Low carbon diet: Reducing the complexities of climate change to human scale

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Abstract

For many years, cognitive linguists, such as Gilles Fauconnier and Mark Turner, have studied meaning construction through language based on intricate mental mapping operations. Their research suggests that conceptual metaphor and conceptual blending permit human beings to reduce very complex issues to human scale. Climate change is such a complex issue. We ask: How is it linguistically reduced to human scale and, in the process, made amenable to thinking and acting? To address these questions, we have analysed the emergence of lexical compounds around a recent key word in debates about climate change in the English speaking world, namely 'carbon'. One such compound and metaphor|blend is 'low carbon diet'. In this article we study how the use of the compound 'low carbon diet' in an advertising campaign, a book, and by a catering company in the United States permitted US newspapers to reduce climate change to human scale. We have combined and compared metaphor and blending analysis with media and discourse analysis to shed light on the linguistic framing of a real-world problem, that is, we engaged in applied blending analysis.

Keywords
lexical compounds, climate change, conceptual metaphor, conceptual blending, media analysis

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* Correspondence address: brigitte.nerlich@nottingham.ac.uk. We gratefully acknowledge funding from the Economic and Social Research Council, for the project *'Carbon compounds': Lexical creativity and discourse formations in the context of climate change*, grant number: RES-062-23-1256. We would like to thank Professor Augusto Soares da Silva for inviting Brigitte Nerlich to the conference *Communication, Cognition and Media* in Braga, Portugal in September 2009. A short article based on the conference presentation, which does not explore *low carbon diet* as a blend, is included in the conference proceedings; see Nerlich and Koteyko, 2010a.

Language and Cognition 3–1 (2011), 45–82
DOI 10.1515/LANGCOG.2011.003
1866–9808/11/0003–0045

1. Introduction: climate change, complexity and lexical compounds

As a complex and multifaceted problem, climate change has come to have many meanings. Numerous rhetorical battles have been fought over the science behind global warming, and more recently, over the political, economic and ethical implications it has or may have. Many voices, embedded in different personal and institutional contexts, can be discerned in these debates which are often framed (in English) via the use of what we have metaphorically called 'carbon compounds', that is, lexical combinations of at least two roots, one of which is *carbon*, that generate a new meaning or concept, such as *carbon footprint* or *carbon criminal*. In a project funded by the Economic and Social Research Council (UK), we have studied the emergence, spread and use of these compounds in context and aim to provide a tool for tracking and mapping these linguistic activities, assessing their potential social, political and cultural impact and listening to the voices of people active in various relevant fields of interest (Nerlich and Koteyko 2010b).

Climate change is a hugely complex scientific problem (see Hulme 2008), being tackled by climate scientists, modellers, economists, geographers and a multitude of other scientists. In this article we keep this scientific complexity in the background. What we want to examine is how this complexity is brought down to earth, is made communicable and cognitively manageable through language. This process involves mapping various aspects of climate change onto more familiar aspects of human life that people understand and can cope with, that is, boiling them down to 'human scale' and connecting them up with established cultural knowledge—and what could be more human scale than eating, food and dieting. The focus of this article is therefore on the use and spread of the phrase *low carbon diet* (referring to the reduction of carbon emissions), particularly in the United States media.

As the climatologist and commentator Mike Hulme has recently pointed out:

> Far from simply being a change in physical climates—a change in the sequences of weather experienced in given places—climate change has become an idea that now travels well beyond its origins in the natural sciences. It meets new cultures on its travels and encounters the worlds of politics, economics, popular culture, commerce and religion—often through the interposing role of the media (Hulme 2009).

As we shall see, the 'idea' of global climate change meets with local concerns via the use of particular carbon compounds, such as *low carbon diet* and is enacted on the level of the media, but also on the level of community groups, church groups and families trying to do their best to reduce carbon emissions which contribute to anthropogenic climate change.

And: "Just as the physical climate-system responds both to slow-changing natural rhythms and also to more rapid human-induced perturbations, so will

those human artefacts we use to make sense of climate change—language, metaphors, policies, beliefs" (Hulme 2008). In this context it is intriguing to find out how language (in this case English) has responded to changes in physical and political climate and what this means for how we, as citizens of the planet, act on the risks and threats posed by climate change.

One of the main ways in which humans make sense of the world is by metaphor, by mapping conceptual knowledge and experience that has been culturally acquired onto problems or phenomena that still need to be assimilated, accommodated, understood and acted upon. When we call somebody a *carbon criminal* we map, for example, our knowledge of criminals onto activities related to climate change mitigation, in this instance blaming somebody for emitting too much carbon dioxide. A somewhat more complicated form of mapping, conceptual blending or double-scope blending, has been studied for many years by Mark Turner and Gilles Fauconnier. They analysed the way humans cope with novel lexical compounds, such as *land yacht* where the mental spaces of 'sailing' and 'driving' are integrated to produce a mental space where the driver of a luxury car is framed in terms of a yacht owner (see Fauconnier and Turner 1998: 271; Coulson 2001; Evans and Green 2006: 415). Similar processes seem to be at work when creating and understanding novel lexical 'carbon compounds', such as *low carbon diet*, for example. Importantly, in a recent article, Turner (2009) has pointed out that

> once we have blended conceptual arrays to make a new blend that has human-scale properties, that blend is now, for us, at human scale, and can be used as an anchor for future networks. These new human-scale blends become second nature for us, and blending is recursive: packed, human-scale blends become inputs to new networks. What was once beyond human scale is now packed to human scale. What counts as human scale is repeatedly extended over the course of a lifetime. [. . .] once the network is acquired, it seems natural, inevitable, effortless.

We argue that so-called carbon compounds (or indeed blends) in English began life as relatively standard or conventional compounds, such as *carbon emission*, which integrated, blended and compressed knowledge of the emission of carbon dioxide into the atmosphere. As a result of these backstage cognition processes, *dioxide* is now usually elided in what one terms the frontstage linguistic representation (see Evans 2009 for a discussion of the distinction between frontstage versus backstage cognition). Soon, more creative, metaphorical and even more compact compounds began to be invented on the back of this relatively simple compounding template (for more detail on the role of analogical reasoning in the theory of compound semantics, see Ryder 1994), such as *carbon footprint*, which became immensely popular after 2004 (see Nerlich and Koteyko 2009a) (again, it should be stressed that this seemingly

simple compound packs a lot of information, referring to the effect of human activities on the climate in terms of the total amount of greenhouse gases produced and measured in units of carbon dioxide). This again seems to have triggered a host of more and more creative uses, at least in the UK (see Koteyko et al. 2010; Koteyko 2010).

A recent example of a creative carbon compound was *carbon raider*, which was used by a journalist to refer to the carbon measurement activities carried out by Rod Robinson, principal research scientist for *carbon metrology*, National Physical Laboratory (NPL), Teddington, London, as reported in *The Times* on October 8, 2009 (http://www.timesonline.co.uk/tol/news/science/article6863322.ece). This rather obscure compound not only reduces the complex scientific activities of this scientist to human scale, but it also frames them in terms of cultural commonplaces, as in this instance by reference to the video game (film etc.) *Tomb Raider*. To even vaguely understand the compound, one has to know that in the video game the player must guide Lara Croft, the 'tomb raider', through a series of tombs and other locations. On the way, she must kill dangerous creatures or other humans, while collecting objects and solving puzzles to gain access to an ultimate prize. In the case of the *carbon raider*, Rod Robinson faces the "challenge" of putting "carbon trading on a firm footing" and his "solution" is to "build spotter trucks that will be able to use a laser to measure [. . .] emissions. It will even be able to spot leaks in a carbon-capture field, where CO2 is being pumped underground into, for example, an old oil well." Obviously, one also has to understand what carbon trading involves and what a carbon-capture field is . . . We are caught in a veritable carbon net spun by language and culture in terms of carbon compounds.

Turner has recently analysed an example of what he calls 'double-scope blending', which relates to our topic, namely the complexity of climate change and its reduction to human scale via language. It deals with a slide-show that is used in conjunction with Al Gore's 2006 film *An Inconvenient Truth* to spread the message about the dangers of global warming:

> Packing the Known Universe to Human Scale
> Toward the end of the film version of his slide-show presentation on global warming, Al Gore posts a picture of Earth, the pale blue dot photographed from 4 billion miles out in space. He explains,
>
> Everything that has ever happened in all of human history has happened on that dot. All the triumphs and tragedies, all the wars and all the famines, all the major advances. That is what is at stake—our ability to live on planet Earth, to have a future as a civilization.
>
> Concluding, Gore states,
>
> > Future generations may well have occasion to ask themselves, "What were our parents thinking? Why didn't they wake up when they had the chance?" We have to hear that question from them now.

> Gore prompts for vast conceptual integration networks that are at vast network scale: a distance of four billion miles, and all of human history plus the future. But, through double-scope blending, we can pack this network to human scale. (Turner 2009).

Turner then goes on to explain how these networks work in great detail. As we shall see, some of the activities involved in engaging in a *low carbon diet* were partly inspired by the film and are partly carried out in conjunction with the film, and, most importantly, also involved the use of vast conceptual integration networks.

2. *Low carbon diet*: a case study

The recent proliferation and use of lexical compounds, such as *carbon footprint*, *low carbon diet*, *carbon detox*, *carbon market*, *carbon fascist* or *carbon guilt*, to talk about issues related to climate change seems to be a unique trait of the English language. In addition to providing positive or negative framing of the highly politicised debate on climate change mitigation, these compounds offer speakers of English a way to compress and integrate complex information prompted for by two or more simple words and to think and talk about issues related to climate change and global warming in relatively straightforward ways. Having once 'discovered' that compounds, such as *carbon footprint* can convey complex information very efficiently, users of the English language, especially those writing for the media or those writing blogs, quickly used this lexical and conceptual tool and applied it to a host of other related issues, thereby constructing an entire 'carbon lexicon' that is at the same time very simple and easy to use but also complex, coherent and flexible enough to allow for creativity to flourish, as attested by the invention of *carbon raider*.

This creativity becomes most apparent in the media, traditional print media as well as novel digital media. The media have to attract and engage readers and in order to do so, they tend to anchor the issues they discuss in human interest stories and focus on issues that have cultural resonance (see e.g. Poletta 2008). In the case of climate change this may involve looking at the plight of people living in the Maldives whose country is threatened by drowning. Another way to introduce human interest is to reduce complex issues to human scale, for example by framing climate change mitigation activities, such as the reduction of carbon emissions, in terms of dieting, which has huge cultural resonance, especially in the United States. We (that is, people living in affluent Western-type societies) all know what a low calorie diet is. Some of us trying to lose weight might even have considered a new diet fad, the low carbohydrate diet, the GI diet or the Atkins diet.

