Explaining superfoods: Exploring metaphor scenarios in media science reports

Ruth Breeze
Universidad de Navarra (Spain)
rbreeze@unav.es

Abstract

Metaphorical language plays an important role in spreading and popularising scientific information. However, little is known about the process through which sober scientific research is transformed into colourful or even sensational news. This paper examines the main metaphor scenarios used to explain nutritional discoveries, generally related to the overarching metaphors of "combat" and "maintenance", and explores how they are developed and distributed across institutional press releases, online news reports, and magazines/blogs. Most of the metaphor scenarios seem to arise first in the press release, but these are considerably extended and embellished by the other media. Only occasionally are new metaphor scenarios engaged, which reflect societal discourses concerning science and nutrition.

Keywords: metaphor scenario, media language, science reporting, discourse analysis.

Resumen

La metáfora en la representación de los superalimentos en los medios de comunicación: Un estudio cualitativo de diez casos

El lenguaje metafórico tiene un papel importante en la difusión de la investigación científica. Sin embargo, no se comprende suficientemente el proceso por el que se transforma la información original en noticias atractivas o incluso sensacionales. En este artículo se estudian los escenarios metafóricos que se emplean para comunicar los resultados de la investigación en nutrición en tres tipos de texto: las notas de prensa institucionales, los periódicos y agencias online, y las revistas/blogs. Los principales escenarios metafóricos, la mayoría

relacionados con los conceptos de "combate" y "mantenimiento", se identifican, y su desarrollo en los distintos medios se analiza. La mayoría de los escenarios aparecen por primera vez en las notas de prensa, pero se elaboran y se amplían en los demás medios online. Solamente en pocas ocasiones los medios introducen nuevos escenarios metafóricos que reflejan otros discursos sobre la ciencia y la nutrición disponibles a nivel social.

Palabras clave: escenario metafórico, lenguaje mediático, difusión científica, análisis de discurso.

Introduction

The popularisation of scientific research has been a steady focus of research in discourse studies over the last thirty years. Early studies tended to assume that science held "true" knowledge, and that the media simplified or even contaminated that information (Hilgartner, 1990). Since then, a more sophisticated understanding has emerged of the role of the media and the complex relationships between scientists, journalists and the public (Weingart, 1998). We now know that scientists and their institutions actively seek to influence the media with a view to enhancing their profile and obtaining funding, while the media themselves are under different pressures that affect content, tone and presentation. Moreover, the role and presence of the audience have also changed over this time, since readers are increasingly able to interact with producers. In this changing landscape, one point is clear: we are witnessing a closer relationship between science and the media, and it is increasingly difficult to disentangle different strands of information. Media science reports consist of a complex blend of rigorous facts, popularisation strategies and hype, and when the message they transmit is seriously distorted, this may have consequences not only for education, but also for public health.

One area of science which is accorded particular prominence in the media is that of nutrition, and research about particular foods is likely to be given more media attention than drier, less accessible forms of scientific research. One topos that frequently generates media attention is the notion of the "superfood" which acts as a panacea against a range of diseases, and which "will give our bodies the health kick they need to stave off illness and aging" (European Food Information Council, 2012). Despite some critical attention from consumer bodies and health authorities (NHS Behind the Headlines, 2016), which are eager to point out that "it is unrealistic to expect a narrow

range of 'superfoods' to significantly improve our well-being" (European Food Information Council, 2012), the notion that some foods have quasi-magical health-enhancing powers recurs frequently in news and magazine reports, as well as in health and diet-related blogs. Such items are often embellished by colourful metaphorical language which dramatizes their claims. What is less clear, is exactly how such transformations occur: do the media writers exercise considerable licence when writing their articles, or do some changes enter the information during the writing of the institutional press release sent to the media? Against this background, this paper conducts a qualitative analysis of how research about so-called "superfoods" is represented in the online media (newspapers, news agencies and providers, magazines and blogs). It centres on the metaphors used in media reports, mapping out the various metaphor scenarios on which writers draw, and endeavouring to tease out where these originated: in the institutional press release, or in the writing of the media text.

Theoretical framework

In cognitive theory, metaphors are understood in terms of one-to-one mappings from source to target domain (Lakoff & Johnson, 1980). However, there are two problems with this. One is that metaphors do not appear in isolation, with one idea neatly mapped onto another to illustrate a point, but rather reflect conventions and comparisons prevalent in a particular culture, often with evaluative implications. The other is that the mappings found in any particular discourse may lack coherence, often conjuring up contradictory images of both source and target. To address these issues, Musolff (2006) suggests that rather than activating isolated mappings from source to target, metaphors in discourse tend to reflect background "scenarios" that provide a range of source material for conceptualising a particular topic. For example, speakers/writers draw upon stereotypical scenarios in our (culturally conditioned) experiences of areas such as health, family or combat, in order to explain and evaluate phenomena from particular source domains such as the economy, business or medical treatment. As Musolff (2006: 24) points out, these scenarios often also have evaluative undertones as a result of social attitudes to the source domain, which may be politically motivated. Use of scenarios is ubiquitous in public discourse (Musloff, 2006: 28, 35), and the "folk-theoretical" and "strongly stereotyping" knowledge employed in such

metaphors actually helps to shape the course of public debate by giving an argumentative advantage to those who appropriate them (Musolff, 2012). As Musolff (2012: 306) points out, even when metaphors are highly conventionalised, the network of associations around them still conveys ideological meanings, since the literal meaning from the source domain tends to "linger" in the text, and is likely to contribute to the pervasive ideological tone.

