
Media reporting and changes in public opinion after Fukushima nuclear accident: Belgium as case study

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Abstract: This study examines the Belgian press coverage related to the Fukushima nuclear accident and investigates the changes in the public opinion related to nuclear energy. Two research methodologies were applied. The first method conducted was a content analysis of two quality newspapers in Belgium, covering the first two months after the accident. The second method was a public opinion survey, based on more than 1000 personal interviews conducted in Belgium in the third month after the accident. The results show that the accident induced enormous media coverage in the first weeks after the accident with focus on many different topics; yet, attention decreased with time and became limited to the ‘future of nuclear energy’ and ‘safety and crisis management aspects’. The Chernobyl nuclear accident has been recognised as part of the collective memory, influencing media reporting and public opinion. As expected, the Fukushima nuclear accident has also induced some changes in the public opinion about nuclear energy.

Keywords: Fukushima nuclear accident; media reporting; public opinion; content analysis; Chernobyl nuclear accident; nuclear governance.

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“When distant and unfamiliar and complex things are communicated to great masses of people, the truth suffers a considerable and often a radical distortion. The complex is made over into the simple, the hypothetical into the dogmatic, and the relative into an absolute”.

Walter Lippman, 1922

1 Introduction

Nuclear accidents have a strong impact on the public opinion and often lead to political discussions about the use of nuclear energy for power generation. In this context, media play an influential role in shaping public opinion about nuclear energy. Media do not only report about public issues, but they also have the power to influence people's opinion. This influence was pointed out already in 1922 by Lippmann (1922). Further studies suggest that the salience of issues in the media reporting influences public opinion and even the behaviour of the people (Barnes et al., 2008). When mass media intensively report about a certain topic, the people receiving the media information consider this topic as important (McCombs and Shaw, 1972; Cohen, 1985). Moreover, numerous studies from political and risk research established strong correlations between media and public priorities (for overview see McCombs and Shaw, 1993).

Some particularities can be mentioned as regards media reporting and public opinion about nuclear accidents and nuclear energy.

Information about the nuclear domain is not directly experienced, but rather learned through elite discourse and communication in the media (Boomgaarden and de Vreese, 2007; Perko et al., 2012). Elite discourse is in turn driven by public opinion. For instance, the experience after the accident in Chernobyl showed that nuclear accidents cause significant changes in the public opinion and frequently lead to political decisions related to nuclear programmes (Cantone et al., 2007).

Media are usually more interested in politics than risk, in simplicity than complexity, and in danger rather than safety issues (Covello, 1988). A nuclear accident is extremely newsworthy, since it is strongly feared, it has catastrophic potential and it can have long-term consequences, which usually exceed the geographical boundaries of the radioactive contamination. At the same time, it is an event that can be personalised, and for which politicians are used as a main source of information (Perko, 2011; Perko et al., 2012). Dramatic and extraordinary real-world events are reported in the media and by themselves have the power to influence the public opinion and to cause shifts in public attitudes (Boomgaarden and de Vreese, 2007).

The nuclear accidents at Chernobyl or Three Mile Island became part of the collective memory and as such, linked to media reporting about any nuclear event (Triandafyllidou, 1995; van der Brug, 2001; Zorkaja, 2006; Boomgaarden and de Vreese, 2007; Greenberg and Truelove, 2011). Lindner (2000) compared the perception of the Chernobyl accident with other, non-nuclear disasters and found that other human-made or natural disasters “*tend to be accepted by the public much more readily*” and are relatively faster forgotten in the media coverage (Lindner, 2000, p.282).

Most of the scholars exploring media reporting about nuclear accidents also addressed, directly or indirectly, the changes in the public opinion and in the public acceptability of nuclear energy after the accidents. It is confirmed that nuclear accidents reduce public support for nuclear energy and increase opposition (McDermott, 1982; Lindner, 2000; Zorkaja, 2006; Boomgaarden and de Vreese, 2007; Greenberg and Truelove, 2011).

Opinion polls show that public support for nuclear power has declined after the Fukushima nuclear accident, not only in Japan but also in other nations around the world (Ipsos MORI 2011; Asahi Shimbun, 2011; Ramana, 2011). People may oppose nuclear power for a variety of reasons, for example perception of nuclear technology as too dangerous.

This paper does not investigate the causal relationships between the nuclear accident, media reporting and public opinion, but it restricts to the analysis of the media and journalism regarding the Fukushima nuclear accident and of the changes in the public opinion on several issues related to the accident itself and to nuclear energy in general. We also highlight the implications for emergency management.

Since the media play a major role in communicating with the public in case of a nuclear emergency, it is important to know what messages the media deliver and how they frame the event. The analysis of media reporting on a nuclear event can be beneficial for nuclear emergency management in two major aspects. On the one hand, such an analysis shows how to deliver risk messages effectively through the media and, on the other hand, it brings insight into the information that has to be communicated by the emergency managers to the mass media. Since media have the power to make, shape or terminate the crisis, they not only reflect the public opinion, but they also create it. Therefore, the changes in the public opinion after the high media attentiveness to the Fukushima nuclear accident partly reflect also the media framing of the accident.

The media analysis reported here concerned Belgian media reporting about the Fukushima nuclear accident in the first two months after the accident, while the public opinion in Belgium was measured in the month following this media exposure. Section 2 gives an overview of the research on media reporting about nuclear accidents. This is followed by a methodological section (Section 3). Section 4 reports on selected results and Section 5 summarises the conclusions.

2 Media reporting about nuclear accidents: an overview

A number of studies have investigated media reporting on the Chernobyl accident. A classical study on nuclear discourse was provided by Gamson and Modigliani (1989) showing how ‘*media packages*’ or ‘*frames*’ have to incorporate events such as Chernobyl and provide them “*with a meaning that is plausible and consistent with the frame*” (Gamson and Modigliani, 1989, p.4). Rowe et al. (2000) showed how newspapers from Sweden and the UK characterised a variety of risks (including nuclear hazards) around the 10th anniversary of the Chernobyl accident. They found an increase in media attention to nuclear hazards in Sweden after this anniversary, suggesting a “*generalization of media concern*” (Rowe et al., 2000, p.59).

