

Daniela Cesiri

**ADAPTING THE LANGUAGE OF PALEONTOLOGY IN ONLINE
NEWS TO POPULARIZE SPECIALIST KNOWLEDGE:
A CONTRASTIVE ANALYSIS OF METAPHOR USE IN THE BBC AND
THE GUARDIAN VS. THE CNN AND USA TODAY**

ABSTRACT. Paleontology is a popular mediatic domain thanks to the widespread fascination with dinosaurs (Clack & Britain, 2007). News articles on dinosaurs showcase discourse features that simplify the domain-specific language of paleontology in order to make specialist contents accessible to the lay audience. The study investigates the popularization strategies employed by quality online news outlets with specific attention paid to the use of metaphors. By means of Lakoff & Johnson's (1980) Conceptual Metaphor Theory, a sample of dinosaur-related online news is analyzed. The study conducts a contrastive investigation to explore possible intra-cultural differences on news from the websites of the BBC and The Guardian for the United Kingdom, and the CNN and USA Today for the USA.

KEYWORDS: Popularization. Online news. Cognitive Metaphor Theory. Paleontology discourse. Specialist knowledge adaptation.

1. Introduction

The disciplines of paleontology and archaeology have so far received scarce attention from scholars who investigate specialized languages. Indeed, only a few linguistic studies are available seeking to describe archaeology as an academic domain. Joyce (2008), for instance, is more an introduction to the stylistic and

semiotic conventions of the discipline than a linguistic analysis of its features in the academic, specialized context.

Six contributions by the present author (i.e. Cesiri, 2012a; 2012b; 2015; 2016; 2019; 2020) aim at describing archaeology and paleontology as disciplinary genres and seek to position them along the continuum of academic disciplines, which includes the hard sciences at one end and the soft sciences at the opposite end. Cesiri (2012a) places the main domain of Cultural Heritage Studies (CHSs) – to which archaeology belongs – along this disciplinary continuum by investigating a corpus of 118 research papers selected from the three sub-fields composing CHSs, i.e. archaeology, arts history and criticism, and cultural heritage preservation and restoration. Results from Cesiri (2012a) show that the discipline reveals features typical of the humanities and the hard sciences simultaneously, thus describing archaeology as a hybrid academic discipline.

Cesiri (2012b) investigates the discipline diachronically by considering the use of hedges and boosters in research articles and essays written in English during the 19th and early 20th centuries. Results from this study confirm that, already in its early days as a modern science, archaeology showed clear signs of domain hybridization as in the present-day data. Cesiri (2015) further confirm the hybrid characteristics of academic writing in the discipline by investigating

strategies of reporting and evaluating prior research in a corpus of abstracts, while Cesiri (2016) focuses on praise and criticism in archaeology book reviews, and Cesiri (2019; 2020) consider the sub-domain paleontology and its popularization for children.

All these contributions reinforce domain hybridization as an intrinsic feature of both disciplines. This tendency might be explained by the nature of the disciplines themselves, composed of empirical investigations typical of the hard sciences and historical, artistic and socio-cultural interpretations of the contexts relating to the creation and use of different kinds of remains from the past in the case of archaeology, and the interpretation and reconstruction of the environment, evolution, behavior and aspect of dinosaurs in the case of paleontology.

While the two latest contributions (Cesiri, 2019 and 2020) focused their attention on the popularization of paleontology for children, the present study investigates the dissemination strategies in the same domain but for a more general category of audience. Specific attention is paid to the use of metaphors as a particularly productive strategy in popularizing texts. By means of Lakoff & Johnson's (1980) Conceptual Metaphor Theory, a sample of online news in English from the websites of four news outlets is examined: the BBC and The Guardian for the United Kingdom, and the CNN and USA Today for the USA.

The contrastive analysis allows the investigation of any possible intra-cultural differences in the selection of the cognitive domains from which the metaphors are selected, and then linguistically instantiated, to transmit complex and abstract concepts related to the disciplinary domain of paleontology.

