

Representations of the future in English-language blogs on climate change

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Abstract

This paper investigates how the notion of *future* is represented in a large corpus of English-language blogs related to climate change, with an overarching interest in exploring to what extent the perspectives of gloom-and-doom versus more positive perspectives of a sustainable society are represented. We address the following questions: 1) How are representations of the future expressed linguistically in public debates related to climate change? 2) What meanings do the representations convey? Our principal contribution is a set of nine meaning categories that characterise different representations of the future: the categories were derived by following a corpus-assisted discourse analysis approach. Within these categories, the large presence of characterisations related to sustainability, as well as frequent positive value-laden characterisations, are noteworthy. Representations reflect various perspectives of a future for humanity, for nature, and for countries as well as for economies. Further, we have found that when climate change is viewed as a threat, it is in relation to nature, humans and security, while it is seen as an opportunity for growth in business and industry. The results provide knowledge on how people conceive the possible impacts of global climate and environmental change within two broad perspectives of a “gloom-and-doom” versus a “bright” future. This may contribute to an improved basis for political decision making on measures in order to avoid dangerous consequences as well as to encourage engagement in the shift towards a low-carbon future.

Keywords: corpus-assisted discourse analysis; future representations; online discourses; blogosphere

1 Introduction

Studies undertaken on climate change communication have recently seen a large and pluridisciplinary development including the fields of media and communication science, political science, sociology, and psychology (e.g., Boykoff 2011; Boykoff and Boykoff 2004; Carvalho 2005, 2007; Carvalho and Burgess 2005; Doulton and Brown 2009; Eide et al. 2010; Giddens 2009; Hulme 2009; Krosnick et al. 2006; Leiserowitz 2006; Nerlich and

Koteyko 2009; Nisbet 2009; Norgaard 2006; Painter 2011; Risbey 2008; Schäfer and Schlichting 2014; Schuldt et al. 2011; Weber 2006). Such investigations are concerned with the contexts and framings in which language is used, and thus the discipline of linguistics has also become important in climate change discourse research (Nerlich et al. 2010). Linguistic studies with perspectives from the micro- to the macro-level (from word to text and context) have been undertaken on various materials such as scientific and policy reports, newspaper articles and social media (Fløttum 2010, 2013; Fløttum and Dahl 2011, 2012, 2014; Fløttum and Gjerstad 2013a, 2013b; Grundmann and Krishnamurthy 2010; Koteyko 2010, 2012; Koteyko et al. 2010). The present paper will develop this linguistic and discursive tradition further with the aim of contributing to a richer understanding of how different perspectives on the future related to climate change are represented. We believe that the results of this study provide important knowledge about both the human and societal dimensions of climate change. Through the representations of the future, we access various conceptions of the impacts of climate change, which in their turn indicate perceived risks and threats and also possible solutions that people are willing to engage in. Further, the studied representations appear to indicate who or what people think of as victims or beneficiaries of on-going environmental and societal changes.

The relationships between the impacts of climate change, proposed political solutions to the challenges and the potential shape of future societies are of great societal importance. However, governance in general and climate policies in particular are all shaped and limited by text and talk, because what is not articulated cannot be acted on. Discourse creates, reproduces, challenges and excludes different representations of the world, thus forming the basis of decisions and actions. From this perspective, the study of climate change communication permits us to uncover some of the fundamental premises of climate and environmental change priorities and policies.

This observation motivates our investigation into what we consider to be a critical part of climate change communication: how the future is conceptualised, i.e. positively or negatively, for what and for whom (cf. Moser and Dilling 2010). Even though the question of the future is raised in numerous public debates, its representations have so far received little attention. Thus, our interest lies around two main research questions: 1) How are representations of the future expressed linguistically in public debates related to climate change? 2) What meanings do the representations convey? In order to answer these questions,

we undertake an exploratory corpus-assisted analysis of blog posts, focusing on patterns of words and semantic-pragmatic meanings.

The blogosphere is now a major site for large-scale and complex discourses about climate change issues, and it has been recognised as an “alternative site of scientific knowledge production” and a “site of knowledge contestation” (Sharman 2014). Since the mid-nineties blogs (or weblogs) have emerged as an important medium where users can create and share personalised content on the Internet. In the late nineties, online tools emerged that made it easy to publish your own blog, and the number of blogs has increased rapidly since 2000 (Rettberg 2008, p.7-12). As a medium, blogs are first and foremost characterised by interactivity, both through links to other blogs and web sites, as well as through readers’ comments. The blog community that is formed through conversation, links and comments is known as the blogosphere (Bruns and Jacobs 2006, p.5). Blogs have become an increasingly important forum for climate change issues, both from a scientific and political standpoint, and for environmentalist campaigners and climate skeptics alike.

Moreover, blogs and social media in general are widely available to the public, even more so than traditional media and particularly broadsheet media. Blogs are also used as a means of dissemination by climate scientists, albeit to a limited extent (see Trench 2012). In sum, blogs offer unique possibilities for exchanging information on climate change, yet we do not at present have sufficient knowledge about the effects they have on public perceptions of climate issues. The study of language use, as in the current paper, should give important insights into framings used in the blogosphere, that should in turn be followed up with further analyses of networks and interactivity expressed through linking and comments.

Some studies of climate change representations have already recognised the need to address online communication in order to complement the extensive literature on representations in print media. However, the focus has tended to be on online communication in general rather than on social media which has only emerged as a research field quite recently (Kirilenko and Stepchenkova 2014; Schäfer 2012, p. 537; Schäfer and Schlichting 2014; Sharman 2014). With regards to the climate blogosphere, pioneering work includes studies of scientists’ blogs (Trench 2012) and the climate sceptical blogosphere (Sharman 2014), from the perspective of science communication and social network analysis. In contrast, this paper studies a large and heterogeneous corpus taken from the English-language climate blogosphere, with a focus on language use, and more specifically the linguistic representation of notions of the future.