Triandafyllidou (1995) analysed the framing of the Chernobyl event in the Italian Press during the period from 1987 to 1991. She discovered that the nuclear accident of Chernobyl acquired “*a prominent position in the collective memory*” (Triandafyllidou, 1995, p.532). Another media content analysis done for Italian press is the research of Cantone et al. (2007), which focused on the media reporting about the political debate related to the nuclear energy programme and the results of the referendum as a direct measurement of public opinion. They found that media reporting was “*polarized to a ‘yes/no choice’, which eventually caused Italy to abandon the production of nuclear power for civilian use*” (Cantone et al., 2007, p.261).

Recent research by Perko et al. (2012) on media reporting about an event at the Krsko nuclear power plant in Slovenia points out that even if the event was minor from the radiological point of view, it triggered a high intensity of media coverage. The results of this study showed that the frequency of the media articles was higher in the countries where nuclear energy was in the public agenda, compared to the countries where it was not a salient topic of discussion: “*The states where the future of nuclear energy was under the political discussion (e.g., a planned referendum in Italy and strong opposition from environmental organizations in Germany) reporting even more than in Slovenia*” (Perko et al., 2012, p.52).

Scholars testify that media reporting about nuclear accidents does not increase knowledge and understanding of radiation risks, but rather increases negative feelings and risk perception. For instance, the findings from the research by Brown and White (1987) exploring how the public in UK defines radiation, radioactive waste and the impact of significant nuclear events revealed that, “*knowledge is not increased by mass media coverage of an accident, but emotional reactions are significantly affected*” (Brown and White, 1987). Another study among the US population about the nuclear accident at Three Mile Island accentuates again this potential influence of the media, showing that: “*sensation-hungry news media contributed to panic based on unwarranted fear*” (McDermott, 1982). A study related to the 20th anniversary of the Chernobyl accident in the Russian media indicated that “*a proper appraisal of Chernobyl has yet to take place, and instead of providing penetrating analysis, the Russian media offers unimaginative catastrophe scenarios*” (Zorkaja, 2006, p.235).

3 Methodology

3.1 Media content analysis

The newspapers included in the analysis (Perko et al., 2011) were the Belgian newspapers *Le Soir* (French language) and *De Standaard* (Dutch language). The news articles were obtained from press clippings from the 'Media data base at University Antwerp – MEDIARGUS' for the period between the 11th March 2011 and the 11th May 2011. This time sampling of two months was focused on the '*critical discourse moments*', which made the nuclear energy issue visible in the mass media.

The articles coded were either directly or indirectly related to the Fukushima nuclear accident and were collected by the following keywords: 'Fukushima' and 'nuclear*'.

Once the articles were selected according to these rules, each article was assigned a number of codes as prescribed in a codebook (Perko et al., 2011). Every article was coded by two independent coders for each of the two languages (French and Dutch). In case of disagreement, the master-coder decided the final code based on a discussion. Krippendorff's coefficient (Krippendorff, 2004) was calculated to assess the inter-coder reliability.

3.2 The public opinion survey

The results presented in this paper are based on a large-scale public opinion survey in the Belgian population.

The data collection method employed was '*Computer Assisted Personal Interviewing*', consisting of personal interviews of about 45 min carried out at the home of the respondents, the answers being directly recorded on a portable hard disk. The field work was performed by a market research company with professional interviewers.

The survey (Turcanu et al., 2011) included, among others, questions on the general attitude towards nuclear energy and the relevance of the accident in Fukushima for Belgium. The field work was carried out between 25 May 2011 and 24 June 2011.

The population sample consists of 1020 respondents and is representative for the Belgian adult population (18+) with respect to sex, age, region, province, habitat and social class.

Most questions in the survey were formulated as statements, to which the respondent could answer using a 5-point Likert scale (e.g. <strong disagreement, disagreement, neither agree, not disagree, agreement, strong agreement>), plus a sixth category (<no answer/don't know>). The latter answering option was allowed, but not encouraged.

4 Results

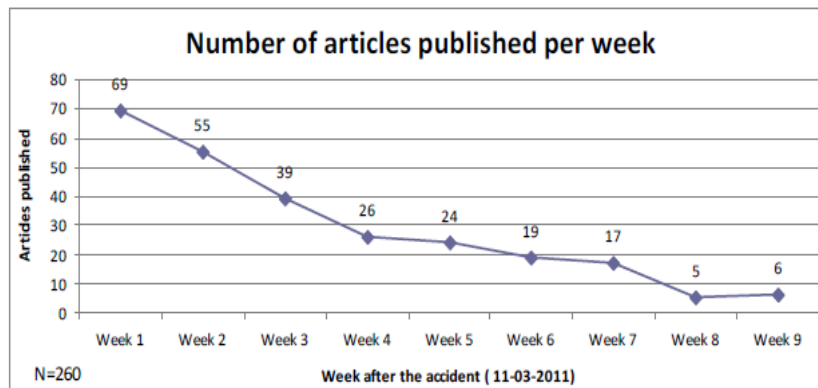
4.1 Media reporting about the Fukushima nuclear accident

4.1.1 Media attentiveness to the Fukushima nuclear accident

One of the first goals in the media content analysis was to identify the accident as a topic on the media agenda and to determine for how long was the Fukushima nuclear accident part of the media agenda. An analysis of the number of articles published per week revealed the immediate outburst of media attention and the subsequent decay in the rate of attention.

To exclude the drops in media attention on Sundays and public holidays the frequency of published articles was calculated per week. Figure 1 clearly shows the explosion of media attention in the first week: the two newspapers published in total 69 articles, with 55 articles related to the accident following in the second week.