The article is structured as follows: Section 2 presents the theoretical-methodological background used in the study; Section 3 presents the sample of online news articles, while Section 4 presents the analysis of metaphors found in the articles. Finally, Sections 5 and 6 present, respectively, some generalizations that can be drawn from the study and the conclusions on the limitations of the study itself, as well as the implications for future research.

2. Conceptual Metaphor Theory

Lakoff & Johnson's (1980) Conceptual Metaphor Theory bases the employment and understanding of metaphors in human communication on the cognitive ability of the human brain of grasping complex and abstract concepts by means of comparison with elements from the real and tangible world (*ibid.*).

As Conceptual Metaphor Theory contends, metaphors are deeply rooted in language and thought, and they are ubiquitous in human everyday life and communication, not just limited to the figures of speech. These are believed to be just the mere linguistic realizations of deeper cognitive processes that allow

people to process, understand and communicate reality by comparing new data to what they already know. Essentially, Lakoff & Johnson (1980) argue that metaphors make people's thoughts more vivid and interesting and, most importantly, they believe that metaphors actually structure our perceptions and understanding of reality. They also consider metaphors not an extraordinary but an ordinary part of language, since «human thought processes are largely metaphorical [...]» and «metaphor is pervasive in everyday life, not just in language but in thought and action. Our ordinary conceptual system [...] is fundamentally metaphorical in nature» (Lakoff & Johnson, 1980, pp. 4-6). According to this viewpoint, metaphors cannot be considered mere decorative devices but «could be seen as a way of describing the connection that exists between two groups of ideas in people's minds» (Deignan, 2005, p. 14).

Moreover, as cross-linguistic studies point out (Tribe, 1988; Bratož, 2004; Capra, 2008; Kermas, 2006, to mention only a few), there are differences in the way languages use different metaphorical conceptualizations to refer to the same phenomenon. These different alternatives are grounded in physical experience, but they are also likely to be «ideological» (Deignan, 2005, p. 23), in the sense that «metaphors have been used in order to present a particular interpretation of situations and events» (*ibid.*). Thus, the selection of metaphors is conditioned by

several factors, such as the cultural background of the speakers who use the metaphor and their interlocutors. More specifically, «metaphor use varies according to a range of variables, including genre, register and membership of different ‘discourse communities’ – groups of people who «have texts and practices in common» (Barton, 2006, p. 75; on this, see also Caballero, 2006; Steen et al., 2010; Goatly, 2011²; Deignan et al., 2013; Demmen et al., 2015). This concept becomes particularly relevant in a cross-linguistic – or intra-linguistic, as in the present case – study of metaphor, which must consider «the extent to which we draw on human universals in order to create shared metaphors» (Deignan & Potter, 2004, p. 1234).

Metaphors, then, pervade everyday language, but – as already anticipated at the beginning of this Section – they are also widely used in specialized discourse to convey abstract concepts, since they exploit the human brain’s ability to grasp the most complex concepts by grounding them on the information that is already known about the physical world (Deignan, 2005, pp. 17-18). This connection is generally made by way of mechanisms of comparison between what is abstract and new and what is concrete and known. In this regard, metaphorical expressions are often used in specialized texts, especially when they «may help decode the conceptual system that underlies the author’s theoretical stance» (Gotti, 2003, p.

61). In specialized discourse, in fact, metaphors are employed both to realize catachresis, namely, to fill a gap in the specialized vocabulary, and to emphasize the expressive connotations of a concept or to add semantic features to a term (cf. Gotti, 2003, p. 56-64). These two functions allow the speaker or the writer to substantially increase the effectiveness of their communication.

Popularizing forms of specialized discourse make extensive use of figurative language, which is highly productive in these contexts since it helps the sender of the message to convey to a lay audience complex, specialized contents in a simplified way. In this case, metaphors are usually drawn from elements in embodied physical experience and everyday life that are shared between the sender and the receiver(s) of the message. Indeed, specialized content is compared to situations that are already familiar to the lay audience, who thus immediately grasp abstract concepts easily and effectively (cf. Gotti, 2003).