But what is a *low carbon diet*? The answer to this question is rather complex, as the phrase semantically evolved over time, from exhorting people to

cut carbon emissions in a quite metaphorical way, to turning round on its literal self and exhorting people to eat fewer calories in order to cut carbon emissions. That is, in the initial development of the compound, its use did not explicitly relate to consuming fewer calories, but rather, to individual activities, centring on the household, that could play a part in the reduction of carbon emissions. Although the word was used in both the UK and US media coverage of climate change mitigation activities, the semantic development sketched out above was most pronounced in the US because of a variety of activities launched by three major players under the label *low carbon diet*. A preliminary unlimited search of the Lexis Nexis Professional database ('all English language news') had shown that the phrase *low carbon diet* was not used in US newspapers before 2006 (unlike in the UK, where it was used once in 2000 and then again quite frequently in 2006 and 2007, it seems, due to being influenced by what was going on in the US).

To study the media coverage around *low carbon diet* in the United States, we therefore searched the 'all US newspapers' section of Lexis Nexis using the search term *low carbon diet* between January 1, 2006 and January 1, 2009. We found 106 articles, some of which were duplicates, that is, published in various outlets under different headlines and of varying length. No leading newspaper made the phrase its own; instead, once promoted in a book with that title, it trickled down into many local newspapers, especially as part of 'Community Briefings' announcing *low carbon diet* workshops, support groups, classes, church meetings, book clubs and so on, especially in California. To give only one example of how *low carbon diet* was embedded in local activities, such as book groups, church meetings or even yoga:

> 'Lose 5,000 Pounds in 30 Days'—3:30 p.m. Sunday. Practice yoga and learn how to reduce emissions following the '***Low carbon diet,***' hosted by Happy Living with Justice. Carver Branch Library, 1161 Angelina St. 292-8093, happylivingwithjustice@gmail.com. (*Austin American-Statesman*, Texas, 21/06/07).

Although the phrase *low carbon diet* seems to have been around since the turn of the millennium, it only came to prominence in the US in 2006. This happened at a time when climate change scepticism, fostered under the Bush administration, began to wane under pressure from scientific evidence and increasing scientific consensus, as well as awareness raising campaigns, especially by Al Gore (see Al Gore 2006, for example). Since then things have changed and, since November 2009 climate scepticism has increased, especially after the scandal that came to be known as 'climategate' (see Nerlich 2010).

The issues discussed around the phrase *low carbon diet* were driven, it seems, by the work of three individuals/companies: Fred Krupp, president of Environmental Defense (see www.fightglobalwarming.com), who led a hard-

hitting television advertising campaign in 2006, covered extensively in the first part of our corpus, as part of which he promoted the adoption of a *low carbon diet*; David Gershon, author of what one newspaper called the *low carbon diet* "bible" (*The Boston Globe* 20/03/2008), *Low carbon diet, A 30 Day Program to Lose 5,000 Pounds*, published at the end of 2006 as part of the activities of the Empowerment Institute (http://www.empowermentinstitute.net/lcd/); and Bon Appétit Management Co., an onsite restaurant company that provides café and catering services to corporations, colleges and universities, and specialty venues with over 400 locations in 29 states and headquarters in Palo Alto, California. Bon Appétit began campaigning for a low carbon (food) diet in 2005, became more prominent in newspapers in 2006 and published an online low carbon calculator in 2007 (http://www.eatlowcarbon.org/) (see also http://www.bamco.com/; http://www.circleofresponsibility.com/). They mobilised many school and university catering services and cafeterias to adopt a *low carbon diet* and made a *low carbon diet* day part of 'Earth Day' in 2007 and 2008. It should also be stressed that in 2006 California passed various carbon reduction and clean energy bills and in the January 2007 Governor Schwarzenegger established a Low-Carbon Fuel Standard (LCFS) by Executive Order, the world's first greenhouse gas (GHG) standard for transportation fuels (see http://www.energy.ca.gov/low_carbon_fuel_standard/). In this context the compound *low carbon diet* had a direct real-world anchor, so to speak, especially in California.

The ad campaign and the booklet produced a first wave of reporting around the phrase *low carbon diet*, and Bon Appétit's activities produced a second wave. Whereas the first wave focused on the reduction of carbon emissions and was linked conceptually to the reduction of carbon footprints (lightening or lowering your carbon footprint), the second wave was predicated more deeply on mappings between eating, weight loss and climate change mitigation, making reference in particular to activities promoted by Weight Watchers, for example. These two major uses of *low carbon diet* were based on two distinct, but interconnected, integration networks which will be discussed in detail in Section 5 of this article, where the first one laid the conceptual groundwork for the creation and use of the second.

A short history of Gershon's campaign can be found in an article published on 28/12/2006 in the *Christian Monitor*, and illustrates the changes in US public attitudes to climate change between 2000 and 2006 which paved the way for the success of the *low carbon diet* compound:

> In 2000, Mr. Gershon created a step-by-step program, à la Weight Watchers, designed to reduce a person's carbon footprint. The idea received positive reviews after a pilot program was run in Portland, Ore., but it eventually fell by the wayside for lack of interest. "The world wasn't ready," says Gershon, who heads the Empowerment

Institute in Woodstock, N.Y., a consulting organization that specializes in changing group behavior.

But since then, Americans witnessed the catastrophic fury of hurricane Katrina, which, if nothing else, showed them what a major city looks like underwater. A substantial body of evidence supporting the idea of human-induced global warming accumulated. And, of course, Mr. Gore made his movie.

Attitudes toward global warming had shifted considerably. [. . .]

Gershon put his nose to the grindstone, and a slim workbook titled "***Low carbon diet*****:** A 30 Day Program to Lose 5,000 Pounds" was the result. Replete with checklists and illustrations, the user-friendly guide is a serious attempt at changing American energy-consumption behavior. (*Christian Science Monitor* 28/12/2006).

Conversely:

Gore's group, The Climate Project, which recently began training 1,000 volunteers to give Gore's now-famous slide show [see Turner's analysis above, Section 1], is handing out 600 copies of the book at the end of the session. (*Christian Science Monitor* 28/12/2006).

What united these campaigns was the effort to turn complex climate science into hands-on climate activism, to make climate change amenable to individual behaviour change. As Matthew Nisbet has pointed out

Historically, as a way to muster public resolve, most climate change communication efforts have focused on increasing the amount of quality news coverage about climate science. Many scientists and advocates expected this increased news attention to promote wider public understanding of the problem's technical nature, leading the public to view it with the urgency that they do. Communication is therefore defined as a process of transmission—that is, the scientific facts are assumed to speak for themselves with their relevance and policy significance interpreted by all audiences in similar ways. (Nisbet 2009).

Communicating climate change via the compound *low carbon diet* seems to have reversed this historical trend to some extent. The scientific facts were left with the scientists and the 'quality news', whereas local action was promoted locally and in digestible chunks in local news outlets, reducing climate complexity to human scale. Similar to the compound *carbon rationing* (see Nerlich and Koteyko 2009b), the compound *low carbon diet* became part of a social movement and those promoting the compound were very much aware of this, especially Gershon, an expert in behaviour change. Newspapers also quoted sociologists and other experts in social movements on this matter, as in the following example.

This growing interest in measurably reducing one's footprint is a textbook case of how new ideas spread throughout society, say sociologists, and how new movements are born. [. . .] Then, movements spread and grow along pre-existing social networks, says Bogdan Vasi, an assistant professor at Columbia University's School of International and Public Affairs. (*Christian Science Monitor* 28/12/2006).

We shall now study in more detail how the idea of a *low carbon diet* was framed in US newspapers. In particular, we will examine how the global and the complex were mapped onto local and human scale activities. To do so we shall employ a mixture of approaches.

3. Method and conceptual framework

In this article we bring together metaphor analysis, blending analysis and media and discourse analysis in order to study how a real-world problem, climate change and especially climate change mitigation, was made amenable to individual human action through language. Like Moder (2008) and Cameron and Deignan (2003), we want to study metaphorical expressions and blends in naturally occurring discourse, in this case climate mitigation discourse, where the discourse prompts for certain interpretations of metaphors, compounds and blends.

The metaphor/blend we examine is a creative lexical compound, *low carbon diet*, that plays on the phrase *low calorie diet* by substituting calorie with carbon. Although some cognitive linguists have studied compounds (see Warren 1978; Sweetser 1999; Langacker 1991), only recently more specific attention has been paid to creative compounds in general and compounds as blends in particular (see Benczes 2006; Coulson 2001).

The interpretation of English compounds is a complex task for the reader or listener, as Jean Aitchison pointed out with regard to compounds around pill, such as *headache pill*, *fertility pill*, *morning-after pill* and so on (see Aitchison 2003). This makes some people believe that noun-noun compounds such as these are not amenable to analysis. Reka Benczes disputes this and tries to find underlying cognitive patterns which guide understanding, based in particular on metaphor, metonymy and blending. In this article we want to add to a deeper, discourse-based, understanding of compounds as blends, that is, get away from studying compounds in isolation like butterflies on a pin. Rather we want to study the butterfly in its discursive habitat, its ecological niche (see Nerlich and Koteyko 2009a). As Jean Aitchison (2003: 41) said: "Word meanings cannot be pinned down, as if they were dead insects. Instead, they flutter around elusively like live butterflies."

In our analysis, especially in Section 5, we argue that *low carbon diet* is a *formal blend*. That is, the compound *low carbon diet* provides a linguistic

means of accessing a complex body of integrated knowledge, which becomes re-activated when we use or hear the form *low carbon diet*. Conceptual blending (Coulson 2001; Fauconnier and Turner 2002; see also Evans and Green 2006) is a mechanism that is central to the way we think. It provides a means of integrating and compressing often very complex knowledge, typically in the process of ongoing meaning construction. And blending is central to higher-order cognitive processes such as inferencing, categorisation, reason and choice. However, and as is the case here, conceptual blends, once they have been constructed, can become stabilised in long-term memory and they can, as in our case, be used to create conceptual variants over time.

Blending involves the setting up of an integration network: a network of knowledge that comes to be integrated during the meaning construction process. The integration network consists of *mental spaces* (Fauconnier 1994, 1997)—bundles of conceptual knowledge set up when we speak and think—that are excerpted from larger, more stable, frames of knowledge. These mental spaces are integrated in various ways producing a temporary association of knowledge, residing in the network and especially the blended mental space (i.e. the *blend*). Often, the integration network can become stable, which through use and reuse, becomes a stored knowledge structure in long-term memory. Moreover, and as is the case with the blends we describe below, linguistic forms, such as *low*, *carbon* and *diet*, provide one type of knowledge that can also become embedded in the integration network, coming to reside, along with other elements, in the blend itself. Indeed, it is precisely because linguistic forms are involved that this type of blending is referred to as a formal blend: while it involves aspects of non-linguistic knowledge, part of the representation conventionally associated with the blend constitutes linguistic forms, as in the case of *low carbon diet*. The importance of a formal blend, then, is that it provides a linguistic anchor which serves to activate the blend (and the rest of the integration network which remains connected to the blend), providing a ready means of reactivating a pre-assembled knowledge structure. In this case, the linguistic form evolved to have two interconnected conceptual and behavioural functions.

