a 1000) each individual post was not recorded in the SPSS file. The aim of the content analysis was to identify how participants had reacted to the *newspaper coverage* of weaning and not just about weaning in general. Therefore, by reading through the entire 12 discussions, 112 comments that directly referred to the weaning issue in the context of newspaper reporting were identified and then analysed.

< Insert Table 3 about here >

The number of participants in a discussion correlated with the length of the discussion: for example, the longest, entitled '*Exclusive BF for 6 months may be harmful*' had 271 participants and the shortest, '*Weaning age recommendation = confused*' had only five. The common trend was that for short discussions (with less than 100 posts), there was

very little actual dialogue between individuals. Instead, forum members tended just to participate by posting a comment and perhaps a reply. For the two longer discussions which had 184 and 714 posts, there was a lot of repeat participants and backwards and forwards dialogue between members. On average, the discussions that commented on newspaper reports of weaning lasted between one and seven days. An exception to this was a discussion lasting almost a month entitled 'How many people wait until the recommended six months before weaning and how many didn't?' Since this referred to individuals' own experiences of weaning the subject was less time-bound and so participants could add to the conversation over a longer period.

The six main themes/frames identified are shown in Table 4. For the intercoder reliability analysis, a simple percentage agreement was calculated: the results showed that the two coders agreed for 92% of the coding.

< Insert Table 4 about here >

The results of the content analysis showed that the most talked about topic was the inaccuracy of media reporting surrounding the weaning issue. The two longest discussions (Table 3) began directly with the topic of breastfeeding and weaning. This parallels the newspaper reporting, which often covers the breast versus bottle-feeding debate.

Of the 12 discussions, eight were posted at the time of the release of the Fewtrell study and are direct reactions to the study's findings and its coverage but soon digress onto the press coverage of the issue. The other four discussions posted between February and May also make references to the Fewtrell study and the media reporting of it; although rather than being knee-jerk reactions they use the study findings to give advice to other parents. Many forum participants made the point that the newspaper reporting of the weaning issue was inaccurate, in particular its association to the breastfeeding versus bottle-feeding debate.

“It's so frustrating the way that the media is turing [sic] this story into a one about breastfeeding. It's just about what stage to introduce solids... whether a baby is breast or formula fed, surely?”

Mumsnet, 14th January 2011: Discussion 6

“I KNOW the 4 month weaning thing isn't an attack on BF, but the media coverage of it has been. However I think it is shameful the way the media has jumped on this and completely misinterpreted the article and is using it as an opportunity to bash breastfeeding.”

Mumsnet, 14th January 2011: Discussion 3

The inaccuracy of headlines was referred to frequently: an important observation since previous research on risk reporting has shown how headlines can set the emotional tone of an article and influence risk perceptions (Rowe *et al.*, 2000).

“Formula feeding mothers are consistently expected to put up with twisted headlines e.g. ‘formula causes obesity’, ‘breast fed babies are cleverer’ without a whimper when reality and common sense shows such headlines are totally ludicrous.”

Mumsnet, 16th January 2011: Discussion 1

‘

The effects that the newspaper reporting would have on readers was referred to by some participants:

“...the reactionary, attention grabbing headlines that have sprung up all over the place as a result of the study are missing the point and unfortunately an awful lot of people won't read the whole report or won't understand it and will just take snippets and headlines to be truth and fact.”

Mumsnet, 14th January 2011: Discussion 12

Combined newspaper and Internet discussion analysis

16 news articles and 9 Internet discussions that mentioned the Fewtrell study directly were analysed. The rating system used in the analysis provided a consistent tool to evaluate the quality of the comments in Mumsnet with those of the newspaper articles. As Table 5 shows, just over a third of the newspaper articles and the Internet discussions contained adequate details about the Fewtrell study, i.e. included information for readers to be able to find out who had carried out the study, where they worked and where the study was published.

The majority of the newspaper articles and the Internet discussions placed the new findings in context (69% and 89% respectively). This meant they gave background to the reader about how weaning advice has changed historically.

“Previously, the advice had been four months, but the Government had decided to change it to six months in 2003 after the World Health Organisation recommended exclusive breast feeding for the first six months of life.”

Daily Mail, 18th January 2011.