Metaphors are pervasively found in newspaper articles popularizing several scientific domains, from medicine (which is also one of the most studied topic in ESP, as in Williams Camus, 2009; Cavalieri, 2015; Semino et al., 2013, to name a few) to genetics (Pramling & Säljö, 2007) to the metaphors employed in specific newspapers dealing with news from the world of business and finance (Musolff, 2006; Cesiri & Colaci, 2011; 2015).

As already mentioned in the Introduction, the field of paleontology has not received the interest of studies on specialized discourse or figurative language so far, so we cannot list any previous literature on the topic. Any data from the present analysis, therefore, will be compared with results from other areas to assess whether the use of metaphors in popularization articles in paleontology follows the same patterns already identified in studies from other fields or whether it diverges, following its own path.

3. Data and Methodology

The sample of articles considered for the present study consists of 40 news articles published on the websites of the news outlets taken into consideration. Namely, these are the BBC and The Guardian for the United Kingdom, and the CNN and USA Today for the USA. The four news outlets were chosen as news media that ensure a national coverage (the BBC and the CNN) as well as the most read quality news brands in the corresponding countries (The Guardian and USA Today), according to the *World Association of News Publishers* (<https://wanifra.org/>).

English was chosen as the language of science and today's global communication (Crystal, 2018). Moreover, the study conducts a contrastive analysis on the news coverage on the two varieties of English today considered as

the Standard Varieties of the language and still used as reference for editorial norms (*ibid.*). Therefore, it was considered potentially interesting to assess whether any differences or similarities may exist in the way in which metaphors are conceptualized to the corresponding lay audience by British and American newspapers articles, respectively.

The articles were found in specific sections of the websites of the news outlets dedicated to the popularization of scientific topics. The first news that reported the tag ‘paleontology’ was selected from the specific news sections. The news articles were then selected in equal number for the four news outlets, namely, 10 for each website, leading to the total sample of 40 news articles.

All the articles in the sample deal with dinosaurs, with news related to new species or with new interpretations on already known fossils. No other news report, for instance, openings of collections, museums, or new technology, so the predominance of dinosaur-related topics is counterbalanced by homogeneity in the news composing the sample, therefore all the articles in the sample deal with the same theme and the metaphors can be compared with greater precision since they are all used in the same context to report similar contents. After selection, the articles were examined manually to identify any metaphor employed, their

conceptual domains and how these are instantiated linguistically in the two British newspapers as contrasted to the two North American newspapers.

4. Analysis

4.1. General Analysis

The manual examination of the sample of 40 articles shows that, overall, they do not make extensive use of figurative language to explain the complex concepts related to paleontology news. Pervasive in the sample are the devices typical of popularizing language (cf. Gotti, 2003), such as: reference to general categories of scholars (Example 1), simplified terminology drawn from General English to convey domain-specific concepts (Example 2), and juxtaposition to provide simplified definitions or explanations of specialized terms or concepts (Examples 3 and 4).

(1) The whole issue of the commercialisation of fossil discovery is raising concerns **among palaeontologists and other scientists** [BBC_1]¹,

(2) Philip Manning [...] was allowed to examine **the fossilised creatures** [TG_4],

¹ All examples are indicated with reference to the source from which they are taken, and their order in the sample. BBC stands for the BBC website, TG is for The Guardian, CNN for the CNN's website, and UT for USA Today. All emphases highlighted in bold type are added to indicate where the relevant feature is visible in all the examples provided in the paper, while the spelling is kept as in the original articles.

(3) The newly discovered species is called Aurornis xui. “Aurora” is Latin for “daybreak” or “dawn.” Ornis is Greek for “bird.” The last part of the name, xui, honors paleontologist Xu Xing. [CNN_1],

(4) The four-footed, long-necked and whip-tailed Brontosaurus (**Apatosaurus being its real name**) [UT_3].

As for the employment of figurative language, the news articles show an uneven distribution with 22 instances of metaphors in the BCC sample, 12 in The Guardian, 8 in the CNN, and 10 in USA Today articles. The domains from which the metaphors are drawn, and their linguistic realizations are illustrated in Section 4.2. and Section 4.3.