Blends arise through the process of constructing an integration network. The purpose of an integration network is to facilitate integration, and more precisely, the blending together of elements from a number of distinct mental spaces (known as *inputs*), see Figure 1. Double scope blending is a particularly complex type of integration which involves, not only the projection of knowledge elements from the inputs, but, in addition, organising frames from two (or more) inputs which may potentially clash in the blend. Knowledge from the inputs is projected to the blend selectively, in service of the particular inference or meaning under construction. This leads to a process

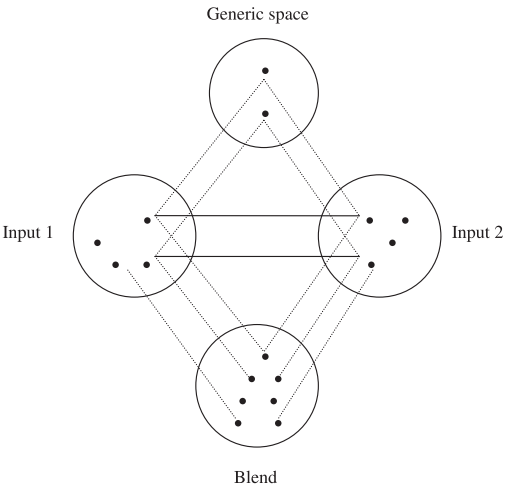

Figure 1. *A basic integration network (adapted from Fauconnier and Turner 2002: 46).*

whereby inputs contribute some, but not all, of their content. This *selective projection* of knowledge to the blended space is then integrated in a process known as *composition*. Once this has happened, the composed elements may require further knowledge being recruited to complete the blend that is emerging. This further process of knowledge recruitment is known as *pattern completion*. Finally, the blended space provides a means of allowing us to do inferential work. We can use the blend for ongoing reasoning, and can even extend and further elaborate the blend. This is known as *elaborating* or *running the blend*.

The driver for the process of composition in blending involves matching *counterparts* in the input spaces. Establishing counterparts (which will be integrated in the blend) involves establishing a connection between the counterparts as they reside in the different inputs. The connection established arises due to a set of common and re-occurring relations such as time, space, cause-effect, role-value and so on. These relations are known as *vital relations*. The mechanism that facilitates the matching process is an abstraction process, involving abstracting away points of difference, leaving similarities. This process of comparing elements across the input spaces results in the establishment of a *generic space*: a mental space that incorporates what is common to the inputs in order to facilitate the matching process. Once counterparts have been matched, they undergo a process known as *compression*. This reduces the complexity (and scale) of counterparts, during the blending process. This reduction in complexity is the hallmark of blending. In the case of the highly

complex real-world issue—what the individual can do in order to reduce global warming—the daunting complexity of reducing a global rise in temperature can be boiled down to a series of simple steps associated with everyday tasks centred around the individual and the individual household. This is achieved through blending, as we shall see below.

Using the analytical tools just described, we were able to extract two overarching blends based on two distinct, but connected, integration networks from our media analysis. According to one network, going on a *low carbon diet* relates to individual activity (especially in and around the household) in order to reduce carbon emissions; according to the other network, going on a *low carbon diet* relates to individual selection, preparation and disposal of food (especially in and around the household) in order to reduce carbon emissions.

In the following section we demonstrate in more detail how these two integration networks emerged and were used in the media and in how far some of the frames that were used to convey a climate change mitigating message clashed and might in fact undermine that message. This is based on a close reading of the texts during which major frames and metaphors were extracted following the standard procedures for the identification of metaphors (Pragglejaz Group 2007) in conjunction with what one might call standard media and discourse analysis (see Fairclough and Wodak 1997; Charteris-Black 2005; Alexander 2008). This enabled us to discuss the use of the metaphors in their societal context.

4. Analysis (part 1): discourses and metaphors

4.1. *Mapping the global onto the local*

Using the *low carbon diet* frame, campaigners and communicators initiated a way of communicating about climate change that was neither too highbrow nor too alarmist. They penetrated local newspapers and they tried to reduce the complexity of climate change science to human scale by giving advice on 'small', 'little', 'simple' and 'easy' steps that individual and local communities could take. As some newspaper headlines declared, "Locals join global warming battle" (*Birmingham News*, Alabama, 3/04/2007), "Families respond locally to global challenge" (*The Record*, Bergen County, NJ, 13/07/2007) and "Changing the Climate One Person at a Time; Berkeley's Ecology Center thinks globally, acts locally to reduce greenhouse gas emissions." (*East Bay Express*, California, 10/12/2008). The stress was on making the global local and the complex individual, bringing the global into your kitchen, as Krupp pointed out in an article accompanying his ad campaign:

It's no wonder the scale of climate change can feel overwhelming. An ice sheet the size of Rhode Island melts into the sea off Antarctica. A blizzard of disease carrying insects reaches high-elevation cities for the first time. Whole islands in the Pacific are ready to disappear beneath the waves. But, while there is much to be done, an important part of the solution to global warming may be right in your kitchen. (*The Augusta Chronicle* [Georgia] 28/03/2006; also in *Pittsburgh Tribune Review* 2/04/2006).

And as an activist expressed it:

"People see global warming as such a large problem, and they go, 'Well, what can I do about it?' " Miller said. "But if you're on the diet, you can say, 'Here are all these little things we can do.' " (*The Associated Press State and Local Wire* 16/09/2007; see also *Milwaukee Journal Sentinel* [Wisconsin] 16/09/07; *The Capital Times* [Madison, Wisconsin] 17/09/07).

The issue of clean and secure energy, in particular, stimulated some debate framed in terms of a *low carbon diet*, a diet that makes a political body, rather than a human body, healthier and stronger.

"The freedom to control our own economy and our own government is only possible if we generate clean energy efficiently using the gifts unique to our own country," said Troy Helming, organizer of The American Energy Summit, and CEO of Krystal Planet. "Without sacrificing or cutting back on our comforts, we can go on a ***low carbon diet***, and march into the 21st century a healthier and stronger America." (*Market Wire* 6/06/2006).

In general, the earlier 2006 coverage linked *low carbon diet* to 'reducing', 'lowering', 'shrinking' or 'lightening' one's carbon footprint. Only later, in 2007, did food as such creep into the discussion, first more indirectly when an energy company (Green Mountain energy) teamed up with a food company (Whole Foods) to promote carbon reduction under the heading of a *low carbon diet* (2/04/2007, PR Newswire US). The link between carbon emissions reduction and food was more forcefully made in April 6, 2007, when United Press International published an article about Bon Appétit under the headline: "Eat To Live: Now, the low-carbon diet". Following Bon Appétit's announcements, journalists began to write about 'low carbon meals' (low carbon breakfast, low carbon lunch etc.) and 'low carbon menus', for example, shifting the meaning of *low carbon diet* (and associated phrases like 'low-carbon household') distinctly into the more literal dietary direction. Advice on how to achieve a *low carbon diet* also changed, as the following 'to do' lists taken from our corpus show:

Table 1. *Advice about going on a* low carbon diet

Low carbon diet (Krupp)	*Low carbon diet* (Gershon)	*Low carbon diet* (Bon Appétit)
Use compact florescent bulbs instead of standard bulbs. Choose a car with better fuel economy. Run full loads in the washing machine and dishwasher. Improve the insulation in our homes, including the attic.	Limit showers to five minutes or less. Reduce dishwasher use by one load a week. Replace and clean air conditioning filters. Raise thermostat by four degrees. Tune automobile engine and maintain correct tire pressure.	Reducing the use of beef by 25 percent—Livestock production is responsible for 18 percent of greenhouse gas emissions.[1] Sourcing all meat and poultry from North America—80 percent of the energy used by the food system comes not from growing food, but from transporting and processing it. Sourcing nearly all fruits and vegetables from North America, using seasonal local produce as a first preference [. . .]. Serving only domestic bottled water and reducing waste from plastic bottles [. . .]. Reducing food waste—Goal of 25 percent reduction in three years or less. Auditing the energy efficiency of kitchen equipment—In home or commercial kitchens energy losses of up to 30 percent can be easily corrected for very low cost.

4.2. *Mapping the global onto the human*

In the previous section, we have seen how the compound *low carbon diet* was used as part of various carbon reduction campaigns and became integrated in local and social movements, thereby reducing the complexity of climate change to local scale. In the following, we shall focus on how the compound managed to bring climate change down to human/body scale through various mapping processes that, in the end, produced two slightly different meanings of the compound, based on two different integration networks which will be discussed in Section 5:

1. *Low carbon diet*: Meaning (1): reduction of carbon dioxide emissions.
Based on: losing 'pounds' of carbon dioxide through various activities
– reducing the carbon footprint of individuals and communities,

1. This number is now being disputed (March 2010).

2. *Low carbon diet*: Meaning (2): reduction of carbon dioxide emissions.
Based on: loosing 'pounds' of carbon dioxide through eating 'low carbon' food, producing such food, selling such food, etc.
– reducing the carbon footprint of food and thereby reducing the overall carbon footprint of individuals and communities.

Meaning 1 of *low carbon diet* seems to be partly based on the following metaphorical mappings between dieting and carbon emissions reduction, as found in the newspaper corpus, but, as we shall see in Section 5, things are actually more complicated. Here, dieting is the so-called 'source domain' for the metaphorical mapping, whereas 'carbon emissions reductions' is the so-called 'target domain' (see Lakoff and Johnson 1980):

Table 2. *Mappings for* low carbon diet *1*

Source: Dieting	Mappings	Target: Reduction in carbon emissions
Counting calories	→	Counting units of carbon dioxide emission
Joining a support group (like Weightwatchers)	→	Joining a local action (environmental) group
Following a weight-loss programme	→	Making a plan to reduce carbon emissions
Shedding pounds (in body weight); weight loss	→	Decreasing carbon emissions
Making pledges, etc.	→	Making pledges to reduce emissions

The secondary meaning of *low carbon diet* is based partly on metaphorical mappings but also on more direct literal mapping, as it combines the benefits of healthy eating and carbon reduction. Again, when dissecting these mappings in terms of blending, things turn out to be more complicated, as we shall see.