Figure 1 Number of articles published per week in *De Standard* and in *Le Soir* (see online version for colours)



The Fukushima nuclear accident was a newsworthy topic of information for the media since it was an extraordinary event, presenting new or unusual information, conflict was very much present, as well as drama, tragedy and presence of experts, elite persons or celebrities. The situation could be personalised and it evoked emotional response. In addition, media have also to fulfil the economic aspects of publishing or broadcasting, with the ‘*bad news is good news*’ slogan being a well-known phenomenon in journalism; from this point of view the Fukushima nuclear accident was also newsworthy. Although the nuclear accident attracted a lot of media attention in the first weeks, the attention monotonously decreased as weeks passed by. The rate of attention dropped to six articles in the ninth week after the accident. Such a drop in attention indicates that long-term media communication might be a challenge for environmental remediation processes.

4.1.2 Objective or subjective type of the articles related to the accident

The question in this part of the analysis was if the news articles and their authors kept to the facts and the objective information or they published mostly subjective opinions related to the nuclear accident.

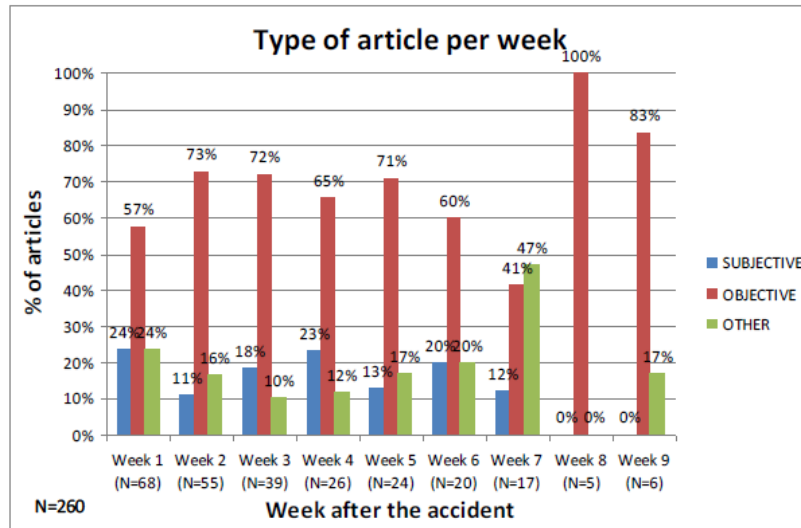
The following articles were considered as subjective articles: editorials, columns, letters and interviews. Such articles were usually written by one person and presented the author’s opinion related to the nuclear accident.

Objective articles presented different views and facts about the nuclear accident. The journalist’s or author’s opinion was not presented in such articles. News and features were considered as objective types of media articles. The articles that could not belong to any of these two groups, for instance a quiz question, were coded as ‘other’.

The inter-coder reliability for the coding of ‘*type of article*’ was 0.96 for the French articles from ‘*Le Soir*’ and 0.92 for the Dutch articles from ‘*De Standaard*’. Figure 2 shows that the majority of articles related to the nuclear accident could be categorised as

objective. Forty-one percent up to 100% of the articles related to the accident and published in the weeks following the accident were news or feature articles. Most of the media texts were concise reports of a news item, usually consisting of a few short paragraphs which dealt with the factual information or gave a summary of an event, for example information about an explosion at one of the nuclear reactors.

Figure 2 Type of the article per week (see online version for colours)



The media also had an in-depth look at what was going on. They often included a detailed description and analysis of the nuclear accident and its consequences. They accompanied the information with an interview or quotes from various emergency actors, local population and victims. They published full-page articles, with photos and sometimes illustrations from field reporting.

In the first seven weeks after the nuclear accident, 12–24% of the weekly published articles could be coded as ‘subjective’. Most subjective articles were published in the first week, when every fourth article was an editorial, a column, a letter or an interview. The authors of this type of article published their own point of view, which involved a critical analysis of the news item (subjective opinion supported by facts). The nuclear accident was often framed in its broader context, for instance the context of international information exchange in case of emergency, nuclear safety, energy needs or international (political) discussion about the nuclear energy. The newspapers also published letters addressed to the editor or the newspaper, written by an individual from the general public or a representative of an organisation, for instance Greenpeace. The type of articles published in the seventh week after the accident is significantly different from all the previous weeks. During this week, the world commemorated the 25th anniversary of the accident in Chernobyl (1986). The highest frequency in the seventh week was of ‘other’ articles (47%), followed by objective ones (41%).

To conclude, news and features prevail in the reporting about this nuclear accident. However, in the first week every fourth article was a subjective opinion.

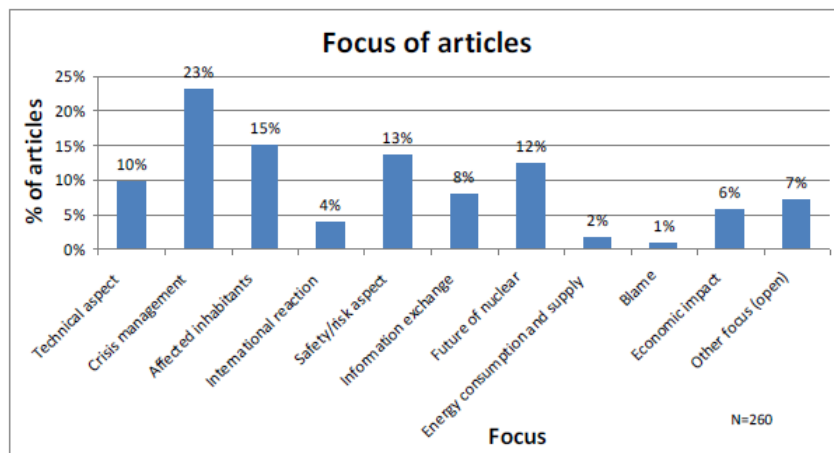
4.1.3 Focus of the media articles related to the accident

The analysis of the ‘*main focus of the article*’ allowed identifying the main challenges of media communication in case of a nuclear accident, as well as the focal point of the media. Media may address an event from different perspectives and interests. The categories used to describe the focus of the articles are summarised in the following.

