

**Driving Through the Debate:
Metaphoric Language in Media Coverage of Climate Change**

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Abstract

Environmental issues, and climate change in particular, are high on the agenda nowadays. Since mass media are the main mediator in communicating scientific knowledge to the general public, media coverage of environmental issues presents a special interest. Previous research has focused largely on its content characteristics. The present study is an attempt to contribute a linguistic perspective to the existing research in the field of media coverage of the matters related to climate change and its influence on the formation of public opinion and public attitudes to this environmental problem. Forty five news articles from three newspapers are analysed in terms of metaphoric sets, the frames they construct, and evaluations in readers' perception that these frames lead to. Two largest metaphoric sets identified in the data under consideration are that of religion and that of a journey. Together with smaller metaphoric sets, they respectively construct the frames 'the world's environmental future does not depend on humans' and 'the world's environmental future is in humans' hands', the former taking significant precedence and thus exercising the most tangible influence on the formation of public opinion.

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1. Introduction

Continuous industrial development of the leading world powers over decades could not pass unnoticed for the environment. Its inevitable impact on the nature, particularly in the form of climate change, became most evident in the middle of the last century. Since then the issue has never left the agenda of international conferences and mass media, although the latter's interest to the problem has been of a somewhat cyclical nature (e.g., McComas and Shanahan, 1999). In any case, the past years have seen an influx of articles that cover environmental issues and are meant for the general public. As is known, mass media exercises powerful influence on the formation of public opinion, and the wide coverage that the climate change matters have received may have been one of the reasons for the enhanced public interest in this issue. Lately the attitudes towards the gravity of the problem and its causes have split, but even so climate change is what is being widely discussed both in the media and by the general public nowadays.

Together with the growing media and public awareness has been increasing research interest in the ways environmental issues are covered by the media (Schoenfeld et al, 1979; Trumbo, 1996; Carvalho and Burgess, 2005). Previous studies have focused on the volume of attention given to climate change in news stories (e.g., Ungar, 1992; Mazur and Lee, 1993), accuracy of reporting the information received from scientific or other sources (Bell, 1994a), awareness of the environmental problem and its understanding by the general public (e.g., Bostrom et al, 1994), political symbols in the coverage of climate change (Wilkins and Patterson, 1991). So far research has concentrated on the content characteristics of the media coverage of climate change, and little attention has been paid to its linguistic aspects. Meanwhile, it cannot be denied that language is the principal medium of divulging information in the printed media, and when it comes specifically to science in the media communication of the issues related to climate change to non-professionals can be viewed as a matter of largely linguistic competence (Bucchi, 1998: 3).

The present thesis is an attempt to make a contribution to the existing research in the field of media coverage of climate change and its effect on the formation of public opinion and laymen's attitudes to the environmental problem by providing a linguistic perspective. The language of the news articles collected for the purposes of the present study is analysed from the point of view of metaphors – one of the most powerful tools to influence readers' interpretations. The target domain being invariably climate change and the related matters,

such as the climate change conference that was under way at the time the articles were published, the analysis of the source domains allows us to see how journalists present this environmental problem to the general public and what attitudes they are trying to frame. This way the potential influence of the printed media on public opinion achieved with the help of linguistic means can be identified.

The paper is organised in the following way. The introduction is followed by theoretical background and literature review. In this section, previous research on language of newspapers, media coverage of science in general and climate change in particular, and the use of metaphors in science is presented with implications for the present research. Due to the nature of previous investigations, the sections on media coverage of science and climate change deal mostly with characteristics of and issues related to journalism in general rather than specifically its linguistic features. The next section describes the theoretical framework of the present study and methods of data collection. It is followed by data analysis and discussion, in which metaphoric sets and the frames they construct are identified and analysed and cross-cultural comparison is provided. The final section concludes the paper by summing up its main findings.

2. Theoretical Background and Literature Review

2.1. Language of the News

We live in a world of information. Every day, every hour, every minute, information is being delivered to us with the help of numerous tools of mass communication, such as newspapers, radio, television, and the internet. While it would be unreasonable to deny that every now and then each information provider relies on visual images or other sign systems to get their message across or enhance the effect produced on the target audience, it is still language that can be considered to be the main ‘vehicle’ of information. Not only is language ‘a tool and expression of media messages’ (Bell, 1991: 3), but it also contributes significantly to the content of the articles we read and the programmes we watch.

Language of mass media has long been recognised as a language in itself, a separate style of language, with its own rules, patterns, and subgenres. Although it constitutes only a small part of the world languages that have developed it as a distinctive genre, its importance cannot be underestimated. Media language embraces all spheres of social life and is

addressed to vast audiences, thus having an opportunity of exercising influence not only on public opinion and trends of social development by forming ideas and beliefs (Fowler, 1991), but also on the evolution of a given language in general.

Despite the fact that nowadays each member of the public can get information of all kinds from the media, it is news that has come to be viewed as the primary media language genre and the focus of media content (Bell, 1991: 1). News is a 'representation of the world in language' (Fowler, 1991: 4). However, this representation is by far not impartial and does not reflect the objective importance of events. Researchers (e.g., Olien et al., 1989; Bell, 1991; Fowler, 1991; Dunwoody and Griffin, 1993; Reah, 1998) have come to the conclusion that news is socially constructed and is determined by social and economic values and ideologies, as well as power structures of a particular setting, that are also mirrored in the language in which the news is told. One of the most obvious forms of social construction is news selection. It is a complex artificial process, which attests to the above mentioned claim that the view of the world the audience gets is only partial. Besides, the news that does get selected is always presented from a particular angle that reflects social, economic, and political adherence of a given news agency (Fowler, 1991: 10). Yet another contribution to news construction is provided by culture. Newspapers and other means of mass communication can be considered 'cultural artefacts' (Reah, 1998: 54). It follows that mass media of a given country is loaded with culture-specific beliefs, traditions, and prejudices of this country and is in this way different from mass media of any other country. That means that one and the same event reported by one and the same source of information (e.g., a newspaper) can take different forms, convey different information, and evoke different feedback from the audience in different countries.

A significant part of this difference will be contained in language, as all the above mentioned aspects of social construction of news are reflected in it. Language gathers its social, emotional, and cultural colouring through the message and values encoded in it (Reah, 1998: 55). But it can also be said to be characterised by a certain degree of autonomy. According to Fowler (1991: 41), no news institution in general or journalist in particular can exercise an entire control of linguistic construction of news, since values and ideologies are already embodied in language. It can be argued though that news producers are in charge when choosing the right vocabulary items or linguistic constructions to get their message across. Once this is done, language starts contributing the whole set of values imprinted in it to the value system created in the perception of the audience.

Following from the above discussion, it can be stated that language of the news violates one of the main doctrines of journalistic professional ethos – that of objectivity. In practical terms, objectivity is constructed by customary linguistic usage, rigid pattern of structuring information, supplying answers to the five ‘wh’-questions (Who?, What?, Where?, When?, Why?), using quotations as evidence, and presenting conflicting points of view more or less equally (Eason, 1982: 145; Entman, 1989: 30). As shown earlier, most of these points are likely to be covered in accordance with socially- and culturally-driven decisions related to news construction. Thus, language of the news can be considered not neutral, but a ‘highly constructive mediator’ (Fowler, 1991: 1).

2.2. Science and the Media

Over the last several centuries science has established itself as an autonomous professional discipline, with the scientist’s professional role being codified and institutionalised (e.g., Ben-David, 1971). This led to the increasingly widening knowledge gap between scientists and the generally educated public, as the scientific enterprise became too complicated and specialised to be understood by the latter. This, in its turn, called for creation of new channels of communication between scientists and the general public and resulted in appearance of media spaces where scientific knowledge could be presented to non-professionals (Bucchi, 1998: 1).

The process of shift to the new communication strategies which would help to address scientific information to various sectors of the public rather than specific audiences was not a fast one. According to Raichvarg and Jacques (1991), an important role in acceleration of this process was performed by the daily press, which provided the general public with the access to scientific knowledge by reporting on landmark events in science and technology. Journalists became new mediators between professionals and laymen, whose task was to interpret scientific theories for non-professionals.

The necessity to popularise science had its effect on language as well, as new literary forms had to be designed that would present scientific knowledge to a wider audience (Shapin, 1990: 1001). In addition to that, convenient ‘mediation’ language had to be thought of. As Bucchi (1998: 3) notes, journalists’ role of mediators can be compared to that of translators or interpreters, for what they need to do is to paraphrase scientific discourse in words that would

be comprehensible to non-scientists. Communication of science to the general public thus becomes a 'matter of linguistic competence' (ibid.). Similar conclusions were drawn by Adams-Smith (1987, 1989), who described the ways in which scientific papers are turned into news stories. In her studies, too, journalists act as text processors by translating terms and using conclusions from the end of a scientific paper in the leads of their articles.