This use of 'diet' is in fact an example of what Feyaerts, Brône and Coulson have called *double grounding* or deliberate ambiguity, used especially by

Table 3. *Mappings for* low carbon diet *2.*

Source: Dieting	Mappings	Target: Reduction in carbon emissions (produced by the production, preparation and consumption of food)
Counting calories	→	Calculating the carbon emissions embedded in food production, food distribution, etc.
Eating food low in calories	→	Eating food that is 'low in carbon'
Points system based on calories	→	Points system based on carbon
Following an eating plan based on low calories	→	Following an eating plan based on 'low carbon' food
Healthy person	→	Healthy planet

headline writers and advertisers to attract attention, keep the attention of readers or viewers and combine cognitive processing with an experience of pleasure and satisfaction (see Nerlich and Clarke 2001; Feyaerts and Brône 2005; Brône and Feyaerts 2005; Brône and Coulson 2010). Such double grounding became the basis of puns and word plays, such as the 'Atkinson diet' adopted by the inhabitants of Fort Atkinson in Wisconsin (see *Milwaukee Journal Sentinel*, Wisconsin, 16/09/2007). Or: "Sure, everyone knows of the low-carb Atkins diet, but how about the '*low carbon* I-GO diet?"—which makes reference to an I-Go Car Sharing scheme (see *University Wire* [Northwestern], 3/10/2007). The mixing of literal and metaphorical mappings continued in debates about the benefits of a *low carbon diet* in the secondary sense. Here, one can observe a reversal of meaning or mapping. A *low carbon diet* is no longer used to make people see climate change in a different way and reduce carbon emissions, but, conversely, using a *low carbon diet* to reduce carbon emissions is used to see food in a different way. Whereas the compound was used before to make abstract bodies (households, nations) healthier, it is now used to make physical bodies healthier.

A bonus of this program is how healthful the *low carbon diet* turns out to be. It closely matches many recommendations doctors and nutritionists are already making: fewer processed foods and more whole vegetables and grains. When chosen from local sources, it's a healthful diet for the planet and the person. (*Contra Costa Times* 22/04/2008).

The *Low carbon diet* could prompt a significant shift in the lens through which Americans view food choices. (*PR Newswire* 22/04/2008).

The multiple meanings of *low carbon diet* also seem to have multiple benefits:

Successful diets have always had ancillary benefits, and there is no exception here: If you factor energy savings, gas prices, better health by walking/riding and other low-carbon activities, a multiplicity of benefits arise. (*Contra Costa Times* 13/04/07).

4.3. *Mapping the local onto the national or state level*

The advantages of a *low carbon diet* are mostly discussed at community level, as we have seen. However, more federal and state initiatives, especially regarding fuel and energy consumption, are also framed by using this phrase, that is to say, California as a whole is said to engage in a *low carbon diet* and the United States as a whole are also invited to join. Overall, the 'body' that is supposed to go on a diet can be either the individual person, the household, the community, the region or the nation, or indeed the planet (in fact, on the front cover of Gershon's low carbon 'bible' we see a home shaped like a planet). The features of such 'diets' then differ in terms of reducing energy one household

or individual at a time to larger schemes that reduce (at least theoretically) carbon emission, such as building nuclear power stations or introducing biofuels.

Putting the rest of the nation on California's **low-carbon diet** could mean replacing the entire U.S. vehicle fleet with hydrogen cars and trucks, capturing carbon dioxide from all fossil-fuel power plants and building 300 nuclear power stations, Ziagos said. (*Contra Costa Times*, California, 19/09/2006; see also *Inside Bay Area*, California, 19/09/2006).

"Ethanol and other biofuels can be a staple in our ***low carbon diet***," Monahan said. "But producers need to make biofuels smartly and sustainably if they're going to live up to the hype." (*States News Service*, California, 12/09/2007).

In this context, Barack Obama, as then presidential candidate who, unlike Bush, paid attention to the climate change issue and climate change science, was mentioned once in our corpus with relation to the Climate Security Act debated in 2008 (*San Jose Mercury News* 19/05/2008):

For those trying to put the nation on a **low-carbon diet**, the timing is right. In odd-couple-style TV spots, Nancy Pelosi joins Newt Gingrich, and Pat Robertson sides with Al Sharpton, in urging Congress to take action. Time magazine has struck up the drumbeat, trading its red border for green with a recent cover story called "How to Win the War on Global Warming." (ibid.).

Nationally or at the state level, Al Gore's film *An Inconvenient Truth*, shown across the United States and beyond in 2006, allowed for various mappings and word plays that linked a *low carbon diet* to the film. One headline for a story of a woman who adapted the film for children and also distributed Gershon's *low carbon diet* booklet to families proclaimed, for example: "She found a more convenient way to teach kids the science of global warming" (*Seattle Post Intelligencer* 9/03/2007). Another article which was syndicated quite widely was entitled: "An Inconvenient Tooth: Food Is Major Contributor to Climate Change; New *low carbon diet* Aims to Take Bite Out of Global Warming" (*Ascribe Newswire* 16/04/2007; see also *PR Newswire US* 17/04/2007). A year later, this was echoed by a book published in 2008, *Cool Cuisine: Taking the Bite out of Global Warming* (www.globalwarmingdiet.org/book).

5. Analysis (part 2): blends and their implications for understanding climate change mitigation

Our close reading and analysis of the corpus has shown that, overall, there seem to be two distinct blends that are used in the US media coverage: an 'earlier'

and 'later' one. These structure the contextual use of *low carbon diet*. The later *low carbon diet* blend, we argue below, derived from the earlier blend, of which it is an extension. In particular, the earlier and later *low carbon diet* blends appear to involve different inputs relating to 'individual household activity': a household energy husbandry input in the first integration network and a food energy husbandry input in the second. The earlier input features a *grounding input* (see Fauconnier's 1997 notion of a ground(ing) space), which relates to 'carbon emission reductions', from which the lexical form *low carbon* is projected. The grounding input relates to the real-world problem that the blend is an attempt to address. In addition, the earlier blend recruits cause-effect structure from a Dieting frame which is added to the blend via pattern completion. The form *diet* is also projected from the Dieting frame, we argue. As we show below, the later blend exploits aspects of the earlier blend in order to extend the remit of the blend from household energy consumption in general, to the energy associated with the production, preparation and disposal of food.

5.1. *Integration network 1*

In this integration network, *low carbon diet* relates to individual activity (especially in and around the household) in order to reduce carbon emissions (see advice given in the first two columns of Table 1 above). It consists of a generic space, an input space relating to carbon emissions management, and multiple input spaces relating to household energy husbandry (corresponding to presumably many millions of households, both in the USA and across the world). It also consists of a third input space, a Dieting frame—which provides the blended space (i.e. the *blend*) with its primary organisational structure—and a blend. The blend is the venue, following composition and pattern completion (discussed in detail below) for the network's emergent structure: the reduction of energy consumption in and around a single household directly causes a reduction in carbon emissions. Of course, reducing household energy consumption does not directly reduce carbon emissions: it is the production of electricity, in power-stations, for instance, by burning fossil fuels, that produces carbon dioxide. A household, in contrast, consumes, rather than produces electricity. Nevertheless, the blend provides a mechanism for integrating highly diffuse cause-effect chains relating to carbon dioxide production and hence carbon emissions, and household energy management, in order to reduce the complexity involved in climate change and, specifically, the ways of tackling this problem to human scale.

In the blend, mitigating the effects of climate change is boiled down to saving energy made in an individual household. The rhetorical point of the integration network is to convince the reader of the need to adjust individual behaviour: energy savings in the home directly cause a reduction in carbon

emissions! This is achieved by virtue of i) the blend providing a venue for inferential work, and ii) the blend remaining connected to the inputs that gave rise to it, and in particular the individual household inputs. Through a process termed *backward projection* (Fauconnier and Turner 2002), the individual reader infers that change(s) in household energy consumption (the cause) will directly result in a reduction in carbon emissions, thereby helping to save the planet (the effect).

As we shall argue below, the integration of the carbon emissions management input with the household energy husbandry inputs on the one hand, and their further integration with the Dieting frame on the other, gives rise to a double grounding effect (Feyaerts and Brône 2005 and Brône and Coulson 2010), as briefly introduced earlier. The consequence is that the compound, *low carbon diet*, specifically relates to a means of mitigating carbon emissions (*low carbon*), centred around an individual-level reduction in consumption (*diet*) that specifically relates to reducing energy consumption in the individual household (the focus input).

We discuss below each of these points. For ease of exposition, we shall refer to Figure 2, which presents the integration network in schematic fashion, and without the generic space—we elaborate on this integration network during the course of the discussion.

Each of the input spaces in Figure 2 is structured by a frame. The frame that structures input 1 relates to Carbon Emissions Management. A frame has various properties that provide it with its structure (see Evans 2009 for discussion). These can be thought of as nodes within the frame—often referred to as *attributes* or *roles*—and relations that hold between the roles—sometimes referred to as *structural invariants*. In addition, the roles in a frame typically have specific *values*. While roles and structural invariants provide the frame with its structure, the values constitute the frame's elements.

The sorts of properties that structure the Carbon Emissions Management frame include, at the very least, i) a role for Harmful entity; ii) role(s) for Agent(s) involved in the production and reduction of the Harmful entity; iii) a role for the Party/ies affected by the Harmful entity; iv) roles for the types of Actions required to reduce (and mitigate) the (effects of the) Harmful entity; v) a role for the Aim in reducing the Harmful entity; and vi) an overall Goal. In addition, the frame also includes, at the very least, a salient Cause-effect structural relation that holds between the role(s) for Actions and the role for Goal. That is, the Actions (cause) lead to Goal (effect).

