Complementing and Contradictory Meanings in the Discourse of Environment: The Case of *global warming* and *climate change*

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Abstract
The environment has been one of the most urgent matters of public concern in the last few decades; however, there is still a great deal of uncertainty and misunderstanding about what environmental problems are, what effect they will have on the Earth, and how they should be dealt with. One discrepancy necessitating closer study concerns the terms *climate change* and *global warming*: while scientifically speaking they are two distinct concepts, in general speech they often seem interchangeable, which creates a certain confusion around the topic. This contribution examines the frequency and collocates of the terms *climate change* and *global warming* in the *Corpus of Contemporary American English*, by means of the methodologies of corpus linguistics and discourse analysis. The objective is to shed light on the use of the phrases in expert and non-expert American English discourse and the extent of their interchangeability. The results seem to suggest that there is indeed a difference in the way the terms are used in expert and non-expert discourses, and that these differences have consequences, both on the way we cognitively frame the environmental issue, and how we respond to it emotionally.

Keywords: climate change, global warming, corpus linguistics, critical discourse analysis, scientific communication.

1. Introduction

The environment has been one of the most urgent matters of public concern in the last few decades. Orekses' (2004) systematic review of 928 scientific articles has shown that humans are contributing heavily to global warming and climate change, as summarised below:

* Sections 1, 2, and 3.2.1 were written by Laura Pinnavaia; sections 3.1, 3.2, 3.2.2 and 4 by Carlotta Fiammenghi.

> Human activities […] are modifying the concentration of atmospheric constituents […] that absorb or scatter radiant energy. […] [M]ost of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations. (McCarthy 2001: 21)

Despite the scientific literature and research findings, there is still no consensus in the science of climate change (Hulme 2009). There are three broad positions on the matter (Urry 2011): gradualism, scepticism, and catastrophism. Gradualism acknowledges human responsibility for climate change and global warming, and is best represented by the Intergovernmental Panel on Climate Change Reports. Scepticism views climate change as driven by the interests of research scientists and the media (Montford 2010). Catastrophism takes from gradualism a belief in the reality of climate change, and from scepticism the significance of uncertainty and the limits of science (Dayrell & Urry 2015: 260). The fact that humans are not generally perceived as being responsible for global warming and climate change (Farnsworth and Lichter 2012) must surely point – alongside political, economic, and social factors – to an enormous gap in the transfer of information between expert and non-expert discourse. In a seminal article, Lakoff (2004) posits that, if there is no unanimous opinion regarding global warming and climate change, this is because these environmental issues have never been communicated in a truthful and intelligible manner to non-expert audiences, and especially in the United States of America, where the conservative and progressive moral systems are at complete odds. While the progressive moral system sees "inherent value in the natural world" and prioritises legislation to safeguard it, the conservative one expresses outrage "in the face of progressive environmental and global warming legislation" (Lakoff 2004: 74-75). The lack of a single political and social vision, along with an ineffective and untruthful transfer of knowledge, might therefore be one of the reasons why there is still a great deal of uncertainty and misunderstanding about what environmental problems are, what they will do to the Earth, and how they should be dealt with.

The environment has been the focus of a fair number of linguistic analyses (see, for example, Hayer, 1995; Mazur, 1997; Boykoff and Boykoff, 2004; Halliday, 2004; Antilla, 2005; Carvalho, 2007, 2010; Castrechini et al, 2014; Bhatia, 2015; Deignan et al. 2017), which

demonstrates recognition of an urgent need to keep addressing it from a communicative point of view. To keep drawing attention to the "multitude of meanings, some complementing and some contradictory[1]" that emerge from environmental discourse (Bhatia 2015: 36) should help to make experts and non-experts speak the same language and avoid the gross discrepancies found between their discourses. One such discrepancy necessitating close study concerns the terms *climate change* and *global warming*. Scientifically speaking, *climate change* refers to a broad range of global phenomena created predominantly by burning fossil fuels that add heat-trapping gases to the Earth's atmosphere, while *global warming* refers to the increased temperature caused by such harmful actions[2]. In general speech the terms are often interchangeable, however, which illustrates the general lack of knowledge around the topic.