Language also comes into picture if social representations of scientific theories are to be studied. According to Moscovici (1984), transformations in the construction of representations involve two processes: objectification and anchoring. Objectification is responsible for selecting certain elements embedded in a given scientific theory and making them more concrete and relevant. The examples that the author provides are Einstein who becomes the image of relativity or Freud who represents all psychoanalysts. Once this is accomplished, the selected items are made more autonomous in the process of anchoring and are then inserted into pre-existing relations. Neither process would be possible without an 'accompanying linguistic arrangement' (Bucchi, 1998: 6). In the progress of decontextualising the keywords of a theory and turning them into stereotypes a thematic language is created, which surrounds the social representation.

Despite the seeming success of journalists in their role of mediators to find the language for rearranging scientific theories for the general public, in reality scientists have repeatedly complained that their theories have been misreported, and numerous cases of misreporting were recorded by researchers working in the field of science and the media (e.g., Fahnestock, 1986; Weiss and Singer, 1988; Bell, 1991; Singer and Endreny, 1993; Cooter and Pumfrey, 1994; Dearing, 1995; Pellechia, 1997; Bucchi, 1998; Stocking, 1999). In the definition of Bell (1991: 216), misreporting occurs where 'the source believes that what she said has not been faithfully communicated'. But it can also be viewed more generally, without the reference to the source's opinion, when researchers record cases of discrepancies between the original scientific account and its popularised version. Unsurprisingly, it is journalists who have come to be blamed for the cases of such miscommunication.

One of the most common journalistic tendencies that lead to misreporting is making science more certain than it is (Stocking, 1999), and this can be achieved by journalists in a variety of ways. For instance, Fahnestock (1986), who compared articles appearing in *Science* magazine with those in popular science and news magazines, and Weiss and Singer (1988), who studied media coverage of the social sciences, reported that provisional findings are often turned into

certain findings in the popularised versions of scientific papers and that scientific claims can be exaggerated. In some cases uncertainties expressed by scientists are minimised by journalists, which was demonstrated, for example, in the study of risks coverage by Singer and Endreny (1993). Misreporting can also take place when journalists resort to a single source of information for their news stories. Such cases were recorded by Weiss and Singer (1988) and Friedman et al. (1996), who found that just a minority of journalists quote more than one or two sources in their articles looking at scientific findings. Other researchers (e.g., Pellechia, 1997) reported that journalists often fail to mention prior research on the topic they are writing about, thus ignoring scientific continuity. Yet another observation present in studies by numerous researchers (e.g., Weiss and Singer, 1988; Singer and Endreny, 1993; Nelkin, 1995; Pellechia, 1997) is that news is largely result- or product-oriented. Omission of descriptions of processes by which scientists arrive at these results and which are usually characterised by polemic and interpretative nature can create an impression that science is more certain than it actually is.

An opposite tendency, which has also been held responsible for some cases of misrepresenting scientific knowledge to the general public, is making science appear more uncertain than it actually is (Stocking, 1999). Although this may not be often the case, when certain scientific accounts are quickly followed by contradictory, but no less certain, reports, the majority of journalists do not aim at explaining the reasons for such discrepancy, as in the case of media coverage of the Global 2000 symposium at the 1983 meeting of the American Association for the Advancement of Science described by Weiss and Singer (1988). The fact that journalists portrayed the new reports simply as being more optimistic than the previous ones created the wrong impression that there existed scientific disagreement on the topics under consideration. Inaccurate use of the sources of information by journalists, which, as shown in the previous paragraph, can lead to depicting scientific knowledge less certain than it is in reality, can also cause the opposite effect of perception of science as being more uncertain. According to Dearing (1995), this happens when journalists present findings with different levels of scientific credibility and acceptance as totally equal competing theories. One more inaccuracy related to sources of information can be found in the articles by journalists who in their reports give equal authority to scientists and non-scientists. An example of such a case was described in the study of media coverage of a trial about creationism by Taylor and Condit (1988).

The question arises, why this misreporting takes place, and many researchers have made attempts at answering it. Some account for lack of accuracy in scientific mass communication simply by differences between the methods, timeframes, values of science and those of journalism (e.g., Dornan, 1990; Bell, 1991). One of the first-order journalistic norms, or organisational demands that journalists have to meet, is novelty and significance of their news stories (Stocking, 1999: 32; Boykoff and Boykoff, 2007: 1192). This professional routine triggers a whole set of clashes with the cycle of scientific research. First of all, the latter is often under way for many years. This does not only exclude the possibility of continuous novel media coverage of one and the same piece of research, but also contradicts the occupational definition of audience in journalism. Audience members are characterised as 'regular and faithful' and following the ongoing coverage of a story 'with some care' (Dunwoody and Griffin, 1993: 47), which can explain editors' reluctance to publish articles that do not provide essentially new information. Besides, as discussed above, it is quite common for scientific accounts to be marked by a certain degree of uncertainty, and when the reality of findings seems questionable it becomes difficult to convince the audience of their significance (Fahnestock, 1986: 283). This might be a possible explanation to journalists' tendency to make scientific knowledge appear more certain than it is. Organisational demands can also explain why journalists do not always turn to relevant sources of information, but tend to limit themselves to finding a catchy headline and stuffing the story with alarming elements (Diaz Nosty, 2009).

An important role in creating the typical uncertainty of scientific reports is performed by professional language employed by scientists, which can be described as a language of probability resorting to a lexicon of caution (Weingart et al, 2000; Zehr, 2000; Boykoff and Boykoff, 2007). Such language would definitely not be appropriate in the journalistic community, which favours expressive and unambiguous discourse. That means that not only on the content level, but also on the linguistic level scientific messages have to be translated into more colloquial terms in order to be understood and accepted by the general public more easily.

Another popular limit that, according to many researchers (e.g., Weaver and Wilhoit, 1996; Bucchi, 1998; Ladle et al., 2005; Diaz Nosty, 2009) can account for journalists' failure to accurately communicate scientific knowledge to the general public is lack of professional specialisation. It would seem a reasonable explanation to cases of misinterpretation of scientific terms or loss of theoretical depth when rearranging the scientific message for non-

professionals, as well as the fact that journalists' accounts can be influenced by people outside the scientific community. However, the study by Weiss and Singer (1988) did not reveal any correlation between journalists' formal training in a given science and their ability to develop news stories that their sources regarded as competent.

The common inaccuracies related to the misuse of sources of information are usually accounted for by what Tuchman (1972) called the ritual of journalistic objectivity – journalistic balance. As mentioned in the previous section, journalists are expected to present differing points of view. This often results in the situation when contrasted opinions are presented as deserving equal attention regardless of their acceptance and the supporting weight of evidence (e.g., Dunwoody and Peters, 1992; Bucchi, 1998; Stocking, 1999; Boykoff and Boykoff, 2007). Journalistic balance can also cause reappearance in the media of scientific opinions that have already been discarded by the scientific community (Diaz Nosty, 2009). From the perspective of the mass media, journalistic balance can be analysed as a positive feature, as it helps to create an impression of agitated debates between scientists, which can serve as a means of attracting readers (Boykoff and Boykoff, 2007: 1193). But it is also in this way that journalistic balance can contribute to forming the impression of scientific uncertainty, while it is not necessarily there.

Irrespective of what explanation researchers go for, the overwhelming majority of them agree that these inaccuracies in mass communication misinform the general public, form wrong understanding of issues related to science, and prevent non-professionals from appreciating scientific development. In other words, journalistic norms when applied to communicating scientific messages can result in the audience being 'entertained without being informed' (Smith, 2005: 1477-1478). And individual competencies or preferences do not come into force here, as journalists will always evaluate potential news material through the 'prism constructed by those norms' (Dunwoody and Griffin, 1993: 26). This was illustrated in the study by Dunwoody and Griffin (1993), which looked at the media coverage of Superfund sites in the U.S. over time. The researchers reported that issues related to a Superfund site only became news when they 'coincided with the interpretive framework provided by the occupation' (pp. 46-47).

Some of the researchers, however, admit that the audience itself makes a contribution to the eventual image of popularised scientific knowledge (e.g., Cooter and Pumfrey, 1994; Bucchi, 1998). Such an approach suggests that popularised science is not a distorted version of its

original and is not necessarily a result of misinterpretation by the general public. Rather, members of the public can use the information provided by journalists for different purposes and in different ways, elaborate on it or simply ignore it, and this will also influence the image of science formed in their minds. This account seems to be in line with Fowler's (1991: 43) suggestion that 'being a reader is an active, creative practice'.