In addition, each of these roles, and the Cause-effect structural relation, are filled by specific sorts of values. The Harmful entity role is filled by the value carbon dioxide; the Agent(s) role(s) is filled by factories, power-stations, car producers, politicians, industrialists, car users, consumers, factory workers, scientists, and so on; the Affected party/ies role is filled by the value ecosystem(s);

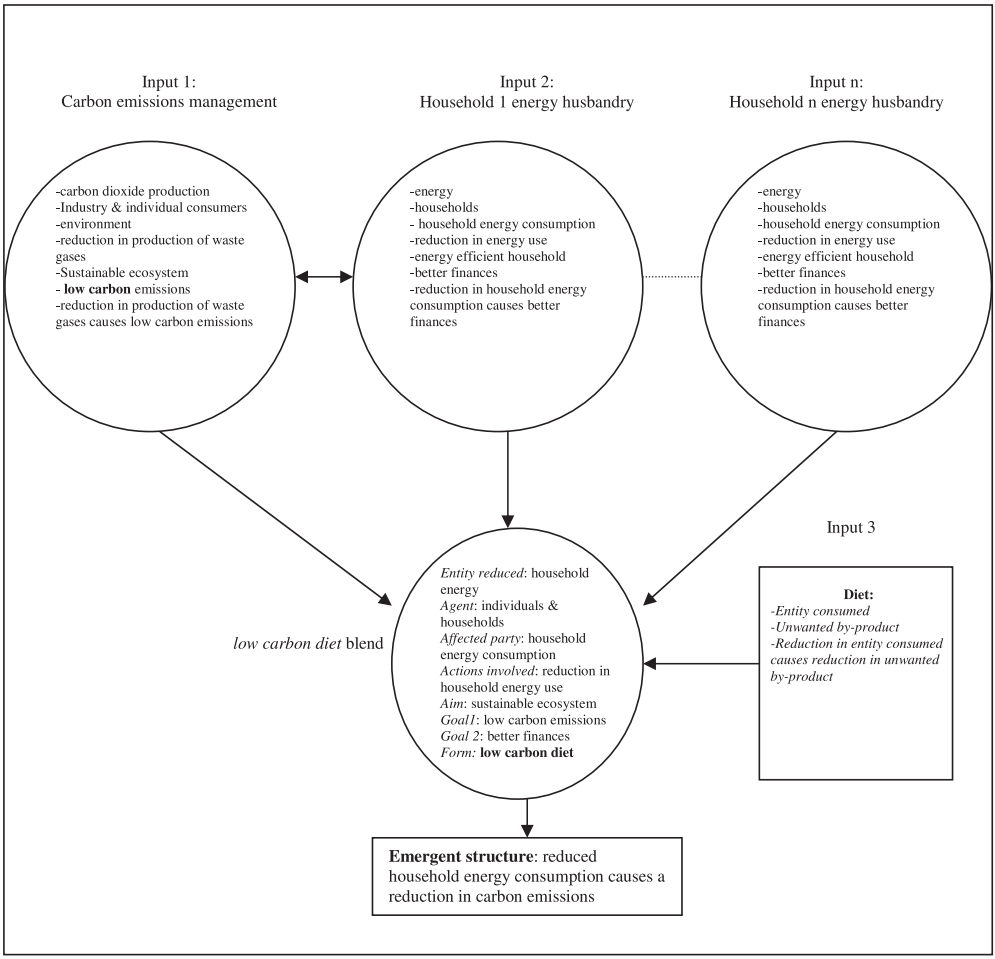

Figure 2. Low carbon diet *integration network.*

the role for Actions is filled by specific actions and activities in order to mitigate the effects of and reduce the production of waste gases. These might include, for instance, global initiatives to reduce carbon emissions (e.g. international treaties to oblige national governments to reduce carbon emissions, the establishment of 'carbon trading' between nations, the reforestation of the planet, scientific research to develop methods to reduce carbon dioxide in the atmosphere, etc.), and national initiatives (e.g. the construction of toll roads to discourage car use, initiatives to reward shared car commuting during rush hour, as is the case, for instance, in the Washington DC metropolitan area, or the daily car charge for bringing a car inside central London), and so on. The

Table 4. *Frame components for the carbon emissions management frame*

Structural properties of the frame (roles and structural invariant)	Frame elements (values)
Harmful entity	Carbon dioxide
Agent(s)	Car manufacturers, factories, governments, industrialists, politicians, consumers, scientists, etc.
Affected party	Ecosystems
Action(s) involved	Reduction in production of waste gases by reducing car use/industrial production, developing 'cleaner' cars/industrial production techniques, etc.
Aim	Sustainable ecosystems
Goal	Low carbon emissions
Cause-effect relation: Actions involved cause Goal	Reduction in waste gases causes low carbon emissions

role for Aim is filled by the value: sustainable ecosystems; while the role for Goal is filled by the value: low carbon emissions. Finally, the Cause-effect structural invariant that relates the roles Actions with Goal is filled by the value: reduction in waste gases causes lower carbon emissions. The frame components (i.e. structural properties and elements) just described are summarised in Table 4.

As shown in Figure 2, in addition to input 1, there is a second sort of input: input 2 to input n. These inputs all share common structure, relating to energy husbandry in an individual household. The number of input spaces of this sort equates to the number of individual households required to save energy in order to achieve the reduction in carbon emissions necessary to make a meaningful difference to climate change. As with input 1, inputs 2-n recruit structure and elements from a frame.

However, in this case, the structure comes from a Household Energy Husbandry frame. This frame relates to knowledge concerning the relationships that hold between household energy consumption, a reduction in energy use, and a corresponding reduction in energy bills leading to better household finances. The frame components that structure inputs 2-n are given in Table 5.

In the integration network, the input 2-n spaces share commonalities at the level of frame properties (i.e. roles, and a shared cause-effect structural relation) and elements (i.e. shared, or at least similar, values). In other words, inputs 2-n are populated by the same type of frame properties and elements. In the formation of an integration network, a process of abstraction leads to input spaces being analysed for commonalities. That is, via abstraction, points of similarity are excerpted giving rise to common structure that populates a novel generic space: a mental space that is populated by structure that is common to all the inputs.

Table 5. *Frame components for household energy husbandry frame*

Structural properties of the frame	Frame elements
Entity consumed	Energy
Agent	Individuals and households
Affected party	Household energy consumption
Actions involved	Reduction in energy use through more sparing energy consumption of electricity and other types of energy in and around the home
Aim	Better finances
Goal	Energy-efficient household
Cause-effect relation: Actions involved cause Goal	Reduction in energy use causes energy-efficient household

Once a generic space is derived, this can be used to identify counterparts across input spaces. As input spaces 2-n are each structured by a common frame, they give rise to a generic space that can be employed to identify the role-value sets in each as counterparts across all the input spaces 2-n.

One consequence of this is that the input spaces 2-n in fact form a separate integration network. In other words, the integration network in Figure 2 is more complex than presented. Accordingly, we present a revised integration network for input spaces 2-n in Figure 3. As shown, this involves compression across the role-value sets in each of the input spaces 2-n; role-value pairings that are identified as counterparts across input spaces 2-n. For instance, the many role-value sets for 'Entity consumed—Energy' found across all the input spaces 2-n are compressed into a single role-value set 'Entity consumed—Energy' in the blend.

In Figure 3, the counterparts (signalled by the double-arrowed horizontal lines across input spaces) are compressed from many to one in the blend. Recall that compression works by reducing the conceptual distance across counterparts. A generic space serves to identify counterparts based on different sorts of relations that hold across input spaces; following Fauconnier and Turner, we introduced the term *vital relation* earlier to designate this type of relation. The vital relation holding between the role-value sets in the input space is that of similarity (or analogy). In other words, the role-value sets across input spaces (e.g. 'Entity consumed—Energy') are analogous. Moreover, this vital relation is an *outer space relation*—it holds across two (or more) mental spaces, namely across the input spaces. Following compression, the outer-space vital relation of analogy transforms the many 'Entity consumed—Energy' role-value sets into a vital relation of identity in the blend. That is, within the blend, all the role-value sets across the many households, which in practice exhibit variation, become identical. And as this vital relation is now contained not across but within a single mental space—the blended space—it now

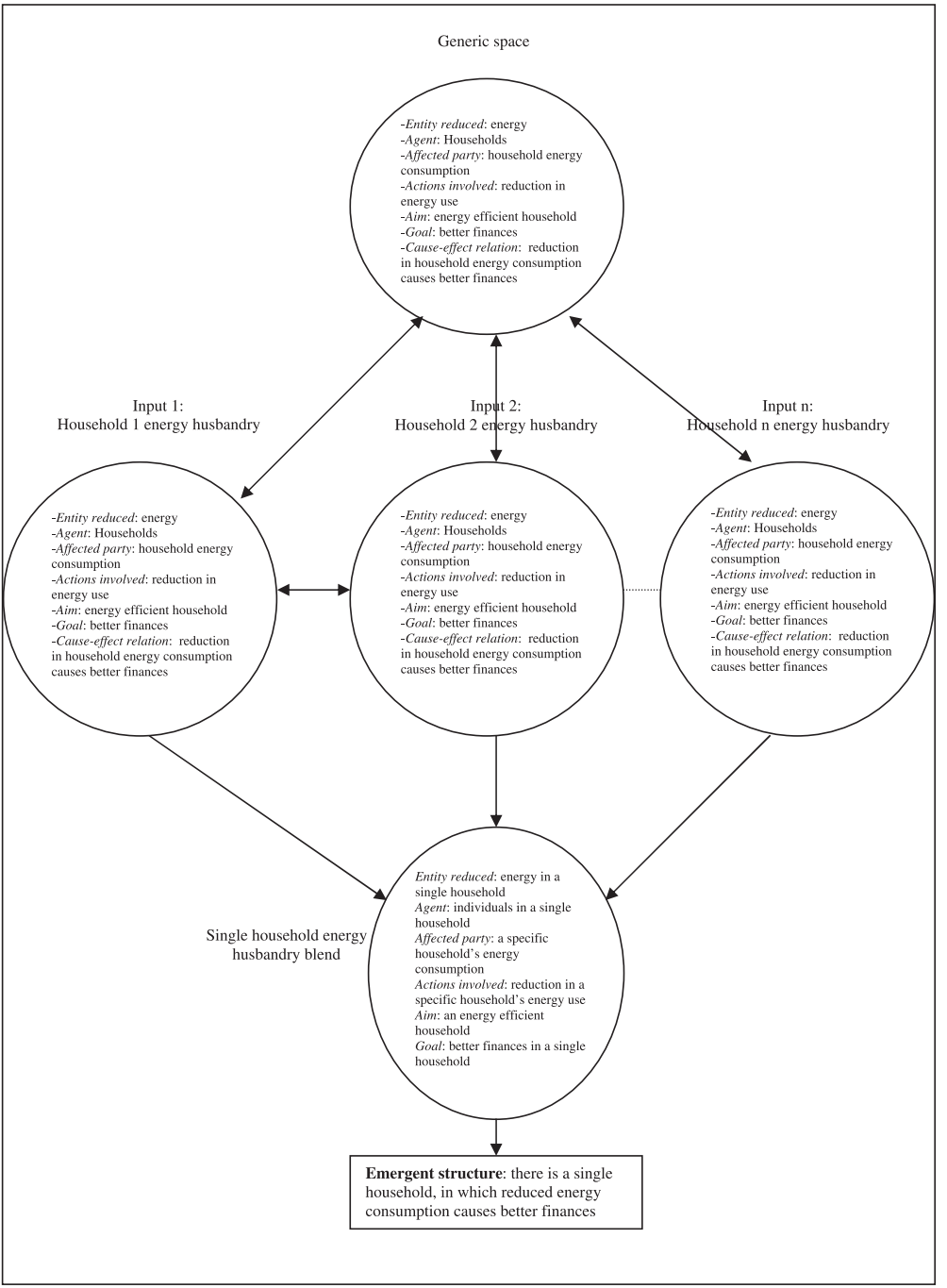

Figure 3. *A single household energy husbandry blend.*

constitutes an *inner space* vital relation. Moreover, this process of compression is repeated for all the other role-value sets across the input spaces, as well as the Cause-effect relations.