The category ‘*technical aspects*’ contained all articles that dealt with the technical aspects of the accident, for example technical data about the state of the reactors or the spent fuel ponds. All articles about emergency management and protective actions for people, the food chain or the environment were categorised as ‘*Crisis management*’. ‘*Affected inhabitants*’ contained all articles that described the situation of people that were victims of the accident. ‘*International reaction*’ presented all articles that described an international reaction on the Fukushima nuclear disaster. Articles on the ‘*Safety/Risk aspect*’ described the possibility of an accident, the probabilistic estimations of risks and accidents in NPPs or referred to the stress tests. ‘*Information exchange*’ contained all articles that described the problems with the information exchange during and after the accident, in specifically the top-down information flow towards the general public and the outside world. The category ‘*Future of nuclear energy*’ included all articles reporting about decisions or discussions of (international) governments towards the choice of nuclear energy in the future. ‘*Energy consumption or supply*’ addressed the articles talking about the energy consumption and/or energy supply, including discussions about the policy of electricity suppliers or operators. The articles that discussed whether there is someone to blame belonged to ‘*Blame*’. ‘*Economic impact*’ contained all the articles that discussed the effects of the Fukushima accident on the (international) economy.

The inter-coder reliability for the coding of ‘*focus of the article*’ was 0.93 for the French articles from ‘*Le Soir*’ and 0.82 for the Dutch articles from ‘*De Standaard*’. Figure 3 depicts the percentage of articles (from the total articles published in *Le Soir* and *De Standaard*) reporting on these focus points.

Figure 3 Focus of the articles (see online version for colours)



We can conclude that the main focal point of the articles concerned the crisis management of the Fukushima nuclear accident (see Figure 3). Twenty-three percent of the newspaper articles focused their attention on the emergency management and the

protective actions for the people, food chain or environment. Fifteen percent of the articles described the situation of people who were victims of the nuclear accident. Interestingly, there were only a few articles that focused on ‘blame’ (1%), ‘international reaction’ (4%) and ‘energy consumption and supply’ (2%). One of the main challenges of emergency communicators is thus to separate the technical and emergency management aspects from the political discussions related to the nuclear energy.

The detailed analysis of the focal interest of the media revealed shifts in media reports and its attention towards different subjects through time, in the weeks after the accident. In the first weeks, the news media focused on many different topics, from technical aspects, crisis management, and safety and risk aspects to energy consumption and supply. Eight weeks after the accident, the media focused their attention on a limited number of topics. In the ninth week after the accident, half of the articles focused on the future of nuclear energy, 33% on safety and risk aspects and 17% on crisis management.

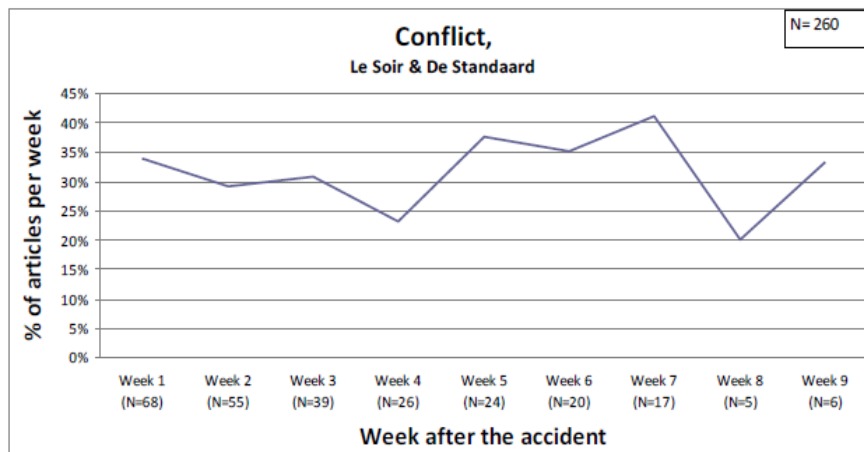
4.1.4 Conflict and disagreement related to the accident

We further investigated whether the news media reported about conflicts or disagreements between people/groups/parties/countries related to nuclear emergency. Such stories contained an explicit mention of the fact that there was disagreement about the issue (e.g. nuclear energy, emergency management, monitoring). This disagreement had to be expressed in words (e.g. contradictory positions or claims) or in deeds (e.g. protest, stigmatisation).

The inter-coder reliability for the coding of ‘conflict or disagreement’ expressed in the articles was 0.91 for both articles in French and Dutch language.

The results presented in Figure 4 show that the number of articles reporting conflict or disagreement issues has an erratic course: it fluctuates in the weeks after the accident between 20% and 41%. One remarkable peak occurs in the seventh week, the same week in which the accident in Chernobyl was remembered all over the world. More than 40% of the articles published in this week reported a conflict or disagreement.

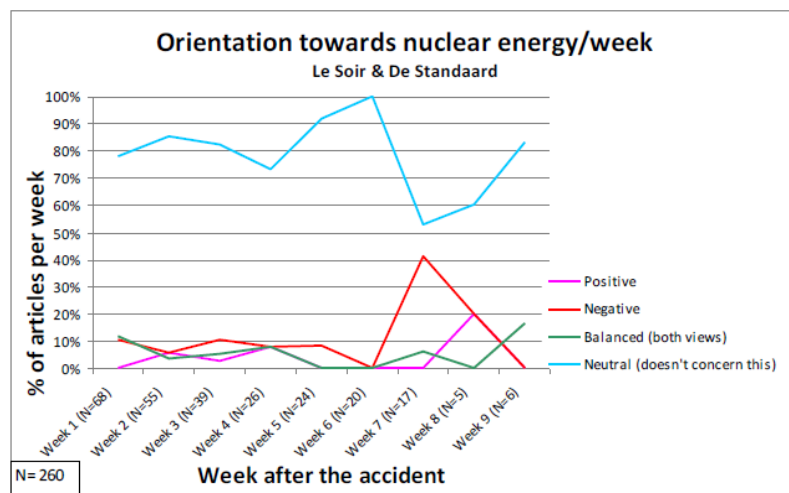
Figure 4 Conflict or disagreement in the articles per week for both newspapers (cumulated) (see online version for colours)