The framework of corpus linguistics which allows for the examination of large electronic collections of texts is now increasingly combined with discourse analysis (Baker et al. 2008; Partington 2010). A key feature of corpus-assisted discourse analysis, which we adopt, is attention to context, i.e. both the situational parameters and the broader socio-political environment in which texts are embedded. For the analysis of blogs reported here, we used quantitative corpus linguistic techniques to identify frequent words and patterns of co-occurring words around them, as well as generating concordances to enable qualitative analysis. Specifically we analyse words and patterns relating to the future, selected from a list of the 1500 most frequent words in sentences that mention “climate change” and “global warming”, in order to elucidate their contribution to meaning categories. This enables the study of the interplay between the micro-level of linguistic choice and the social processes of framing climate change issues, e.g. its causes, consequences, and existing as well as envisioned responses (Koteyko 2010).

In section 2 we describe further our material and methods. Then the main part of the paper (section 3) is devoted to the analyses of the selected words and patterns, starting with meaning categories that are proposed on the basis of the *cotext* of the word “future” (i.e. the immediate surrounding text, within a full sentence). Then we develop these meaning categories by considering the cotext of a selection of words semantically related to “future”. For the negative future perspective, we analyse “risk(s)”, “danger(s)” and “threat(s)” and for the positive perspective we analyse “opportunity(ies)”. This section concludes with a table representing a summary of the meaning categories mapped to topics and broader perspectives. In section 4, we discuss the results and propose paths for further studies.

2 Material and method

Our material is taken from the NTAP blog corpus (Salway et al. 2013) which comprises 1.5m English-language blog posts from around 3,000 blogs related to climate change, up to the middle of 2012; the vast majority of posts are from 2005 onwards, i.e. some 49,000 posts in 2005 rising annually to 300,000 in 2011.

This corpus was intended to comprise as many English-language blogs as possible that discuss any of a broad range of scientific, political and social issues pertaining to climate change; for both technical and methodological reasons it was considered unfeasible and undesirable to associate blogs with specific countries. It was created with an automated crawl

process, starting from 20 hand-picked seed blogs that were deemed to reflect different positions and aspects of the climate debate. The crawl proceeded by following hyperlinks from these blogs to others, and so on. Key terms extracted from the seed blogs (e.g. “climate change”, “climate science”, “carbon dioxide”, “emissions trading”, “sea levels”, etc.) were used to decide which further blogs were kept, based on topical relevance. When there were no more links to previously unseen blogs, a web search engine was used to find more seeds for continuing the crawl. It is difficult to make strong claims about the representativeness of such a blog corpus, since to do so would require knowledge of the entire blogosphere. However, we are confident that the wide-reaching nature of the crawl makes the NTAP corpus suitable for our exploratory analyses which are more concerned with characterising meaning categories than quantitative comparisons. For the analysis presented in this paper we selected from this corpus all sentences containing “climate change” (209,107 sentences; 3.6m words) and “global warming” (124,092 sentences; 3.0m words). We believe that these canonical terms are sufficient to retrieve most of the relevant sentences; whilst we miss sentences containing alternative forms, like “AGW”, we feel that this does not affect the quality of our sample. We adopted a mixed methods approach combining quantitative and qualitative research (Dörnyei, 2007) in order to provide a multi-level analysis of complex climate change issues and to anchor results in more robust and context-sensitive interpretations.

First we analysed a list of the 1500 most frequent words in the chosen sentences and selected those words that we postulated would be used particularly frequently in representations of the future: future (frequency=5611), threat (f=4145), threats (f=1200), risk (f=2408), risks (f=1679), danger (f=738), dangers (f=743), opportunity (f=892), opportunities (f=637), should (f=6173), must (f=3852). The selection of these words was justified through our overarching question related to negative and positive conceptions of the future. Their high frequencies meant that a manual analysis of all their cotexts and contexts was not feasible, so we used a semi-automated technique to characterise salient patterns containing these words, cf. lexical bundles (Biber, Conrad and Cortes 2004). To boost the salience of patterning we grouped together words that we assumed would behave in similar syntactic and semantic ways in our material, i.e. {risk(s), danger(s), threat(s)} and {opportunity(ies)}. Patterns were identified with the help of the AntConc tool, specifically its functionality for word clusters and sorted concordances (Anthony 2011). A frequency ordered list of word clusters showed the most common sequences containing the word of interest, e.g. “future of”,

“future for”, etc. Sorted concordances presented text snippets around the word(s) of interest, sorted alphabetically according to the surrounding words: they were useful to elucidate patterns such as ‘a WORD future’, where WORD can stand for any word (see Figure 1).

Figure 1. Part of a sorted concordance which elucidates the pattern ‘a WORD future’.