Following compression from analogy to identity, the role-value sets and Cause-effect relation undergo further compression within the blend, into uniqueness. Hence, each of the compressed frame components recruited by the inputs 2-n from the frame Household Energy Husbandry, represent a single household in the blend. The purpose, then, of the Household Energy Husbandry blend in Figure 3 is to compress many households into a single household. In the blend, diffuse structure has been compressed into a single instance: a reduction from many to one—one of the hallmarks of conceptual blending. The consequence of this is that the single household blend stands for all the households where energy husbandry is practised.

Once this blending operation has occurred, the 'single household energy husbandry' blend depicted in Figure 3 serves as an input for the *low carbon diet* integration network. A more complete version of the network given earlier in Figure 2 is presented in Figure 4.

While the frame elements across inputs 2-n in Figure 3 are similar, the frame elements that populate input 1 (in Figure 4) are quite different, vis-à-vis those that populate inputs 2-n (input 2 in Figure 4). Nevertheless, there are commonalities in terms of frame structural properties. For instance, both input types (input 1 and input 2) feature the following frame structural properties: Entity, Agent, Affected party, Actions involved, Aim, Goal, and Cause-effect relation. In other words, both the 'carbon emissions management' input and the 'individual household energy husbandry' input (as in Figure 4) have relatively abstract structural features in common. These shared properties are abstracted away from the individual inputs giving rise to a generic space. This serves to identify the structural elements just mentioned as counterparts across the two input spaces.

While the frame properties (i.e. the roles, including the roles involved in the Cause-effect relations) across input spaces are established as counterparts, the values that fill them are not. This enables compression of roles (and cause-effect relations) into uniqueness in the blend. That is, in the blend there are single roles for Agent, Affected party, Actions involved and Aim, and a single cause-effect relation. As a consequence, there is selective projection of values from the input spaces, such that each role, and the structural cause-effect relation, is compressed with a value; the values are recruited in selective fashion from each of the two inputs. This compression is due to an outer-space role-value vital relation (one that holds across input spaces) being compressed into uniqueness of roles with values in the blend. For instance, the unique Entity role, in the blend, is compressed with the value Energy, from input 2. The role Agent is filled by the value individual households (from input 2), while the role

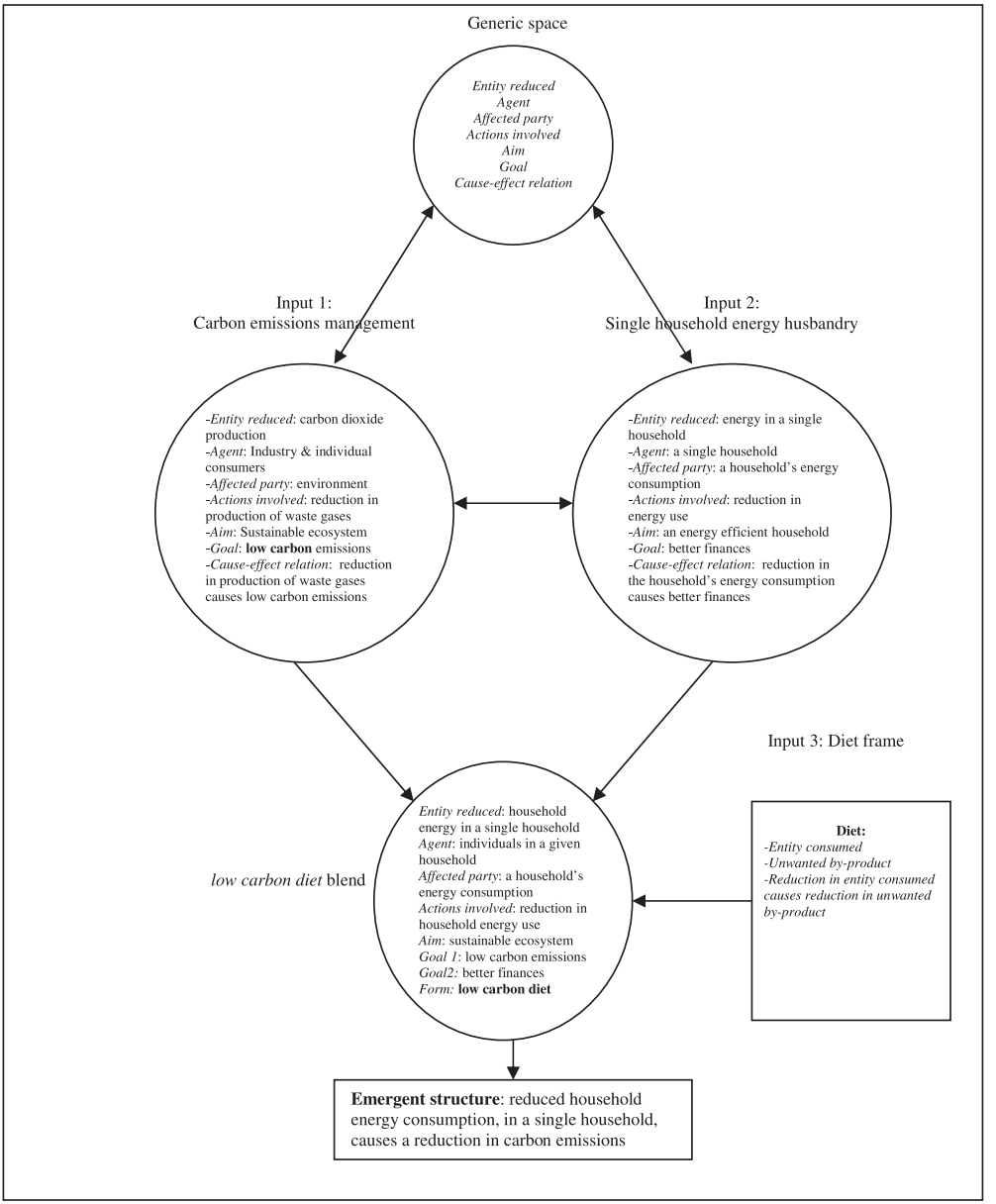

Figure 4. *Revised* low carbon diet *integration network.*

for Affected Party is filled by the value ecosystems from input 1. The role for Actions involved is compressed with the value: Reduction in energy use within the household (from input 2), while the role for Aim is filled by the value sustainable ecosystems (from input 1).

Interestingly, in the blend, two Goal roles appear to be projected. As we saw earlier in our discourse analysis of this *low carbon diet* blend, one of the virtues extolled for reducing household energy consumption (in order to reduce one's carbon footprint) is that it actually makes good financial sense. By saving the planet we also save money, by reducing household expenses! In other words, values for both Goals, the Goals in inputs 1 and 2 appear to be projected into the blend, suggesting that two Goal roles are also projected to the blend: reducing carbon emissions (goal in input 1), also saves money (goal in input 2).

The fact that both Goal roles appear to be projected to the blend may, on the face of it, potentially lead to a clash. After all, from the perspective of input 1 ('carbon emissions management'), saving money is incompatible with a reduction in carbon emissions. Reducing carbon emissions is often, indeed typically, associated with increased expenditure: research and development of 'cleaner' fuels, cars, etc. is typically very expensive, as are efforts to clean up, reduce and mitigate carbon emissions, and the effects of increased carbon dioxide levels. As we shall see below, however, the potential clash resulting from projection of frame structure from both inputs is, in fact, avoided in the blend.

Before considering this issue in more detail, we first discuss the values that fill the unique Cause-effect relation found in the blend. Recall that the Cause-effect relation constitutes a relation holding between the roles 'Actions involved' and 'Goal'. In input 1, the Actions involved concern activities directly associated with mitigating and reducing carbon emissions. But this value is not projected to the blend. Rather, it is the corresponding value from input 2, 'reduction in household energy consumption' that is projected. This then fills the 'Cause' slot in the Cause-effect relation. But what of the 'Effect'? After all, we have seen that two Goals and two values are projected, one from each input space. Which value fills the 'Effect' slot?

We argue that this is determined, crucially, via recruitment of structure from a third input which contains a Dieting frame. As with frames that structure inputs 1 and 2, the Dieting frame contains a lot of complex information including knowledge concerning structural properties of the frame, as well as frame elements. For instance, structural properties include roles for an Entity (with the frame element: calories), and the role for an unwanted, and harmful By-product (with the frame element: fat). The frame also contains the role Action of minimising consumption (with the value: reduce calorie intake), and the role Goal of reducing harmful waste product (with value: reduce fat levels). The frame also consists of a Cause-effect relation which links the roles Actions with Goal,

Table 6. *Frame components for Dieting frame*

Structural properties of the frame	Frame elements
Entity reduced	Calories
Harmful and unwanted by-product	Fat
Actions to minimising consumption	Follow a calorie-controlled diet
Goal to avoid harmful by-product	Reduce fat levels in the body
Cause-effect relation: reducing consumption causes reduction in by-product	Consumption of fewer calories causes less fat

such that the Actions (reducing calories intake) causes the Goal (the reduction of fat). The frame components for the Dieting frame are captured in Table 6.

Of course, the values 'calories' and 'fat' are not projected to the blend. However, the structural properties—Actions: minimise consumption, Goal: reduce harmful waste product, and the Cause-effect relation that combines them—are. It is these properties, we suggest, that provide the Cause-effect relation in the *low carbon diet* blend with its structure. In particular, it is recruitment of the Cause-effect relation from input 3—the Dieting frame—that provides the template for selecting the 'correct' role-value set for Goal, given that there are two role-value sets in the blend.

As we have seen, in the blend, the 'Cause' slot is filled by the value associated with 'Actions' projected from input 1. This relates to the reduction of household energy consumption. We now return to the issue of which Goal value is integrated with the 'Effect' slot in the Cause-effect relation. We argue that this is selected under guidance from the Cause-effect structure from input 3: the Dieting frame.

In the Dieting frame, the Cause-effect relation involves a relation between an entity whose consumption is reduced (fulfilled in the blend by the value: reduce energy household consumption), and the effect, namely a reduction in an unwanted and harmful by-product. Hence, the Goal role selected for is the Goal from input 1, and the value is that of low carbon emissions. Thus, Cause-effect structure in the Dieting frame determines the Cause-effect relation in the blend. Hence, the Dieting frame plays a central function in ensuring that the 'correct' values are compressed with the Cause-effect slots in the blend.