The potential of metaphor has also been discussed by scholars interested in other types of discourse, particularly in the areas of education and popularisation. Metaphor plays a prominent role in media popularisation discourses and other areas where specialised knowledge is conveyed to non-specialist audiences. In business, for example, popular periodicals such as *The Economist* have been found to contain a wider range of metaphors than academic journals, and these metaphors were different in frequency and type (Skorczynska & Deignan, 2006). In scientific reporting, the potential of metaphor to explain complex ideas by means of parallelisms between the source and target domain is probably the first motivation for employing such devices (English, 1998; Luzón, 2015). Nevertheless, although the use of metaphors in scientific discourse, say, may seem far removed from the ideological uses mentioned above, there are some areas in which elements are present that are more than simply explanatory. This is particularly evident in media texts about scientific phenomena, in which metaphors are indeed used to explain, but also to dramatise or humanise scientific concepts. As Calsamiglia and van Dijk show, "the mass media are not passive mediators of scientific knowledge, but actively contribute in the production of new, common knowledge and opinions about science and scientists" (2004: 371). With metaphor, what happens is particularly interesting, since as Knudsen (2003: 1259) observes, the media do not simply relay the metaphorical language devised by scientists, but actually adapt and extend it, reworking and recontextualising it for lay audiences. In specialist texts, scientific metaphors, once accepted, generally become what she terms "closed" (2003: 1254), being used just like any other scientific concept (e.g. "translation" in genetics). However, in non-specialist texts, these metaphors tend to be "open", or even "reopened", in that they are marked as metaphors, and explained further, sometimes in relation to other metaphors used to clarify fundamental scientific concepts that might not be familiar to the reader.

In all this, it is important to note that, as Calsamiglia and van Dijk show, "the role of new knowledge production by the mass media needs to be further

contextualized in relation to the other, especially the entertainment, functions of the media" (2004: 371-2). Metaphors spark and maintain interest, and explanatory uses of metaphor in the media merge with "promotional" or even "sensationalising" functions. Lexical choices which animate, or even personify, diseases raise the emotional temperature of a text and provoke fear in readers. In such cases, the explanatory use of particular metaphor scenarios overlaps with the need to attract attention and persuade the audience. Moreover, as media language is relatively conventionalised, the use of such metaphor scenarios quickly becomes widespread in reports about particular topics. The media tend to reflect each other, and many reports on the same issue will rely on the same sources, and even the same informants, so that particular topics readily become associated with particular metaphor scenarios.

Although this is interesting as a discourse-related phenomenon, it raises several difficult questions concerning the media and their role in promoting public health. The way in which health topics are reported has come in for repeated criticism, generally levelled at the journalists responsible for such reports. Goldacre (2008, 2016) draws our attention to the crude oversimplifications found in media reports, which sometimes culminate in absurd generalisations. However, although many of his analyses centre on a misuse of metonymy, he focuses more on the misleading reporting of scientific content than on the actual language or metaphors used, and his criticisms centre on factual issues rather than on conceptual or linguistic features. In a linguistically-focused approach to media science reporting, Breeze (2015) shows how one health-related scientific discovery was relayed in the media, analysing how newspapers reproduced the boosting devices first introduced in the press release, while eliminating the hedging used there to moderate specific claims. Her study identified salient metaphors appearing in the media texts, most of which originated in the press release itself. Interestingly, this suggests that the metaphors and metonymy found in media science reports may in fact often be introduced by the original press release, or even by the scientists themselves, who provide striking quotations to accompany the brief reports on their research. Far from being a media distortion, this phenomenon could be part of the strategy adopted by scientific institutions to draw attention to their work and attract funding.

Despite the evident importance of this subject, little research has been published on the role of metaphorical language and metaphor scenarios in media science reports. In this paper, I undertake a detailed qualitative study

of ten research articles about the health benefits of consuming certain foods, often labelled "superfoods", together with the institutional press releases issued on publication, and a selection of online newspaper and magazine articles covering the same pieces of research. In particular, I address the following questions. 1) What are the characteristic metaphor scenarios engaged in media reporting on superfoods? 2) Where do the metaphor scenarios originate, and how are they elaborated across the press releases and different kinds of media report (online news reports, magazines/blogs) based on the same original text?[1]

Texts and method

The texts selected for this study were all initially located through the NHS website "Behind the headlines", which provides accurate information about health-related stories published in the UK media. Ten different foods were selected which had been the subject of a report on this website over the years 2010-2016. In each case, I located the original press release, and media reports that referred specifically to this piece of research, including online news reports (e.g. newspapers, BBC News, CNN News), and other media (online magazines or blogs). Media reports were included in this study only if they referred directly to the research study or researchers in question, and if they dated from the two-month period following the publication of the original article. Science articles for which fewer than two online news reports and two magazine or blog entries could be located were excluded from this study. It should be noted that although an attempt was made to search for all the texts specifically reporting on the research article in question over the two-month period following publication, it is likely that some texts escaped my attention, either because they did not include the words included in the search criteria, or because they were no longer online.

The foods selected are shown in Table 1, which also provides an overview of the number of news reports and other media articles for each one. A total of 60 news reports and media texts were included in the study, as well as ten press releases and the original ten research papers. News and other media reports were included in the study if they had originally been published in the month after the original report, and included a direct reference to the study (by giving the title or journal of the paper, or naming the scientists or their research team). Since not all the research papers attracted the same

media attention, it was not possible to include an equal number of news and other media reports for each food.

	Press release	Online news reports	Other media
Beetroot	1	2	2
Black rice	1	3	2
Broccoli	1	3	2
Chocolate	1	7	3
Fish oil	1	5	2
Green tea	1	2	2
Nuts	1	4	2
Pomegranate	1	5	3
Red grapes	1	4	2
Yoghurt	1	3	2

Table 1. Types of source text included in this study for the ten foods.

Words or expressions were taken as metaphorical if they had a more basic contemporary meaning in other contexts than in the given context (Pragglejaz, 2007), i.e. these words had a usual meaning which was more concrete, more related to bodily action, or more precise than the one in the text, and the contextual meaning contrasted with this usual meaning but could be understood in comparison with it. For example, when the *Daily Mail* states that "green tea can fight off dementia", the phrasal verb "fight off" means "to defend oneself from an attack by someone or something" (*Oxford English Dictionary*), as in the sentence "Candice fought her assailant off". This is a) more concrete and more related to bodily action than the use in the text, and b) the use in the text can be understood in comparison with it. It is therefore classed as a metaphorical use.