The discussion of risk was lacking in any of the newspaper articles and was only present in a third of the Internet discussions. However, where risk was explained in the forum, there was often a very clear explanation.

“It's about relative risk. And the weight of evidence and scientific consensus from multiple studies is clear - b/f babies are far less likely to develop allergies. One study with three out of four authors funded by formula/baby food manufacturers does not change that.”

Mumsnet, 14th January 2011: Discussion 3

Over two thirds of the Internet discussions included independent sources and mentioned a conflict of interest amongst the authors of the study. This was much lower in the newspaper articles (33%).

“Declarations in the paper revealed that three of the four authors had been paid by baby food companies for consultancy work or research in the past three years.” The Independent, 15th January 2011.

The Internet discussions also contained more discussion of the study methodology, how the study was carried out, how good the data was and the quality of the evidence (66%): no newspaper articles covering the Fewtrell study did this.

“I've read through that synopsis of the study. What surprised me was the lack of caveats in the conclusions, even though as I was reading through the synopses of the studies which were being considered, I could see obvious social factors which would affect outcomes.”

Mumsnet, 14th January 2011: Discussion 6

< Insert Table 5 about here >

It is possible that without the journalist constraints that apply to traditional news media, the forum participants had more time to research the study and, within the discussions, had more space to explore points in detail and could be more critical of the results of the original research. Indeed, we found the word counts of the Internet comments considerably higher compared to the newspaper articles (Table 6), which gave them the potential to communicate the issues in much more depth.

< Insert Table 6 about here >

To ensure a fair view is given of the strengths and flaws of forum comments, it is important to look at examples of where the science communication is poorly conveyed and/or distorted or inaccurate information is given. The confines of this study do not allow for an in-depth analysis of this; however we were able to find examples in the forum comments where parents gave personal experiences that were in conflict to scientific advice.

For example:

“I weaned at 22 weeks for DD [darling daughter] and DS1 [darling son] and 24 weeks for DS2... I felt so guilty about it, as I hadn't followed the guidelines

even though the sleep issues immediately resolved. None have allergies, but my nephew who was EBF [exclusively breast fed] for 7 months, then BLW [baby-led weaned] (BF until 18 months) has allergies and health issues as a result of being iron and vit d deficient.”

Mumsnet, 14th January 2011: Discussion 4

Future work is needed to understand how personal comments, such as these, could affect other users of the forums.

Discussion

The lack of thorough reporting, the uncertainty in the media messages and the scientific inaccuracy found in this study, echoes the findings of prior studies on science communication by the media (Pellechia, 1997; Rowe *et al.*, 2000; Gauthier, 2011). Davidson and Wallack (2004, p.116) conclude that health reporting in the news is “...often superficial, confusing, or inaccurate”, while previous research has highlighted a wide difference in reporting by the various genres of newspapers (Entwistle and Hancock-Beaulieu, 1992). The results from this study suggest articles on weaning in the tabloid and middle-market papers lacked a level of scientific detail and balance when compared to the quality newspapers. The topics covered by the various newspaper genres were also very different. The popular press preferred sensationalised stories – focusing on the direct health effects of weaning (i.e. obesity and behavioural problems) or on the breast versus bottle-feeding debate. In fact, none of the tabloid articles were written by specialist science/health reporters.

One of the major flaws in science communication is in the reporting of risk (Friedman *et al.*, 1996). In this study, newspapers reported the dangers that could occur to infants if they were not weaned at a certain time but the reporting of weaning displayed many of the flaws of previous risk reporting, including not placing the risk in its proper context and not using the correct linguistic tools, such as risk comparisons to describe the level

of risk to infants (Wilkins and Patterson, 1987; Rowe *et al.*, 2000). Indeed, in the comparison between the newspaper articles and the Internet forum, no newspaper article discusses risk adequately, in comparison to over a third of the forum discussions. An interesting result as to date, researchers know very little about how risk information for health issues is conveyed in online forums.

