

The Metaphor of Struggle in Communication of the Evolutionary Theory

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Abstract: The objective of the paper is a Conceptual Metaphor Theory analysis of the metaphor of struggle in Darwin's theory. The study begins with a short survey of uses of the concept of "struggle for existence" predating Darwin's book followed by a systematic analysis of linguistic manifestation of this metaphor in *The Origin of Species*. It is argued that the rich elaboration of the conceptual metaphor RELATIONSHIPS IN NATURE ARE STRUGGLES in Darwin's theory (e.g. as war, battle, conquest, competition, race) results from multiple functions it plays in framing of the theory, that is the theory-constitutive, exegetical, catachretic, and rhetorical function.

Keywords: metaphor function, scientific discourse, Darwin

1. Introduction

The idea of struggle for existence has become the hallmark of the evolutionary theory and has permeated the language of evolution propagation and reception. This paper attempts to investigate the beginnings of the metaphor of struggle in the theory of evolution and considers its implications for the communication of this theory. Using the methodological framework of the Conceptual Metaphor Theory (CMT), we present an analysis of the conflictive scenario in Darwin's famous book *On the Origin of Species* (1859) as a first publication in which the concept of struggle for existence becomes fully integrated with the evolutionary perspective. In the analysis, special attention is paid to the rich elaboration of the struggle metaphor and its function in Darwin's argument. The functions of Darwin's struggle metaphor are discussed vis-à-vis functions that metaphors can perform in scientific discourse, especially theory-constitutive, exegetical, catachretic and rhetorical function. We want to argue that the extensive (and excessive) elaboration of the struggle scenario in Darwin's book and the fact that it goes beyond the immediate needs of theory explanation and coherence, as well as its career in evolutionary discourse, stem from a synergic effect of all these functions.

The paper is structured as follows: First, the research on metaphor in science and metaphor in Darwin's theory is briefly presented followed by an outline of main theoretical framework and key terminology. Then the concept of "struggle for existence" in texts preceding Darwin's *Origin* is discussed. In the largest, analytical part of the paper we investigate Darwin's use of the metaphor of struggle, its structure and elaborations. Finally, we discuss the nexus of functions that the metaphor of struggle performs in Darwin's theory.

2. Metaphor in Science and Metaphor in Darwin's Theory

The research on metaphor in science is diverse and extensive and has been conducted from the different perspectives of philosophers and historians of science, literary critics, and linguists. Metaphor is frequently discussed in relation to analogy and model. The significance of metaphor in constructing and expressing scientific theories is fully recognized in such works as Black (1962), Kuhn (1962), Hesse (1970), and Soskice and Harré (1996). Functions of metaphor that are listed in the literature on the subject are numerous, and sometimes overlapping. An exhaustive discussion is provided by Zawisławska (2011). For the purpose of this paper we limit our attention to four functions: theory-constitutive, catachretic, exegetical, and rhetorical.

The theory-constitutive function of metaphor discussed by Boyd (1993) corresponds to the heuristic function mentioned by Perelman (1969) and, more generally, with the role of metaphor in model construction (cf. Zawisławska, 2011, pp.115-117, Brown, 2003, p.12). Most importantly, metaphors in this role “encourage discovery of new features of the primary and secondary subjects, and new understanding of theoretically relevant respects of similarity, or analogy, between them” (Boyd, 1993, p. 489). Consequently, such metaphors “constitute, at least for a time, an irreplaceable part of the linguistic machinery of a scientific theory” (Boyd, 1993, p. 486). They become an inherent part of a theory and cannot be replaced by non-metaphorical descriptions without affecting this theory. Boyd further remarks that theory-constitutive metaphors can also play a catachretic role because “they provide a way to introduce terminology for features of the world whose existence seems probable, but many of whose fundamental properties have yet to be discovered” (1993, p. 490). Soskice and Harré (1996, p. 304) even argue that metaphor in the catachretic function is more useful in the formation of scientific theory than it is in constructing scientific models. The third function, which Boyd calls exegetical or pedagogical, highlights the potential of metaphor for “the teaching or explication of theories which already admit of entirely adequate non-metaphorical (or, at any rate, less metaphorical) formulations” (Boyd, 1993, pp. 485–486). In other words, metaphors are used to explain scientific theories in a more accessible way, even though a non-metaphorical description is available. The fourth and last function of metaphor in science discussed here is the rhetorical or aesthetical function. The tradition of rhetoric going back to the Antiquity emphasizes the capacity of metaphor to attract the receiver's attention by aesthetically pleasing effects. Metaphor in scientific discourse can also be used to achieve persuasive effects, and the struggle metaphor in Darwin's theory is a case in point. What is more, the analysis of the struggle metaphor in *The Origin* reveals that one metaphor can have several functions in one theory that are in operation at the same time. Thus, in this study we focus on the function of the struggle metaphor as a tool for reasoning (theory-constitutive function), a tool for communication (catachretic function), a tool for explanation (exegetical function) and a tool for persuasion (rhetorical function). The majority of research on metaphors in evolutionism emphasizes cultural and historical context of *The Origin*. Darwin's anthropomorphic metaphors, especially personification