Since the focus of the present study is on how press releases and online media report research results about "superfoods", the metaphors identified here concern only the food itself and its supposed effects (other metaphors, such as those used to explain diseases or processes without reference to the food or substance and its effects, or those used to describe ongoing nutritional trends, have been excluded, for reasons of space).

Overview of metaphor scenarios

The main metaphor scenarios used in the context of each food are shown in Table 2, with lists of the main words or expressions used to engage these scenarios in each set of texts.

	Main metaphor scenarios	Press release	Online news reports	Magazines/blogs
Beetroot	H A S	Boost, power, Popeye effect	Humble, boost, power, dramatic, Popeye effect	Boost, power, magic
Black rice	C H CL S A	Rival, fight, boost, embrace	Fight, packed, boost, mop up, hail, revere, pack a punch	Promote, boost, rivals, treasure, rich, marry, forbidden
Broccoli	C H B S A	Loaded, pack, promising progeny, stick around	Loaded, stick around, miracle, boost, protect	Big Daddy of superfoods, hail, minitrees, pack, stick around, supercharge, makeover
Chocolate	C H S A	Cut out, protect	Protect, comfort, guilty, slash, cut, rejuvenating, healing powers, boost	Boost, revered
Fish oil	C A	Role	Dramatic, protect, cut, slash	Inflammation-fighting, exciting, cut, trigger, keep symptoms at bay
Green tea	C H M	Missiles, kill, zoom in on target, stealth molecules, camouflage, boost, target	Cancer-fighting, protect, attack, hurdle, harness	(Homing/nano) missiles, stealth molecule, camouflage, filter out, target, boost, shield, cloak
Nuts	C H CC A	Cut, killer, fight, protect, crack mystery, boost, stave off	Cut, killer, fight	Killer
Pomegranate	C H M B CL CC S A	Reveal secret, protect, struggle, recycle powerhouse, David against Goliath, clean-up process, essential mechanism, fight, open up territory	Recycle and rebuild themselves, food of the gods, holds the key, power plants, cluttered up, poorly functioning, packed, combat, fountain of youth, miracle, tiny battery packs, power up, keep at bay, recharge, open up territory, small generators, boost, attack, clean-up, promise	Secret, powerhouse, power, key, fountain of youth, recycle, kick-starting, soothe, fight, battery packs, keep at bay, recharge, miracle, run down, drained, holding at bay

Red grapes	C H M CC S A	Enhance, boost, synergy, popped out, fight, (first line of/ barrier) defence, combat	Boost, fight, go awry, popped out, synergy, reveal, key role, fight, hail, first line of defence, fend off, work with, stood out, harness, trigger	Work in synergy, popped out, fight, key role, first line of defence, combat, boost
Yoghurt	H M A	Beneficial, boost, role, enrich, mechanism, leaky	Benefit, boost, wasting, mechanism, enriched	Benefit, mechanism, boost, friendly

Table 2. Metaphorical words or expressions used in connection with the food/substance and its actions. Key: C: Combat; H: Harnessing own forces; M: Mechanism; B: Battery; CL: Cleaning; CC: Cracking a code or secret; S: Supernatural; A: Animation.

As is evident from Table 2, the main metaphor scenarios engaged are related to what might be termed two "master scenarios": namely, "combat" and "maintenance". *Combat*, and the related scenario of *harnessing*, are the most frequent, appearing in relation to all but one case. In what follows, I provide an outline of the main metaphor scenarios activated, indicating if these are common to all media or specific to a particular kind.

Combat (attack and defence) is a scenario that has frequently been associated with medical discourse in many contexts (Demmen et al., 2015). Here, the notion of the body as a battleground appears across all three sets of texts. Expressions such as "fight/combat cancer/infection/disease", "barrier defence" and "line of defence" occur in many press releases, and tend to be repeated across online news reports and other media, often giving rise to more elaborate discursive realisations than in the press release, such as "fend off bacteria" (*Daily Express*), "shielding" (*Escapist Magazine*), "keep symptoms at bay" (*Daily Mail*), "free radicals attack our cells" (*Daily Express*). Moreover, the "master scenario" of combat can be seen to underlie the metaphor of "harnessing forces", which will be described next.

Harnessing the body's own potential, or the forces of nature, forms a second common scenario found in all three sets of texts. This draws on the idea of the body as a vital system that is potentially self-regulating, which has a long trajectory in the history of thought, going back at least to the times of Galen (Bechtel & Richardson, 1998). The system itself can fail, or "go awry", but it, or particular parts of it, can "harness health-boosting power" available naturally in order to restore the organic balance. In particular, the concept of "boosting" appears to be a staple of health-related media reporting. This is

one of the few expressions identified as metaphorical which is actually used in the original scientific research papers (e.g. "resveratrol boosts CAMP expression", in the article on red grapes), but there the meaning is characteristically "closed" to convey an exact scientific concept related to raising the expression of a particular gene. In the online news reports, on the other hand, "boosting" is an open metaphor, used rather loosely, in a variety of different ways (Knudsen, 2003). Press releases often contain the notion that a substance "boosts" one of the body's natural processes, which is then repeated, or further developed, by the media. Other metaphors appear to draw on the same underlying organic/vitalistic model of the human body.

The body as a machine or *mechanism* that can break down and be repaired is linked to the above idea, but the underlying metaphor is to a mechanical device rather than an organic system. Indeed, the master scenario of "maintenance" seems to underlie not just the *mechanism* scenario, but also the *battery* and *cleaning* scenarios described below. The notion of the body as machine is famously associated with Descartes (Hatfield, 2016), who popularised it, but it actually underlies much scientific writing. Here, this is particularly frequent in the reports on the pomegranate: the body can "become worn out and damaged" (*Daily Telegraph*), an "essential mechanism" can fail (*Press Release*), in which case the superfood can help to "kickstart" an important function (*Natural Society*). In the case of yoghurt, we even read that important barriers can become "leaky with aging" (*Press Release*).