The use of the Mumsnet discussion forum to look at the effects of newspaper reporting was highly informative. The basic content analysis identified a range of themes, with the most prominent being the inaccuracy and the sensationalisation of the newspaper reporting of infant weaning. Parents, it seems, are acutely aware of the lack of thoroughness in reporting that the media analysis identified. The individual comments by forum users, though summarised here, were very rich in content, giving an insight into how users felt about the newspaper reporting of the weaning issue and are not simply passive recipients of media messages (Chung, 2011) but use content as ‘triggers’ to discuss aspects important to them (Laslo *et al.*, 2011). Since most of the comments were angry, reactionary comments to the newspaper articles (in particular newspaper headlines), it seems that the effect of the newspaper reporting on users was to infuriate, rather than inform. Interestingly, many of those involved in the discussion were concerned about the effect of the newspaper reporting on parents other than themselves.

The articles and discussions placed the topic in context and mentioned the background of changing evidence around when to wean. In particular, the Internet discussions added

personal information about the weaning times selected by parents, their experiences with this (and potential health outcomes), though it should be remembered that this was largely personal experience rather than scientific evidence. These personal accounts of weaning would potentially assist the participant to make their own judgements. Shanahan (2010) found that comments to online news articles are rich with both personal and scientific expertise. This is important since “...respondents interpret and contextualize media reporting on the basis of their prior knowledge and experience, and where possible, in the context of their everyday lives, in terms of their citizen knowledge, or citizen expertise” (Holliman, 2004, p.124).

No newspaper articles adequately discussed risk, the study methodology or the quality of the evidence and only a third of the articles used independent sources and disclosed potential conflicts of interest meaning that opportunities were missed to contextualise the argument. In comparison, two thirds of the forum discussions used independent references and disclosed sources of conflicts of interest. When compared to the newspaper articles, the discussions also included references and hyperlinks to official reports or websites.

Schwitzer (2008), who found high levels of inadequate reporting, claims this type of coverage “raises important questions about the quality of the information” that consumers receive from the news media. Schwitzer (2008) found that only 35% of news stories were satisfactory for their discussion of study methodology and the quality of the

evidence, issues that he claims only a trained health journalist could be expected to understand. In this study, the majority of news articles were not written by specialist reporters. Mumsnet participants are also not necessarily trained scientists (although it is possible that some forum contributors had science and medical backgrounds or were professionals in such fields). However, in comparison to the newspaper articles, 66% of the Internet discussions referenced independent sources and referred to a conflict of interest, as well as reviewing the study methodology and the quality of the evidence.

Internet forums hold a rich source of information about the public's beliefs and opinions but there were limitations to the methods used in this study. Participants were probably not demographically representative of the wider population (Laslo *et al.*, 2011), Mumsnet often being perceived to attract middle-class parents in particular (Pedersen and Smithson, 2013). It is therefore dangerous to make generalised conclusions about the wider parent population as a whole. The data is also limited to a specific media report and should also not be extrapolated to make conclusions about the quality of information in the forum for any other issues or indeed for similar forums on other websites.

Conclusions

The main aim of this study was to discover how the media coverage of infant weaning affects parents using one example of a discussion forum. Bringing together the results of the media and internet analyses we are able to draw some interesting conclusions about how parents, in this context, used a forum to respond to newspaper articles.

What this research shows is that although the science of weaning is poorly communicated at times by the press, in the context of this case study, forum users are using this information to generate online discussions, which embellish the initial reporting and enrich the scientific discussion. Through these online discussions caregivers are becoming potentially more informed (through interaction with their peers) about the issues involved, with the forum effectively operating as a 'boundary' between science and journalistic representations, and public perspectives (Shanahan, 2011). Previous research by Dunwoody and Peters (1993, p.309) has demonstrated how people use the mass media find out about the nature of a scientific risk but then use personal contacts "to find out how much they themselves should be concerned about that particular risk". Could it be that parents are using Mumsnet as a vehicle to better understand the science behind weaning and how it affects them?

The effect that the online environment is having on science journalism is echoed in the findings of this study; the forum discussions drew out information about the Fewtrell

paper that had not been mentioned in any of the newspaper reports, such as the competing interests of the article authors. The Mumsnet forum analysis therefore reveals how discussion forums are part of the evolving relationship between science and health journalists and their audiences.

The results of this case study can assist scholars to understand how science is communicated through the media to a particular audience. It can also give an insight into how the public can be engaged in a scientific debate through the use of an Internet forum. We have also seen evidence of science communication occurring in Internet forums; with discussions of risk, use of independent sources and analysis of study methodology. Further research is needed, however, to continue to explore the role of Internet forums in allowing parents to make sense of science and health communication through the media.