of nature and natural selection, have earned the greatest interest. They were noticed, and often criticized, by his contemporaries, such as Alfred Wallace, the co-creator of the theory of evolution, as evidenced by letters he wrote to Darwin (cf. Young, 1983, p.100). Darwin's exploitation of personification has been explained as his theoretical deficiency to identify a cause for the transmutations of species (Young, 1983) or as stemming from his struggle with the English language, which is anthropocentric in nature (Beer 2009). In Beer's words, Darwin "was telling a new story, against the grain of the language available to tell it in" (2009, p.3), and that made him resort to metaphors. The claim that the whole concept of natural selection is a metaphor can be found in Thompson (2000), who focuses on the implications that this metaphor has for Darwin's theory.

A wider range of metaphors used by evolutionists for over a century was investigated by Ruse (1999). He discusses the metaphors of the tree of life, natural selection, adaptive landscape, progress, dynamic equilibrium, division of labour, struggle for existence, and arms race. He also emphasizes the impact of the social and cultural background of researchers on their views of the role of struggle for existence in the theory of evolution (Ruse, 1999, pp. 246-8). Thus, Darwin, who was heavily influenced by 18th and 19th century political economy and the industrial reality of Victorian England, found struggle and competition to be an indispensable and positive mechanism operating in nature, whereas German or Russian evolutionists either diminished the role of struggle in evolution or rejected it completely.

Research has also been conducted on Darwin's metaphors that applies the theoretical assumptions and methodology of the Conceptual Metaphor Theory (CMT) and the Blending Theory (BT). For example, Al-Zachrani (2008) identifies a number of conceptual metaphors: NATURE IS A MOTHER, NATURE IS A BREEDER, LIFE IS WAR, LIFE IS A RACE and EVOLUTION IS PROGRESS, and discusses their implications for Darwin's argument. A CMT analysis of the personification of nature and natural selection can be also found in Drogosz (2008, 2011, 2012a), a discussion of Darwin's use of the metaphor of family, tree, and struggle in Drogosz (2009), an overview of Darwin's use of metaphors of motion in his conceptualization of evolutionary change in Drogosz (2010, 2012b, 2013), and commentary on the overall impact of this network of metaphors on Darwin's theory and its coherence and logic in Drogosz (2012c, 2015, 2016).

We believe that the Conceptual Metaphor Theory is especially promising for researching the use of metaphor in science because from the CMT's conception, Lakoff and Johnson (1980) have emphasized the role of metaphor in reasoning, and because its methodology provides tools for a detailed and systematic analysis of metaphor structure. The basic assumptions and terminology of the CMT are presented in the next section.