4.1.5 Article orientation towards nuclear energy

The variable concerning the orientation of the article towards nuclear energy explored the way of journalistic reporting about nuclear energy and the arguments used. This referred to the subjective intention of the author or the newspaper policy to expose arguments in favour or against nuclear energy. The articles that presented an opinion about nuclear energy were therefore categorised as ‘positive’ (pro), ‘negative’ (against) or ‘balanced’. To classify a media text as ‘balanced’ required that pro and con arguments and statements concerning the nuclear energy were equally presented in the article, without a clear tendency towards one of these sides. Note the difference from articles that did not express any orientation towards nuclear energy at all; these were coded as ‘neutral’ (see Figure 5).

Figure 5 Orientation of the article towards nuclear energy per week (see online version for colours)



The inter-coder reliability for the coding of the ‘orientation’ of the articles towards nuclear energy was 0.97 for French articles and 0.84 for the Dutch articles in the sample.

The results of our media analysis show that the overall orientation of the published articles towards nuclear energy was neutral. This means that most articles did not really address the topic of ‘good or bad’ and that they did not express a normative opinion with regard to nuclear energy.

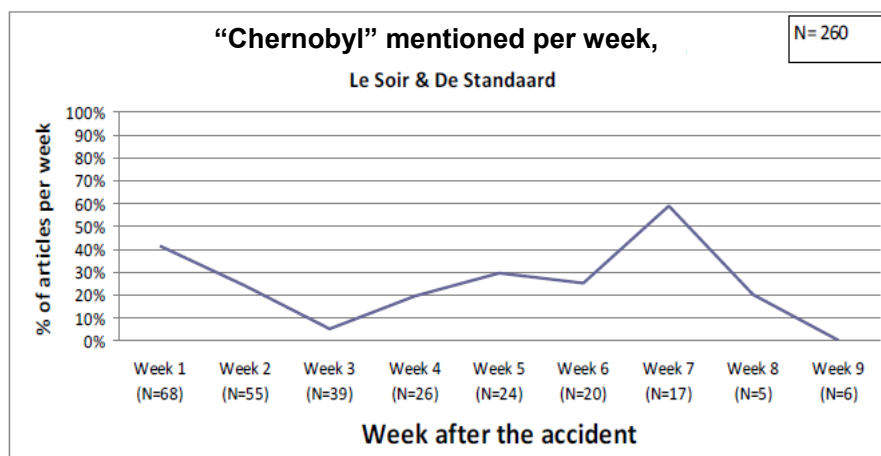
The comparison of the orientation of the articles towards nuclear energy in the weeks after the nuclear accident suggests that the increase in negatively orientated articles in the seventh week is not only due to the accident in Fukushima, given that the overall trend shows a fairly low and balanced number of normatively oriented articles. During the period of analysis, in the seventh week after the accident, the world commemorated the 25th anniversary of the accident in Chernobyl (1986), still the worst nuclear accident in history. It is in this week that we observed a significant increase of articles negatively orientated towards nuclear energy and a significant decrease of neutral articles.

4.2 The word ‘Chernobyl’ in the media articles

Another interesting point of research was to highlight if and how the media coverage of the Fukushima nuclear accident was presented to the public through the memories of the Chernobyl accident from 1986. While the journalists are producing a news story, they present in general the news within a meaningful frame that guides the public on how this news should be understood. Since Chernobyl is part of the collective memory, we explored how many times the two newspapers made a reference to this past nuclear accident when reporting on the nuclear accident in Fukushima. We found out that although the nuclear accident in Chernobyl had completely different characteristics than the one in Fukushima, the media frequently referred to it. The word ‘Chernobyl’ appeared in the articles almost every day. On the fourth day after the accident in Fukushima the reference to Chernobyl was even made ten times in the articles of the two newspapers.

The graph in Figure 6 presents the percentage of articles per week related to the Fukushima nuclear accident and mentioning the word ‘Chernobyl’, for the two newspapers taken together.

Figure 6 Presence of ‘Chernobyl’ keyword in the articles published, per week, both newspapers (see online version for colours)



4.3 Public opinion after Fukushima nuclear accident

4.3.1 The relevance of the accident in Fukushima for Belgium

Even if the accident in Fukushima occurred far away from Belgium and due to a combination of specific natural hazards, the topic was salient in the Belgian context. It was thus important to find out how was the accident perceived by the population in terms of its relevance and the feelings triggered by this accident. Results show that the public opinion in Belgium was divided as regards the relevance of the accident for Belgium (see Figure 7).

Figure 7 Opinions and feelings triggered by the accident at Fukushima (part 1), $N = 967$ (see online version for colours)