The claim made in the previous section about the influence of social values and culture on the language of the news holds more specifically for the media coverage of issues related to science as well. As has been shown in the studies by Carvalho and Burgess (2005) and Diaz Nosty (2009), information varies by country and by media, and it is elite press that offers the most accurate accounts of scientific knowledge.

2.3. Climate Change and the Media

It has been repeatedly noted by researchers that the mass media play the key role in interpretation of environmental issues, and risks associated with climate change in particular, for the general audience and construction of such issues as a social problem (e.g., Schoenfeld et al., 1979; Allan et al., 2000; Wilson, 2000a; Wilson, 2000b; Antilla, 2005; Smith, 2005; Boykoff and Boykoff, 2007). In the U.S., for example, it is from the media that the majority of adults get informed about scientific developments (Nelkin, 1995). And even though climate change has been shaped in the public sphere to a significant extent by the efforts of politicians and political bodies newspapers have always played an important mediating role in this process by filtering information through their ideological stances (Carvalho and Burgess, 2005).

In the last decades academics have paid an increasing interest to the relationship existing between journalism and environmental issues, and most of the studies have revealed deficiencies in the media coverage of climate change (Singer, 1990; Bell, 1994b; Carvalho and Burgess, 2005; Diaz Nosty, 2009). When evaluating the quality of popularising scientific reports on climate change researchers almost unanimously come to the conclusion that inconsistent and non-committal media messages produce a negative effect on public opinion of the issues related to climate change, its cases and consequences. These inaccuracies often result from the more general challenges in communicating scientific knowledge to vast

audiences outlined in the previous section. Therefore, these are, again, journalists who are blamed for the public's ignorance in the related matters (e.g., Smith, 2005).

Probably the biggest danger arising when climate change is explained by the media to non-professionals stems from journalists' tendency to present science as being either more or less certain than it is in reality. Back at the end of last century, having carried out a study of what people knew about climate change, their understanding and misinterpretations of the problem, Bell (1991) concluded that the public was sure that climate change was going to happen – 'probably surer than the scientists themselves', as the researcher put it (p. 245). But the situation has noticeably changed since then. Later investigations (e.g., Zehr, 2000; Antilla, 2005; Diaz Nosty, 2009) have shown that nowadays consensus over climate change matters in the scientific community exceeds 90%, and being sure that an irreversible climate change is taking place scientists are now more concerned about applying global policies that would help to slow down and minimise the environmental decline. However, the journalistic debate is still not past the first stage, and consensus over the issue as presented in their accounts of scientific reports is considerably underestimated. This leads to framing climate change as uncertain in the minds of the general public.

The journalistic norm that exercises the most negative influence on public opinion regarding climate change matters is the journalistic balance, as it does not only have the consequence of presenting climate change as uncertain, but questions anthropogenic origins of the problem, which nowadays do not arouse any doubts in the scientific community (e.g., Boykoff and Boykoff, 2007). This happens because journalists in their reports give weight to the opinions of scientific minorities – namely, climate change sceptics who have emerged from conservative think tanks and are promoting their beliefs that climate change is not provable, is not caused by human activities, or is not a serious issue at all (Adger et al., 2001; McCright and Dunlap, 2000, 2003; Antilla, 2005; Diaz Nosty, 2009). The problem of such informational bias is particularly acute in the U.S. where the number of climate change sceptics is greater than in any other country (Antilla, 2005: 339). Moreover, those of them who understand how the journalistic routine works can turn it to their own benefit. An example of such manipulation was described by Gelbspan (1997). He referred to the case in the late 1990s when a relatively small group of dissenting scientists made sure they were given exactly the same time as an international panel of 2500 scientists.

Journalists' attempts to remain objective and present various opinions have exercised quite tangible influence on public opinion: according to Gallup's data, during the period of 2001-2008 the number of people in the U.S. who believe that climate change has natural rather than anthropogenic causes increased from 33 to 38 per cent, while the number of those who believe that climate change is caused by human beings decreased from 66 to 58 per cent (Diaz Nosty, 2009: 105). On the other hand, a couple of natural disasters such as storms or flooding have come to be associated with the processes of human induced climate change (Smith, 2005). But such accounts are limited to concluding or opening sentences of articles in the newspapers of a restricted number of countries, mostly Britain and continental Europe.

Another professional demand - journalists' urge towards novelty and sensationalism - finds a specific expression in climate change media coverage. The media's attention to climate change matters is determined to a large extent by economic and political events happening in the country. For instance, Ward (2008) accounts for the decrease in the media's concern for climate change in 2008 by the economic crisis that started towards the middle of that year and was high on the agenda back then. In practical terms, such a sensationalistic approach in journalism leads to polarisation in public opinion in regard to the causes and consequences of climate change, as well as lack of importance that non-professionals assign to the related issues (Diaz Nosty, 2009). From the academic perspective, this journalistic norm results in what researchers describe as a cyclical pattern in climate change media coverage (e.g., McComas and Shanahan, 1999). It is of interest that this pattern seems to be of a universal character: similar cycles of the media coverage of environmental issues have been recorded for the U.S. (Schoenfeld, Meier and Griffin, 1979; Trumbo, 1996), the U.K. (Carvalho and Burgess, 2005), and Canada (Parlour and Schatzow, 1978).

In addition to the informational bias concerning anthropogenic origins of climate change and the seriousness of the matter caused by the journalistic norms, a general decrease in the quality of information provided by the media leads to the lack of critical judgement on the part of the audience (e.g., Boykoff, 2007; Diaz Nosty, 2009). People exposed to audiovisual culture tend to be less reflective over what they experience in the public sphere and are thus more likely to be easily manipulated; besides, media content seems to put the concerns of the individual above those of society (Diaz Nosty, 2009: 96) making it difficult for the public to evaluate what a considerable effect an environmental problem like climate change can have on the social sphere in general. A significant role in this degradation process is played by language. Journalists and people professionally engaged in other media spheres aim at

creating a 'happy culture' (ibid.). Consequently, all media content gets filtered through expressions associated with it, which makes information lose its impact and convincing value and, once again, narrows down the possibility for the general public to think critically.

Yet another obstacle in the way of successful communication of scientific knowledge about climate change to the general public associated with language is that pollution, alongside other environmental problems, is often talked about in highly technical language (Dunwoody and Griffin, 1993: 22). This creates a double bind situation for journalists: if in their reports they resort to the same terms as scientists the information may become hardly comprehensible for non-professionals, especially those with little background knowledge in the field, as prior knowledge is critical to assimilating new information in a given area (e.g., Kleinnijenhuis, 1991). But once scientists' accounts get 'translated' into more colloquial language the information often becomes too simplistic failing to reveal the theoretical value of scientific theories. Furthermore, journalists themselves can also fail to interpret scientists' reports in the correct way, since the latter often write in understated language (Howland, 2006).

Speaking of journalists' inaccuracies when reporting on climate change matters it is useful to go back to the above mentioned study by Bell (1991). Even though its findings were challenged by later research, Bell's investigation stated two important principles that still hold true. First of all, any faults that occur in news stories are highly unlikely to be random. Bell studied 360 articles, and one of the typical journalists' mistakes that he recorded was inaccurate reporting of units of measurement. If such mistakes occurred randomly both smaller and larger units would have been found in the data. However, all the measurement mistakes in Bell's corpus were those of exaggeration, which the researcher accounted for by the journalists' desire to enhance the news value of their stories. Secondly, a mismatch was revealed between the media coverage and the public understanding of some particular aspects of the climate change issue. This means that not all public misunderstanding comes from the media; part of it is the public's own work deduced from their personal experience and characteristics of climate in their particular area.

Some of an individual's misunderstanding may also come from the way newspapers are read. The empirical work in linguistics demonstrates that the form and content of media messages have a clear effect on those readers who pay a lot of attention to what they are reading, while they may only form a general idea of the news that is on the agenda for the readers who look

through headlines and occasional leads (Kuha, 2009). Nevertheless, language is the factor that can be influenced most in the scientific information that is made available to the general public. And it is scientists' as well as journalists' task to make the language of scientific communication direct and forceful keeping it as objective as possible at the same time (ibid.).