This phenomenon, whereby a third input space modifies the way in which two inputs are integrated, resembles the type of integration network that exhibits double grounding, as suggested by Brône and Coulson (2010). Examples of newspaper headlines of the sort: *Russia took the froth of Carlsberg's results* involves an ambiguity between two possible readings, one relating to a reduced amount of beer, due to losing the froth, and another relating to the value of Carlsberg's shares, which decreases. The ambiguity arises, according to Brône and Coulson, due to the integration of a metaphor (with source and target input

spaces) and a third input, involving a metonymic link between producer (e.g. Carlsberg) and product (e.g. beer). The integration of inputs 1 and 2 gives rise to one interpretation, while integration with the third metonymically structured input gives rise to the second interpretation. Hence, it is the double grounding that is responsible for the ambiguity and so the humour associated with a newspaper headline of this sort.

While the integration of the Diet frame does not have the same effect as that achieved with newspaper headlines of the sort studied by Brône and Coulson, the integration network we are studying here appears related. The function of the Diet frame in the blend is not to provide the blend with additional values. As we have seen, the values come from input 2 primarily, while the frame elements (i.e. the roles) come predominantly from input 1. In particular, the blend is explicitly not about food consumption and/or the reduction of calorie intake in pursuit of weight loss. Crucially, however, the Dieting input provides the Cause-effect relation in the blend with key organisational structure. In effect, it determines which values from inputs 1 and 2 (in Figure 4) occupy which roles. And in this sense, the blend is grounded twice: in terms of role-value compression across inputs 1 and 2, and by the recruitment of structure from input 3, which determines how the roles in the Cause-effect relation are filled.

We now return to the issue of potential clashes in the blend. Structure in input 1 involves an attempt to minimise a potent threat to the survival of 'the planet' (i.e. humanity), while input 2 relates to a concern to save money by reducing household energy consumption. As such, they each contain quite different Cause-effect structure relations. Moreover, we have seen that both Goal roles, and their values, are projected to the blend: minimising household energy consumption, in the blend, directly reduces carbon emissions, whilst simultaneously saving money! As noted earlier, this potentially leads to a clash: in the grounding input, reducing carbon emissions is not normally associated with reduced expenditure. Indeed, reduced expenditure often directly causes an increase in carbon emissions.

Yet, in the blend the clash is avoided. This, we argue, is a consequence of pattern completion. By guiding completion of the Cause-effect structure in the blend, structure drawn from the Dieting frames helps obviate a clash. Only one of the two values for Goal is compressed with the 'Effect' slot in the Cause-effect relation. Hence, both role-value sets for Goal exist simultaneously in the blend. But there is no clash, as only one of the Goal role-value sets is integrated with the 'Effect' slot. Structure recruited from input 3—the Dieting frame—is, thus, not only important for guiding the distinctive Cause-effect structure of the blend. In addition, it serves the crucial function of obviating a clash, rendering the blend coherent: reducing household energy consumption directly causes lower carbon emissions and the householder also, simultaneously, saves money.

As discussed in an earlier section, the hallmark of the most complex of blending operations is the projection of frame structure from both inputs that potentially clashes in the blend. As we have seen, in our *low carbon diet* blend, two Goal roles are projected to the blend, as well as values for each of these roles. And in the grounding input, such Goals are incompatible. We have also seen that their co-existence in the blend is possible by virtue of double grounding, achieved via the Dieting frame, which ensures that the 'correct' Goal role aligns with the 'Effect' slot in the unique Cause-effect structural relation that inhabits the blend. We suggest, therefore, that the *low carbon diet* blend is an instance, *par excellence*, of double scope blending: frame structure (as well as frame elements) are projected to the blend from all input spaces. And this being so, the *low carbon diet* blend illustrates the power of the human imagination: our ability to compress quite different and diffuse cause-effect chains into a clear and simple cause-effect relation. By reducing energy consumption in the home we can both save the planet while also saving money—a true win-win situation!

Another interesting facet of the conceptual integration network depicted in Figure 4 is that it is identified by a lexical form: *low carbon diet*. This form provides a linguistic anchor that remains connected to the blend, providing a conventional means of identifying and manipulating the blend. And as the blend remains connected to the entire integration network, the form provides a short-cut back to other parts of the integration network. Indeed, we argue below that it is precisely this property of the formal blend that has facilitated the later development of a new *low carbon diet* blend (integration network 2, discussed below).

In addition to frame properties and elements being projected to the blend, word forms are also projected, which is precisely what makes the *low carbon diet* blend a formal blend. In particular, the form *low carbon* is projected from input 1, the grounding space. It is this mental space that remains connected to the real world scenario—the problem space that the *low carbon diet* blend is an attempt to solve by reducing the complexity of global warming to individual human scale. And reflecting its importance in completing the Cause-effect structure, the Dieting frame provides the blend with the form *diet*. As already noted, the blend that results is not, then, a diet in the sense of a food regime, involving a reduction in calories—values, after all, are not projected from the Dieting frame. Rather, what the Dieting frame provides is a particular way of construing and organising the Cause-effect relationship that holds between input 1, relating to carbon dioxide reductions, and household energy husbandry in input 2.

Indeed, the importance of the Dieting frame in structuring the blend is that it obviates potential clashes between the two input spaces, as we have argued. In addition to Cause-effect structure, the frames that structure the inputs potentially clash in a number of other ways. For instance, household energy

husbandry does not produce a harmful by-product. Reducing energy consumption in the home is, ordinarily, simply an attempt to reduce household expenditure. It arises from the common experience of attempting to cut household expenses in order to create greater disposable income, especially in times of straightened finances due to, for example, pay freezes or pay cuts, or loss of employment in a recession. In contrast, the frame that structures input 1 does involve a harmful by-product, namely carbon dioxide. In the blend, the reduction of energy consumption directly causes a reduction in carbon emissions. Of course, in reality, reducing household energy consumption does not directly cause a reduction in carbon emissions. Carbon emissions have a myriad causes, and the role of household energy consumption in this is indirect—it is the production of electricity (for instance) that (among other things) directly causes the production of carbon dioxide. In the household, electricity is not produced, rather it is consumed—we use it to make the lights work in our homes, to operate air conditioning units, TVs, radios, fridges, hair dryers, kettles and other electrical appliances. We use it to operate heaters that keep us warm, and so on and so forth. The Cause-effect structure from the Dieting frame enables us to view a reduction in household energy consumption as directly causing a reduction in carbon emissions.

Before concluding our discussion of Integration Network 1, we briefly consider a number of other matters relating to the *low carbon diet* blend. Firstly, we consider how our 'many-space' blending analysis represents an improvement over the simpler 'two-domain' metaphor-style analysis presented in the previous section, as summarised in Table 2. Perhaps what is most obvious is that our blending analysis allows us to model with greater precision the complex body of knowledge that is anchored by the form *low carbon diet*. In particular, our blending analysis reveals that the metaphor analysis is oversimplistic. A *low carbon diet* does not structure carbon emission reductions in terms of counting calories, etc., as depicted in Table 2 above. Rather, what is provided by the Dieting frame is, crucially, a more abstract level of Cause-effect structure. In addition, the metaphor analysis ignores the crucial role of knowledge concerning household energy husbandry. This plays an important role in the *low carbon diet* blend as it is knowledge recruited from this frame that directly causes a reduction in carbon emissions.

Another issue concerns the rhetorical point of the *low carbon diet* blend. Overall, the blend represents an attempt to bring about a change in behaviour at the level of individuals and individual households. Climate change is a complex problem, and the reduction of carbon dioxide levels is a complex challenge that must be tackled on many fronts. For individuals to be persuaded to play their part, the rhetoric of campaigners and advertisers must successfully reduce this complexity to something that makes sense at the individual level—the complexity must be effectively reduced to human scale.

One of the ways in which the *low carbon diet* blend achieves this comes from a general feature of blends—blends remain connected to the input spaces that give rise to them. The integration network we have been discussing, as depicted in Figure 4 above, consists of two inputs. The first is the grounding input. This concerns the real-world problem that the blend is an attempt to solve. The second relates to the real-world scenario in which ordinary individuals attempt to ensure better household finances in their daily lives. And in the present case, there is a third input space, a Dieting frame, which facilitates double grounding, determining the Cause-effect relation that is evident in the blend.

In the blend, the consequence of better household finances, namely reduced household energy consumption, directly causes a reduction in carbon emissions. As a result of the blend remaining connected to the input spaces, in particular the 'individual household energy husbandry' input, inferences that are created in the blend can be projected back to the input spaces that gave rise to them—the phenomenon of *backward projection*. By virtue of backward projection, individual householders can infer that by saving energy in their homes in order to save money—something they may be predisposed to do in any case—they are, in effect, helping to save the planet!

In the *low carbon diet* blend, we see both the power of the human imagination, and the sophistication of the blending framework—allowing us to model how meaning arises. The *low carbon diet* blend provides a powerful means of communicating a particular message very effectively—a change in individual behaviour can have a significant impact on the fight against climate change. It represents a prime example, we suggest, of how to effect change by reducing complexity to human scale.

5.2. *Integration network 2*

In this integration network, *low carbon diet* relates to a reduction in 'food energy' (i.e. a reduction in the wastefulness associated with the selection, preparation and disposal of food in the household) in order to reduce carbon emissions (see advice in third column of Table 1 above). We argue that this integration network is derived from the previous integration network. Specifically, the *low carbon diet* blend from integration network 1 serves as one of the inputs in integration network 2. As we saw above, integration network 1 facilitates a direct causal relationship between a reduction in household energy consumption and a reduction in carbon emissions. Integration network 2 takes this idea one step further. The household kitchen, and food preparation in particular, is one particularly salient contributor to a household's energy consumption. Many household appliances are found in the kitchen and play a central role in the storage and preparation of food (e.g. fridge, freezer, oven, hob,

cooker hood, microwave oven, dishwasher, toaster, kettle, and so on). Moreover, there are other types of energy indirectly associated with food consumption. These include the energy required to transport food from the farm or factory to the supermarket where it is purchased. Energy is also consumed every time we throw food away, for instance, in the operation of refuse collection vehicles, and the energy required to appropriately recycle and/or dispose of the packaging associated with our food, and so on.

We argue that integration network 2 is an extension of integration network 1. It focuses on the reduction of a specific type of household energy—the reduction of what we term 'food energy'. We define food energy as the energy required to transport and produce food, and to dispose of food waste (including packaging). Food energy can be reduced in a number of ways, including the following:

i) a reduction in the amount of 'food miles' associated with food purchased for household consumption—i.e. the distance the food has been transported—such that locally produced food should be preferred over non-local food;
ii) a reduction in purchasing food high in packaging (and minimising the use of new bags in order to transport groceries back to the household kitchen);
iii) a reduction in the use of household energy in the preparation of food.