3. The Conceptual Metaphor Theory: Basic Terms and Relevance for the Study

At the core of the CMT approach to language is the claim that “metaphor is pervasive in everyday life, not just in language but in thought and action”, that the whole “conceptual system, in terms of which we think and act, is fundamentally metaphorical in nature” (Lakoff and Johnson, 1980, p.3). As CMT theorists emphasize, “metaphor allows us to understand a relatively abstract or inherently unstructured subject matter in terms of a more concrete, or at least a more highly structured subject matter” (Lakoff, 1993, p.245). The CMT defines metaphor very broadly and uses the term “conceptual metaphor” to distinguish it from other approaches to metaphor. A conceptual metaphor is taken to be an “understanding of one conceptual domain in terms of another conceptual domain”, with the conceptual domain being defined as “any coherent organization of experience” (Kövecses, 2002, p. 4). In other words, a conceptual metaphor involves mappings (or projections) from a source domain, which is typically more concrete, familiar and experientially grounded, to a target domain, which is typically less familiar and more abstract. The CMT methodology enables a principled analysis of systematic correspondences between the domains and an identification of inferences and entailments that result from these correspondences. Consequently, in this study, the metaphor of struggle in *The Origin of Species* is analysed as a set of mappings from the source domain of social relationships (struggle), onto the target domain of relationships among organisms, that is as the conceptual metaphor RELATIONSHIPS IN NATURE ARE STRUGGLES. The CMT analysis of Darwin’s use of the domain of struggle allows us to show the systematicity and complexity of these mappings and provides a starting point for a discussion on its functions in the theory.

4. Malthus and Lyell: Pre-Darwinian Struggle for Existence

Charles Darwin was not the first to use the phrase “struggle for existence” nor was he the first to describe relationships among organisms in antagonistic terms. That is why this analysis of the struggle metaphor in *The Origin of Species* begins with a short overview of Darwin’s predecessors, which will also reveal the growing popularity of the metaphor. It also puts Darwin’s use of the metaphor in historical context. It should be remembered that Darwin was not drawing from some abstract domain of social dynamics but from his own experience of 19th century English society’s understanding of which was framed by the political philosophy of Thomas Malthus (cf. Ruse, 1999, p.246).

The term “struggle for existence” was used by Thomas Malthus and Charles Lyell whose works significantly influenced Darwin.¹ In his book *An Essay on the*

¹ In *The Origin*, Darwin explicitly admits the inspiration coming from reading Malthus’ work: “In the next chapter the Struggle for Existence amongst all organic beings throughout the world, which inevitably follows from their high geometrical powers of increase, will be treated of. This is the doctrine of Malthus, applied to the whole animal and vegetable kingdoms. As many more

Principle of Population, Thomas Malthus used this term only in relation to human society and this use is relatively limited. The word “struggle” appears only twice in the 1st edition (1798) (e.g. 1) and six times in the 6th edition (1826). Other words of conflict are also limited: “war” – 6 times, “contest” 2, “competition” 4 (competition in the market), “conquest” 2.

1. The peaceful inhabitants of the countries on which they rushed, could not long withstand the energy of men acting under such powerful motives of exertion. And when they fell in with any tribe like their own, **the contest was a struggle for existence**; and they fought with a desperate courage, inspired by the reflection that death was the punishment for defeat, and life the prize of victory. (1798, p. 14)

Charles Lyell used the word “struggle” only four times in his three-volume work *Principles of geology* (1830-1833), three of which refer to the world of nature and are quoted below.² Although he extended the antagonistic conceptualization to the organic world, he did so through an explicit analogy to human society. The word “conquer” is only used in reference to people and the idea of competition does not appear at all.

2. Unhealthy plants are the first which are cut off by causes prejudicial to the species, being usually stifled by more vigorous individuals of their own kind. If, therefore, the relative fecundity or hardiness of hybrids be in the least degree inferior, they cannot maintain their footing for many generations, even if they were ever produced beyond one generation in a wild state. In the **universal struggle for existence**, the right of the strongest eventually prevails; and the strength and durability of a race depends mainly on its prolificness, in which hybrids are acknowledged to be deficient. (1832, pp. 55-56)
3. We have only to reflect, that in thus obtaining possession of the earth by conquest, and defending our acquisitions by force, we exercise no exclusive prerogative. Every species which has spread itself from a small point over a wide area, must, in like manner, have marked its progress by the diminution, or the entire extirpation,

individuals of each species are born than can possibly survive; and as, consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be NATURALLY SELECTED. From the strong principle of inheritance, any selected variety will tend to propagate its new and modified form” (1859, p.5). And further: “Hence, as more individuals are produced than can possibly survive, there must in every case be a struggle for existence, either one individual with another of the same species, or with the individuals of distinct species, or with the physical conditions of life. It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms;...” (1859, p.63).