While it is true of course that not all quality newspapers underestimate the danger of climate change or dissuade the audience from its anthropogenic causes, those that do not contradict their own reports with the other content of their editions. For example, Edwards and Cromwell's (2006) research has shown that in one and the same edition of 'The Guardian' reports of global species loss can be found next to endless adverts for airlines, companies producing computer equipment, and especially brands of cars. Such policies can be easily accounted for by the percentage of the revenue that newspapers get from promoting mass consumption, but this is an important factor contributing to the growing public scepticism regarding climate change. The same study has discovered that in January 2004 'The Guardian' got under a lot of criticism from its readers for publishing full-page adverts for American Airlines '2 for 1 flights' a day after describing the prospects for climate catastrophe. However, none of the complaints was included in the letters section, which would have damaged the reputation of the newspaper and deprived it of some income, but would have also raised the readers' awareness of the public concern.

Summing up the deficiencies in media coverage of climate change, it is 'mobilising information' that is absent from journalistic reports. And it is this type of information which, in the definition of Lemert et al. (1975), allows people to act by providing details of what and how could be done. People base their actions not only on the information they receive, but also on their understanding or misunderstanding of this information (Mendelson, 1990: 38). As Dunwoody and Griffin (1993: 23) remark, risk stories contain very little of the risk information identified by scientists, and the discussion above has shown that in many cases even the little that they present is often a distortion of the original reports, whether caused by the professional routine, the usage of language, or some other factors. Therefore, the wrong perception formed in the minds of the general public prevents it from undertaking the correct course of action or, as Zehr (2000) suggests, directly leads to inaction.

As many journalists would argue, it is not really their task to encourage people to act in any particular way. New Jersey journalists interviewed for the investigation by Sandman et al. (1987) defined their primary goal as to report on what happened and not to dwell on the

nature and extent of risk. Similarly, at one of the seminars held within the project by Smith (2005) journalists expressed a unanimous opinion that their job is to tell the public what is happening and not to impose any ways of behaviour. However, given the media's key role in popularising scientific knowledge, it is also the media that should inform the audience of the preferred course of action in case there is one.

Like any other type of news, environmental news is a social construction (e.g., Einsiedel and Coughlan, 1993). As such, it can be viewed as a product of the culture and ideology that are dominant in a given society, which means that media coverage of climate change may vary in different countries. Some of the differences can come from the fact that, as Smith (2005: 1475) put it, it is 'legitimate' to get information from various sources. Since Northern Europeans enjoy a larger variety of information sources to choose from and an easier access to them, they can be considered to receive more balanced media content than people in other parts of the world (Diaz Nosty, 2009: 96). But differences are noticeable even in the media content of the countries that are believed to have more democratic media. For instance, a comparative study between the U.S. and the U.K. demonstrates that over the last several years the latter has seen a more considerable growth in the media coverage of environmental issues (Boykoff, 2007: 475; Diaz Nosty, 2009: 105). The U.S. was found to drag behind the U.K. in terms of the amount of coverage, the percentage of coverage devoted to clarifying the nature of global warming, and the number of climate sceptics (Kuha, 2009). Some of the differences are also rooted in language, as concepts and descriptions included in journalists' narrative activities are often culturally determined (Einsiedel and Coughlan, 1993).

2.4. Metaphor in Science and the Media

It was repeatedly stated in the above sections that scientific theories may be somewhat difficult for understanding to non-professionals, which is why they have to be 'translated' by journalists into more colloquial language. One of the convenient means of such 'translation' is metaphor, since it draws comparisons between complicated scientific phenomena or concepts and experience from well-known domains helping to visualise the theory and thus comprehend it better and more easily. It would seem that metaphors are employed largely by journalists in their role of mediators of scientific knowledge. However, as Bucchi (1998) states, most of such metaphorical transformation processes can be found in the accounts of scientists themselves (p. 7). Metaphorical images are often embedded in scientific theories,

and some of the images created later by journalists are also initially suggested by scientists. This does not mean that there are no metaphors used only at the constitutive or only at the popularisation level, but often these metaphors are the same.

The functions of metaphors in science can differ from those in journalism though. Boyd (1979) attributes a primarily linguistic role to metaphors in science. According to him, they are used to fill in gaps in terminology. But this is not the exclusively linguistic role that metaphors play in science. Three main reasons for their usage, as outlined by Holton (1986), are to help scientists deal with obstacles that cannot be overcome by means of logic, to allow their creative imagination to float between the scientific world and reality, and to help the scientific language to keep up with rapidly changing scientific theories. Journalists' aims in resorting to metaphors are obviously different, as they do not either develop any scientific theories or write in the scientific language proper. And there are likely to be more reasons behind the use of metaphors in journalism than simply to make scientific knowledge more comprehensible for the general public. As Einsiedel and Coughlan (1993) notice, metaphors can 'frame an issue in ways that project greater importance, urgency or heightened emotion' (p. 147), and this quality seems to be helpful to media players in meeting their professional demands such as the sensationalism approach.

Some researchers have argued against the presence of metaphors in the scientific language – not so much against their presence per se, but rather its necessity. The argument in support of this view is that once metaphors are introduced into the language of science they become dead metaphors and can be viewed simply as technical terms (e.g., Soskice, 1985). The importance of metaphors in the media, on the other hand, has never been doubted. Moreover, Uskali and Nordfors (2009) have observed influence in the opposite direction as well. They have studied the role of journalism in creating the metaphor of Silicon Valley and have concluded that journalism does indeed contribute significantly to creation of new concepts and metaphors and their assimilation into society.

Metaphors have also played a tangible role in the media coverage of climate change issues over years. Research has shown that the emerging metaphors reflected the development of scientific theories and changing attitudes towards this environmental problem (Einsiedel and Coughlan, 1993). For example, war and dominance metaphors started appearing in 1987 when it became clear that the environmental decay needed to be fought. The time when the potential damage to the world's economy was estimated saw the appearance of economic and

financial metaphors. Later on, when scientists realised how serious the danger actually was their message found its expression in metaphors of a sick planet that needed not just cleaning up but nursing back to health.

Creating vivid images in readers' minds this trend of the use of metaphors may have had a positive effect on the public attitude to the problem. At the same time, metaphors can add to the lack of understanding in the general public often recorded by researchers. It has been demonstrated that non-professionals have more knowledge and a deeper understanding of the ozone hole than of climate change. Ungar (2000) accounts for this discrepancy by the fact that the ozone hole was encapsulated in a simple 'penetration' metaphor that people are able to think with and that has affinities with elements of the popular culture. But no metaphor is available to provide a similar schematic understanding for the processes of climate change, which would have rendered the problem simpler for non-scientists.

3. Methodology

3.1. Analytical Framework

The conceptual framework chosen for the interpretation of the data selected for the present research is framing. Since this is not one of the most conventional approaches to studying discourse, a certain clarification is needed as to what is understood under framing and how this methodology was used. In order to do this, examples from previous studies in which the researchers resorted to framing have to be drawn upon. These descriptions may be expected to have been included in the theoretical background. However, as they are used to clarify the methodology of the present research, they appear more appropriate for the methodology section.

In their work, a number of researchers have emphasised the importance of frames for the media coverage of scientific developments. Tankard et al. (1991: 5) defined a frame as a 'central organizing idea for news that supplies a context and suggests what the issue is through the use of selection, emphasis, exclusion, and elaboration'. More specifically, media frames are defined as 'principles of selection, emphasis, and presentation composed of little tacit theories about what exists, what happens, and what matters' (Gitlin, 1980: 6). Thus, frames can be viewed as a certain way of filtering and structuring the information received from the sources.

Being a cognitive structure on the individual level, a frame plays an important role in the process of journalists' understanding of the stories they get from their sources (Dunwoody and Griffin, 1993). At the same time, frames can serve as a convenient tool of constructing the news stories that eventually make their way to newspaper editions and are read by the general public. In this case, we deal with conscious framing of information that pursues certain communicative aims as described by Entman (1993; 2004). In order to promote a particular interpretation or evaluation of the reported news, journalists make selected aspects of a perceived reality more salient than others and establish connections between the highlighted facets of the events. Therefore, framing takes a significant place in the process of influencing the readers and forming public opinion.

The majority of researchers who have interpreted their data through the conceptual framework of framing have looked at the information that journalists choose to include in their news reports. However, it cannot be denied that the cognitive process of framing would not be possible without the linguistic aspect, since it is through language that journalists promote certain interpretations that form a system and lead to evaluations. Besides, framing can be seen as taking place not only on the initial stage of information selection, which is often influenced or even determined by the newspaper's views and policies, and thus does not depend entirely on the journalist's choices of any kind, but also on the stage of the actual news story production. And it is on this latter stage that the journalist's linguistic choices contribute significantly to framing the reported events in a certain way.