4.2. Metaphors in the British news articles

Metaphors in the BBC sample are used to describe the reconstructed aspect or behavior of the dinosaurs at the core of the news. For instance, dinosaurs are often compared to other animals living in the present day, which might be more familiar to the audience. Due to the regularity in the occurrence of this domain, this metaphor can be conceptualized as DINOSAURS ARE PRESENT.DAY ANIMALS, as realized in Examples 5 to 8:

(5) a long **swan-like** neck [BBC_1],

(6) **duck-billed** hadrosaurs [BBC_2],

(7) The **dog-sized** plant-eater had a dome-shaped skull [BBC_3],

(8) This included several **bird-like** oviraptorosaurs [BBC_6].

Even though the examples may be considered instances of similes rather than metaphors, they are so pervasive and embedded in the popularizing language of the articles that they are used as describing terms for the creatures' characteristics to the point that we might define them, rather than similes or 'dead metaphors', as 'sleeping metaphors' which might be activated ('woken up') in their metaphorical force depending on their level of use, as theorized by Müller (2009).

Moreover, Example 7 contains another conceptualization, namely, DINOSAUR'S HEAD IS ROOF, which reflects the description of the head of the dinosaur as part of a building. This, to a certain extent, is also reflected in Example 9, in which the ecosystem is compared to an architectural element or, more precisely, to a place:

(9) its own ecological **niche** [BBC_2].

Other conceptualizations offer descriptions of the behavior of dinosaurs as reconstructed through fossilized remains and excavation sites (Examples 10 to 12):

(10) it was found forever frozen in a linked death **clasp** with its prey [BBC_1],

(11) But there is more to this remarkable death **duelling** pair [BBC_1],

(12) It would have been more concerned with **feasting on** plants [BBC_10].

In the first two realizations (Examples 10 and 11), the conceptual domain can be expressed as DINOSAURS' FIGHT IS METALLIC OBJECT and DINOSAURS' FIGHTS ARE WAR, respectively, which are both used to describe two fossils of dinosaur found mid-fight with the jaws of one dinosaur clenched to the bones of the other dinosaur. In Example 12, instead, the conceptualization would be DINOSAUR EATING HABIT IS BANQUET to stress the excess in the eating spree of the dinosaur while eating plants as described by the journalist.

Discoveries themselves are instantiated as in Examples (13) to (15), with some variety of domains:

(13) Scientists have **unveiled** a new species [BBC_2],

(14) Madagascar is a **treasure trove** for palaeontologists [BBC_5],

(15) Fossil finds have revealed a **wealth** of information [BBC_8].

While Examples 14 and 15 are both conceptualizations of NEW DISCOVERY IS RICHES, in Example 13 the conceptual domain can be expressed in more general terms as DISCOVERY IS MOVEMENT, a conceptual domain that we find instantiated in other cases to indicate the evolution of different species of dinosaurs (Example 16) and how dinosaurs' embryos grew in the egg (Example 17), respectively.

(16) Now this takes dinosaurs back to the right kind of time when those two groups would have split apart from each other [BBC_7].

(17) and we can put this together to get a growth trajectory of the embryo itself [BBC_7].

One last group of metaphors involves the evolutionary history of dinosaurs, and it can be conceptualized as DINOSAURS' FAMILY TREE IS A CONTAINER. In the BBC sample, we count nine instances of this metaphor, all realized with the expression of 'filling the/a gap', as illustrated in Examples 18 to 25.

(18) University of Toronto researchers say the new species [...] **fills in gaps** in the dinosaur family tree [BBC_1]

(19) Dinosaur '**fills fossil record gap**' [BBC_2],

(20) The discovery **fills a gap** in the fossil record [BBC_2],

(21) The most intriguing thing for me is that it **fills a major gap** in what we know about the history of dinosaurs in Madagascar [BBC_3],

(22) Palaeontologists have found what is likely to be the oldest known dinosaur, **filling in a yawning evolutionary gap** [BBC_5],

(23) It **fills a gap** between what we previously knew to be the oldest dinosaurs and their other closest relatives [BBC_7],

(24) **There was this big gap** in the fossil record where dinosaurs should've been present and this fossil neatly **fills that gap** [BBC_9],

(25) As it **closes** that evolutionary **gap** [BBC_10].