Within this general area, the *battery* offers a particular scenario, the specific development of which is worthy of further attention. In the present sample, this scenario is exploited most in the case of the pomegranate. The press release tells us that as we age, "our cells increasingly struggle to recycle their powerhouses", but the *Daily Express* elaborates on this, informing us that our cells are filled with "small energy generators called mitochondria", and these mitochondria are "tiny rod-like 'power plants'" (an explanation which is not provided in the press release, but which is available in many online reference sources), and that the substance in question will enable us to "recycle these drained battery packs" and "power them up again". Curiously, the scenario of the battery seems to be usable both to explain what happens in the body (in the case of pomegranates) and to describe what scientists are doing to the food (in the case of broccoli).

Along similar lines, *cleaning*[2] is also an aspect of bodily maintenance at cellular level that also gives rise to some metaphorical explanations, which also draw

on the main underlying metaphor scenario of the body as machine. The press release about pomegranates alludes to the cellular "clean-up process", and this idea is developed further by the media reports. Cells can become "cluttered up" (*Daily Telegraph*) and unwanted items need to be "cleared away" and "recycled" (*Daily Telegraph*). With other foods, similar creativity is exercised in the media reports concerning the use of this scenario: e.g. newspapers tell us that black rice can "mop up harmful molecules" (*Daily Mail*).

Moving beyond the main scenarios related to *combat* and *mechanism*, we also encounter some other scenarios in these texts. Scientific advances are sometimes represented as *cracking a code*. This rather diffuse scenario is, of course, a staple of reports about complex issues such as the genome (Liakopoulos, 2002), but is here applied to less abstruse science-related questions. Playing on the use of "to crack", the *Mirror* tells us that "scientists have cracked the age-old mystery about why nuts are good for us". According to the *Daily Express*, scientists working on red grapes have "revealed the secrets" of having a healthy life. The press release about pomegranates has the headline "pomegranate finally reveals its powerful anti-aging secret". The *Daily Mail* picks up this idea, stating that the pomegranate "may hold the secret to a long and healthy life", while the headline in *Food and Wine* is "science reveals the secret behind pomegranates' anti-aging power".

Various metaphors found here also draw on the scenario of the *supernatural*, although it should be noted that the press releases refrain from employing such imagery. Broccoli, the *Daily Express* tells us, is a "miracle vegetable", while according to the food blog *Delish*, beetroot has "magic muscle power". Black rice is a "forbidden rice" (*Daily Mail*), the prerogative of Chinese Emperors. Milk chocolate is "revered" (*You Beauty*). The food credited with the most exceptional properties of this kind is the pomegranate, variously celebrated by the news reports and other online media as the "food of the gods" (*Daily Telegraph*) which contains a "miracle ingredient" (*Daily Mail*) or "miracle anti-ageing tool" (*Daily Express*), and which holds the "fountain of youth" (*Life Plan*). Links to the supernatural, to religion or magic, have been previously documented in media science reporting, particularly in the area of biotechnology and genetics (Liakopoulos, 2002). Here, such references are not highly developed (for example, the term "miracle vegetable" can at most be interpreted as vaguely religious hype), except in the case of the pomegranate, where the fruit's association with Classical culture allows the

writers to develop a scenario drawing on ancient mythology and narrative (e.g. the fountain used by the king of the Ethiopians, described in Herodotus in the 5th century BC (1987, 3.23)). In general, the scenario of the supernatural, in the broadest sense, is variously invoked, to enhance messages concerning the food's supposed qualities, the mystique surrounding it and the way people feel about it.

Finally, one device which, though metaphorical, is hard to relate to one specific scenario, is that of *animation*, occasionally even personification: either the food itself, or one of its components, is animated. The emphasis may be on the "character" or "presentation" of the food itself, so we find the pomegranate personified as a "humble fruit" (*Daily Mail*), while broccoli will "get a makeover" (*Science Alert*). Animation is also used to attribute volitional actions to what are, intrinsically, inanimate substances. The substance in red grapes that helps to cure infection is said to have "popped right out" from the other substances, while black rice can "pack a punch" (*CNN*), thus engaging *animation* as well as the *combat* scenario. Yoghurt promotes the development of "friendly bacteria" (*Net Doctor*). In other contexts, foods compete with each other or have family relationships. The "rhetoric of animation" associated with health-related reporting was amply discussed by Fowler in the negative context of health scares, where the combat metaphor activates the "battle against the bugs" scenario associated with horror and science fiction movies (1994: 97). It is therefore interesting that animation also appears in reports with a positive framing of health issues.

Metaphors from press release to media reports

Although it is clear from Table 2 that press releases generally contain fewer metaphorical uses than the media reports, press releases certainly do make use of metaphorical language. Since institutional press releases are written with the main aim of promoting their institution and its research, with a view to attracting broad attention and obtaining as much media coverage as possible, it is hardly surprising that the writers of such press releases should employ a similar repertoire of rhetorical strategies to journalists themselves – including metaphors. On the other hand, the writers of press releases probably do operate under more constraints than journalists and bloggers, since they represent serious scientific institutions, and cannot afford to lose credibility with the scientific community itself. Previous research has

suggested that they operate in a grey area between two different paradigms: that of newsworthiness, and that of scientific research (Breeze, 2015). This explains why, for example, claims made in the press releases are often heavily hedged, even though the positive results and their implications are boosted. In the present set of texts, many metaphor scenarios fleetingly engaged in the press release are taken up and further developed in the media reports. It might seem excessive to claim that skilled press release writers can "prime" media reporters to follow particular lines of thought, but as we shall see, there is evidence to suggest that a press release that draws on recognisable metaphor scenarios will find these at least reproduced, if not developed and embellished, in the media reports that it generates.

Starting from the most obvious point, as Table 2 shows, the press releases which contain a larger range of metaphorical expressions seem to be associated with media reports that also include many metaphors. The most sober press releases, such as those for "fish oil", "chocolate" or "nuts", which contain only the most conventionalised metaphorical language, appear to give rise to a relatively narrow range of metaphors in media reports. Conversely, where the press release employs a more highly developed dramatization of the scenario, the media pick up on this and even develop this further. Thus in the case of green tea, the press release contains a set of metaphorical expressions which engage the scenario of warfare or combat: "missiles", "stealth molecules", "camouflage" and "tumor targeting". The media reports not only repeat the same expressions, but also develop this theme even more dramatically along the same lines: expressions such as "homing missiles", "nanomissiles" and "cloaking drugs" are not in the original press release, but are found in the magazine/blog articles to describe the effects of the substance in question.