The main linguistic tools exploited in the process of framing are keywords and metaphors (Entman, 2004; Antilla, 2005). Keywords help to emphasise the information that the journalists view as the most essential for the public consumption and that will stay in the readers' minds ultimately leading to the formation of a certain evaluation or attitude. Metaphors are even more useful for framing, since the basic mechanisms involved are substantially the same for both of them. As Entman (1993: 55) argues, framing is largely based on selection and salience. And this is also what metaphors do: they pick a certain aspect of the target domain and foreground it in our perception by comparing it to a similar quality of the source domain¹. In other words, a selected aspect becomes more salient because it is this aspect that we pay more attention in trying to understand the analogy.

¹ For the definitions and the concept of the source and target domains see, for example, Lakoff and Johnson (1980); Kövecses (2002).

The frames in the media coverage of climate change identified by previous research include the following: criticism of scientific evidence, substantial benefits of climate change, actions to ameliorate would be a threat to economy (McCright and Dunlap, 2000); valid science, ambiguous cause or effects, uncertain science, controversial science (Antilla, 2005). The present study aims to identify and analyse the main frames created in the media coverage of climate change by means of linguistic tools, namely keywords and metaphors, and the effect that these frames may exercise on public opinion and attitude to this environmental issue.

First the general statistical analysis of all the tokens of metaphors and keywords referring to climate change and the related matters was carried out, which helped to reveal the largest and most significant metaphoric sets. Then each of the sets was analysed separately in terms of the tokens that it consists of, its thematic subsets (for the largest metaphoric sets), the frame that the metaphoric set constructs, and the effect that this frame can have on the formation of public opinion. Finally, the language of climate change used in each of the newspapers selected for the present research was analysed in isolation followed by a cross-cultural comparison.

3.2. Data Collection

The data selected for the purposes of the present research are presented by articles from three newspapers: *The Guardian*, *The New York Times*, and *The Sydney Morning Herald*. These newspapers are all published in different countries (the UK, the USA, and Australia accordingly), which allows us to carry out intercultural analysis and see whether cultural differences in media coverage of climate change identified by previous research hold for the setting under consideration. Since claims are made in the present research about the effect newspapers have on public opinion, the main criterion for choosing one newspaper from the newspapers of one country was its readership. The selected newspapers have been repeatedly acknowledged as the most popular and widely read or accessed quality newspapers in their countries² (the popularity of the online editions was taken into consideration, as it is from the online editions that the articles for the present study have been retrieved; although all the articles are essentially the same in both print and online editions, they may have slight differences, since the latter get occasionally updated). Moreover, the popularity of the

² See References for the links to the surveys and ratings.

newspapers goes beyond the national level: for the year of 2010, *The New York Times* has the largest online readership of all English language newspapers in the world, with *The Guardian* ranking second. Besides, *The New York Times* was described by Mazur and Lee (1993: 710) as ‘the real initiator of national coverage’, while *The Sydney Morning Herald* is the oldest continuously published newspaper in Australia.

December 2009 was selected as the month for the analysis. Between December 7 and December 18 the Copenhagen climate change conference took place. This conference was seen by many as a landmark event meant to set the direction of the world’s environmental development, which resulted in extensive media coverage of the climate change matters and enhanced interest to the issue both from the general public and social institutions. As Mintz (1949) found out, media content proportions similar to those of an entire month are provided by samples consisting of every second and every fifth day. In accordance with this pattern, articles from every second day (a total of fifteen articles from each newspaper) were selected for the present analysis. All of the articles come from the Science section of the online editions of the three newspapers, but they differ from the point of view of content: some of the articles follow the progress of the climate change conference, while the others cover various manifestations of the environmental issue itself.

Further on, all climate change metaphors and keywords were identified in the collected articles. The condition for selecting metaphors was that they should have climate change or related issues as their target domain. Keywords were defined as words or word phrases taken from the source domain and contributing to the creation of an extended metaphor in a given article while also helping to get its key message across to the reader. All together, three hundred and fifty two tokens were retrieved from the forty five articles. For statistical purposes, it is important to notice that all data were analysed by tokens. Therefore, quite a number of keywords and some of the metaphors presented in the next section occur more than once in a given article of a set of articles from the same newspaper.

4. Data Analysis and Discussion

4.1. Overview: Metaphoric Sets and Climate Change Frames

The analysis of the data collected for the present study has proved the point made in previous research that both scientists developing theories and journalists communicating these theories

to the general public resort to metaphors as a means of bringing their messages home to the audience. The language of the news in the three data sets can generally be characterised as highly metaphoric, which is demonstrated by the high density of metaphors and keywords from the source domains contributing to extended metaphors in the articles.

All the metaphoric expressions retrieved from the data fall into several metaphoric sets, the two largest having the source domains of religion and a journey. The number of keywords and metaphors that these metaphoric sets contain varies for each of the three newspapers. The reason for identifying these metaphoric sets as the two main ones is that for each of the articles blocks the number of members of one of these sets is larger than the total of all the keywords and metaphors belonging to the other metaphoric sets (excluding the ‘religion’ and the ‘journey’ ones). The general distribution of keywords and metaphors over the identified metaphoric sets is shown in Table 1.

	Number of tokens (items)	Percentage of the overall number of tokens (%)
Metaphoric set of religion	139	39.5
Metaphoric set of a journey	86	24.4
Other metaphoric sets	127	36.1

Table 1. Overall distribution of keywords and metaphors over the metaphoric sets

As can be seen from Table 1, the metaphoric set with the source domain of religion is the largest one and exceeds even the overall number of keywords and metaphors included in the metaphoric sets other than the two main ones. The fact that so many keywords and metaphors are borrowed by journalists from the source domain of religion clearly indicates that it is this metaphoric set that would exercise the most tangible influence on the formation of public opinion and would play the most substantial role in leading to certain interpretations and evaluations in the readers’ perception. For these reasons, it is this metaphoric set that the present analysis deals with in the first place.

4.1.1. *Metaphoric Set of Religion*

Being the largest in terms of the number of tokens, the metaphoric set with the source domain of religion is also the most peculiar one. It does not include practically any metaphors proper. If the linguistic items that were included in this metaphoric set are analysed in isolation they probably would not be recognised as being of metaphoric nature at all. However, when occurring within one and the same article in noticeable numbers and in the key positions of the news article structure, such as the headline or the lead paragraph, they arouse evident associations to the field of religion and can be definitely said to create metaphorical mapping of the two domains – religion and climate change. Thus, the linguistic tool involved in construction of this metaphoric set is the use of keywords.

The tokens belonging to the metaphoric set of religion can be further divided into several subsets. The first and most obvious one is the subset of faith and belief, which is represented by such keywords as ‘(not to/ refuse to/ strongly or very strongly/ truly) believe’, ‘a strong/ central belief’, ‘misplaced faith’, ‘the new article of faith’. Such lexical items, which are rife throughout the corpus and often contain grammatical or lexical negation, lead to the readers’ interpretation that the issues related to climate change, and its human induced nature in particular can be either believed in or not, just as one can choose to adopt or reject religious beliefs. This view is considered false by scientists, as was outlined in the previous sections. In addition to that, some of the articles are characterised by identity work, which finds its manifestation to a large extent on the level of personal pronouns: ‘us Vs them’. Clauses of the type ‘they want us to believe’ or ‘despite what they would have us believe’ create confrontation and arouse the sense of imposition of certain beliefs by someone from the outside, which in its turn results in the natural reaction of defence and denial.

Another aspect of the subset of faith is that when people believe in something this usually indicates lack of empirical evidence because when the evidence is present one can be said to know something, not to believe in it. This suggested lack of evidence is supported in the data under consideration by direct lexical indications, such as ‘no/ lack of (empirical) evidence’, ‘removed from reality’, ‘proved hard to demonstrate’, ‘faulty logic’, ‘reject all the proof’, ‘remain a mystery’, ‘to need to be verified’, ‘inability/ need to convince’, ‘to stoke a firestorm of scepticism’. Being common in many of the articles, keywords of the kind stay in the reader’s mind ultimately leading to the understanding that there is no evidence of the human induced climate change, which again contradicts the scientific point of view.

The second significant subset in the metaphoric set of religion is that of hope. Religion teaches people to never lose hope for the better or give way to despair, and some articles in the data seem to suggest a similar attitude to the problem of climate change, which on the level of lexis is evident from the following keywords and word combinations: ‘hopeful news’, ‘revived hopes’, ‘hopes are alive’, ‘there is still hope’, ‘it’s what gives me hope’, ‘to boost hope’, ‘(not to) hold out much hope’. In terms of the effect on the formation of the readers’ interpretations and attitudes, this metaphoric subset does not work in favour of science either. Alongside the idea of hoping for something such language promotes the belief that what is going to happen to our environment in the future does not depend on us, as one is usually left with the option of hoping when everything one could do is already done.