46	, men, farmers and pastoralists can have a bright future and never again suffer from famine hopefully th
47	industrialist oleg deripaska said he saw a brighter future for nuclear development "because only nuclear c
48	energy that will allow mankind to have a brighter future, and this needs to happen now the only botherso
49	erved climate changes do not portend a calamitous future, global warming alarmism is invading nearly eve
50	ot day proof of global warming and a catastrophic future during their grandparents' early lives (and som
51	hat the world is on the brink of a "catastrophic" future of killer heatwaves, floods and droughts unless
52	ot day proof of global warming and a catastrophic future during times of natural global warming, elevate
53	nly seem to have a strong faith in a catastrophic future has global warming really stopped? has global w
54	e legislation an important step towards a cleaner future for australia but said much more needed to be d
55	e change, guilt, love of nature, wanting a decent future for your children as an illustration of the li
56	climate change, we might fail to create a decent future - we're pretty close to the edge now and there
57	limate change under control and preserve a decent future for our grandchildren unless we leave most of t
58	ostlethwaite as an old man living in a devastated future earth, watching archive film of the planet and
59	at it is how we focus collectively on a different future, and in focusing on it, make it happen "a power
60	te chapter of climate wars described a different future scenario, exploring how climate change would af
61	ng itself to the inevitability of a discontinuous future, with our institutions and life support systems
62	ing, and if they're right, the state has a dismal future if nothing is done to stop it a group of enviro
63	ta and projecting perceived trends into a distant future that is difficult to grasp so much of the publi
64	ta and projecting perceived trends into a distant future that is difficult to grasp so much water is ext
65	d one to think so climate change is not a distant future climate change is not a forever problem climate
66	e " and far from being a threat only in a distant future, "climate change is happening now " and if ther
67	das of governments and it is not just a distant "future" climate change that threatens us and it is no
68	e change and climate model projections of a drier future across the south-east * iucn press release, dec
69	argue that it won't be a crisis in a foreseeable future either neither howard nor rudd have committed
70	and when the main actor in that movie is a former future president, the rules of the game suddenly under
71	baird, wikimedia commons) re-imagining a global future through dialogue and action tippingpointaustral
72	walk out of any presentation that showed a gloomy future; how people in her church would immediately dis
73	lm the age of stupid projects forward to a gloomy future climate change is a real phenomenon climate cha

Working in this way, we identified a total of 42 patterns related to representations of the future in our material. Of these, 18 were selected for in-depth study (see Table 1). Each pattern contains a filler, i.e. WORD, WORD WORD, or WORD WORD WORD. In some patterns there is alternation which is shown with the ‘|’ symbol. For each pattern we give the number of instances of that pattern, the number of different fillers, and the five most frequent fillers with their frequencies: this data was generated with a specially written Perl program.

The 24 patterns that were ignored included all 9 patterns around “must|should”: whilst these seem interesting as cues to representations of what action should be taken, and by whom, we felt that these representations were peripheral to our main focus. Also ignored were 5 patterns around “risk(s)|danger(s)|threat(s)” that appear to serve primarily as statements that climate change is a risk, e.g. “risk(s)|danger(s)|threat(s) of WORD WORD”. The remaining 10 patterns were ignored either because the patterns or their fillers had low frequencies, or because the frequent fillers were grammatical words, which made the pattern

unsuitable for semantic-pragmatic classification, e.g. “WORD the opportunity(ies)” with the frequent fillers “and”, “had” and “of”.

In Table 1, patterns 1-10 highlight a variety of properties that are attributed to ‘future’ and as such appear relevant to our question about what meanings are conveyed by different representations. Thus, we proceeded with a semantic-pragmatic classification of the content words (fillers) contained in the patterns, on the basis of close reading of cotexts (e.g. full sentences) and consideration of contexts. Taking the most frequent fillers as a point of departure, we developed meaning categories by considering semantically related fillers. This led to a provisional set of meaning categories that were each valid for several of the ‘future’ patterns, and that were further corroborated by evidence from patterns around other words, see patterns 11-18 in Table 1. These patterns are based on lexical items that are semantically related to ‘future’. Some express negative aspects, i.e. “risk(s)”, “danger(s)”, “threat(s)”, so we analysed these as likely pessimistic representations of the future (cf. gloom-and-doom perspectives). The in-depth analysis of these patterns led us to identify meaning categories relating to persons and objects which are construed as victims of climate change, or beneficiaries of climate change mitigation and adaptation. Conversely, patterns 15-18 around “opportunity(ies)” led us to identify optimistic representations of the future, as well as the nature of opportunities and the social sectors and actors which were recurrently construed as being the beneficiaries. To summarise, the complete analysis of the selected patterns resulted in the identification of nine meaning categories, which will be described in the following section: 1) sustainability, 2) value-laden positive, 3) value-laden negative, 4) temporal 5) future for people/human beings and future of humanity/planet, 6) future for and of regions/countries, 7) future for nature/environment, 8) future for business/industry/economy, 9) future for security.

Table 1. Patterns selected for in-depth analysis

Pattern	Unique fillers	Total instances	Number of instances for the five most frequent fillers
(1) a an WORD future	97	239	sustainable (34); low-carbon (19); better (15); uncertain (12); greener (7)
(2) a an WORD WORD future	105	204	clean energy (46); low carbon (10); more sustainable (10); safe climate (6); sustainable energy (6)