Let us consider another example to explore how this works in more detail. The press release about red grapes states that "Continued research could ... possibly lead to the development of therapeutically useful natural compounds that could boost the innate immune response". This is picked up by almost all media reports and elaborated further. Typically, the media reports zoom in on the substantive claim, ignoring the (substantial) hedging used to couch it (Breeze, 2015). In addition to the obliteration of subtlety and flattening of modality, however, the media also add new metaphorical language which heightens the importance of the discovery and downplays any uncertainty about its real applications. The *Daily Express* relays the original information as follows, using metaphors from the press release:

"Scientists have discovered that red grapes and blueberries contain ingredients that work with vitamin D in the body to boost the immune system, vital for good health in fighting infection". This sentence not only combines one new instance of animation ("work") with two metaphors from the press release ("boost" and "fight"), but it compresses complex information that is originally set out carefully across a much longer expanse of text in such a way that the effects of these substances are made to seem to be generalised, immediate, and extremely important. By conflating key ideas from the press release within a single sentence, the report generates a new, dramatic scenario in which active agents are depicted as "working" to "boost" the system that "fights" infection.

Interestingly, some expressions seem to be perceived as newsworthy in themselves, and are seized upon by all the reporters who pick up the story. In the case of red grapes, the expression "popped right out" (indicating their uniqueness) originates in the press release, in a direct quotation from one of the scientists. This is then picked up by almost all the online media. On the other hand, the fate of other equally colourful expressions seems to be more idiosyncratic: for example, a "David and Goliath" comparison is provided in the press release on pomegranate, but is not taken up by the media at all, while the "Popeye effect", which also originates in the press release (for beetroot), is picked up by online news reports, but not by the magazines/blogs. On the other hand, expressions playing on the notion of "keeping the doctor away" abound in all types of media articles, often in the headline, but are never in the press releases.

Finally, as Table 2 shows, one press release, namely that about pomegranates, was particularly rich in metaphorical language. Although this press release adheres to the convention that results should be hedged, and stresses that so far, result have only been obtained in nematodes, it also makes strong claims, such as: "The EPFL scientists' approach provides a whole new palette of opportunities to fight the muscular degeneration that takes place as we age, and possibly also to counteract other effects of aging". The different metaphor scenarios engaged in this press release (code-cracking, supernatural, mechanism, battery, cleaning) are all taken up in various ways in the media reports. Interestingly, the battery metaphor is not spelled out in the press release, although it is alluded to in "our cells increasingly struggle to recycle their powerhouses". Yet the media mostly pick up the battery metaphor and elaborate on it, adding explanations of their own, many of which centre on the idea of mitochondria as "tiny battery packs that power

our cells" (*Daily Mail*). The *Daily Express* provides the following explanation: "All our cells are filled with small energy generators called mitochondria - but when mitochondria get old they become less-efficient, or even toxic. Old mitochondria are recycled by the cell into new mitochondria - and this, in turn, is mitophagy". Here, it seems that journalists and bloggers are sensitive to metaphor scenarios activated in the press release, and do not lack creativity or imagination when it comes to taking advantage of these cues to extend and embellish the information they have to convey.

On a different note, the metaphors used in the press release often clearly have an educational function: for the wider public to appreciate scientific research, it is necessary for them at least to have a basic understanding of the concepts and processes involved. Scientific popularisation relies on basic shared knowledge which can enable the writer to develop or convey a new idea by combining ideas that the reader already has (Hallyn, 2000). This sample of texts offers some instances where a metaphor-based didactic explanation is simply reproduced in media reports. For example, the press release on broccoli provides the following explanation: "The researchers crossed two broccoli lines and tested their progeny in terms of total phenolic content and their ability to neutralize oxygen radicals in cellular assays. They then used a genetic technique called quantitative trait locus analysis to search for the genes involved in generating phenolics in the most promising progeny." This explanation, with its image of "progeny" and "promising progeny" is repeated verbatim in the *Daily Express*. However, we should note that although some of the metaphors relayed in the media reports are simply included as explanations, this is not the end of the story. It is interesting to observe that other media forgo the "family" scenario and replace this idea with explanations such as "scientists believe they are now one-step closer to creating other vegetables such as kale and cabbage with mega-doses of phenolic compounds which lower risk of heart disease" (*Daily Mail*). The use of "creating" here subtly evokes the image of the scientist who "plays God" (see Knudsen, 2003), studiously avoided in the press release, which prefers to convey that of the homely plant-breeder and the "family" of plants. This illustrates how journalists sometimes go beyond their source material to engage metaphor scenarios available on a broader societal level, which perhaps reflect their own background interpretation of the issue, or a wider ideological framework.

Conclusions

This qualitative study of metaphor scenarios in press releases on so-called superfoods and in the media reports based on these specific source texts extends our knowledge of the workings of metaphor in discourse, and sheds light on how the media draw on and elaborate metaphor scenarios as they relay scientific information to the wider public.

Concerning the decision to use the concept of the metaphor scenario (Musolff, 2006), it is evident that this provides a useful framework for analysing phenomena such as media reports, where metaphorical language is used for a variety of purposes, including explanation, dramatisation and promotion. The notion of the scenario proves productive here, because it reveals some of the strategies that journalists use to develop, popularise and promote complex scientific concepts. Most metaphorical language in the media reports reflects scenarios originally engaged in the press release, suggesting that the metaphor scenarios used are particularly salient for these journalists and bloggers. However, the media writers do not simply reproduce metaphors, but generate new ones associated with the same scenario (e.g. warfare or batteries), available by association with socially familiar discourses. Moreover, media writers even occasionally introduce references to new metaphor scenarios (e.g. scientists playing God) by association with other popular notions. As Liakopoulos (2002) has emphasised, the imagery surrounding particular scientific topics tends to stabilise and consolidate over time. While in professional science, this stabilisation leads to the adoption of metaphorical language as technical terms with a fixed meaning (Knudsen, 2003, see above), in media language this means that particular clusters of "open" metaphors tend to be available for dealing with a particular topic, and these metaphors (or scenarios) prove generative for media writers.