The metaphoric subset that promotes similar interpretations even to a larger extent is that of fate. Those who have a religious world picture tend to believe that most events in our life are predetermined or do not depend on our will. A similar conclusion is suggested by such lexical items as ‘untameable fate’, ‘to be inevitable’, ‘fated to destruction’, ‘everything in my power’, ‘to feel powerless’, ‘human failing’ that occur in the data under analysis. The conviction that nothing or very little depends on human beings in the current situation of environmental havoc carried by these keywords discourages the general audience from taking any action or changing their behaviour in ways that would slow down and eventually reverse the environmental decline.

Other metaphoric subsets that complete the picture of the religious source domain and its mapping onto the field of climate change are as follows:

- Church rituals: ‘to have a confession to make’, ‘having confessed’
- The need to make sacrifices for the sake of God and the surrounding people: ‘to have to make sacrifices’, ‘only with sacrifices’, ‘no longer may we live without restraint’, ‘earnest self-restraint’
- Rectitude: ‘to apply moral principles’, ‘moral passion’, ‘caring and sharing’, ‘to help the poor cope’, ‘care for creation’, ‘modest’
- Religion showing the right life path: ‘to direct us all’, ‘to guide the world’s actions into the future’, ‘to mislead people’
- Biblical events or historical periods associated with religion: ‘a hysterical witch hunt’, ‘the public is too easily seduced’, ‘an apocalyptic vision’

The analysis of the metaphoric set with the source domain of religion suggests that the frame created by this set is ‘the world’s environmental future does not depend on humans’. The mapping of the religious domain onto the sphere of climate change makes the latter seem to be caused by and depend largely on some powers beyond people’s grasp. Talking of climate change and the related matters in the ‘religious’ language allows non-professionals to identify themselves as powerless and hence irresponsible creatures who cannot really account for the natural phenomena and can only hope for the better and blindly follow the fate. As a result, this frame leads to the formation of readers’ interpretations and evaluations that are wrong from the scientific point of view and can cause undesirable inaction and environmental unawareness.

4.1.2. Metaphoric Set of a Journey

Quite the opposite effect is created by the second largest metaphoric set with the source domain of a journey, or in a limited number of cases simply moving at a certain speed in a certain direction. A noticeable difference from the previously described metaphoric set is that this one consists practically exclusively of metaphors proper, although many of them play an important role in conveying the message of the articles and occupy key structural positions, and can thus be also said to serve as keywords. In some cases, this is rather a phrase or even a whole clause that expresses the metaphor of ‘climate change talks/ the world’s environmental development is a journey’. But even in these cases the mapping of the source and target domains is at once obvious and can be deduced from the phrase or the clause itself without reference to a larger context.

The metaphors and keywords that belong to the metaphoric set of a journey roughly fall into two categories: movement of or caused by humans and movement of or caused by natural phenomena or inanimate objects, with the first category being presented in the data under consideration to a considerably larger extent. The most remarkable feature of both categories is that all movement indicated by them is of active and deliberate nature – that is, whoever moves or causes the movement takes conscious actions to do so and does it on purpose. This effect is created with the help of linguistic tools on the levels of semantics and grammar. Grammatically, this is achieved by means of the category of voice. Active voice constructions are predominant in the metaphoric expressions of movement. Where passive voice does occur, it tends to express a slightly different aspect of a journey. For example, in

the clause ‘both obstacles are cleared’ the state resulting from the action performed towards the obstacles makes it possible to continue the journey, and the desire to do so can be viewed as the main motivation for carrying out this deliberate action. In another instance of passive constructions – ‘the world will know which way it is headed’ – the participle seems to behave more like an adjective, and the interpretation of the action of heading performed on the world is not very obvious from the clause. The construction is perceived rather as a synonym of a verb of movement presupposing a certain direction. But even if viewed as a purely passive construction, this clause still reveals signs of participation and awareness from the grammatical subject, which is realised on the semantic level by the meaning of the verb ‘know’.

It is also of interest that the only case of grammatical negation within the metaphoric set of a journey occurs in the combination with a verb indicating lack of movement: ‘We can’t afford to stay where we are much longer’. This can be regarded as one of the hints that in the data under analysis movement is considered to be positive. Another hint is given by modal verbs: whenever some form of necessity is expressed by them this is necessity of movement, e.g. ‘the rich must move first’, ‘should lead instead of obstructing’.

Within the metaphoric set with the source domain of a journey several thematic subsets can be identified. The first of them refers to various stages of the metaphoric journey:

- Beginning of the journey: ‘to put the world on the path to’, ‘to start this marathon’, ‘to get under way’, ‘a historic first step’
- Termination of the journey: ‘to enter its final stretch’
- The whole period of the journey: ‘to drive through a global deal’, ‘issues that have been on a 30-year detour’, ‘the ride has been long’, ‘to review the idea is a very long way from’

The distribution of the tokens among the identified stages of the metaphoric journey suggests that the solutions to the environmental problems or any actions regarding climate change are still in their infancy. The only token denoting the termination of a journey was used in the article in reference to the climate change conference that was under way, not the actual application of any solutions to the existing climate challenges. The majority of the tokens metaphorically depict the beginning of the journey. As for those that embrace a whole period of the journey, they usually imply that this period lies ahead of us or that the termination of

one journey is just the beginning of another, as in the case with issues that ‘have been on a 30-year detour’.

Another subset embraces speed metaphors, which can indicate fast or slow movement.

- Fast movement or acceleration: ‘to be in overdrive’, ‘to give momentum’, ‘Dr. Hansen’s journey [...] accelerated’
- Slow movement or deceleration: ‘a temporary slowdown’, ‘to slow down an international agreement’, ‘to slow climate change’, ‘to slow the pace of emissions’, ‘to be stalled’, ‘to take its foot off the emission reduction accelerator’

The most important characteristic of this subset is that the metaphors of slow movement or deceleration always turn out to have a negative connotation. They either arouse associations with unwanted development that can lead to irreversible results if not slowed down immediately, thus implying a certain degree of danger, or indicate a slowdown in the climate change talks that many scientists and world leaders pinned their hopes on, thus hinting at the possibility of not achieving the desired results at the conference. Either way, by contrast this effect adds to framing the readers’ interpretation that fast movement is good and that is what needs to be done.

The negative connotations of slow movement are echoed by the subset of obstacles in the way or disrupted movement, which is presented by such metaphors as ‘to derail talks/ the agreement’, ‘to put new obstacles in the way of’, ‘to stymie’, ‘to throw sand in the wheels of freewheeling finance’, ‘to seek to stand in the way of progress’. This last phrase is of particular interest, as it attests to the claim made earlier that the tokens of the metaphoric set of movement imply aimed activity on the part of humans. On its own the phrase ‘to stand in the way’ may indicate a state resulting from an accidental concurrence of circumstances. But the semantics of the verb ‘to seek’ makes this action deliberate. Obstacles in the way of movement present a challenge that calls for a response from the humans on the metaphoric journey. This explains appearance of such metaphors as ‘both obstacles are cleared’ or ‘the bridge for us to get into the next decade’, which again portrays humans as taking action.

The other subsets containing metaphors with the source domain of a journey or movement and contributing to the creation of an overall metaphoric image of movement are as follows:

- Direction of movement: ‘the right track’, ‘to stay on track toward’, ‘course of action’, ‘to change its [climate change] course’, ‘reversing the road we have travelled for 200

years', 'to slow and then reverse the emissions', 'moving things forward', 'to career towards', 'a major step toward', 'a technological path', 'the world will know which way it is headed', 'to set the direction of global environmental planning'

- Competitive movement: 'we are in a race against time', 'racing with optimism', 'to start this marathon', 'to catch up with the developed nations', 'has long been ahead of', 'one step before the miners'
- Roles on the journey: 'to lead the way', 'to follow Europe's lead', 'the main driver'

Summing up the analysis of the metaphoric set with the source domain of a journey, the frame that the metaphors and keywords included in this set create can be defined as 'the world's environmental future is in humans' hands'. This interpretation is passed on to the readers with the language denying the random nature of the metaphoric movement and characterising the metaphoric journey of dealing with the matters related to climate change as being under people's control. The resulting evaluation that is ultimately formed in the general public is the opposite of the one formed by the metaphoric set with the source domain of religion: humans can and should be in charge of the world's environmental development, the majority of challenges are still to be met, and we should act fast in order to change the current direction of climate change.