² Although Lyell used the concept of struggle to describe the world of nature and although Darwin acknowledged his fascination with *Principles of geology*, Lyell himself was not in favour of the idea of changing species and did not embrace Darwin’s views until late in life (cf. Ruse, 1999, p.75).

of some other, and must maintain its ground by a **successful struggle** against the encroachments of other plants and animals. (1832, p. 156)

4. A faint image of the certain doom of a species less fitted to **struggle** with some new condition in a region which it previously inhabited, and where it has to contend with a more vigorous species, is presented by the extirpation of savage tribes of men by the advancing colony of some civilized nation. (1832, p. 175)

As we can see, the idea of struggle for existence was used before Darwin either to describe social relationships or to describe relationships in nature in analogy to human society. It was Darwin's role, however, to extend this concept to the world of nature and make it the cornerstone of the theory of organic change.

5. "Struggle for Existence" in *The Origin of Species*³

Charles Darwin consistently used the language of conflict to describe the world of nature: the relationships between organisms and their relation to the physical environment. Unlike Malthus, Darwin uses the term of struggle to describe nature, not human behaviour. Unlike Lyell, he describes antagonisms in nature without explicit analogy to the human society. Struggle for existence is an inherent part of his argument which can be summarized as follows: Because resources are limited, organisms have to struggle to survive, and because more are born than can possibly survive, such struggle is inevitable. Organisms which develop any advantage over others are more likely to survive and pass that advantage to next generation. In Darwin's theory, struggle for existence, coupled with natural selection, leads to evolutionary changes and the origin of new species without divine intervention. Thus, in *The Origin*, struggle is not an analogy, but a domain through which organic life is understood and described, that is the conceptual metaphor RELATIONSHIPS IN NATURE ARE STRUGGLE.

The importance of the antagonistic construal in Darwin's theory is reflected in the frequency with which he uses struggle-related vocabulary in comparison to his predecessors: "struggle" appears in the text 95 times, "compete/competition" – 54 times, "conquer/conqueror" – 6 times, "weapon" – 5 times, "war" – 4 times. The frequency of vocabulary corresponds to the richness of the expressions from the domain of STRUGGLE which, in turn, stems from extensive elaboration of the metaphor throughout the text of *The Origin*.

³ The analysis of Darwin's language in this study is based on the first edition of his book *On the Origin of Species by Means of Natural Selection* published in 1859. Page numbers given with the quotations come from the first edition published by John Murray, London, available at the website Darwin Online

<http://darwin-online.org.uk/content/frameset?itemID=F373&viewtype=side&pageseq=1>.

Structuring the domain of relationships in nature in terms of human antagonistic behaviour means that the roles of antagonists are ascribed to elements of nature. Darwin's theory identifies three lines of conflict: between organisms and natural environment, as in (5), between organisms of the same time and in the same area for natural resources, as in (6), and between earlier and later forms of species, as in (7).

5. But a plant on the edge of a desert is said to **struggle for life against the drought** ... (1859, p.62)
6. The **struggle** will generally be more **severe between species of the same genus**, when they come into competition with each other (1859:76)
7. Hence the **improved and modified descendants of a species** will generally cause the **extermination** of the **parent-species**; (1859, p.321)

Describing struggle at a schematic level would be sufficient to satisfy the demands of logic and coherence of Darwin's theory. However, in the text we find astonishingly rich elaborations of this domain. Thus, relationships in nature are not just a struggle, but more specifically a war (battle, invasion, conquest, victory, defeat) and competition:

RELATIONSHIPS IN NATURE ARE A WAR

8. Thus, **from the war of nature**, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. (1859, p.490)

RELATIONSHIPS IN NATURE ARE A BATTLE

9. If two great regions had been for a long period favourably circumstanced in an equal degree, whenever their inhabitants met, the **battle** would be prolonged and severe; and some from one birthplace and some from the other might be **victorious**. (1859, p.326)

RELATIONSHIPS IN NATURE ARE A CONQUEST

10. One large group will slowly **conquer** another large group, reduce its numbers, and thus lessens the chance for further variation and improvement. (1859, p.125)