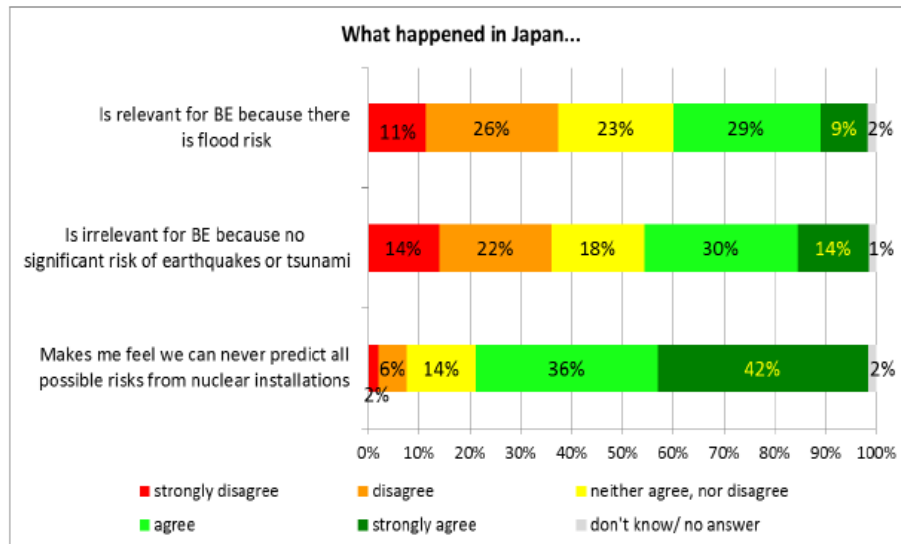
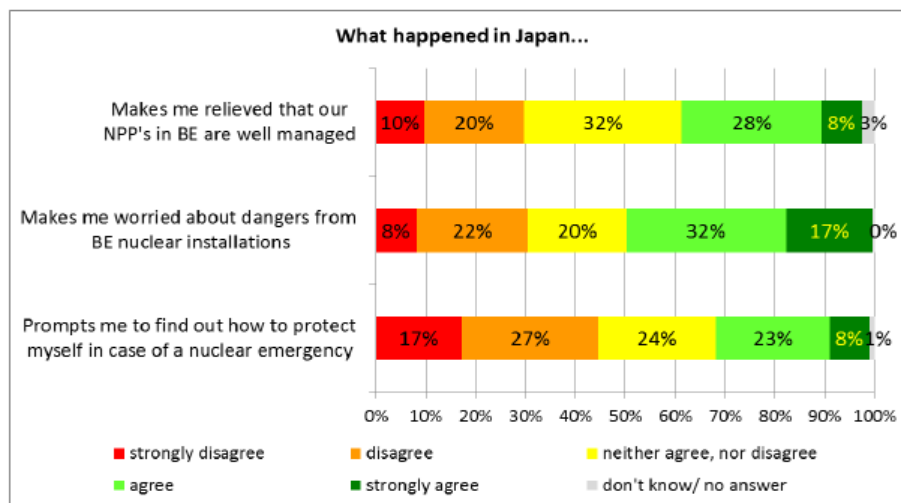


Figure 8 Opinions and feelings triggered by the accident at Fukushima (part 2), $N = 967$ (see online version for colours)



From the 967 respondents who had heard about the accident (out of 1020 interviewed), 38% of the respondents thought that the accident in Japan is relevant for Belgium because there are flood risks, but almost the same percentage (37%) did not agree with this statement. Forty-four percent of the respondents (out of the 967) expressed the opinion that the accident in Fukushima is not relevant for Belgium, since there are no significant risks of earthquakes or tsunami, while 36% disagreed with this statement.

Whether they found it relevant or not, it is clear that for the big majority (78% out of 967) the accident in Fukushima induced a feeling of uncertainty over how well we can predict the potential risks from nuclear installations.

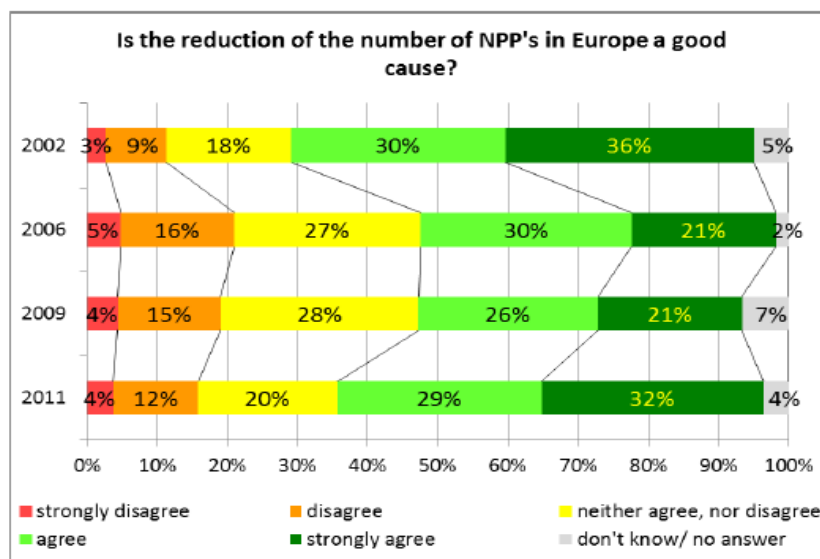
We also enquired about the management of nuclear installations in Belgium. About 36% of the 967 respondents who had heard about the accident felt relieved that the nuclear installations in Belgium are well managed, while 30% disagreed with this (Figure 8). What is somewhat striking is that 49% (out of 967) worry about dangers from Belgian nuclear installations, but only 31% want to know how to protect themselves in case of a nuclear emergency.

4.3.2 Changes in the attitude towards nuclear

The attitude towards nuclear energy was first assessed through a number of general questions on which the respondents had to state their degree of agreement or disagreement.

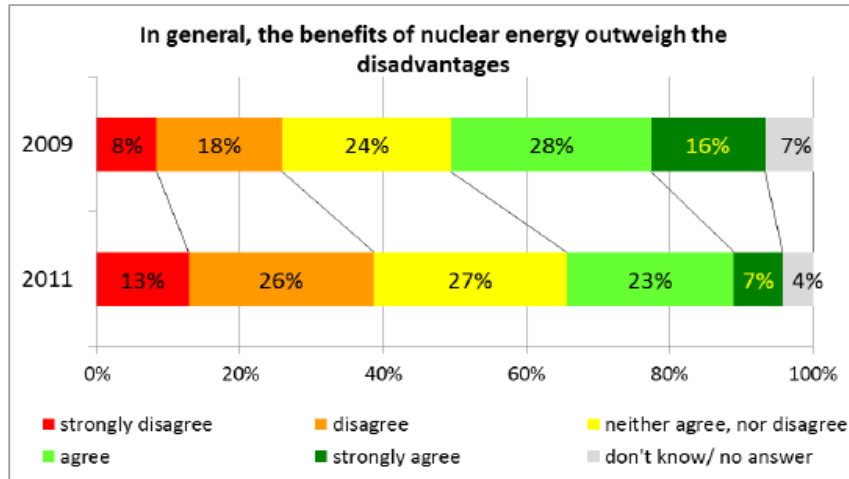
The opinion on whether ‘the reduction of the number of nuclear power plants in Europe is a good cause’ has been measured in all SCK CEN Barometers since 2002 (see Figure 9). The percentage of respondents agreeing with this statement decreased from 66% in 2002 to 51% in 2006, and 47% in 2009. In 2011 the trend has changed: 61% of respondents agreed with this statement, which is comparable to the year 2002, before what is sometimes referred to as the ‘nuclear renaissance’. The year 2003 is the year in which the Belgian government decided on a (gradual) nuclear phase-out.