References

- Anderson, A., Allan, S., Petersen, A., and Wilkinson, C. (2005) The Framing of Nanotechnologies in the British Newspaper Press. *Science Communication*, 27 (2), 200-220.
- Artz, K. and Wormer, H. (2011) What recipients ask for: An analysis of 'user question generated' science coverage. *Journalism*, 12 (7); 871-888.

Bouche, G. and Migeot, V. (2008) Parental use of the Internet to seek health information and primary care utilisation for their child: a cross-sectional study. *BMC Public Health*, 8; 30.

Chung, I. J. (2011) Social amplification of risk in the Internet environment. *Risk Analysis*. Available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2011.01623.x/abstract>

Davidson A.E. and Wallack, L. A. Content Analysis of Sexually Transmitted Diseases in the Print News Media. *Journal of Health Communication*, 9 (2); 111–117.

Davies, D.P. and O'Hare, B. (2004) Weaning: a worry as old as time. *Current Paediatrics*, 14 (2); 83-96.

Denecke, K. and Nejdil, W. (2009) How valuable is medical social media data? Content analysis of the medical web. *Information Sciences*, 179 (12); 1870-1880.

Dewey, K.G. (2001) Nutrition, growth, and complementary feeding of the breastfed infant. *Pediatric Clinics of North America*, 48 (1); 87–104.

Diaz, J.A., Griffith, R.A., Ng, J.J., Reinert, S.E., Friedman, P.D. and Moulton, A.W. (2002) Patients' use of the Internet for medical information. *Journal of General Internal Medicine*, 17 (3); 180–185.

Dunwoody, S. and Peters, H.P. (1993). The mass media and risk perception. In: Ruck, B., ed. *Risk is a construct*. Munich: Knesebeck.

Entwistle, V. and Hancock-Beaulieu, M. (1992) Health and medical coverage in the UK national press. *Public Understanding of Science*, 1 (4); 367-382.

Eysenbach, G. and Köhler, C. (2002) How do consumers search for and appraise health information on the world wide web? Qualitative study using focus groups, usability tests, and in-depth interviews. *British Medical Journal*, 324; 573-577.

Fahy, D and Nisbet, M (2011) The science journalist online: Shifting roles and emerging practices. *Journalism*, 12 (7); 778-793.

Fewtrell, M., Wilson, D.C., Booth, I. and Lucas, A. (2011) When to wean? How good is the evidence for six months' exclusive breastfeeding? *British Medical Journal*, 342; 209-212.

Friedman, S.M., Villamil, K., Suriano, R.A. and Egolf, B.P. (1996). Alar and apples: newspapers, risk and media responsibility. *Public Understanding of Science*, 5 (1); 1-20.

Gambles, R. (2010) Going public? Articulations of the personal and political on Mumsnet.com. In: N. Mahony, J. Newman and C. Barnett, eds. (2010) *Rethinking the public*. Bristol: The Policy Press, University of Bristol.

Gauthier, E. (2011) Foodborne microbial risks in the press: The framing of listeriosis in Canadian newspapers. *Public Understanding of Science*, 20 (2); 270-286.

Hilton, S., Hunt, K., Langan, M., Bedford, H. and Petticrew, M. (2010) Newsprint media representations of the introduction of the HPV vaccination programme for cervical cancer prevention in the UK (2005-2008). *Social Science and Medicine*, 70 (6); 942-950.

Holliman, R. (2004) Media coverage of cloning: a study of media content, production and reception. *Public Understanding of Science*, 13 (2); 107-130.

Johansson, M., Rubertsson, C., Rådestad, I. and Hildingsson, I. (2010) The Internet: one important source for pregnancy and childbirth information among prospective fathers. *Journal of Men's Health*, 7 (3); 249-258.

Khoo, K., Bolt, P., Babl, F.E., Jury, S. and Goldman, R.D. (2008) Health information seeking by parents in the Internet age. *Journal of Paediatrics and Child Health*, 44 (7-8); 419-423.

Kjærgaard, R.S. (2010) Making a small country count: nanotechnology in Danish newspapers from 1996 to 2006. *Public Understanding of Science*, 19 (1); 80-97.