This study aims to investigate the claim by examining the frequency and the collocates of the terms *global warming* and *climate change* in the *Corpus of Contemporary American English* (from now on COCA)[3], by means of the methodologies of corpus linguistics

[1] In Bhatia's view, the disagreements and controversies that characterise discourses on climate change are a consequence of the fact that the very idea of climate change has given rise to a multitude of meanings circulating among a network of competing discourses (among which the economic, corporate, political and professional discourses play a major role); and each of these discourses is shaped by historical, sociocultural, and ideological factors. Hence, in the present article, we use the term 'complementing' in the sense of 'shaped by a variety of intersecting discourses, linguistic, and social influences', and 'contradictory' in the sense of 'taut with disagreement and controversy'.

[2] See "What's in a name? Weather, global warming and climate change", retrieved from https://climate.nasa.gov/resources/global-warming/, and accessed 19th May 2018.

[3] Davies, Mark. (2008-) *The Corpus of Contemporary American English* (COCA): 560 million words, 1990-present. Available online at https://corpus.byu.edu/coca/. The corpus is composed of more than 560 million words from more than 160,000 texts, including 20 million words from each of the years 1990 through 2017. It is a fully balanced corpus, representing the following five genres: spoken, fiction, popular magazines, newspapers, and academic journals. The texts come from a variety of sources: Spoken: (85 million words of transcripts of unscripted conversation from nearly 150 different TV and radio programs); Fiction: (81 million words of short stories and plays, first chapters of books 1990–present, and movie scripts); Popular magazines: (86 million words from almost 100 different magazines); Newspapers: (81 million words from ten newspapers from across the US); Academic Journals: (81 million words from almost a 100 different peer-reviewed journals).

and discourse analysis (see Baker 2006). The objective is to shed light on the use of the phrases in expert and non-expert American English discourse and the extent of their interchangeability.

2. Methodology

The first step in carrying out this research was to decide in which variety of English to analyse the phrases *global warming* and *climate change*. Since both terms came into being in American English first[4], and it is in the United States of America that the differing positions regarding the changing climate are especially strong, it was decided to examine them in a corpus of American English. Even though the term *climate change* was first recorded in 1854 and the term *global warming* in 1952, it was found that it is only since the 1990s that the terms have been regularly used in a range of genres and text-types. This determined the choice of the contemporary corpus COCA, which ranges from 1990 to 2017[5].

The phrases *climate change* and *global warming* were then retrieved from COCA to obtain the quantitative and qualitative results. From a quantitative perspective, the frequency of usage was examined in the entire corpus and in the sub-corpora. This was done by simply typing in the node phrases in the query box and recording the raw frequencies returned from the corpus, from each sub-corpus – spoken, fiction, popular magazines, newspapers, and academic journals, and from each text-type (see footnote 4 for the text-types in each sub-corpus[6]). This information allowed us to understand the distribution of the phrases across the different discourses (expert and non-expert) across nearly thirty years. From a qualitative perspective, the collocates of *climate change* and *global warming* were searched for, taking into consideration a span of -4,

[4] The first attestation of *climate change* dates back to 1854, in the *United States Magazine Sci., Arts, Manuf.* (OED s.v. *climate change*); the first attestation of *global warming* is in 1952 in the *San Antonio (*Texas*) Express* 28 Apr. 2/5. (OED s.v. *global warming*).

[5] When looked up in *the Corpus of Historical American English* that contains more than 400 million words of texts ranging from 1810-2000, examples of use of the two phrases were not found in texts earlier than 1988.

[6] As the number of words comprising each sub-corpus of the COCA is balanced, it was deemed sufficient to count the raw frequencies and not the normalised ones as well.

+4 (see Sinclair 1991). According to the tenet that "you shall know a word by the company it keeps" (Firth 1968 [1957:11]), the context in which the node phrases most frequently appeared provided insights into how these phrases have been used in the discourses regarding the environment. Thanks to this information regarding frequency and usage, it was possible to begin evaluating how complementary and contradictory the meanings of *climate change* and *global warming* really are in American English.