Integration network 2 involves two input spaces. The first input space is derived from the blended space from integration network 1. Recall that this space involves a Cause-effect relation holding between energy reduction in a single household and a reduction in carbon emissions. The second input space relates to energy reduction associated with food consumed in an individual household ('food energy husbandry'). As with integration network 1, input 2 is itself a blend—food energy husbandry across many households is compressed such that input 2 represents food energy husbandry in a single household. That is, input 2, in effect, stands for *all* the households (and premises where food is prepared and sold) where food energy husbandry is practised and, moreover, the number of households required in order to effect a reduction in carbon emissions. We present the integration network diagrammatically in Figure 5.

In terms of Figure 5 (vis-à-vis Figure 4), the 'new' input is input 2: the 'food energy husbandry' input. The frame that structures this input is provided in Table 7.

A key difference between integration networks 1 and 2 is that in the latter the primary organising structure of the blend comes, not via double grounding, by virtue of a third input space relating to Dieting, but rather from one of the input spaces: in this case, input 1. Input 1 (the blended space derived from network 1) provides the blend (in network 2) with its key frame components, namely the Cause-effect structure that is central to the blend.

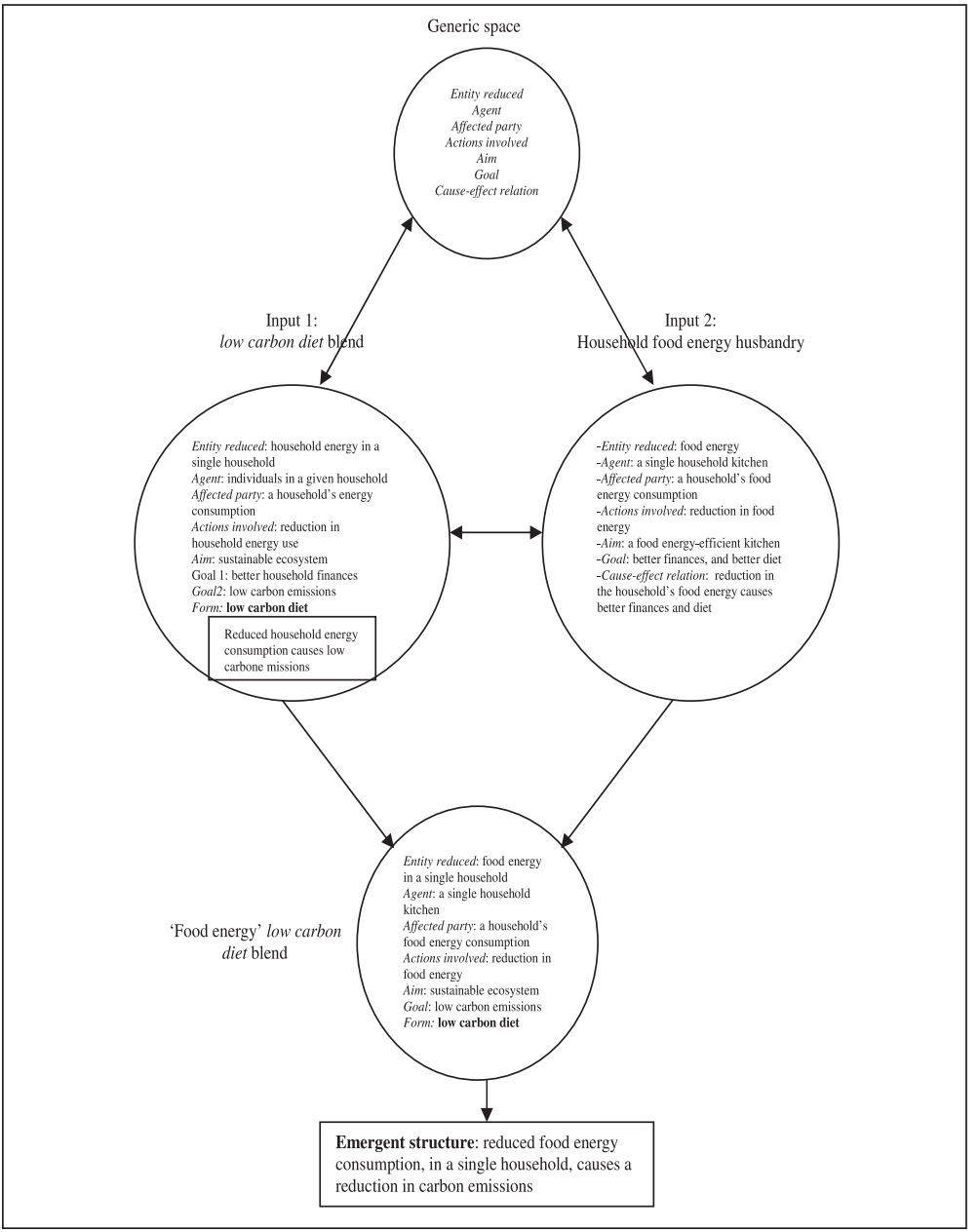

Figure 5. *'Food energy'* low carbon diet *blend.*

Table 7. *Frame components for food energy husbandry frame*

Structural properties of the frame	Frame elements
Entity	Food energy
Agent	A single household kitchen
Affected party	Household food energy consumption
Actions involved	Reduction in food energy use through selection of food low in 'food miles' and packaging, and reduced energy consumption in preparation of food
Aim	Better finances and diet
Goal	Food energy-efficient kitchen
Cause-effect relation: Actions involved cause Goal	Reduction in food energy causes food energy-efficient kitchen

In input 1 (in network 2), the cause-effect structure stipulates that there is a direct causal relationship between household energy consumption and carbon emissions. Specifically, a reduction in household energy consumption causes a reduction in carbon emissions. Input 2 (food energy husbandry) provides information concerning a specific type of household energy: food energy. As the Cause-effect relation in input 1 structures the blend, following Fauconnier and Turner (2002) we refer to this as the *framing input*. In contrast, input 2 provides the specific type of household energy that is compressed with the Cause role in the blend. That is, it provides the value: food energy. Accordingly, input 2 provides the *focus input* (Fauconnier and Turner 2002).

Another way of stating this is as follows. The inference that a reduction in household energy directly causes a reduction in carbon emissions is already present in input 1 (in integration network 2). The purpose of the integration network is to focus on input 2, which is to say, on one aspect of household energy husbandry: food energy. Just as household energy reduction, in general terms, causes a reduction in carbon emissions (integration network 1), so too a reduction in food energy (a specific type of household energy) causes a reduction in carbon emissions (integration network 2).

It follows that the Dieting frame is not explicitly present in integration network 2. The Cause-effect structure that it provides in integration network 1 is part and parcel of input 1 in integration network 2. Another important difference between the two integration networks relates to the provenance of frame structuring components in the blend. Recall that we argued above that integration network 1 is a double scope blend—Goal role-value sets from across the input spaces are projected to the blend. However, in integration network 2, Cause-effect frame structure is only projected from input 1, which is what makes it the framing input. The function of input 2 is to provide the specific type of household energy we are concerned with: the focus. Accordingly, integration network 2 has the characteristics of a single scope network—frame

structure from only one of the inputs (input 1) serves to provide the blend with its organisational structure.

Given that integration network 2 is derived from and, indeed, appears to be an extension of network 1, we now briefly consider how it was motivated in the first place. This is a pertinent question as while household energy husbandry (input 2 in network 1) is a common scenario in our everyday lives, the idea of saving money by reducing food energy (input 2 in network 2) is, perhaps, a less obvious way of saving money (and improving the quality of household food). We suggest that the blend in network 2 is an opportunistic exploitation of the already existing blend associated with network 1. Indeed, the use of this 'food energy' *low carbon diet* blend was first promulgated by a food company which sought to promote its own products which met the requirements specified in the blend. As such, it represented an ingenious exaptation of existing conceptual and linguistic resources for new ends, namely the promotion of food products.

6. Conclusion

In this article we have investigated climate change through the lens of language use and the lens of the media. Language is among the most critical tools humans have to shape the world they live in. As the sociologist Anthony Giddens wrote, social life is "*produced* by its component actors precisely in terms of their active constitution and reconstitution of frames of meaning whereby they organize their experience" (Giddens 1976: 79). New words and new concepts provide people with new ways of experiencing themselves and their world, with new ways of being and new ways of knowing. Carbon compounds have become efficient tools for making sense of climate change and users engage in numerous creative ways of modifying, varying and extending these compounds to achieve a variety of discursive ends, from promoting carbon trust to critiquing carbon offsetting, via rather ingenious metaphorical compounds, such as *carbon indulgence* (see Nerlich and Koteyko 2009a) and *low carbon diet*, for example.

We have studied here how new words and new concepts around *carbon* as a lexical stem, and the compound *low carbon diet* in particular, allowed speakers of English, in our case US campaigners and journalists, to engage with the complex issue of climate change and try to reduce it to human scale, that is, to make it, at least conceptually, digestible with the ultimate aim of instigating changes in behaviour and promoting action. This is achieved by integrating and compressing complex and quite diverse knowledge types, including the familiar (e.g. dieting and household energy husbandry) with the unfamiliar (e.g. the causes and mitigation strategies for global carbon emissions), and integrating these with linguistic forms. This has led to the coining of new lexical expressions, such as *low carbon diet*, and new meanings—complex

integration networks that lie behind the scenes, which can be re-activated by the linguistic anchor that is connected to them. We focused on the United States, where this compound/metaphor/blend was used most enthusiastically in various campaigns and in the newspapers that reported on them or advertised activities related to them.

This reduction of the global and complex to the national, local and human and therefore the familiar has implications for climate change communication and for actions that individuals can perform to mitigate climate change. Unlike complex scientific arguments, advice based on 'diet' makes climate change amenable to action. But it is a complex question to resolve what action to take in order to reduce carbon emissions. And the messages conveyed via the *low carbon diet* blends can be positive but also may be confusing. As we have seen when analysing the blends, the *low carbon diet* compound encourages individuals and households to reduce energy consumption, that is, it fosters individual small-scale actions that can contribute to reductions in carbon emissions. It also encourages more and more people to get involved in reducing carbon emission together or in groups, that is, it contributes to developing community action. However, our analysis has also shown that exhorting people to reduce household emissions on the individual level does not necessarily 'save the planet'. This does not mean that individual emission reduction activities cannot be part of what Gershon calls, on the front page of his *low carbon diet* book, 'the global warming solution'. However, individuals should not delude themselves into thinking that this is enough to deal with what many scientists regard as the threats posed by global warming. To tackle global warming effectively, it is not only necessary to think in small steps as advocated by this *low carbon diet* blend, but also, and perhaps more importantly, to think big. David MacKay (2009) makes the following observation:

> Have no illusions. To achieve our goal of getting off fossil fuels, these reductions in demand and increases in supply must be *big*. Don't be distracted by the myth that "every little helps.[2]" *If everyone does a little, we will achieve only a little*. We must do a lot. What's required are *big* changes in demand and in supply. (ibid.: 114)

Changes such as these require political will-power, even more than dieting will-power.

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