4.1.3. Other Metaphoric Sets

Of the smaller metaphoric sets identified in the data under analysis, the first one that deserves special attention is the metaphoric set of games of chance or gambling. Metaphors of gambling have not been recorded in any of the previous studies of the language of climate change, and though in the present research this metaphoric set is not very considerable in terms of the number of tokens belonging to it, it is still noticeably present throughout the data. In the collected articles the issues related to climate change or dealing with environmental problems are described with the help of such metaphors and keywords as 'the Russian roulette', 'it's a lottery', 'the best bet', 'to bet on', 'to play politics', 'to put some real money on the table', 'to hold their cards close to their chests'. The tokens in the metaphoric sets described in this section are not numerous enough to exercise any significant influence on the formation of public opinion independently. In other words, they can hardly be considered to construct separate frames. However, the smaller metaphoric sets can definitely make a contribution to the interpretations and attitudes formed by the language of one of the

larger sets. Games of chance that the above enumerated metaphors create an allusion to are all associated with a certain amount of luck, or what others might call fate, and the outcome of these games never entirely depends on the players. Thus, the metaphoric set of gambling enhances the frame ‘the world’s environmental future does not depend on humans’.

Other smaller metaphoric sets in the data under consideration include:

- The metaphoric set of war: ‘a climate change battle’, ‘a valiant fight’, ‘to live on the frontline’, ‘to claim victory’, ‘joint forces’, ‘fighting spirit’, ‘to fall prey to’, ‘to slay all false ideas’, ‘arguments [...] are shot down’, ‘environmental shackles’, ‘a scathing attack’, ‘to defend demands/ the choice’, ‘to combat the threat’, ‘to make peace with the planet’
- The metaphoric set of the ill planet: ‘a planetary emergency’, ‘a cure for climate change’, ‘to hurt the economy’, ‘a global hangover’, ‘to save the planet’

Both of these smaller metaphoric sets can be viewed as contributing to the frame ‘the world’s environmental future is in humans’ hands’. The mapping of the source domain of war onto the climate change situation allows the general public to view the latter as a situation in which everyone has to take active participation, whether voluntarily or not. Even those who do not initiate their own involvement earlier or later face the need to break up metaphoric attacks, thus getting an opportunity to exert influence on the outcome of the metaphoric fight. In the case with the ill planet, humans in general and recipients of the metaphoric mapping in particular are put in the position of doctors whom the life of the planet depends on. Therefore, the metaphoric set of the ill planet awards humans with a serious responsibility making it obvious that their participation can noticeably change the situation.

There are many more interesting metaphors in the data under analysis that are used by journalists to talk about climate change. Among them are, for example, metaphors with the source domain of a political regime: ‘energy dictatorship’, ‘scientific fascism’. But these metaphors occur in isolation or do not number more than a couple of tokens. Consequently, they do not form metaphoric sets. There is, however, one more metaphor that deserves at least a quick notice, and this is the ‘heat’ metaphor. As was mentioned in one of the previous sections, Ungar (2000) accounts for the lack of public knowledge of the problems related to climate change by the fact that this environmental issue has not been (and probably cannot be) encapsulated in a simple metaphor that would facilitate the process of understanding for non-professionals. This may hold true even today. At the same time, it would be unfair to say

that journalists do not make any attempts at drawing parallels between the natural processes of climate change and humans' handling of them. The present research has recorded the use of such metaphors as 'a climb up the heat ladder', 'the debate [...] is one of the most heated', 'the talking heats up', 'to turn up the heat at Copenhagen', 'seek to cool off from the hot European cities', 'to cool interest', 'daily struggles swamp'. While it is true that these metaphors give an account of some of the consequences of climate change rather than its processes proper and that even this account may be too simplistic, they nevertheless constantly remind the general public of the current environmental situation and may also exercise influence on public opinion by appealing to the readers' senses and experience of discomfort from the heat, thus forming an idea that something should be done.

4.2. Cultural Analysis: Climate Change Frames in Different Newspapers

As stated by numerous researchers whose findings were outlined in the Background section, the media coverage is far from being homogeneous. Differences can result from the general cultural patterns, as well as each newspaper's individual style and policies. These observations give rise to the analysis in the two following sections. First the language of climate change is analysed for each of the three newspapers selected for the present research, then cross-cultural comparison is carried out.

4.2.1. The Guardian

The distribution of metaphors and keywords over the identified metaphoric sets in the articles retrieved from the archive of *The Guardian* newspaper is shown in Table 2.

	Number of tokens (items)	Percentage of the overall number of tokens in the data set (%)
The metaphoric set of religion	77	51.3
The metaphoric set of a journey	25	16.7
The metaphoric set of gambling	6	4
The metaphoric set of war	10	6.7
The metaphoric set of the ill planet	3	2
Other metaphors	29	19.3

Table 2. Distribution of tokens over the metaphoric sets in the data from 'The Guardian'

As the statistics presented in Table 2 reveal, the largest metaphoric set in terms of the number of keywords and metaphors in the data set under consideration is that of religion. The tokens belonging to it constitute more than half of the overall number of metaphors and keywords related to the climate change matters that occur in the articles from *The Guardian*. That means that all the other metaphoric sets in the articles from this newspaper including one of the two generally largest sets – that of a journey – do not have the potential of exercising influence on public opinion of the same power that the metaphoric set of religion does. However, the analysis of the metaphoric sets and climate change frames has shown that several metaphoric sets can contribute to the construction of one and the same frame. The statistics based on the distribution of tokens over the climate change frames is presented in Table 3.

	Number of tokens (items)	Percentage of the overall number of tokens in the data set (%)
The frame ‘the world’s environmental future does not depend on humans’	83	55.3
The frame ‘the world’s environmental future is in humans’ hands’	35	25.3

Table 3. Distribution of tokens over the climate change frames in the data from ‘The Guardian’

As the statistical data presented in Table 3 show, metaphors and keywords that frame climate change as not depending on humans’ actions clearly predominate in the data set under consideration. At the same time, the tokens that promote a more active position towards the environmental issue on the part of the general public cannot be discarded altogether, although their contribution to the formation of the interpretations and evaluations of the readers of the newspaper is expected to be much less significant.

4.2.2. The New York Times

For the data set consisting of the articles from *The New York Times* the situation looks quite different. The way climate change related metaphors and keywords are distributed over the metaphoric sets in this data set is shown in Table 4.

	Number of tokens (items)	Percentage of the overall number of tokens in the data set (%)
The metaphoric set of religion	9	12.5
The metaphoric set of a journey	32	44.4
The metaphoric set of gambling	-	-
The metaphoric set of war	10	13.9
The metaphoric set of the ill planet	1	1.4
Other metaphors	20	27.8

Table 4. Distribution of tokens over the metaphoric sets in the data from ‘The New York Times’

In the articles from *The New York Times* the metaphoric set of religion is one of the smallest in terms of the number of tokens. It is exceeded even by one of the generally smaller metaphoric sets – the metaphoric set of war. The latter takes part in framing climate change as being at least to a certain extent under humans’ control. Taking into consideration that the metaphoric set of religion, on the contrary, constructs the interpretation that not much if anything at all depends on humans, this difference in the number of tokens alone says a lot about the evaluations formed in the readers’ minds by the journalists writing for *The New York Times*. Moreover, the smaller metaphoric set that participates in the creation of the same frame that the metaphoric set of religion does – the metaphoric set of gambling – is absent from the data set under consideration altogether.

The metaphoric set that is characterised by the largest number of tokens is the metaphoric set of a journey. Its members constitute almost half of the overall number of tokens in this data set. Given the relatively large number of tokens in the smaller metaphoric sets that contribute to the construction of the same climate change frame as the metaphoric set of a journey does, the frame ‘the world’s environmental future is in humans’ hands’ in this data set is created by more than a half of the overall number of tokens, which can be seen from Table 5.

	Number of tokens (items)	Percentage of the overall number of tokens in the data set (%)
The frame ‘the world’s environmental future does not depend on humans’	9	12.5
The frame ‘the world’s environmental future is in humans’ hands’	43	59.7

Table 5. Distribution of tokens over the climate change frames in the data from ‘The New York Times’

The conclusion suggested by the statistical data presented in Tables 4 and 5 is that with the help of the linguistic tool the journalists writing for the American newspaper send their readers the message that the environmental development depends on humans who cannot stay indifferent to the problem of climate change.