3. Results and discussion

In the following section, the quantitative and qualitative results of the investigation will be explored. In the first sub-section, the frequency and the distribution of *climate change* and *global warming* will be listed and discussed. In the second, the collocates of the same node phrases will be presented and examined.

3.1. Frequency and distribution of the phrases *climate change* and *global warming*

Having entered the node phrases *climate change* and *global warming* in COCA, the first stage of the investigation was to note the raw frequencies in the whole corpus over the 27-year period. Table 1 shows that *climate change* is almost twice as frequent as *global warming*, with 10,203 occurrences as opposed to 6,028.

TABLE 1
Overall temporal frequency for *climate change* and *global warming* in COCA

Temporal range	Number of occurrences of *Climate change*	Number of occurrences of *Global warming*
1990-1994	340	710
1995-1999	822	542
2000-2004	1030	1025
2005-2009	2331	2194
2010-2014	3415	1140
2015-2017	2265	417
Total number of occurrences	**10203**	**6028**

As Table 1 shows, occurrences of *climate change* have been steadily rising since the 1990s. The use of *global warming* has been much less regular, characterised by an undulating trend from 1990 to 2009, and a rapid fall since. This difference in usage over time was claimed by Frank Luntz to have been the result of a conscious choice by the Bush administration (see Lakoff 2010: 71): by opting for the phrase *climate change*, the government hoped to conceal the human cause suggested by *global warming*, and to distance the fear and negativity carried by the phrase. This claim can, however, only be confirmed by a qualitative analysis.

TABLE 2
Sub-corpora frequency for *climate change* and *global warming* in COCA

Sub-corpora	Number of occurrences of *Climate change*	Number of occurrences of *Global warming*
Academic	3962	1095
Magazine	2951	2141
Spoken	1635	1245
Newspaper	1574	1388
Fiction	81	159

The second stage of the quantitative investigation was observation of the distribution of the phrases *climate change* and *global warming* in the sub-corpora, as shown in Table 2. It can be seen from the Table that both terms are moderately frequent in the spoken and newspaper sub-corpora, and are relatively rare in fiction. What truly differentiates them, however, is their rate of occurrence in the academic and magazine genres: while the use of *climate change* prevails in academic discourse, *global warming* prevails in magazines.

We sought an explanation for this by examining the occurrences of the phrases in the text-types composing the two dominating sub-corpora: academic and magazines. In academic discourse, *climate change* occurs frequently in texts concerning science and technology, law and political science. More precisely, it was found that *climate change* repeatedly appears in the compound nouns

Intergovernmental Panel on Climate Change and *United Nations Framework Convention on Climate Change*[7]. The former is the international body that assesses the scientific findings regarding climate change and provides important policymakers, such as the latter, with regular assessments of the situation, impact, and future risks of the problem. The fact that science and politics are deeply entangled when discussing climate change makes sense and is no coincidence. Similarly, it was no surprise to ascertain that *global warming* recurs mostly in the magazines that popularise science and technology, such as *Popular Science, Scientific American, The Verge, Science News*.

While it is obviously not possible to explain the difference in the number of occurrences of *climate change* and *global warming* in the sub-corpora of COCA over the 1990-2017 period, it may nonetheless be possible to begin interpreting these differences in such a way as to underscore our initial claim; i.e., that *climate change* and *global warming* are not used in the same way by experts and non-experts. That *climate change* appears more frequently and at an increasing rate in the whole corpus – and especially in the academic sub-corpus – than does *global warming* may indeed indicate that experts are well-aware of the difference in meaning. Given that *global warming* technically refers to only one of the possible causes of climate change, and not to the problem itself, it is not surprising that it is used less, more irregularly, and above all by experts. Where *global warming* and *climate change* appear with a more balanced frequency, such as in magazines, newspapers, and spoken genres that embody non-expert discourse, this could be interpreted as a sign that the two phrases are used in a less distinct manner and with meanings that overlap. These hypotheses, based on the quantitative results, are however only tentative for the time being. A closer analysis of the use of the phrases in context will help to confirm or refute them.