This phenomenon evidently holds considerable interest for discourse analysts. Just as the use of certain metaphor scenarios associated with media health scares, becomes "a self-sustaining expressive performance" (Fowler, 1994: 91) which persists autonomously within the discourse of a particular domain, so another set of metaphor scenarios forms a stable background to the way nutrition-related topics are represented and recontextualised for media audiences. The media surround certain types of food with discourses that engage other scenarios, ranging from vitalist and mechanistic visions of the human body, to religion and mythology. Such reports may fulfil a public

health function and encourage healthy eating. However, they also appear to conjure up a world view in which people's health can be magically transformed by the consumption of a particular food.

To conclude, the role of the media in informing the public, promoting health and explaining scientific discoveries can never entirely be separated from the intention to attract and maintain attention. The use of metaphorical language is one of the ways in which the media bridge the gap between making new scientific knowledge known, and providing entertainment. In the case of media science, this process may actually begin further back, with the press releases that are issued with promotional, as well as informative, intent. It would require further research, particularly in the area of reader reception, to determine the extent to which the functions of informing and entertaining are fulfilled in each case, and whether the overall message is conducive to public health.

Article history:
Received 04 January 2017
Received in revised form 31 March 2017
Accepted 03 April 2017

References

Bechtel, W. & R.C. Richardson (1998). "Vitalism" in E. Craig (ed.), *Routledge Encyclopaedia of Philosophy*, 639-643. London: Routledge.

Breeze, R. (2015). "Media representations of scientific research findings: From 'stilbenoids raise CAMP expression' to 'red wine protects against illness'" in M. Gotti, S. Maci & M. Sala (eds.), *Insights into Medical Communication*, 311-330. Bern: Peter Lang.

Breeze, R. (2016). "Tracing the development of an emergent part-genre: The author summary". *English for Specific Purposes* 42: 50-65.

Calsamiglia, H., & T.A. van Dijk (2004). "Popularisation discourse and knowledge about the genome". *Discourse and Society* 15: 369-389.

Demmen, J., Semino, E., Demjen, Z., Koller, V., Hardie, A., Rayson, P., & S. Payne (2015). "A computer assisted study of the use of violence metaphors for cancer and end of life by patients, family carers and health professionals". *International Journal of Corpus Linguistics* 20: 205-231.

English, K. (1998). "Understanding science: When metaphors become terms". *ASp* 19-22: 151-163.

European Food Information Council (EUFIC) (2012). "The science behind superfoods. Are they really super?" URL: http://www.eufic.org/article/en/artid/the-science-behind-superfoods/ [22/09/2017]

Fowler, R. (1994). "Hysterical style in the press" in D. Graddol & O. Boyd-Barrett (eds.), *Media Texts: Authors and Readers*, 90-99. Clevedon: Multilingual Matters.

Goldacre, B. (2008). *Bad Science*. London: Fourth Estate.

Goldacre, B. (2016). *Bad science blog*. URL: http://www.badscience.net/ [22/09/2017]

Hallyn, F. (ed.) (2000). *Metaphor and Analogy in the Sciences*. Dordrecht: Kluwer.

Hatfield, G. (2016). "René Descartes" in E. N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy*. URL: https://plato.stanford.edu/archives/sum2016/entries/descartes/ [22/09/2017]

Herodotus. (440 BC, 1987). *The History* (tr. D. Grene). Chicago: University of Chicago Press.

Hilgartner, S. (1990). "The dominant view of

popularization: Conceptual problems, political uses". *Social Studies of Science* 20: 519-539.

Knudsen, S. (2003). "Scientific metaphors going public". *Journal of Pragmatics* 35: 1247-1263.

Lakoff, G. & M. Johnson (1980). *Metaphors We Live By*. Chicago: University of Chicago Press.

Liakopoulos, M. (2002). "Pandora's Box or panacea? Using metaphors to create the public representations of biotechnology". *Public Understanding of Science* 11(5): 5-32.

Luzón, M.J. (2015). "Recontextualising expert discourse in weblogs: Strategies to communicate health research to experts and the interested public" in M. Gotti, S. Maci & M. Sala (eds.), *Insights into Medical Communication*, 331-352. Bern: Peter Lang.

Musolff, A. (2006). "Metaphor scenarios in public discourse". *Metaphor and Symbol* 21(1): 23-38.

Musolff, A. (2012). "The study of metaphor as part of critical discourse analysis". *Critical Discourse Studies* 9(3): 301-310.

NHS Behind the Headlines. (2016). URL: http://www.nhs.uk/news/Pages/NewsIndex.aspx [22/09/2017]

Oxford English Dictionary. Oxford: Oxford University Press.

Pragglejaz Group (2007). "MIP. A method for identifying metaphorically used words in discourse". *Metaphor and Symbol* 22(1): 1-39.

Skorczynska, H. & A. Deignan (2006). "Readership and purpose in the choice of economics metaphors". *Metaphor and Symbol* 21(2): 87-104.

Weingart, P. (1998). "Science and the media". *Research Policy* 27: 869-879.

Ruth Breeze is senior lecturer in English at the University of Navarra, Spain, and combines teaching with research as a member of the GradUN Research Group in the *Instituto Cultura y Sociedad*. Her most recent books are *Corporate Discourse* (Bloomsbury Academic, 2015) and the coedited volumes *Essential competencies for English-medium university teaching* (Springer, 2016), *Evaluation in media discourse: European perspectives* (Peter Lang, 2017) and *Power, Persuasion and Manipulation in Specialised Genres* (Peter Lang, 2017).