Krimsky, S. (2007) Risk communication in the internet age: the rise of disorganized scepticism. *Environmental Hazards*, 7; 157-164.

Lacy, S. and Riffe, D. (1996). Sampling error and selecting intercoder reliability samples for nominal content categories: Sins of omission and commission in mass communication quantitative research. *Journalism and Mass Communication Quarterly*, 73; 969-973.

Laslo, E., Baram-Tsabari, A., and Lewenstein, B.V. (2011) A growth medium for the message: Online science journalism affordances for exploring public discourse on science and ethics. *Journalism*, 12 (7); 847-870.

Lemire, M., Paré, G., Sicotte, C. and Harvey C. (2008) Determinants of Internet use as a preferred source of information on personal health. *International Journal of Medical Informatics*, 77 (11); 723-734.

LexisNexis (2011) *Nexis UK*. Available at

<http://www.lexisnexis.com/uk/nexis/auth/checkbrowser.do?t=1320347886655andbhep=1>

Malone, M., Harris, R., Hooker, R., Tucker, T., Tanna, H. and Honnor, S. (2004) Health and the Internet - changing boundaries in primary care. *Family Practice*, 21 (2); 189-191.

Marks, L., Kalaitzandonakes, N., Wilkins, L. and Zakharova, L. (2007) Mass media framing of biotechnology news. *Public Understanding of Science*, 16 (2); 183-203.

Mikkelsen A., Rinné-Ljungqvist, L., Borres, M.P. and van Odijk, J. (2007) Do Parents Follow Breastfeeding and Weaning Recommendations Given by Paediatric Nurses. A Study With Emphasis on Introduction of Cow's Milk Protein in Allergy Risk Families. *Journal of Pediatric Health Care*, 21 (4); 238-244.

Mumsnet (2011) *Mumsnet: by parents for parents. 'About us'*. Available at <http://www.mumsnet.com/info/aboutus>

National Readership Survey (2010) *NRS Readership Estimates - Newspapers and Supplements*. Available at <http://www.nrs.co.uk/toplinereadership.html>

Nelkin, D. (1987) *Selling science: How the press covers science and technology*. New York: W.H. Freeman.

Nisbet, M.C. and Mooney, C. (2007) Framing Science. *Science*, 316 (5821); 56.

Northstone, K., Emmett, P., Nethersole, F. and ALSPAC Study Team (2001). The effect of age of introduction to lumpy solids on foods eaten and reported feeding difficulties at 6 and 15 months. *Journal of Human Nutrition and Dietetics*, 14 (1); 43-54.

O'Connor, H. and Madge, C. (2004) 'My mum's thirty years out of date'. *Community, Work and Family*, 7 (3); 351-369.

Olausson, U. (2009) Global warming—global responsibility? Media frames of collective action and scientific certainty. *Public Understanding of Science*, 18 (4); 421-436.

Anhäuser, M and Wormer, H. (2012) A question of quality: Criteria for the evaluation of science and medical reporting and testing their applicability. 12th International Public Communication of Science and Technology Conference. Available at: (www.medien-doktor.de/medizin/wp-content/uploads/sites/3/downloads/2013/05/Paper-Florenz.pdf)

Pedersen, S. and Smithson, J. (2010) Membership and activity in an online parenting community. In: R. Taiwo, ed. (2010) *Handbook of Research on Discourse Behavior and Digital Communication: Language Structures and Social Interaction* (pp.88-103). Pennsylvania: IGI Global.

Pedersen, S. and Smithson, J. (2013) Mothers with attitude – How the Mumsnet parenting forum offers space for new forms of femininity to emerge online. *Women's Studies International Forum*, 38 (1); 97-106.

Pellechia, M. G. (1997) Trends in science coverage: a content analysis of three US newspapers. *Public Understanding of Science*, 6 (1); 49-68.

Pew Research Centre (2014) Available at <http://www.pewinternet.org/2014/08/26/social-media-and-the-spiral-of-silence/>

Plantin, L. and Daneback. K. (2009) Parenthood, information and support on the internet. A literature review of research on parents and professionals. *BMC Family Practice*, 10; 34.

Popular Science (2013) Available at <http://www.popsci.com/science/article/2013-09/why-were-shutting-our-comments>

Rier, D.A. (2007) The impact of moral suasion on Internet. HIV/AIDS support groups: evidence from a discussion of seropositivity disclosure ethics. *Health Sociology Review*, 16 (3-4); 237-247.