[7] The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP). IPCC assessments underlie negotiations at the UN Climate Conference – the United Nations Framework Convention on Climate Change (UNFCCC).

3.2. Collocates of the phrases *climate change* and *global warming*

The second stage of the investigation was to extract the collocates of *climate change* and *global warming* from the sub-corpora and examine their use in context. Because these phrases were found to be rare in the fiction sub-corpus, we decided to focus on the academic, newspaper, magazine, and spoken corpora only. We also decided not to select any part of speech in particular so as to obtain a wider and more comprehensive view of their semantic preferences and discourse prosodies[8]. As mentioned above, the collocates were extracted in a span of -4, +4 words and using a combination of frequency and Mutual Information values[9]. We also decided to limit our analysis to the twenty most frequent collocates, excluding for the phrase *climate change* the strong collocates "intergovernmental", "panel", "IPCC", "nations", "framework", and "convention" which, as we saw earlier, form the proper names *Intergovernmental Panel on Climate Change* and *United Nations Framework Convention on Climate Change*.

3.2.1. The syntactic patterns

Table 3 lists the twenty most frequent collocates of *climate change* and *global warming* in each sub-corpus.

[8] According to Stubbs (2001: 65), semantic preference is "the relation, not between individual words, but between a lemma or word-form and a set of semantically related words". According to Baker (2006: 87), "semantic preference is also related to the concept of discourse prosody where patterns in discourse can be found between a word, phrase or lemma and a set of related words that suggest a discourse".

[9] Mutual information (MI) is calculated by examining all the places where two potential collocates occur in a text or corpus. An algorithm then computes what the expected probability of these two words occurring near each other would be, based on their relative frequencies and the overall size of the corpus. It then compares this expected figure to the observed figure, and converts the difference between the two into a number which indicates the strength of the collocation: the higher the number, the stronger the collocation (see Baker, 2006: 101). Although it has been said that MI tends to favour low-frequency scores, it is useful to obtain content word collocates.

TABLE 3
Twenty most frequent collocates of *climate change* and *global warming* in each sub-corpus of COCA

Academic		Newspaper		Magazine		Spoken	
Climate change	*Global warming*	*Climate change*	*Global warming*	*Climate change*	*Global warming*	*Climate change*	*Global warming*
Global	Ozone	Global	Effects	Global	Effect	Global	Climate
Impacts	Effects	Address	Cause	Effects	Cause	Warming	Change
Effects	Depletion	Effects	Scientists	Impacts	Emis-sions	Action	Debate
Science	Climate	Science	Threat	Impact	Pollution	Effects	Fight
Responses	Potential	Energy	Issue	Addressing	Threat	Science	Treaty
Adaptation	Threat	Impact	Caused	Address	Scientist	Threat	Gore
Mitigation	Impacts	Action	Fight	Issues	Depletion	Legislation	Pollution
Biodiver-sity	Concern	Issues	Emissions	Fight	Ozone	Impact	Manmade
Address	Caused	Fight	Climate	Threat	Climate	Energy	Effects
Biotic	Rain	Policy	Contribute	Pollution	Gas	Combat	Hoax
Risks	Pollution	Combat	Science	Caused	Gases	Caused	Science
Anthropo-genic	Cause	Addressing	Evidence	Due	Theory	Immigration	Energy
Scenarios	Carbon	Emissions	Curb	Environmental	Issues	Address	Kyoto
Ozone	Scientific	Scientists	Treaty	Warming	Kyoto	Affecting	Combat
Mitigate	Kyoto	Threat	Pollution	Mitigate	Evidence	Kyoto	Impact
Pollution	Contributor	Evidence	Reduce	Abrupt	Contri-bute	Coping	Emissions
Negotia-tions	Layer	Pollution	Consequences	Weather	Carbon	Impacts	Caused
Adapt	Acid	Policies	Combat	Consequences	Caused	Summit	Fighting
Ecosys-tems	Debate	Concerns	Slow	Scientific	Slow	Hoax	Scientists
Depletion	Contribute	Effect	Effect	Combat	Impacts	Causing	Contribute