As we can see from the examples, the metaphor is so productive that it is repeated more than one time even in the same sentence and is sometimes accompanied by other figurative expressions such as 'family tree' in Example 18, and 'their closest relatives' in Example 23, in both cases instantiating the conceptual domain of DINOSAUR SPECIES BELONG TO A FAMILY.

In the case of the popularizing articles from The Guardian, the 12 instances of figurative language show some similarities in the conceptual domains used to describe the appearance of dinosaurs as well as some peculiarities. As for the similarities, the conceptualizations DINOSAURS ARE PRESENT-DAY ANIMALS (Example 26) and DINOSAURS' FIGHTS ARE (Example 27):

(26) They died about 67m years ago, **locked in combat** in what is now Hell Creek in Montana [TG_1],

(27) He said the nanotyrannus would have had a long, **swan-like neck** [TG_1]

Other interesting conceptualizations appear in the sample, such as DINOSAURS ARE STATUES (as in Example 28), which adds an emotive assessment of the appearance of the dinosaurs, otherwise described with neutral or positive

connotations, as demonstrated by the metaphors used in all the examples previously reported.

(28) For most of us, “pterodactyls” are imagined as large, vicious and ugly **gargoyles** [TG_3].

A peculiar set of metaphors is present in The Guardian sample and this group can all be categorized in the conceptualization of DINOSAURS ARE MACHINES/VEHICLES, as illustrated in Examples 29 to 34.

(29) These air sacs pushed pterosaur bones to their **mechanical limits** [TG_3],

(30) bird-like respiratory **mechanism** [TG_3],

(31) laboured **gliders** they were once thought to be [TG_3],

(32) so they clearly have some decent **processing power** [TG_4],

(33) it already had most if not all the brain required for flight before the **lineage took to the air** fully. [TG_4],

(34) a part of the brain unique to birds that assists in **processing sensory input** [TG_4].

In the examples reported in this group, the terminology employed by the journalist to instantiate the metaphors borrows terms from a wide range of technical domains, which can be identified as aeronautics and, more generally, mechanics (Examples 29, 30, 31, 33) as well as ICT with a familiar conceptual

domain THE BRAIN IS A COMPUTER (Examples 32 and 34) usually applied to humans (cf. Gotti, 2003).

4.3. Metaphors in the US news articles

As already mentioned at the end of the General Analysis (Section 4.2.), the sample of US news articles contains fewer metaphors than the British sample, namely, 8 in the CNN group of articles and 10 in the USA Today group.

Due to the relative scarcity of metaphors in the US sample, these will be presented together for both news outlets, unlike those presented in the British sample, also because the North American part shows a recurrence of the same conceptual domains already seen in Section 4.2. For instance, DINOSAURS ARE PRESENT-DAY ANIMALS is also present in both the CNN and USA Today news articles with similar linguistic realizations:

(35) this dinosaur ate **like a falcon** [CNN_1],

(36) tiny beast that would have looked something **like a “nimble, two-legged porcupine** [CNN_4],

(37) it had a **parrot-shaped** beak [CNN_5],

(38) stretching their necks **like giraffes** [UT_1],

(39) **duck-billed** dinosaurs [UT_2].

Even though Examples 35, 36, and 38 might be similes more than metaphors, as in the case of the British sample, they are instances of figurative language used to simplify the corresponding specialized concepts and to disseminate scientific knowledge about dinosaurs to a lay audience, notwithstanding the status of ‘sleeping metaphors’ (Müller 2009) already hypothesized in Section 4.2. for similar cases. Examples 37 and 39 are more evident instantiations of metaphors in which some physical features of present-day animals are used to describe similar characteristics of dinosaurs and clarify the concepts to the audience of non-experts.

The same strategy is used in the realizations illustrated in Examples 40 to 43:

- (40) a **pint-sized** creature that sported quills [UT_2],
- (41) **whip-tailed** Brontosaurus [UT_2],
- (42) a **scissors-like** set of teeth [UT_8],
- (43) “**dome-skull**” dinosaur [UT_9].