(3) future for WORD	46	99	our (12); the (10); all (8); us (6); next (4)
(4) future for WORD WORD	64	88	us all (5); all of (4); generations to (4); next generation (4); people and (3)
(5) future for WORD WORD WORD	53	66	generations to come (4); all of us (3); people and the (2); the environment, already (2); humans on a (2)
(6) future of WORD	171	620	the (180); our (46); climate (35); humanity (30); global (13)
(7) future of WORD WORD	333	601	the planet (41); climate change (32); our planet (18); the kyoto (17); the human (11)
(8) future of WORD WORD WORD	412	525	the kyoto protocol (16); the human species (10); the climate change (8); coral reefs rains (5); the planet geothermal (4)
(9) in the WORD future	24	260	near (152); foreseeable (31); distant (30); immediate (9); not-too-distant (8)
(10) in the WORD WORD future	21	61	far distant (23); very near (11); face of (4); context of (3); far distance (2)
(11) risk(s) danger(s) threat(s) facing WORD	30	142	the (43); our (26); humanity (25); mankind (10); humankind (5)
(12) risk(s) danger(s) threat(s) for WORD	87	207	the (42); a (19); our (9); humans (8); climate (6)
(13) risk(s) danger(s) threat(s) to WORD	376	2347	the (561); our (210); human (107); humanity (106); public (58)
(14) risk(s) danger(s) threat(s) to WORD WORD	1007	2224	the planet (66); public health (50); the world (49); human health (38); the future (33)
(15) opportunity(ies) for WORD	236	412	the (49); climate (9); a (8); us (8); new (7)
(16) opportunity(ies) of WORD	21	52	climate (16); a (10); the (4); global (3); our (2)
(17) opportunity(ies) to WORD	325	843	make (39); address (18); put (16); build (16); take (15)
(18) WORD opportunity(ies)	337	2220	the (384); an (342); and (216); of (84); economic (73)

3 Results

The selected patterns listed in Table 1 show how the majority of the ‘future’ and semantically related notions that we found are realised linguistically (research question 1): that is in nominal groups with various epithets and in different prepositional and participle groups and subordinate clauses. Here we describe how we derived nine meaning categories related to frequent representations of the future in our material. The core of our categories was based on the patterns that include the word “future” (patterns 1-10). The categorisation was bolstered, refined and slightly extended through analysis of patterns around “risk(s), danger(s), threat(s)” and “opportunity(ies)” (patterns 11-18). In the main we were strictly guided by the frequent filler words in patterns, i.e. examples in which filler words alone make it clear how a representation fits into a category, though consideration was always given to context.

3.1 Meanings related to sustainability

We observed that the majority of epithets of “future”, as evidenced by the fillers in the patterns ‘a|an WORD future’ and ‘a|an WORD WORD future’, are related to sustainability, through the epithet “sustainable” (f=34) and through epithets that in the climate change debate over the years have become more or less contextually synonymous, such as “low-carbon” (f=19) and “low-emissions” (f=6). These are characteristics which are emphasised in all initiatives aiming at a transition from the fossil-fuel based society, clearly indicated by the IPCC as a main cause of climate change, and they recur in public and media contexts. Here is an example:

(1) any one technology is unlikely to solve the looming climate change and peak oil problems, but working together within the larger system, they could tilt the globe away from catastrophe and towards **a sustainable future**

Interestingly, the ‘a|an WORD WORD future’ pattern also captures combinations with the noun “energy”:

(2) recognizing that energy security, food security, climate change are interlinked, and that eliminating poverty and ensuring sustainable development and **a clean energy future** are among the foremost global objectives, the two leaders agreed to enter into a green partnership to address these global challenges

The most frequent fillers in this pattern for this category are: clean energy (f=46); low carbon (f=10); more sustainable (f=10); safe climate (f=6); sustainable energy (f=6); cleaner energy

(f=4). A similar tendency was seen in instances of the ‘future of WORD’ pattern with some representations also focusing on the future of both traditional and renewable sources of energy: energy (f=11), coal (f=10), nuclear (f=7), renewable (f=6):

(3) as concerns about climate change cast a shadow over the **future of coal**, a new energy economy is emerging in the united states

In this example it is nevertheless important to consider the full sentence with the wording “shadow over the future of coal”.

The category related to sustainability is quite heterogeneous, including (in the pattern ‘future of WORD WORD WORD’) characteristics which reflect discussion of existing and projected policy initiatives, as can be seen from co-occurrence with “the kyoto protocol” (f=16), for example:

(4) at nairobi, governments are debating the future of **the kyoto protocol** and action to prevent the most serious impacts of climate change

Further analyses into this category could provide knowledge on what different actors see as the most efficient instruments and measures to reach a sustainable future.

Some of the epithets classified in this category, such as “sustainable”, may also be considered as value-laden to some extent through context, but for methodological reasons we separated them from the epithets that contain a clearer axiological trait (more or less inherent) belonging to categories 2 and 3 which are described in the following sections.

3.2 Value-laden positive meanings

Public debates on climate change are often value-laden, reflecting people’s interests and world views (Hulme 2013). We explored how this is expressed in the blogs under study. In the ‘a|an WORD future’ pattern there were 115 occurrences of value-laden representations (compared with 80 of the sustainability category) which we divided into positive (f=70) and negative (f=45), in order to investigate the overarching theme of gloom-and-doom/negative perspectives versus more positive perspectives. The most frequent positively value-laden epithets were: better (f=15); greener (f=7); green (f=5); livable (f=5); safer (f=5); strong (f=4); decent (f=3); bright (f=3). Here is an example:

(5) [...]saving water, sources of energy and non-renewable natural resources will ensure a **better future**

While “better”, as the comparative form of “good”, contains an inherent positive trait, the adjective “green” (and the comparative “greener”) does not. However, this colour adjective has developed over the years to convey the meaning of a positive representation of society (in opposition to the fossil-fuel based over-consumption society), a connotation due to the contexts in which it has been and is used:

(6) and if this government is successful in creating a **greener future**, it will set a powerful international example – and help kick-start real action to combat global warming [...]

Positive value-laden meanings were also observed in instances of the ‘WORD opportunity(ies)’ pattern: unique (f=48), good (f=12), golden (f=10), perfect (f=9), best (f=8), excellent (f=6), fantastic (f=4), better (f=4). This is hardly surprising, given the semantic properties of “opportunity”, which would make the use of many value-laden negative adjectives look out of place, e.g. “horrible/tragic/bleak opportunity”. Examples of positively value-laden representations included:

(7) the current economic downturn actually presents us with a **golden opportunity** to unleash canadian ingenuity and develop the green technologies that will renew our economy and confront climate change

(8) nevertheless, public sensitivity about climate change and global warming presents an **excellent opportunity** and platform to address some of the necessary mitigation steps

In sum, these characteristics indicate a positive perspective oriented towards a “bright” future.