The adjective "global" is the most frequent collocate of *climate change* in all the sub-corpora. This is particularly interesting in terms of our research question and the claim that *climate change* and *global warming* are often confused in non-expert discourse. Looking closely at the concordances, it is interesting to see that in academic texts "global" collocates with *climate change*, modifying other nouns such as issues, threats, effects, e.g. (1) "Cities are increasingly taking the lead in tackling global issues like climate change"[10], or qualifying the phrase directly so as to create the complex noun phrase *global climate change*, e.g. (2) "Huppert and Sparks suggest that global climate change is contributing to greater frequency and severity of extreme weather events"[11].

In the non-expert sub-corpora, "global" usually appears in the phrase *global warming*, which is juxtaposed to *climate change* by the coordinator "or", as in example (3): "It's not a concrete, easily measurable phenomenon like climate change or global warming"[12]. This, of course, happens the other way around too: if the most frequent collocate of *global warming* in spoken discourse is "climate", it is because it appears in *climate change* next to *global warming*.

(4) Let me ask you, though, for your assessment of the situation because you write in the book – and I'm paraphrasing here – that the media tends to overhype stories about global warming, climate change and tends to scream out the headlines of the worst-case scenario[13].

Example (4) is typical of the way in which *global warming* and *climate change* are used in non-expert discourse. Apposition, with or without the coordinator "or", gives the impression that the two phrases are one and the same thing.

3.2.2. The shared collocates

The interchangeability of the phrases in non-expert discourse

[10] Academic: Brigham Young University Law Review Provo Vol. 2016, Issue 1, pp. 177-260.
[11] Academic: Emerging Infectious Diseases, March 2014, vol. 20, Issue. 3, pp. 349-355.
[12] Magazine: Futurist Sep/Oct 2012, vol. 46 Issue 5, pp. 8-10.
[13] Spoken: NBC Today 2007 (20071029).

seems to be confirmed by the number of collocates they share: if in the academic genre only four out of the twenty collocates considered are common to both phrases ("effects", "impacts", "ozone", and "pollution"), in the other genres the number of collocates *climate change* and *global warming* have in common are far greater. There are seven shared collocates in the magazine corpus ("caused", "effect", "effects", "impacts", "issues", "pollution", and "threat"), eight in the spoken corpus ("caused", "combat", "effects", "energy", "hoax"; "impact", "Kyoto", and "science") and as many as ten in the newspaper corpus ("combat", effect", "effects", "emissions", "evidence", "fight", "pollution", "science", "scientists", and "threat"). The number of shared collocates clearly points to a similar usage of *global warming* and *climate change* in non-expert genres, which does not appear to apply to expert ones to the same extent.

In academic texts, the functions of the discourse that *climate change* and *global warming* help to create are distinct. *Global warming* is usually referred to as one of the environmental causes of climate change, along with acid rain, for example:

(5) Environmentalists can operate at broad spatial and temporal scales, observing the effects of local activities on macro-level conditions such as global warming and acid rain formation and global despoliation of the resource base[14].

Other causes associated with *global warming* are carbon emission, ozone, and pollution:

(6) This inclusion punishes the Arab countries because of high per capita emission in all of the oil- and gas-producing Arab countries. Moreover, it is not at all agreed that carbon emission has an immediate or obvious impact on human development. This is not to deny the impact of the environment on human life, but carbon emission has more to do with the ozone layer and global warming than with urban environment and water pollution[15].

In contrast*, climate change* is used in statements of the ecological

[14] Academic: Journal of International Affairs: Spring 2005, Vol. 58, Issue 2, pp. 11-33.
[15] Academic: Arab Studies Quarterly: Spring 2004, vol. 26, Issue 2, pp. 5-20.

problems that need addressing, along with energy scarcity, resource depletion, and population growth, as shown here.