In this group we find instantiations of the conceptual domains DINOSAUR/DINOSAUR’S BODY PART IS OBJECT and DINOSAUR’S HEAD IS ROOF already used in the British sample (Example 43), which are all employed to describe the physical appearance of the dinosaurs by way of comparing them with

objects that are taken from the audience's tangible experience of the real world, therefore making them familiar and understandable for the readers.

Other metaphors realizing domains already seen in the British sample are *DINOSAUR SPECIES BELONG TO A FAMILY* and *DINOSAURS ARE STATUES*, both illustrated in Example 44, while Example 45 illustrates the former.

(44) Still, *Aurornis xui*'s exact position in its **family tree** is likely not **set in stone** [CNN_1],

(45) a new member of the dinosaur **family tree** [CNN_4].

One final group of metaphors is instantiated with several conceptualizations, which are illustrated in Examples 46 to 49.

(46) It's no bloody, foot-stomping **battle to the death** [CNN_6],

(47) following on the **heels of the discovery** of a new dinosaur species [CNN_8],

(48) findings can serve as a "**road map**" [UT_1],

(49) various fossils [...] **cobbled together** by a Florida fossil dealer [UT_9].

The domains conceptualizing these metaphors are various and varied: we can list the familiar *DINOSAURS' FIGHTS ARE WAR* already seen in the British sample (Example 46), but also *DISCOVERY IS BODY PART* (Example 47), as well as *FOSSILS ARE STRATEGY* as in Example 48, or *FOSSILS ARE ROAD* in Example 49.

5. Discussion

The analysis of the metaphors employed in both British and North American articles popularizing dinosaur-related news has revealed that the domains that recur in the sample seem to be those that help to conceptualize the appearance of the creatures, leading to either their objectification – i.e., comparing dinosaurs to everyday objects – or to their personification, as in those domains in which dinosaurs are likened to members of a human family. The most recurrent domain, however, which pervades the sample of news articles, remains the one that conceptualizes dinosaurs as animals living in the present-day world, namely, by comparing them to creatures that are familiar to any member of the audience in terms of physical properties and behavior. This is a well-established strategy extremely productive in any popularizing text (cf. Gotti, 2003), which ensures the dissemination of scientific concepts to the targeted audience.

The lack of existing literature on other popularizing articles from the same discipline as well as the limited size of the sample considered in this study do not allow for generalizations on the patterns of choice in terms of metaphorical preference in the news articles. Moreover, the lack of intra-cultural variation, the presence of the same domains in both British and North American news articles, along with the relative scarcity of metaphors found in the sample might lead to

preliminarily hypothesize that, rather than recurring to figurative language, the journalists disseminating this kind of news, prefer to adopt general strategies of popularization techniques, which are common in news articles disseminating scientific knowledge to a lay audience.

6. Conclusions

The present study has analyzed a sample of 40 popularizing articles from British and North American online news outlets to investigate if and how they use metaphors to transmit domain-specific information concerning the domain of paleontology. More specifically, all the articles in the sample reported news about dinosaurs and – by means of Conceptual Metaphor Theory – the study found out that, diatopic difference in the online newspapers notwithstanding, the most preferred domains were those that conceptualized dinosaurs by comparing them to present-day animals, or to everyday objects, or even by attributing them human-like societal organization as well as machine-like bodies.

The study, however, presents some limitations, mostly due to the small size of the sample considered. Another limitation is the origin of the news, which were taken from only four online sources (two for each news outlet) and considered only the British and the North American perspective in the English-speaking world.

In order to allow for sounder generalizations on the preliminary patterns identified in the present study, future research may consider a larger sample of news articles dealing with the same topic (dinosaurs and paleontology), properly collected and organized into a corpus for a more systematic investigation of the data. Moreover, other British and North American online newspapers might be included, and the perspective could also be expanded to other English-speaking news media. Finally, research could also include popularizing articles in other languages in order to ascertain whether metaphor use, and popularization strategies *lato sensu*, are shared by media in other languages or whether they characterize only English-speaking journalism disseminating news from the domain of Paleontology.

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