3.3 Value-laden negative meanings

Regarding the negative value-laden epithets, the most frequent in the ‘a|an WORD future’ pattern were: uncertain (f=12); bleak (f=6); catastrophic (f=3); apocalyptic (f=3). Two of these – “catastrophic” and “apocalyptic” – are clearly conveying the gloom-and-doom perspective such as in this example:

(9) no doubt the latest report from the un's intergovernmental panel on climate change, warning as it does of **an apocalyptic future** should global warming continue at the predicted rates, will only recruit more foot soldiers for the battle against carbon emissions

We included “uncertain” in this group even though it may also convey an epistemic meaning. However, in the occurrences related to “future”, it clearly has an axiological value, referring to a negative reality:

(10) as many as five million pacific islanders could be facing **an uncertain future** if global warming predictions come true

Though in total much less common than for positive epithets, we did find some negative epithets in the ‘WORD opportunity(ies)’ pattern: missed (f=20), lost (f=12):

(11) the toronto g20 summit is yet another **missed opportunity** in the fight against climate change

3.4 Temporal meanings

Our fourth meaning category was initially based on a few instances observed for the ‘a|an WORD future’ pattern, where “future” is characterised by time-related epithets: distant (f=4); and long-term (f=3):

(12) and far from being a threat only in **a distant future**, climate change is happening now

More evidence for the category was seen in the patterns ‘in the WORD future’ and ‘in the WORD WORD future’, notably with the fillers distant (f=30) and far distant (f=23):

(13) the research looked at how climate change will affect glaciers on which millions depend for their water and the problems faced by generations **in the far distant future**

Interestingly, far more of the epithets in these patterns referred to the short term – near (f=152), foreseeable (f=31), very near (f=11), immediate (f=9), not-too-distant (f=8), coming (f=4):

(14) we have an oil crisis looming **in the foreseeable future**, and then there’s runaway climate change, which is exasperated by our excessive greenhouse gas emissions

3.5 Meanings related to the future for people/human beings and the future of humanity/planet

Reference to humans emerged as an important meaning category, including references to humans alone, together with nature, or to specific groups of humans. References to “the planet” or “the world” were also taken to refer metonymically to humans. The meanings

related to the future of humans are particularly present in the selected ‘risk(s) | danger(s) | threat(s)’ patterns (299 occurrences of various fillers such as “humanity”, “human”, “mankind”), as well as in patterns around “future”.

In order to understand more about the representations of the futures that may be in store for people, it is necessary to take into account for whom and for what ideas of different futures are conceived. Thus, we turned to the patterns that start with “future for ...” and “future of...” and found representations ranging from futures for people in general (in some cases together with “the planet”, or realised as “us all”, “all of us”, “humankind” or “human species”) via “children” to “generations to come”. Though not particularly frequent, the patterns ‘future for WORD’ and ‘future for WORD WORD WORD’ did give some relevant examples:

(15) the current text shows no ambition on the most important issues here in rio – [...] addressing climate change or setting goals for the creation of a just and sustainable **future for people** and the planet

(16) our political leaders should be securing a cleaner energy **future for us** and our children, not caving in to polluters that bring oil spills and climate change

More substantial evidence for this meaning category came from the patterns starting ‘future of WORD WORD’: the planet (f=41); our planet (f=18); the human (f=11); our children (f=8); my generation (f=6); the world (f=5); humanity today (f=5). While the patterns share a reference to humans, they do so in terms that vary in the way they conceptualise humanity. As the following examples show, humans may be conceptualised as a species (“humanity”, “human species”):

(17) "perhaps the biggest threat to confront the **future of humanity today**" is how he describes global warming while in germany today for the g8 summit

(18) "ignoring the future - the psychology of denial" , the importance of facing major issues that will confront the **future of the human** species were emphasized

Moreover, the future of humans may also be expressed in ways that approach metonymy, through expressions such as “our children”, where groups of people come to represent the future for all of humanity, and where the linking of generations (“blights the **future of our children**, grandchildren and those as yet unborn”) attempts to create a concrete relation to the future:

(19) it wrecks god's work of creation and blights not only those affected by climate change today, the poor and the vulnerable, it also blights the **future of our children**, grandchildren and those as yet unborn [...]

Expressions such as “the planet” and “the world” also include humans in their reference, although the reference is expanded to potentially include other species and the physical environment, as seen in the following examples:

(20) ‘a year ago, if a reporter called me, all i got was questions about why i’m trying to deny climate change and am threatening the **future of the planet**,’ said professor ross mckitrick of guelph university near toronto [...]

(21) as the world’s farming lands and savannahs dry up and water becomes scarcer thanks to climate change and mismanagement, the **future of the world** as we know it and its resources are becoming less certain, scarcer and more unpredictable [...]

Examples like these indicate that humans are perceived as being part of a wider environmental context, sharing the destiny of other species in the face of climate change, a conceptualisation that is also reflected in occurrences where “people” and “nature” are set up side by side:

(22) adopt a negotiator aan is a project of the global campaign for climate action, an alliance of more than 350 non-profit organizations working to ensure a safe climate **future for people and nature**, to promote the low-carbon transition of our economies [...]

Although this representation can hardly be conceived as a back-to-nature vision of the future, it does indicate a future scenario where humans must work with nature, rather than against it, to safeguard the future and transition to a low-carbon society.