4.2.3. The Sydney Morning Herald

Table 6 demonstrates the distribution of metaphors and keywords related to climate change over the metaphoric sets in the articles from the *Sydney Morning Herald* newspaper.

	Number of tokens (items)	Percentage of the overall number of tokens in the data set (%)
The metaphoric set of religion	53	40.8
The metaphoric set of a journey	29	22.3
The metaphoric set of gambling	3	2.3
The metaphoric set of war	10	7.7
The metaphoric set of the ill planet	1	0.8
Other metaphors	34	26.1

Table 6. Distribution of tokens over the metaphoric sets in the data from 'The Sydney Morning Herald'

Once again, it is the metaphoric set of religion that takes precedence in the data. And though its coalition metaphoric set – the metaphoric set of gambling – is not marked by a large number of tokens, it is present in the data set under consideration as well. Together, these two metaphoric sets form the majority and influence the formation of public opinion by constructing the frame 'the world's environmental future does not depend on humans'. However, the number of tokens included in the metaphoric sets that construct the opposite climate change frame is not much fewer. The distribution of the tokens over the frames is shown in Table 7.

	Number of tokens (items)	Percentage of the overall number of tokens in the data set (%)
The frame ‘the world’s environmental future does not depend on humans’	56	43.1
The frame ‘the world’s environmental future is in humans’ hands’	40	30.8

Table 7. Distribution of tokens over the climate change frames in the data from ‘The Sydney Morning Herald’

It becomes evident from the statistical data presented in Table 7 that the numeric gap between the two climate change frames in the articles from *The Sydney Morning Herald* is smaller than in the previous data sets. Although the frame ‘the world’s future does not depend on humans’ can be expected to exercise a greater influence on the formation of the public attitude to the environmental problem, the Australian journalists can be said to have a more or less equal dialogue without anyone taking a remarkable lead.

4.3. Cross-Cultural Variation

Following the analysis of the metaphoric sets and the climate change frames for each of the three newspapers under consideration, this section contains the general cross-cultural comparison.

As has been revealed by the analysis of each of the three data sets individually, *The New York Times* is the only newspaper in which the frame ‘the world’s environmental future is in humans’ hands’ takes precedence. Moreover, this is the only data set in which the opposite climate change frame is formed by one major metaphoric set only without contributions from any other smaller metaphoric sets. This tendency could be viewed as positive by scientists, as such distribution of metaphors and keywords related to climate change is expected to result in

a more active position and a more responsible attitude of the general public. But the general cross-cultural analysis of the metaphoric sets makes the picture less optimistic.

In the first place, The New York Times can be described as the least ‘metaphoric’ of the three newspapers under analysis. Table 8 presents the distribution of metaphors and keywords over the three data sets.

	Number of tokens (items)	Percentage of the overall number of tokens (%)
The Guardian	150	42.6
The New York Times	72	20.5
The Sydney Morning Herald	130	36.9

Table 8. Distribution of tokens over the three data sets

As can be seen from Table 8, the metaphors and keywords that occur in *The New York Times* constitute just a fifth of the overall number of tokens in the whole data. This results in the general distribution of the tokens over the metaphoric sets presented in Table 9.

	Number of tokens (items)	Percentage of the overall number of tokens (%)
The metaphoric set of religion	139	39.5
The metaphoric set of a journey	86	24.4
The metaphoric set of gambling	9	2.6
The metaphoric set of war	30	8.5
The metaphoric set of the ill planet	5	1.4
Other metaphors	83	23.6

Table 9. Distribution of the overall number of tokens over the metaphoric sets

As the data in Table 9 reveal, the more significant quantitative contribution from the two larger data sets leads to the situation in which the metaphoric set of religion is quite significantly ahead of all the other metaphoric sets in terms of the number of tokens and consequently in terms of the potential influence on the formation of public opinion. It is true that the pattern discovered for *The New York Times* can have an effect on the readers that would be positive from the scientific point of view in case this is the only newspaper that they read. However, in the modern age of computer technologies and internet communication making access to the online editions of newspapers worldwide easily available to anyone people showing interest in the scientific knowledge are highly unlikely to limit themselves to reading one newspaper only. Getting information from various sources one can form a more objective opinion while also being influenced by more varied linguistic tools.

The lead of *The New York Times* in terms of promoting the scientifically correct attitude to the problem of climate change also loses its value a bit if the data are considered qualitatively. The metaphoric set of a journey in *The Guardian* and *The Sydney Morning Herald* is characterised by fast movement (e.g., ‘racing’, ‘to give momentum’, ‘to be in overdrive’), whereas *The New York Times* describes movement in terms of steps. These can be ‘bold steps’, or ‘a major step forward’, or ‘a historic first step’, but these are still steps – a very limited movement covering an extremely short distance that stops after a short while without the guarantee of going farther. This can be accounted for by the fact that the US has been lagging behind the UK and some European countries in the questions of environmental protection, and now that the States are starting to alter their policies in this field they cannot or do not want to immediately plunge into it. Apparently they need some time to ‘warm up’, weigh all the pros and cons, and make decisions altering their stance slowly, step by step. Unfortunately this is not the immediate uncompromising action that scientists and climate change activists are calling for. Thus, though the other two newspapers appear to be more active in promoting inaction, when they do appeal to the readers to act with the help of the linguistic tools the action that they suggest seems to better meet the current environmental demands.

Besides, if the potential effect on public opinion is considered from the point of view of the climate change frames with a glance at all the metaphoric sets that contribute to them (see Table 10) the frame ‘the world’s environmental future does not depend on humans’ is ahead of the frame ‘the world’s environmental future is in humans’ hands’ by less than ten per cent only. To a large extent, this hopeful result is achieved due to the metaphoric set of war.

Although this metaphoric set definitely belongs to one of the smaller ones, its presence in the data is stable and relatively significant.

	Number of tokens (items)	Percentage of the overall number of tokens in the data set³ (%)
The frame ‘the world’s environmental future does not depend on humans’	148	42.1
The frame ‘the world’s environmental future is in humans’ hands’	121	34.3

Table 10. Distribution of the overall number of tokens over the climate change frames

5. Conclusion

The present research has investigated the metaphoric use of language in news articles covering the matters related to climate change and the influence such language can exercise on the formation of public opinion and laymen’s attitudes to the environmental issue.

The high density of metaphoric expressions in the analysed data attests to the findings of some previous studies that described language of science and journalism as highly figurative and identified metaphors as one of the most powerful tools of both communicating scientific knowledge to non-professionals and framing readers’ interpretations. As the results of the present research have shown, climate change is most often spoken of in the printed media in terms of religion and movement. It is of interest that both metaphoric sets create rather than

³ Only those metaphors and keywords that form metaphoric sets constructing the frames were counted. However, there are many tokens in the data that occur once or twice and thus do not provide enough instances for forming a metaphoric set. Such tokens were not included in the table, which is why the percentage of the overall number of tokens does not add up to 100%.

emphasise similarity of the source and target domains. The novelty and unusualness of such metaphors can thus be said to produce an even stronger effect on readers.

These two largest metaphoric sets together with a number of smaller metaphoric sets fall into two groups, and each of these groups constructs a certain frame. The metaphoric sets of religion and gambling build up the frame 'the world's environmental future does not depend on humans', while the metaphoric sets of a journey, war, and the ill planet contribute to the frame 'the world's environmental future is in humans' hands'. Although the first frame is constructed in the analysed data by two metaphoric sets only, they noticeably outnumber the metaphoric sets contributing to the second frame. The most tangible evaluation framed in the readers' perception by means of linguistic tools is thus that humans are not responsible for climate change and even if they can do something about it their actions will not considerably change the planet's environmental future. The same conclusion is attested to by cross-cultural analysis. The frame 'the world's environmental future is in humans' hands' takes precedence only in one of the analysed newspapers, but qualitative comparison alongside statistical analysis of the overall number of tokens in the whole data set deprive this leading position of its significance. At the same time, the data collected for the purposes of the present research is not by far unvaried, and there is obviously a dialogue going on in the printed media regarding the environmental issue on the agenda.

The present thesis made an attempt at contributing a linguistic perspective to the existing research in media coverage of climate change and its effect on the formation of public opinion, and this perspective is of significant importance for the field. Language does not determine thinking, but it can be a powerful tool in forming people's attitudes and evaluations. It is probably the most influential when the world representation communicated through language is not explicit, which seems to be the case with metaphoric expressions. The kind of influence they produce becomes evident as a result of linguistic analysis and may not be obvious otherwise. Not being aware of this influence readers do not have an opportunity to resist the ideology that is communicated to them, and that is why linguistic tools are such a powerful means of forming public opinion.

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