(7) Our thesis is that major forces in coming decades will drastically affect both the science of ecology and the role of ecology and natural systems in society. These forces include energy scarcity, climate change, resource depletion, and continued population growth. The most important roles for ecologists in this time of transition are to quantify connections between the biosphere and society and to help define sustainable future paths as natural energy flows again assume a greater importance. We define ecology broadly as the study of the functioning of the biosphere, and ecologists as those who seek to understand this functioning[16].

The differing lexical and grammatical contexts in which *climate change* and *global warming* are set in academic texts confirm their semantic distinctiveness.

In non-expert discourse (newspapers, magazines, and speech), on the other hand, similar lexical and grammatical contexts for *climate change* and *global warming* point to similar discourses for both:

(8) The air board wants cities, counties and regional transportation agencies to organize and carry out their own plans to fight climate change. As an incentive, additional state funds could be made available to implement some local programs[17].
(9) The test, by a Bay Area company called AltaRock Energy, could give the world another source of renewable energy, a valuable weapon in the fight against global warming[18].
(10) EPA' s Energy Star certified clothes dryers offer Americans an opportunity to save energy and do their part to combat climate change. By working with industry, we are bringing innovative technology to market that' s good for the planet[19].
(11) Not so in the developing world, where officials still tout big dams as the best way to tackle future energy needs and combat global warming[20].
(12) America would respond to the growing threat of climate change for the sake of our children and future generations[21].

[16] Academic: Bioscience: April 2009, vol. 59 Issue 4, pp. 321-331.
[17] Newspaper: San Francisco Chronicle 2008 (080622).
[18] Newspaper: San Francisco Chronicle 2009 (090816).
[19] Magazine: USA Today Magazine, March 2015, vol.143, iss.2838, pp.6-9.
[20] Magazine: Newsweek Sep 29, 2008, vol. 152, Issue 13.
[21] Spoken: ABC, 2013 (130623).

(13) He has a bipartisan bill on cap and trade because for five long years he has said global warming is a threat to the planet and America needs to take a leadership role[22].

As examples (8)-(13) show and the information in Table 3 confirms, both *climate change* and *global warming* co-occur with "fight", "combat", and "threat". Not only does the parallelism created by the war metaphor to emphasise the dangers for the Earth and its inhabitants[23] produce a heavily negative semantic prosody for both phrases, it also erroneously likens the two concepts. Consequently, they appear too big and too difficult to tackle, fostering a catastrophic vision and a sense of hopelessness in the readership.

This feeling is magnified when *climate change* is modified by the collocate "abrupt" in magazine articles, as shown in examples (14)-(16):

(14) The Earth cannot withstand the ravages of habitat destruction indefinitely, nor the strain of an exploding human population and abrupt climate change[24].
(15) Extinction rates jumped, however, once humans entered the scene and finished off species made vulnerable by the climate shifts, says earth scientist Chris Turney of the University of New South Wales in Sydney. "Abrupt climate change alone can drive a mass extinction," he says, "but humans can make it a lot worse"[25].
(16) One report by the National Academy of Sciences compared the mechanics of abrupt climate change to a person with his finger on a light switch; the person applies gradual pressure, increasing until – snap – the switch is thrown[26].

In all these examples the use of the adjective has a calamitous effect because "reportage of terms such as 'rapid' or 'abrupt', which individuals may liken to their everyday temporal meaning, may differ considerably from scientific, often geologic timescales" (Lowe et al. 2006: 5).

[22] Spoken: Face the Nation 2008 (080622).
[23] For an elaborate analysis of war metaphors in environmental discourse, see Romaine (1996).
[24] Magazine: USA Today Magazine, Jan. 2015, vol.143, Issue 2836, pp.20-22.
[25] Magazine: Science News, 2015/8/22, vol.188, Issue4, p.9.
[26] Magazine: Popular Science, Jun. 2004, vol.264, Issue 6, p.56.