RELATIONSHIPS IN NATURE ARE AN INVASION

11. ... bearing in mind that the tropical productions were in a suffering state and could not have **presented a firm front against intruders**, that a certain number of the more vigorous and **dominant** temperate forms might have **penetrated the native ranks** and have reached or even crossed the equator. The **invasion** would, of course, have been greatly favoured by high land, and perhaps by a dry climate... (1859, p.377)

RELATIONSHIPS IN NATURE ARE A COMPETITION

12. The **competition** will generally be most severe, as formerly explained and illustrated by examples, between the forms which are most like each other in all respects. (1859, p. 320)

RELATIONSHIPS IN NATURE ARE A RACE

13. Hence, rare species (...) will consequently be beaten in the **race for life** by the modified descendants of the commoner species. (1859, p.110)

14. Hence, the more common forms, in the **race for life**, will tend to beat and supplant the less common forms for these will be more slowly modified and improved. (1859, p.177)

On the basis of these examples and the whole text of *The Origin*, we can see that there three levels of relationships in nature construed as a struggle and two main elaborations of this struggle (war and competition) used by Darwin to describe them. The level of struggle that is described with the greatest detail and which recruits the greatest number of mappings is the level of relationships among organisms at a given moment of time, which is conceptualized and described as WAR. The mappings are summarized in Table 1.

SOURCE DOMAIN WAR	TARGET DOMAIN RELATIONSHIPS AMONG ORGANISMS AT A GIVEN MOMENT OF TIME
enemies	species individual organisms
winners	surviving species/individuals
losers	species/organisms that disappeared from an area
victory	survival
defeat	disappearance of organisms from an area they used to inhabit
battlefield	an area inhabited by organisms, natural environment
invasion/conquest	appearance of organisms in a new area
natives/inhabitants of a country	organisms inhabiting an area
foreigners/intruders/ foreign troops	organisms migrating to an area
weapons	traits, adaptations, behaviour, etc.
possession of a land	living in an area
beating	replacing indigenous organisms

Table 1.

The metaphorical mappings between the domain of RELATIONSHIPS AMONG ORGANISMS AT A GIVEN MOMENT OF TIME and the domain of WAR

Projections from the domain of WAR onto the domain of relationships between earlier and later forms of organisms are less numerous. The participants in that conflict are earlier (parent) forms of an organism, which correspond to the defeated army, and later (descendant) forms, which correspond to the winners. The theory predicts only one outcome of this conflict, namely victory over or extermination of parent forms by later,

better adapted, descendants (cf. 7). The domain of COMPETITION is less elaborated than the domain of WAR, neither it is applied to structure the relationships between organisms and the environment. The constraint stems from the empirical knowledge of the target domain: while organisms can be seen as competing for resources, the physical environment cannot participate in competition.

The choice to use the antagonistic construal to structure the domain of relationships in nature was a logical consequence of Darwin's assumption that environmental resources are insufficient for the number of organisms that come to existence with every generation, an assumption inspired by reading *An Essay on the Principle of Population*. Consider:

15. A struggle for existence **inevitably follows** from the high rate at which all organic beings tend to increase. (...) It is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms; for in this case there can be no artificial increase of food, and no prudential restraint from marriage. (1859:63)
16. As more individuals are produced than can possibly survive, **there must in every case be a struggle for existence**, either one individual with another of the same species or with the individuals of distinct species, or with the physical conditions of life. (1859:63)

The metaphor of struggle not only structures Darwin's descriptions of relationships in nature but also, more importantly, his reasoning. For example, because related forms of organisms need the same resources, the theory predicts that the competition between related forms should be more severe than between unrelated organisms, as is illustrated in (17) and (18):

17. As species of the same genus have usually, though by no means invariably, some similarity in habits and constitution, and always in structure, **the struggle will generally be more severe between species of the same genus**, when they come into competition with each other, than between species of distinct genera. (1859:76)
18. As the individuals of the same species come in all respects into **the closest competition with each other, the struggle will generally be most severe between them**; it will be almost equally severe between the varieties of the same species, and next in severity between the species of the same genus. (1859:467)