In addition to broad representations of humanity and humans and nature, we found patterns where the specificities of certain groups of people, perceived as being particularly vulnerable to climate change effects, were represented. An example of this was found in representations emphasising geographical location. In this context, we identified more specific representations where people and a country are linked in the same representation:

(23) a freak tornado and floods last month may be a harbinger of a troubled **future for brazilian farmers**, who worry that climate change could severely disrupt production in one of the world's breadbaskets

Representations of people are also very much present in the ‘risk(s) | danger(s) | threat(s)’ patterns. The selected patterns represent instances where something or someone is construed as being at risk from climate change, and fillers related to humans proved to be important in these contexts. In fact, for several of the patterns, the most frequent fillers referred to humans and humanity – ‘risk(s) | danger(s) | threat(s) for WORD’: humans (f=8); ‘risk(s) | danger(s) |

threat(s) facing WORD’: humanity (f=25), mankind (f=10), humankind (f=5); and, ‘risk(s) | danger(s) | threat(s) to WORD’: human (f=107), humanity (f=106).

Regarding the ‘risk(s) | danger(s) | threat(s)’ patterns, it is likely that association with fillers related to humans represent people as being at risk from the effects of climate change. Indeed, the patterns are generally associated with contexts of pessimistic and even bleak future scenarios, as in the following examples:

(24) global warming is one of the biggest **dangers facing human** existence on earth, and combating this danger is therefore one of the greatest challenges facing mankind

(25) recent greenhouse gas ghg emissions place the earth perilously close to dramatic climate change that could run out of our control, with great **dangers for humans** and other creatures

Looking into the cotext around the selected patterns, we see a clear emphasis on the urgency and gravity of the problem in both example (24) “[...] one of the biggest dangers [...] one of the greatest challenges [...]” and example (25) “[...] perilously close [...] dramatic climate change [...] could run out of control, with great dangers [...]”. In example (25) we also see the connection between humans and “other creatures”, which echoes the representation of humans and nature seen as one when faced with the challenges of climate change, as described above.

3.6 Meanings related to the future for and of regions/countries

In this category we found both unspecified (such as “future for regions”) and specified geographical names in representations using patterns starting ‘future for...’ and ‘future of...’:

(26) low-lying pacific nations are flooding because of climate change and it is a window to the **future for australia** unless action is taken

(27) climate change projections have painted a gloomy, waterless **future for south africa**

In a few instances the patterns ‘opportunity(ies) for WORD’ and ‘opportunity(ies) to WORD’ referred to the future for “countries” in general within the pattern, and for specific countries in its immediate cotext:

(28) ed miliband, energy and climate change secretary, said: "ccs presents a massive industrial growth **opportunity for the uk**

(29) the uk has a great **opportunity to bring** together the global financial reforms now under way with the fundamental changes arising from the climate change agreement

3.7 Meanings related to the future for nature/environment

As seen in 3.5, the corpus contains patterns representing humans and the environment together, as sharing the same destiny in the face of climate change. However, we also found instances where nature and the environment are represented independently of humans. This phenomenon was observed in several of the patterns around “future”.

Within this category we found the ‘future for WORD WORD’ pattern being used to make reference to the future for the environment in general, and for specific aspects of it:

(30) “the japanese plan presents a bleak **future for the environment**, already suffering from the serious impacts of global warming including rising sea-levels, rising sea temperatures, and increased extreme weather patterns to name just a few,” said andrew kerr of wwf’s international climate change campaign

Specific aspects of nature that may be addressed can be species or ecosystems, as in the following example:

(31) climate change and the **future for broadleaved forests** in the uk

A little more frequently, the pattern ‘future of WORD WORD’ was used in a similar way – including the fillers ‘coral reefs’ (f=10), ‘himalayan glaciers’ (f=4), ‘the oceans’ (f=3).

Another, and more frequent, way in which the future for nature and the environment was represented used the patterns starting with ‘risk(s) | danger(s) | threat(s)...’ with fillers representing ecosystems and individual species, as in the following example:

(32) climate change is the biggest **threat facing the** polar bear

In this respect, the pattern ‘risk(s) | danger(s) | threat(s) to WORD WORD’ was particularly important, with fillers including ‘polar bears’ (f=23), ‘the environment’ f= (21), and ‘coral reefs’ (f=19). These patterns are interesting because “polar bears” and “coral reefs” are species that are recurrent throughout the corpus and seem to carry high symbolic value, whatever the views on climate change that are being expressed.

Interestingly, very few occurrences of this category were found in the pattern ‘opportunity(ies) of WORD’, suggesting that nature may be less likely to be included in the most optimistic scenarios, at least to the extent that these are lexicalised in the ‘opportunity(ies)’ patterns. Conversely, this finding may also imply that nature and the environment are more likely to be represented as vulnerable and at risk of climate change effects.

3.8 Meanings related to the future for business/industry/economy

Some of the ‘future for...’ patterns with fillers were used to represent the business/industry domain, such as “future for tourism” and “future for emissions-intensive, trade-exposed industries”.

The most common pattern in this category was ‘WORD opportunity(ies)’: economic (f=73), business (f=71), investment (f=25), development (f=11), employment (f=10), market (f=9), growth (f=6), commercial (f=4):

(33) "boosting renewable energy and cutting energy waste will create exciting new **business opportunities** and new green-collar jobs — as well as helping tackle climate change

We also saw representations with the pattern ‘opportunity(ies) for WORD’: innovation (f=6), business (f=5), economic (f=5), investment (f=5), growth (f=4), companies (f=4).