Almost like science fiction films, magazine articles create a discourse prosody in which climate events – climate change and its manifestations – are perceived either as catastrophic and inevitable, or as catastrophic and implausible. When referring to the 2004 science fiction disaster movie *The Day After Tomorrow*, Daniel P. Schrag[27] commented: "On the one hand, I'm glad that there's a big-budget movie about something as critical as climate change. On the other, I'm concerned that people will see these over-the-top effects and think the whole thing is a joke..."[28]. There is indeed the risk that in the absence of a solid understanding of the environmental problem, collocations such as these lead the public at large into thinking that climate change is inevitable and cannot be stopped or, worse still, that it is one big hoax and should not be of any real concern to anyone. These are, after all, the attitudes that match the two positions described by Urry (2011) as catastrophism and scepticism, whose diffusion may thus be imputed to the confusion, anxiety, and fear conveyed by those who are not experts in the field. Much more balanced is the attitude of experts: in their discourse characterised by the collocates "adaptation" and "mitigation", which explain the strategies to tackle the causes and effects of climate change[29], we recognise the central position defined by Urry (2011) as gradualism, which aims to address the problem in order to solve it.

4. Conclusion

In this article, the frequency and distribution of the phrases *climate change* and *global warming* in COCA were examined, alongside their most frequent collocates and typical contexts of use. The

[27] Daniel Schrag is a paleoclimatologist and professor of earth and planetary science at Harvard University.

[28] Bowles, Scott (May 26, 2004). "'The Day After Tomorrow' heats up a political debate. Storm of opinion rains down on merits of disaster movie". USA Today, available at https://usatoday30.usatoday.com/educate/college/firstyear/articles/20040530.htm, retrieved November 26, 2018.

[29] Mitigation strategies tackle the causes of climate change and entail reducing or stabilising the level of atmospheric concentrations of greenhouse gases through emission reductions and/or carbon sequestration; adaptation strategies tackle the effects of climate change and refer to the process of learning how to cope with the adverse impacts of climate change and/or to take advantage of any positive effect.

aim was to establish how the two expressions have been used in American English, and, more precisely, whether there is a difference in their meanings and use in expert and non-expert discourses. Both quantitative data on the frequency and distribution of the two terms and qualitative data on the collocates and context of use were explored. The results seem to suggest that there is indeed a difference.

To elaborate on the difference, we will return to Lakoff's (2010: 76) view, that "[w]e are suffering from massive hypocognition in the case of the environment": that is, we lack the ideas necessary to understand it, because the words and slogans used to further the environmental cause do not activate the necessary frames through which we should interpret the scientific facts. This lack of framing is testified to by the fact that, while in expert discourse the scientific distinction between climate change and global warming is neatly maintained – shown by the different frequency and distribution data, as well as by their largely non-overlapping collocates, in non-expert discourse the semantic preferences and discourse prosodies often overlap, which does not seem to build upon and help create a clear distinction between the two concepts. As a consequence, when it comes to discussing how to tackle the environment problem, expert and non-expert discourses differ greatly: expert discourse constantly refers to adaptation and mitigation strategies, whereas non-expert discourse makes overwhelming use of the metaphor of war against it. This activates an emotional response of panic or denial instead of creating an informed paradigm of the policies and actions needed to tackle the problem. As Lakoff (2010: 74) insists, there is an impelling need:

> to understand what to do about it. And choosing the right policies means understanding those policies and how they are supposed to work. This is an incredibly complicated matter, and in many cases the right frames for understanding policy have not even been figured out.

Although no evidence was found of a truly erroneous usage of *climate change* and *global warming* from a scientific point of view, or of a conscious blurring of the two concepts as hypothesised by Luntz, it is possible to conclude that the largely overlapping discourses around the two issues in general usage may indeed be a sign of a

lack of environmental framing detrimental for the environmental cause. While further research on other corpora in addition to COCA, and on extended contexts of use, would certainly be worthwhile to consolidate these findings, we may for the time being posit that the meanings of *climate change* and *global warming* that emerge from these intersecting environmental discourses are indeed complementary and contradictory, thus contributing to the creation of the discrepancies and controversies that the environmental issue is still so taut with.

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