Robinson, S. and DeShano., C. (2011) 'Anyone can know': Citizen journalism and the interpretative community of the mainstream press. *Journalism*, 12 (8); 963-982.

Rowe, G., Frewer, L. and Sjöberg, L. (2000) Newspaper reporting of hazards in the UK and Sweden. *Public Understanding of Science*, 9 (1); 59-78.

Sarkadi A. and Bremberg, S. (2005) Socially unbiased parenting support on the Internet: a cross-sectional study of users of a large Swedish parenting website. *Child: Care, Health and Development*, 31 (1); 43-52.

Schudson, M. (2003) *The Sociology of News*. New York: W.W. Norton and Company.

Schwitzer, G. (2008) How do US Journalists Cover Treatments, Tests, Products, and Procedures? An evaluation of 500 stories. *PLoS Medicine*, 5 (5).

Schwitzer, G. (2004) A statement of principles for health care journalists. *Am J Bioeth* 4: W9-W13.

Secko, D.M. (2009) The unfinished science story: reflections on journalist-audience interactions in the online environment. *Journal of Media Practice*, 10 (2-3): 259-266.

Secko, D.M., Tlalka, S., Dunlop, M., Kingdon, A. and Amend, E. (2011) The unfinished science story: journalist-audience interactions from the *Globe and Mail's* online health and science sections. *Journalism*, 12 (7): 814-831.

Shanahan, M-C. (2010). Changing the meaning of peer-to-peer? Exploring online comment spaces as sites of negotiated expertise. *Journal of Science Communication*, 9 (1); 1-13.

Shanahan, M-C. (2011) Science blogs as boundary layers: Creating and understanding new writer and reader interactions through science blogging. *Journalism*, 12 (7); 903-919.

Skea, Z.C., Entwistle, V.A., Watt, I. and Russell, E. (2008) 'Avoiding harm to others' considerations in relation to parental measles, mumps and rubella (MMR) vaccination discussions - An analysis of an online chat forum. *Social Science and Medicine*, 67 (9); 1382-1390.

Whaley, S.R. and Tucker, M. (2004) The influence of perceived food risk and source trust on media system dependency. *Journal of Applied Communications*, 88 (1); 9-27.

Wilkins, L and Patterson, P. (1987) Risk analysis and the construction of news. *Journal of Communication*, 37 (3); 80-91.

World Health Organization (WHO) (2002a). *Nutrient adequacy of exclusive breastfeeding for the term infant during the first six months of life*. World Health Organisation. Switzerland: Geneva.

World Health Organisation (WHO) (2002b). *The Optimal Duration of Exclusive Breastfeeding: Report of an Expert Consultation*. Geneva, Switzerland, 28–30 March 2001. World Health Organisation. Switzerland: Geneva.

Wright, C.M., Parkinson, K.N. and Drewett, R.F. (2004) Why are babies weaned early: data from a prospective population based cohort study. *Archives of Disease in Childhood*, 89 (9); 813–816.

Word Count: 5,212 words for main text

Table 1: List of criteria and explanations used to judge adequacy of newspaper article/Internet discussion

1.	<p>Adequately gives details about the Fewtrell study on weaning The article/discussion thread mentions the author of the study, the affiliation or where the study was published. We would expect that there is clear reference to the study so that the reader knows what is being talked about and could go and research the article further with this information.</p>
2.	<p>Adequately places the new findings in context The article/discussion thread talks about the current and past advice on weaning and how this has changed. We would expect the article to draw up a bigger picture of the issue to show that weaning times have changed in the past and that there is no scientific consensus on the issue.</p>
3.	<p>Adequately discusses risk The article/discussion thread places the idea of ‘risk’ in context and talks about relative risk to individuals. We would expect there to be discussion of what the risk factors are and how the risks may affect different individuals and what factors may affect the risk. There should be no scaremongering or over-exaggeration of risk.</p>
4.	<p>Seeks out independent sources and discloses potential conflicts of interest The article/discussion thread seeks independent experts that comment on weaning times and/or the research i.e. by using quotes or Internet links. We will use the advice of Schwitzer (2004) to judge adequacy: “To reflect only one perspective of only one source is not wise; [journalists should] be vigilant in selecting sources, asking about, weighing and disclosing relevant financial, advocacy, personal or other interests...”</p>
5.	<p>Reviews the study methodology or the quality of evidence for the Fewtrell study. The article/discussion thread explains how the study was carried out: number of participants, length of study, use of meta-reviews etc. There is a critical analysis of the method: i.e. we would expect there to be discussion on the limitations of the study and what it does not show. If the discussion/article does express caution about the data of the study or limitations of the methodology it will be judged unsatisfactory.</p>