NOTES

[1] In what follows, "online news reports" is used to mean newspapers and news sources such as the BBC and "magazines/blogs" to other types of online publication. "Media reports" and "the media" is used to refer to all of these publications collectively.

[2] Although "cleaning" may have a literal meaning in terms of cellular processes, the elaborations of this, such as "mop up" or "cluttered up" are clearly metaphorical.

Appendix

Source material (RA: Research Article; PR: Press Release)

Beetroot

RA: Coggan, A., Leibowitz, J., Spearie, C., Kadkhodayan, A., Thomas, D., Ramamurthy, S., Mahmood, K., Park, S., Waller, S., Farmer, M., & Peterson, L. (2015). Acute dietary nitrate intake improves muscle contractile function

in patients with heart failure: a double-blind, placebo-controlled, randomized trial. *Circulation: Heart Failure* 8, 5: 914-920. URL: https://doi.org/10.1161/CIRCHEARTFAILURE.115.002141

PR: Beet juice boosts muscle power in heart patients. Washington University. https://source.wustl.edu/2015/09/beet-juice-boosts-muscle-power-in-heart-patients/

Consumer Healthday. Beet juice boosts muscle power in heart patients. 21 September 2015.

Delish. Beets are underappreciated. 17 September 2015.

Mirror. Experts hail beetroot juice's 'Popeye effect' in building strength of heart attack patients. 17 September 2015.

NPR. Why you might want to be drinking beet juice at the gym. 14 October 2015.

Black rice

RA: Jang, S., & Xu, Z. (2009). Lipophilic and hydrophilic antioxidants and their antioxidant activities in purple bran rice. *Journal of Agricultural and Food Chemistry* 57, 3: 858-862.

PR: Black rice rivals pricey blueberries as source of healthful antioxidants. Louisiana State University. URL: https://www.acs.org/content/acs/en/pressroom/newsreleases/2010/august/black-rice-rivals-pricey-blueberries-as-source-of-healthful-antioxidants.html [22/09/2017]

CNN. Is black rice the new brown? 26 August 2010.

Daily Mail. Black rice is the new cancer-fighting superfood, claim scientists. 27 August 2010.

Independent. Scientists hail health benefits of black rice. 27 August 2010.

Natural News. Nutrition discovery. Black rice rivals blueberries as source of healthful antioxidants. 14 September 2010.

Nutrition Unplugged. Is black the new blue? 15 September 2010.

Broccoli

RA: Gardner, A., Brown, A., & Juvik, J. (2016). QTL analysis for the identification of candidate genes controlling phenolic compound accumulation in broccoli. *Molecular Breeding* 36, 81.

PR: More reasons to eat your broccoli. University of Illinois. 24 June 2016. URL: http://web.extension.illinois.edu/state/newsdetail.cfm?NewsID=3380 [22/09/2017]

Daily Mail. Why broccoli really is a superfood. 23 June 2016.

Daily Express. Eating miracle vegetable broccoli three times a week cuts cancer risk and this is why. 11 October 2016.

Huffington Post. Broccoli to become the Big Daddy of superfoods. 24 June 2016.

Metro. Broccoli is about to get even healthier. 28 June 2016.

Science Alert. Scientists just found a way to make broccoli even healthier. 28 June 2016.

Chocolate

RA: Kwok, C., Boekholdt, S., Lentjes, M., Loke, Y., Luben, R., Yeong, J., Wareham, N., Myint, P., & Khaw, K. (2015) Habitual chocolate consumption and risk of cardiovascular disease among healthy men and women. *BMJ Heart* 101, 16. URL: http://dx.doi.org/10.1136/heartjnl-2014-307050 [22/09/2017]

PR: Eating up to 100g of chocolate every day linked to lowered heart disease and stroke risk. University of Aberdeen. 16 June 2015. URL: https://www.abdn.ac.uk/news/7836/

Daily Express. A chocolate a day: how just two bars daily can add years to your life. 16 June 2015.

Daily Telegraph. Two bars of chocolate a day 'lowers risk of stroke and heart disease'. 15 June 2015.

Independent. Two chocolate bars a day 'reduce risk of heart disease and stroke'. 16 June 2015.

ITV News. Link between eating chocolate and lowered stroke risk. 16 June 2015.

Metro. It's official: chocolate linked to lower risk of heart disease and stroke. 16 June 2015.

Mirror. Two chocolate bars a day can slash the risk of heart disease. 16 June 2015.

Science Daily. Chocolate for your heart. 15 June 2015.

The Guardian. More evidence that chocolate may be good for the heart. 16 June 2015.

Well & Good. Eating chocolate every day linked to lower heart disease and stroke. 16 June 2015.

You Beauty. Get low with cocoa. 16 June 2015.

Fish oil

RA: Di Giuseppe, D., Wallin, A., Bottai, M., Askling, J. & Wolk, A. (2016). Long-term intake of dietary long-chain n-3 polyunsaturated fatty acids and risk of rheumatoid arthritis: a prospective cohort study of women. *Annals of the Rheumatic Diseases*, online first, 10 November 2016.

PR: Regular weekly portion of fatty fish can halve rheumatoid arthritis risk. *British Medical Journal*. 13 August 2013. URL: http://ard.bmj.com/content/suppl/2013/08/13/annrheumdis-2013-203338.DC2/annrheumdis-2013-203338_press_release_to_upload.pdf [22/09/2017]

BBC. Eating oily fish 'halves rheumatoid arthritis risk'. 13 August 2013.

Consumer Healthday. Eating fish may be tied to lower rheumatoid arthritis risk: study. 13 August 2013.

Daily Express. How oily fish can halve risk of arthritis. 13 August 2013.

Daily Mail. Eating salmon once a week 'reduces risk of rheumatoid arthritis by half'. 13 August 2013.

Everyday Health. Researchers have long touted the health benefits of omega-3 rich fish, and now research suggests it could substantially reduce your RA risk. 12 August 2013.

Mirror. Eating salmon once a week 'cuts rheumatoid arthritis risk in half. 13 August 2013.

The Guardian. Eating fish could halve risk of arthritis. 13 August 2013.