(34) but he also said the challenge of global climate change offered **opportunities for innovation** and investment

(35) climate change is likely to present both serious challenges to the global economy over the next few decades and significant **opportunities for business** innovation

Looking at the cotext for the pattern ‘opportunity(ies) to WORD’ we identified further examples of this category, e.g. around the verbs “boost” (f=4), “grow” (f=4) and “make” combined with “money” (f=4):

(36) "moving to a low carbon economy is crucial to tackling climate change and ensuring our security, but it is also a transition that can provide **opportunities to boost** jobs, skills and investment", the governor added

(37) local communities and a new breed of business entrepreneurs increasingly see delivering a low-carbon economy as an **opportunity to make** money, [...]

We observed that the majority of representations for the future for business, industry and the economy were cast in a positive way, but there were some negative representations using patterns starting with ‘risk(s) | danger(s) | threat(s) to...’ – businesses (f=3), the economy (f=9), their business (f=9):

(38) would firms make such substantial investments without quantitative risk analysis of climate change and its opportunities and **risks to their business**

Example (38) suggests that there may be an interplay between “risk” and “opportunity”; we will return to this question in section 4.

3.9 Meanings related to the future for security

Representations in our final category construe climate change in terms of national security and as a threat to peace and stability. These constructions were only observed in the ‘risk(s) | danger(s) | threat(s)’ patterns, suggesting they are related to a negative or pessimistic view of the future. Despite being restricted to the negative scenarios, we believe that the occurrences are frequent enough to warrant a separate category.

Representations of meanings related to security were particularly frequent in association with the pattern ‘risk(s) | danger(s) | threat(s) to WORD WORD’: national security (f=31), international peace (f=24), our security (f=12), global security (f=12), as illustrated by the following examples:

(39) global warming is a bigger threat to the world than hitler but economic crisis pales beside what the military reported to bush was the greatest **risk to national security**: rapid climate change

(40) yesterday, july 20th, the un security council debate resulted in the issue of a presidential statement that climate change is a real **threat to international peace** and security

Moreover, meanings related to the future for security were largely linked to policy makers and political stakeholders, such as the military or the United Nations Security Council, suggesting that this scenario is primarily found in institutionalised political discourse, or at least that it has originated in such contexts. Interestingly, this category and the category described in 3.8 (meanings related to the future for business/industry/economy) seem to be the only meaning categories that are linked to specialised discourses.

3.10 Summary

In sections 3.1-3.9 we have explained how we identified nine different meaning categories based on the evidence of frequent linguistic realisations and analysis of cotexts: 1) sustainability, 2) value-laden positive, 3) value-laden negative, 4) temporal, 5) future for people/human beings and future of humanity/planet, 6) future for and of regions/countries, 7) future for nature/environment, 8) future for business/industry/economy, and 9) future for security. Table 2 (below) suggests how (parts of) these categories may relate to each other and how they may be mapped onto larger topics, and further onto the overarching perspectives or frames of a “gloom-and-doom” versus a “bright” future. For example, categories 1 and 2, exemplified by "a sustainable future" and "a better future", map to the topic "how the future should be" and further to the positive frame of a "bright" future. The picture of the patterned diversity of perspectives on the future that the table conveys will be discussed in the following section.

Table 2. Summary of perspectives on the future in the English language blogosphere

Meaning categories	Topics	Future frames
A sustainable future (category 1) A better future (category 2)	How the future should be	Positive: A “bright” future
A future of opportunities – for business (category 8)	How to shape the future	
A catastrophic future (category 3)	How the future should not be	Negative: A “gloom-and- doom” future
A future characterised by risk, danger and threat (categories 5,6, 7) A future for security (9) A near future (category 4)	How the future is conceived for humans, countries, environment	

4 Discussion

We have identified nine meaning categories characterising representations of the future in the climate change blogosphere which we have found to fit into the broader negative and positive frames of a “gloom-and-doom” and a “bright” future, respectively. The representations reflect various perspectives of a future for humanity, for nature, for countries as well as for economies. Within these categories, the large presence of characterisations related to sustainability, as well as a dominance of positive value-laden characterisations, are noteworthy. Through previous studies, mostly using psychological methods, we know that value-laden framings may have an impact on how people react to climate change perspectives. Positive frames tend to encourage stronger intentions to act (see Morton et al., 2011, p.104, and their references): “research on message framing suggests that subtle variations in the way information is presented can guide how people respond”.

With regard to our overarching question, we have noted the dominance of value-laden characteristics within the patterns around “future”; positive epithets being more frequent than negative ones. These findings provide knowledge on how people are conceiving possible impacts of global climate and environmental change, which may contribute to an improved basis for political decision making on the measures to undertake in order to avoid dangerous consequences as well as to encourage engagement in the shift towards a low-carbon future. Such conceptions of future further invite the question whether there is in fact more emphasis

on hope (manifested through positive epithets) than on fear/risk/threat/danger in people's future representations. They also reflect the fact that conceptions of the future related to climate change are coloured by people's interests, values and world visions. The combination of categories 1, 4 and 5, for example, reflects the worldview of 'conservational stewardship', which is one of the Christian religious discourse coalitions identified by Wardekker et al. (2009). The conservational stewardship discourse emphasises the need to preserve creation, of which mankind is a part, and is focused on the temporally close or already occurring impacts of climate change on nature (category 4). Such discourse outlines visions for a sustainable future (category 1) and is often negative (category 5, also 6 and 7) as climate change is seen as leading to a destruction of habitat and decline in biodiversity (Wardekker et al., 2009: 515).