Furthermore, the source domain of struggle involves not only the participants in the conflict, but also the idea that the winner must be somehow better than the defeated. That inference is transferred to the theory of evolution, at least in its initial formulation by Darwin, who repeatedly states that the later forms of organisms must be superior to their predecessors:

19. If under a nearly similar climate, the eocene inhabitants of one quarter of the world were **put into competition** with the existing inhabitants of the same or some other quarter, the eocene fauna or flora would certainly be beaten and exterminated; (1859:337)

20. I do not doubt that this process of improvement has affected in a marked and sensible manner the organisation of the more recent and **victorious** forms of life, in comparison with the **ancient and beaten forms**; but I can see no way of testing this sort of progress (1859:337)
21. The inhabitants of each successive period in the world's history **have beaten their predecessors in the race for life**, and are, in so far, **higher** in the scale of nature; (1859:345)
22. ...sub-groups (...) will constantly tend to **supplant and destroy** the earlier and less improved sub-groups (1859:126)
23. for in all cases **the new and improved forms** of life will tend to **supplant the old and unimproved forms**. (1859:281)

What is more, this inference is in fact the foundation on which Darwin's mechanism of evolutionary change rests: those organisms that happen to be victorious in the struggle for life survive because they must have some advantageous trait that made it possible. They survive as individuals, but they also pass that winning trait on to the next generation, which, when the process is repeated over countless generations, results in accumulation of modification and, ultimately, the emergence of a new species (24, 25). The belief in the positive results of all that struggle is claimed to outweigh the terrors of the war (26, 27):

24. **New species** are formed by new varieties arising, which **have some advantage** over older forms... (1859:325)
25. ... for each **new species** is formed by having had **some advantage in the struggle for life** over other and preceding forms. (1859:337)
26. When we reflect on this struggle, we may console ourselves with the full belief, that the **war of nature** is not incessant, that no fear is felt, that death is generally prompt, and that the vigorous, **the healthy, and the happy survive and multiply**... (1859:79)
27. Thus, **from the war of nature**, from famine and death, the most **exalted** object which we are capable of conceiving, namely, **the production of the higher animals**, directly follows. (1859:490)

Summing up this section we can state that relationships in nature are conceptualized and described in *The Origin* via the conceptual metaphor RELATIONSHIPS IN NATURE ARE A STRUGGLE. The metaphor is richly elaborated and the text abounds in images of conflict between organisms. As we have mentioned, the elaboration and detailed description exceeds the needs of the argument. The question then arises, what motivated Darwin to push this metaphor that far. We want to argue that the answer can be found in the multiple functions that this metaphor plays in Darwin's theory.

6. The Functions of the Struggle Metaphor in Darwin's Theory

The Conceptual Metaphor Theory emphasizes the significance of metaphor in abstract reasoning and the comprehension of abstract concepts. In Darwin's theory, the domain of struggle structures reasoning about organisms and plays a key role in Darwin's explanation of the origin of species without the involvement of supernatural powers. As it was demonstrated above, Darwin reasoned that limited resources must lead to competition, that competition must be the greatest among closely related organisms, that individuals that happen to have any advantage will pass that advantage on to the next generation. Advantageous modifications, accumulated over long expanses of time, will result in the emergence of new species, which must be superior to the earlier species. The antagonistic construal of nature, then, becomes an inherent part of Darwin's argument and a foundation of his theory. In other words, it is, as Boyd (1993) called it, a theory-constitutive metaphor. It could not be replaced by a non-metaphorical description or by a different metaphor, because it would affect the theory itself. In fact, attempts to extend evolutionism's explanatory potential by introducing the concept of cooperation among organisms (e.g. by Kropotkin, 1902) were not welcome.