Green tea

RA: Chung, J., Tan, S., Gao, S., Yongvongsoontorn, N., Kim, S., Lee, J., Choi, H., Yano, H., Zhuo, L., Kurisawa, M., & Ying, J. (2014). Self-assembled micellar nanocomplexes comprising green tea catechin derivatives and protein drugs for cancer therapy. *Nature Nanotechnology* 9: 907-912. URL: http://www.nature.com/nnano/journal/v9/n11/full/nnano.2014.208.html [22/09/2017]

PR: IBN Develops Green Tea-Based 'Missiles' to Kill Cancer Cells More Effectively. A*STAR. 6 October 2014.

Daily Express. Tea bid to fight cancer. 6 October 2014.

Daily Mail. Green tea could help scientists develop new cancer fighting drugs. 5 October 2014.

Escapist Magazine. Green Tea-Powered Nano "Missile" is the Latest Cancer-Fighting Drug. 7 October 2014.

Phys.org. Researchers develop green tea based 'missiles' to kill cancer cells more effectively. 6 October 2014.

Nuts

RA: Aune, D., Keum, N., Giovannucci, E., Fadnes, L., Boffetta, P., Greenwood, D., Tonstad, S., Vatten, L., Riboli,

E., & Norat, T. (2016). Nut consumption and risk of cardiovascular disease, total cancer, all-cause and cause-specific mortality: a systematic review and dose-response meta-analysis of prospective studies. *BMC Medicine* 14, 207. URL: https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-016-0730-3 [22/09/2017]

PR: A handful of nuts a day cuts the risk of a wide range of diseases. Imperial College London. 5 December 2016.

Daily Express. Eat nuts to live longer. Doctors say nuts 'should be prescribed to fight killer diseases'. 5 December 2016

Daily Mail. Eating nuts every day to cut heart and cancer risk: just a handful can reduce chance of dying early by a fifth. 5 December 2016

Huffington Post. Handful of nuts a day can keep the doctor away, research shows. 5 December 2016

Independent. Eating handful of nuts a day can keep the doctor away, research proves. 5 December 2016

Mirror. Eat a handful of nuts daily to slash your risk of heart disease and cancer. 5 December 2016

Nature World News. Eating a Handful of Nuts Every Day Reduces Risk of Heart Disease, Cancer. 6 December 2016.

Pomegranate

RA: Ryu, D., Mouchiroud, L., Andreux, P., Katsyuba, E., Moullan, N., Nicolet-dit-Félix, A., Williams, E., Jha, P., Lo Sasso, G., Huzard, D., Aebischer, P., Sandi, C., Rinsch, C., & Auwerx, J. (2016). Urolithin A induces mitophagy and prolongs lifespan in C. *elegans* and increases muscle function in rodents. *Nature Medicine* 22: 879-888.

PR: École polytechnique fédérale de Lausanne. 11 July 2016. URL: http://actu.epfl.ch/news/pomegranate-finally-reveals-its-powerful-anti-agin/ [x22/09/2017]

Business Standard. Pomegranate juice may help fight ageing. 14 July 2016.

Daily Express. Are pomegranates the key to living forty five percent longer lives? 11 July 2016.

Daily Mail. Are pomegranates a fountain of youth? 11 July 2016.

Daily Telegraph. Discovery of pomegranate's anti-ageing molecule is a 'milestone'. 11 July 2016.

Food and Wine. Science reveals the secret behind pomegranates' anti-aging power. 14 July 2016.

Fox News. Swiss biotech company tests anti-aging promise of pomegranates. 12 July 2016.

Life Plan. Are pomegranates a fountain of youth? 18 July 2016.

Natural Society. The superfruit that may hold the fountain of youth. 12 July 2016.

Red grapes

RA: Chunxiao Guo, Brian Sinnott, Brenda Niu, Malcolm B. Lowry, Mary L. Fantacone, Adrian F. Gombart. Synergistic induction of human cathelicidin antimicrobial peptide gene expression by vitamin D and stilbenoids. *Molecular Nutrition and Food Research, supported by the National Institutes of Health*. Published online 14 September 2013.

PR: Red grapes, blueberries may enhance immune function. Oregon State University. 17 September 2013. URL: http://oregonstate.edu/ua/ncs/archives/2013/sep/red-grapes-blueberries-may-enhance-immune-function [22/09/2017]

Consumer Healthday. Blueberries, red grapes may enhance body's immune function. 17 September 2013.

Daily Express. Revealed: the secret of living a berry healthy long life. 18 September 2013.

Daily Telegraph. Red wine and blueberries could boost immune system. 17 September 2013.

KGW News. Red wine, blueberries may boost your immune system. 17 September 2013.

Mirror. Red grapes and blueberries boost immune system, scientists say. 17 September 2013.

Pill Advised. Grapes and blueberries boost immunity. 17 September 2013.

Yoghurt

RA: Akbari, E., Asemi, Z., Kakhaki, R., Bahmani, F., Kouchaki, E., Tamtaji, O., Hamidi, G., & Salami, M. (2016). Effect of probiotic supplementation on cognitive function and metabolic status in Alzheimer's disease: a randomized, double-blind and controlled study. Frontiers in Aging Neuroscience, published online 10 November 2016. URL: https://doi.org/10.3389/fnagi.2016.00256 [22/09/2017]

PR: Probiotics improve cognition in Alzheimer's patients. Eurekalert. 10 November 2016. URL: https://www.eurekalert.org/pub_releases/2016-11/f-pic110116.php [22/09/2017]

Daily Telegraph. Probiotics can help thinking and memory for people with Alzheimer's disease. 10 November 2016.

Homecare. Probiotics found in yoghurt may 'benefit cognition' in people with Alzheimer's disease. 11 November 2016.

Netdoctor. Could yoghurt help people with Alzheimer's? 11 November 2016.

The Sun. Eating probiotics "boosts" brainpower in Alzheimer's patients. 10 November 2016.

The Times. Yoghurt can 'help treat Alzheimer's'. 10 November 2016.