We further consider the relatively large presence of characteristics related to a "sustainable" future as important, suggesting that many of the future representations stem from politics and NGO discourses. Another finding, which could be an objection to the previous suggestion that there seems to be an emphasis on the emotion of hope, indicates that there is a clear focus on the short term perspective: the frequent phrase "near future" is predominantly used to describe concerns and undesirable consequences, and may be part of the gloom-and-doom perspective. This may indicate efforts to communicate urgency as immediate risks are perceived as more alarming than distant ones. Such framing may be particularly prominent in the efforts to communicate adaptation needs that are typically more short term (Ekstrom and Moser, 2013).

The analyses of the 'risk(s) | danger(s) | threat(s)' patterns focussed on who or what is construed as potential victims of climate change. The analyses of these patterns indicated that climate change is primarily viewed as a threat to nature, humans and security, while business and industry are perceived as being less at risk. As for the 'opportunity(ies)' patterns, which could indicate potential beneficiaries of climate change, there was a strong predominance of words pertaining to business, industry and economic growth. Conversely, category 8 – future for business/industry/economy – was less present in the 'risk(s) | danger(s) | threat(s)' results, implying that when business, industry and economic growth is associated with climate change, it is primarily viewed through a positive lens in the blogosphere. In this context it seems relevant to refer to the findings of recent research undertaken by Nyberg and Wright (2013), who show how external pressure from NGOs and other civil society actors lead corporations to introduce more environmentally friendly business practices. However,

internal pressure also leads them towards a prioritisation of financial rather than environmental sustainability. In interviews, “actors acknowledged that the promotion of the environment could only occur where such practices promoted the good of the market.” (Nyberg and Wright 2013: 418). According to the authors, such lop-sided compromises reinforce the hegemony of the market, as the perceived balance between the environmental and the financial contrasts with the one-sided advocacy of deep ecology, while maintaining the prevalence of financial priorities (ibid. 420). A similar focus on the financially advantageous nature of climate change measures in the ‘opportunity(_ies)’ pattern in the present paper indicates that the value of monetary gain imposes itself on the issue of climate change in the blogosphere as well. In other words, money is used as a rhetorical lever when blog authors consider the value of environmental protection too weak to constitute a solid basis for argumentation on its own.

However, it should be noted that further to our main analyses, we observed many instances of the pattern ‘risk(s) | danger(s) | threat(s) and opportunity(ies)’, e.g. “risks and opportunities”. Many of these occurrences are in fact connected to the business and industry domain, suggesting that there is a perceived link between future potential risk and opportunity in the corpus. The ‘opportunity(ies)’ patterns may represent an interesting deviation in climate change discourse, as the risk-based or loss framing of climate change that highlights destructive scenarios has so far been dominant in climate change communication efforts (Morton et al., 2011). The focus on negative consequences is based on the premise that an apocalyptic vision of the future will scare people into action. Yet, as the long standing research into health communication and recent studies of climate change discourses have shown, such loss framing is rarely effective (O’Neill and Nicholson-Cole, 2009). In this regard, Morton et al. (2011), maintain that “uncertain optimism about the future is more motivating than uncertain pessimism” (p. 108).

The findings presented in this paper are exploratory. That said, we are confident that we have identified the major categories of future representations in the English-language blogosphere, due to the systematic analysis of a large and heterogeneous corpus. There is though an obvious need for more analyses in order to obtain a more solid answer to the overarching question of the frequency of positive versus negative perspectives on the future, even though we have observed a higher frequency of positive-laden epithets than of negative-laden ones in the patterns examined. Combined with information about social actors, such analysis can begin establishing a picture of how the construction of climate change-related

future/s takes place in online spaces, which include scientific, counter-scientific and non-scientific contributions (Eden 1996; Brossard and Scheufele, 2013). Equally important is the possibility to deepen the analysis into how the public are considering measures and instruments enabling a transition to the future they foresee. Moreover, our data on lexical patterns around ‘future’ indicate regularities in the conceptual representations of the potential consequences of climate change that are likely indicative of different and even opposing worldviews. It would be interesting to examine these different worldviews further through larger contexts, following the approach undertaken by Thévenot, Moody and Lafaye (2000), who relate modes of argumentation on environmental issues to “orders of worth”, evaluative frameworks or worldviews used in the justification of, or in opposition to, policy choices that are potentially harmful to the environment (see also Gjesdal and Fløttum 2014).

For all findings presented in this paper, and for further work on the interpretations of future representations, we need to know the sources (for example possible associations with groups who support or deny the existence of climate change) and when the representations are produced (who says what and when). In this context, an interesting development could also be to study the networking between both different blogs and blog posts, in line with Sharman’s mapping of the climate sceptical blogosphere (Sharman 2014).

A still further issue to study could be how various blog post authors refer to each other and what patterns and variations of reported speech are used, in order to develop a view of how various constellations of actors and networks are created. In order to obtain more robust results, it would be necessary to undertake an in-depth study of a larger context of the relevant occurrences. This could also reveal more specific genre characteristics/traits attributed to blogs, such as interactional markers.

There are some similarities between our corpus of blog texts and the formal language of UK national newspapers (see Koteyko 2012) which could be explored in future studies. This includes the prominence of lexis characteristic of policy documents (such as, for example, “low carbon”, “clean energy”, “the Kyoto protocol”), as well as the emphasis on the sustainability category of future representations, and on economics/business in the ‘opportunity(ies)’ patterns. Our material also invites analysis of broader contexts in which future representations are present (local, national, international) and the extent to which they are related to emotions such as hope and fear. Finally, we would like to go further into a diachronic perspective: since the corpus contains a significant amount of material for the period 2005-2012, there may be interesting changes over time.

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