Figure 9 On the reduction of NPP’s in Europe, $N = 1020$ (see online version for colours)



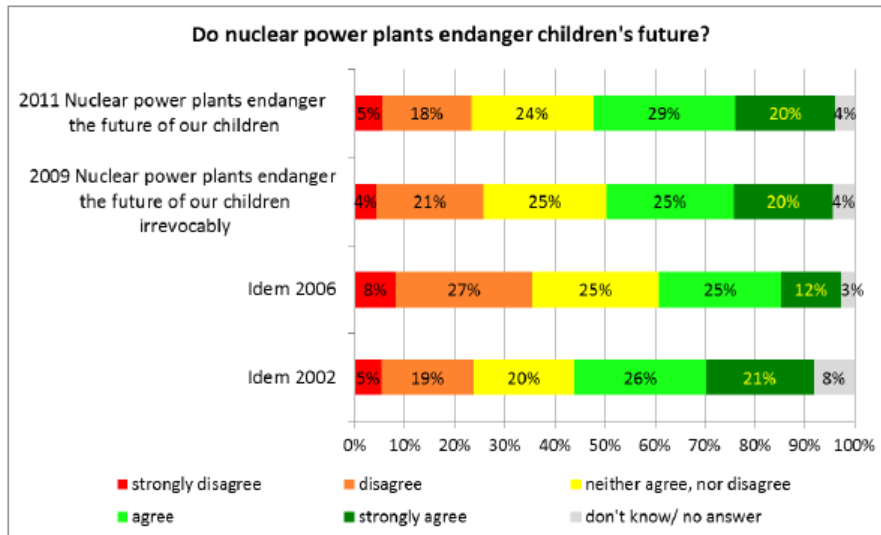
The negative switch in the attitude towards nuclear energy was observed also with the statement ‘in general, the benefits of nuclear energy outweigh the disadvantages’. In 2011, 30% of the respondents agreed or strongly agreed with this statement, compared to 44% in 2009 and 39% disagreed in 2011, compared to 26% in 2009. This shift is illustrated in Figure 10.

Figure 10 On the benefits versus disadvantages of nuclear energy, $N = 1020$ (see online version for colours)



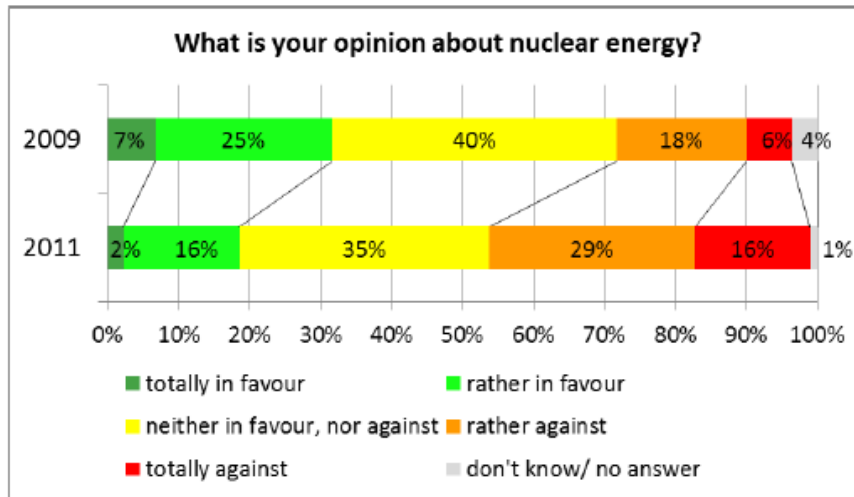
Another issue studied since 2002 was whether the respondents thought that the ‘*nuclear power plants endanger the future of our children*’. For this item, the results in 2011 were very similar to those obtained in 2009 (and 2002). Only a minor increase in the percentage of respondents agreeing or strongly agreeing with this statement could be observed as compared to 2009 (Figure 11).

Figure 11 Nuclear power plants and children’s future, $N = 1020$ (see online version for colours)



Next, opinion about nuclear energy was measured by a direct question on whether the respondent was in favour of nuclear energy or not. A change towards a more negative opinion about nuclear energy could be clearly noticed in 2011 compared to 2009 (see Figure 12).

Figure 12 Opinion about nuclear energy, $N = 1020$ (see online version for colours)



In 2009, the opinions about nuclear energy were rather balanced, with a slightly higher number of respondents in favour of nuclear energy (32% pro and 24% against nuclear energy) and a large number of people undecided. In 2011, only 18% of the respondents were in favour of nuclear energy, whereas 45% were against. It can also be noticed that, similarly to 2009, more than one-third of the population does not take a clear stand as regard nuclear energy.

The results therefore show that the Fukushima nuclear accident led to changes in the public opinion related to nuclear energy, which could be clearly measured in the third month after the accident. There is more concern about safety of nuclear installations, and there is a tendency to evaluate the risks from nuclear energy as higher than the benefits it brings.

5 Conclusions

Risk communication during Fukushima nuclear accident was one among the most challenging aspects for emergency management even in other states than Japan. On the one side, a high media attention helped as a communication tool for communicators; on the other side, a media information-hunger could cause information mistakes and over- or under-statements. The Fukushima accident induced enormous media coverage in the first weeks after the accident but attention decreased with time. This can be of concern for the long-term communication, for instance related to the environmental remediation process. Conflicts and disagreements were highly presented in the media articles.