Table 2: Publication type and the main theme/frame of the weaning article

	Frequency	Percentage (%)
Quality paper		
Time frame issue	16	55
Health issues	5	17
Behavioural difficulties /IQ levels	1	3
Contraceptive issues	0	0
Food toxins/contaminants	2	7
Food types	1	3
Breast versus bottle-feeding	1	3
Other	3	10
Total	29	100
Middle-market		
Time frame issue	3	43
Health issues	1	14
Behavioural difficulties /IQ levels	1	14
Contraceptive issues	0	0
Food toxins/contaminants	0	0
Food types	0	0
Breast versus bottle-feeding	2	29
Other	0	0
Total	7	100
Tabloid		
Time frame issue	2	20
Health issues	3	30
Behavioural difficulties /IQ levels	1	10
Contraceptive issues	1	10
Food toxins/contaminants	0	0
Food types	1	10
Breast versus bottle-feeding	1	10
Other	1	10
Total	10	100

Table 3. Results of the discussion search on Mumsnet

Discussion	Discussion Title	Date	Participants	Posts	Length of discussion (days)
1	To think the fuss over recent weaning headlines is a sad example of the huge amount of hypocrisy surrounding the breast V formula debate?	13.01.11	20	30	2
2	Would IBU to get consistent advice? "Babies 'need solid food, not just breast milk'", headline from today's Times.	14.01.11	58	184	4
3	To think that cuntinng Cow and Gate with their 'clever' marketing about babies 'needing iron' and funding 'research' have fucked up the last 10 years of improving and supporting breastfeeding?	14.01.11	38	69	5
4	New Who advice on BF!!	14.01.11	271	714	7

5	tommee tippee teats and weaning	14.01.11	18	44	2
6	Exclusive BF for 6 months may be harmful	14.01.11	23	52	1
7	How many people wait until the recommended 6 months before weaning and how many didn't?	15.01.11	8	11	1
8	Has anyone else seen this?	16.01.11	10	13	1
9	To hate the conflicting info re when to wean your baby	10.02.11	5	14	3
10	Weaning age recommendation = confused	04.03.11	10	22	4
11	to have tweeted this swearsy tweet based on todays headlines?	07.04.11	5	5	1
12	in thinking the bf story in the news today....	29.05.11	36	49	25

Table 4. The representation of the different themes in the discussion forum

Theme	Frequency	Percentage (%)
The reporting of weaning is inaccurate	42	38
The reporting of weaning is sensationalized	26	23
The reporting of weaning is confusing	14	13
The reporting of weaning is accurate/good	1	1
The effects that newspaper reporting has on readers	6	5
The bad science reporting practices of newspapers in general	23	20
Total	112	100

Table 5: Results of the joint analysis: % of articles/discussions ‘satisfactory’

Criteria (Did the story adequately...)	Newspaper article (n=16) % Satisfactory	Internet discussion (n=9) % Satisfactory
Gives details about the Fewtrell study on weaning	38	33
Places the new findings in context	69	89
Discusses risk	0	33
Seeks out independent sources and discloses potential conflicts of interest	33	66
Reviews the study methodology or the quality of evidence	0	66

Table 6: Word count of analysed newspaper articles and Internet comments

Newspaper article #	Word count	Internet comment #	Word count
16.	1192	1.	851
19.	1055	2.	1958
20.	686	3.	13164
22.	1458	4.	5310
24.	949	5.	1203
25.	653	6.	64050
26.	1436	9.	1169
28.	499	10.	447
29.	634	12.	3072
30.	254		
31.	828		
33	575		
34.	550		
35.	551		
36.	924		
37.	346		
Median	670		1958
Data range	1112 (346 to 1458)		63603 (447 to 64050)

Figure 1