The metaphor of struggle plays a catachretic role as well in that it provides vocabulary to express the theory in language. When Darwin set forth to write his book, he needed a vocabulary that would best reflect his thoughts. Thus, the conceptualization of relationships in nature as struggle provided metaphorical expressions to precipitate Darwin's ideas into language. It should be emphasized that Darwin was aware that he was using a metaphor (28), however what was a metaphor for him, has become in time the conventional language of evolutionism, as attested, for example, by (29), an excerpt from a popular text describing plant life

28. I should premise that I use the term Struggle for Existence in a large and **metaphorical sense**, including dependence of one being on another, and including (which is more important) not only the life of the individual, but success in leaving progeny. (1859, p.62)
29. **Competition** isn't just a phenomenon in the animal world; plants **compete** with each other too. They need adequate sunlight, soil nutrients, and fresh water to survive. Though they are stationary, they still have ways of **combating** each other. Over time plants have evolved ingenious ways of procuring sunlight, attracting pollinators, and obtaining fresh water. They may take an **offensive** approach, responding to the **competition** head-on, or a **defensive** approach, making modifications to increase their chances of survival and reproduction. For example, when sunlight is the limiting factor, some forest trees grow rapidly to tower over their **competitors** and absorb the most sunlight, others channel their energy into producing many seeds and attempting to spread them so that they increase the chances of their offspring landing in a well-lit area. Plants have developed all kinds of **competitive** strategies from storing nutrients to becoming parasites to developing disease resistance.

<http://www.untamedscience.com/biology/ecology/interactions-among-organisms/competition/> Accessed 15.02.2017

Presenting his theory to the public, Darwin also faced the problem of explaining his ideas to the general readership. As it was common in 19th century science, his explanation had to be expressed in a way that would be understandable not only to fellow specialists, but to the general readership as well (cf. Beer 2009:41, 49). Describing relationships in nature as if they were engaged in war or competition ideally served this purpose, as it appealed to concepts familiar to his readers. Consequently, the metaphor of struggle was used with what Boyd (1993) calls the exegetical or pedagogical function.

Finally, Darwin hoped to make a convincing case. *On the Origin of Species*, inevitably, became part of the debate on presence of divine intervention in the order of nature and the book itself is structured as “one long argument”, as Darwin himself admits (1859, p.459). The genre of debate exerts pressures on discourse; interesting the reader is one such pressure. The antagonistic construal is again a natural choice. In the first place, it turns the static state of organisms existing in an area or time period into a dynamic narrative of struggle. Such narrative appeals to emotions and triggers the imagination, simply, it makes an interesting read. That is why we argue that the metaphor of struggle performs an aesthetic or rhetorical function as well, and that this function is responsible for Darwin’s excessive elaboration of this metaphor manifested in his vivid, almost epic, pictures of combat in nature. We also believe that rhetorical potential of the struggle metaphor has contributed to its continuing career in the theory of evolution.

7. Conclusions

This paper presented an analysis of the metaphor of struggle that permeates Darwin’s famous book *On the Origin of Species*. Using the methodology of the Conceptual Metaphor Theory, it analysed this metaphor in its historical and cultural context with a view to explain its rich and excessive elaboration in Darwin’s text. It is argued that the success of the conceptual metaphor RELATIONSHIPS IN NATURE ARE A STRUGGLE, both in the original formulation of the theory of evolution and its contemporary developments, results from the four converging functions that this metaphor performs: theory-constitutive, catachretic, exegetical, and rhetorical. The analysis also has revealed that one metaphor can play multiple functions in the same discourse. What is more, these functions support each other and motivate extensive use of a variety of related metaphorical expressions.

The analysis also allows for more general observations concerning the role of metaphor in scientific discourse. In the first place, apt metaphors tend to be conventionalized in time. While initially their use may be grounded in the fundamental need to express new ideas in a comprehensible way, frequent use of metaphorical expressions turns standardizes their usage within a particular branch of science. Conventionalizing the language can also lead to fossilization of the construal that the

metaphor imposes on the studied phenomenon, thereby blocking alternative construals. Secondly, the study also shows the difference that analogy and conceptual metaphor may have for the reception of a theory. Both analogy and metaphor are used to explain, convince, illustrate and facilitate reasoning; however, the act of making an analogy remains overt to the reader and leaves room for alternative analogies and explanations, perhaps better ones. Conceptual metaphor, on the other hand, is less transparent to the readers, leaves less room for alternative construals, and may create the illusion that what is being described is factual. However, further CMT research is needed to study the differences in how analogy and conceptual metaphor used in scientific discourse affect understanding and, more generally, reception of a scientific theory.

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