The journalists presented the Fukushima nuclear accident through the collective memory of the Chernobyl accident during the first two months after the incident. The word 'Chernobyl' appeared in the articles almost every day. Although the results of media analysis show that the overall orientation of the published articles towards nuclear energy was neutral and the type of the articles was objective, the articles' orientation towards nuclear energy displayed a clear emphasis on the negative aspects in April 2011, at the time of the 25th anniversary of the Chernobyl accident. This goes in parallel to the observed change in the public opinion which has shifted towards more negative opinions and attitudes towards nuclear energy as compared to previous years.

References

- Asahi Shimbun (2011) 'Asahi poll in December 2011: 57% of Japanese say no to nuclear power', *The Asahi Shimbun*. Available online at: http://ajw.asahi.com/article/behind_news/social_affairs/AJ201112130013
- Ipsos MORI (2011) 'Global citizen reaction to the Fukushima nuclear plant disaster', *Global @dvisor*. Available online at: <http://www.ipsos-mori.com/Assets/Docs/Polls/ipsos-global-advisor-nuclear-power-june-2011.pdf>
- Barnes, M.D., Hanson, C.L., Novilla, L.M.B., Meacham, A.I., McIntyre, E. and Erickson, B.C. (2008) 'Analysis of media agenda setting during and after Hurricane Katrina: implications for emergency preparedness, disaster response, and disaster policy', *American Journal of Public Health*, Vol. 98, pp.604–610.
- Boomgaarden, H.G. and de Vreese, C.H. (2007) 'Dramatic real-world events and public opinion dynamics: media coverage and its impact on public reactions to an assassination', *International Journal of Public Opinion Research*, Vol. 19, pp.354–366.
- Brown, J.M. and White, H.M. (1987) 'The public's understanding of radiation and nuclear waste', *Journal of the Society for Radiological Protection*, Vol. 7, pp.61.
- Cantone, M.C., Sturloni, G. and Brunelli, G. (2007) 'The role played by stakeholders in the public debate that brought Italy out of the club of nuclear energy producers', *Health Physics*, Vol. 93, pp.261–266.
- Cohen, B.L. (1985) 'A simple probabilistic risk analysis for high-level waste repositories', *Nuclear Technology*, Vol. 68, pp.73–76.
- Covello, V.T. (1988) 'Seven cardinal rules of risk communication', EPA US Environmental Protection Agency, Washington, DC, USA.
- Gamson, W.A. and Modigliani, A. (1989) 'Media discourse and public opinion on nuclear power: a constructionist approach', *The American Journal of Sociology*, Vol. 95, pp.1–37.
- Greenberg, M. and Truelove, H.B. (2011) 'Energy choices and risk beliefs: is it just global warming and fear of a nuclear power plant accident?', *Risk Analysis*, Vol. 31, pp.819–831.
- Krippendorff, K. (2004) 'Reliability in content analysis', *Human Communication Research*, Vol. 30, No. 3, pp.411–433.
- Lindner, L. (2000) 'Chernobyl today and compared to other disasters', *Atw-Internationale Zeitschrift Fur Kernenergie*, Vol. 45, pp.282–292.
- Lippmann, W. (1922) *Public Opinion*, Macmillan, New York.
- McCombs, M.E. and Shaw, D. (1972) 'The agenda-setting function of the mass media', *Public Opinion Quarterly*, Vol. 689, pp.813–824.
- McCombs, M.E. and Shaw, D.L. (1993) 'The evolution of agenda-setting research – 25 years in the marketplace of ideas', *Journal of Communication*, Vol. 43, pp.58–67.
- McDermott, J.J. (1982) 'Three Mile Island', (The malfunction and its effects on American public opinion), *Fizikai Szemle*, Vol. 32.

- Perko, T. (2011) 'Importance of risk communication during and after a nuclear accident', *Integrated Environmental Assessment and Management*, Vol. 7, pp.388–392.
- Perko, T., Turcanu, C. and Carlé, B. (2012) 'Media reporting of nuclear emergencies: the effects of transparent communication in a minor nuclear event', *Journal of Contingencies and Crisis Management*, Vol. 20, pp.52–56.
- Perko, T., Turcanu, C., Geenen, D., Mamane, N. and Van Rooy, L. (2011) *Media Content Analysis of the Fukushima Accident in two Belgian Newspapers*, Open Report, Belgian Nuclear Research Centre SCK CEN, Mol, Belgium.
- Perko, T., Turcanu, C., Schröder, J. and Carlé, B. (2010) *Risk Perception of the Belgian Population: Results of the Public Opinion Survey in 2009*, SCK•CEN, BLG-1084, Mol, Belgium.
- Ramana, M.V. (2011) 'Nuclear power and the public', *Bulletin of the Atomic Scientists*, Vol. 67, pp.43–51.
- Rowe, G., Frewer, L. and Sjöberg, L. (2000) 'Newspaper reporting to hazard in the UK and Sweden', *Public Understanding of Science*, Vol. 9, pp.59–78.
- Triandafyllidou, A. (1995) 'The Chernobyl accident in the Italian press – a media story-line', *Discourse & Society*, Vol. 6, pp.517–536.
- Turcanu, C., Perko, T. and Schröder, J. (2011) *The SCK CEN Barometer 2011 – Perception and Attitudes towards Nuclear Technologies in the Belgian Population Open Report*, Belgian Nuclear Research Centre SCK CEN, Mol, Belgium, pp.150.
- van der Brug, W. (2001) 'Perceptions, opinions and party preferences in the face of a real world event – Chernobyl as a natural experiment in political psychology', *Journal of Theoretical Politics*, Vol. 13, pp.53–80.
- Zorkaja, N. (2006) 'Radiant disinterest – Chernobyl in Russian public opinion', *Osteuropa*, Vol. 56, pp.235.