

The Role of Metaphor in Argumentation

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Metaphors are cognitive processes used to represent the world and better understand ourselves. This view, widely accepted in contemporary metaphor studies and confirmed by an extensive range of analysis and experiments, allows to explain why metaphors have such deep impact on several contexts of human language and thought: they can range from syllogisms to poems, from newspapers headlines to adverts, from scientific models to thought experiments. There has been considerable study of the persuasive effect that metaphors have in advertisements, political speeches, arguments in debates, educational material, and elsewhere. While an apt metaphor can strengthen an argument and make it more persuasive without doing violence to the truth, metaphor can also, by exacerbating problems of ambiguity, contribute to fallacies of argumentation. The present volume collects nine papers which combine logical and philosophical analysis and empirical research to study different aspects of metaphors in argumentation. The aim of this collection is to theoretically analyse the way metaphors are used in argumentation, and the linguistic and epistemological phenomena involved in metaphor production and comprehension in different research fields, such as science, literature and philosophy.

All the collected papers were presented at the first Cagliari-Urbino Meeting on “Metaphor and Argumentation”, held at the Department of Edu-

cation, Psychology, Philosophy of the University of Cagliari on June 13-14, 2012. The meeting was jointly organised by the research groups Linguistica-Mente and ALoPhiS - Applied Logic, Philosophy and History of Science (University of Cagliari), Synergia Research Group in Logic, Language, Cognition, History and Philosophy of Sciences (University of Urbino) and APhEx. Portale italiano di filosofia analitica (www.aphex.it). The workshop was divided into four sections, presenting four different perspectives on the role of metaphor in argumentation.

The first section, “The language of metaphor”, investigates the use of metaphor as a linguistic phenomenon from a historical point of view, paying attention to its role in literature. After having introduced the major theories of metaphor from Aristotle to Relevance scholars, it focuses on live metaphors in Italian contemporary literature. The second section, “Epistemology of metaphor”, focuses on the role of metaphor in scientific theories and discusses the functions and characteristics metaphor needs in order to be a real tool for scientific discovery and argumentation. The third section “Arguing with metaphors”, more specifically analyses the effects of metaphor in argumentation, from both a general perspective as in the case of the ontogenesis of universal and a specific perspective as in the case of *quaturnio terminorum*. The fourth section “Experimenting with metaphors”, proposes two methodologies to test metaphor comprehension in argumentation. The first one comes from psycholinguistics and consists in indirectly asking people whether and how they recognize that a conclusion follows from some premises containing metaphors. The second one is rooted in philosophical tradition and consists in imagining radical situation and/or particular context where metaphors could be investigated in their deeper mechanisms.

1. The language of metaphor

In “Metaphor and Reasoning: Aristotle’s View Revisited”, Elisabetta Gola argues that all contemporary theories of metaphor claim that metaphors and reasoning are somehow bound. Indeed, whether emphasizing metaphors’ conceptual features or underlining its linguistic peculiarities, in any case these theories are aimed at showing that metaphor is a powerful device to increase our knowledge, because it enhances the connections between human thought and reality (Gola 2005). Elisabetta Gola investigates the historical roots of this idea, by defining the terms of the problem in the philosopher who set them first: Aristotle. Aristotle thought that metaphor is proper to learning and understanding, because it allows a transfer of knowl-

edge from different domains (from a concrete domain to an abstract one), which are isomorphic. According to Aristotle, metaphor is a way to grasp by intuition the similarities we find in nature. Other conceptual procedures intervene to understand whether such similarities are true and metaphors are then grounded.

This view on metaphor has been interrupted when classic rhetoric has coded metaphor and other tropes of language according to their use, classifying them as language embellishments. Metaphor lost the power of connecting language, thought and reality until 1954, when Max Black proposed the interactive theory of metaphor, focusing on the role of imagination in the language of science. The main idea of the theory is that a metaphor involves at least two domains of knowledge and that the relation among them cannot be reduced to their single words nor to the entire domains considered as separated. The interaction among domains is created through a metaphor, which restructures the domains themselves, by (1) selecting, (2) emphasizing, (3) suppressing, and (4) organizing their traits. In 1980 George Lakoff and Mark Johnson proposed another view, the conceptual theory of metaphor, which brings back to the foreground the cognitive role of metaphor. Metaphors are just the linguistic surface of deeper structures, called image-schemata, lying between propositions and images. Such image-schemata guarantee conceptualization through a complex system of primary and cultural projections from a source domain to a target domain. Therefore metaphors are the litmus paper of the mechanisms of projections between domains according to the context of use.

Psycholinguists such as Raymond Gibbs (1994), Sam Glucksberg (2001), and Rachel Giora (2003) and others bring in front of the tribunal of experience the major theories of metaphor, by testing the mechanisms involved in metaphor comprehension to understand whether they are different for literal and figurative meaning and whether they need different processing times. Elisabetta Gola discusses different hypotheses showing that there still is no shared answer to these problems in the field of metaphor studies. However scholars such as Deirdre Wilson and Dan Sperber, who proposed the Relevance theory in 1986, show that there is a “continuum” between literal language and figurative language, metaphor included, and that therefore the dichotomy between literal and metaphorical uses of language is inaccurate. They are just different solutions to the same problem: understanding in each communicative encounter and for each exchanged message, which its more relevant interpretation is, i.e. the interpretation optimizing the costs/benefits relationship between processing effort and cognitive effect.

Their explanation of the explicit meaning challenges the traditional distinction between literal and non-literal uses of language, insofar as what is considered as “literal” is the result of a pragmatic process of modulation (Carston 2002). Appealing to a “unified approach” to literal and non-literal uses of language, Robyn Carston (2002) explained metaphors as a local, on-line pragmatic adjustment of the encoded lexical meaning resulting in an *ad hoc* concept. However, in the case of live metaphors, an alternative, “imaginative” route is hypothesized (Carston 2010; Carston and Wearing 2011): the literal meaning would be maintained in a more global pragmatic process resulting in a range of communicated affective and imagistic effects. This route to understanding metaphors does not exclude the *ad hoc* concepts mechanisms, i.e. a more conceptual way to metaphor understanding. In Carston’s view, literal meaning plays indeed a fundamental role for metaphor understanding. However, in the case of live or literary metaphors the literal meaning endures in evoking an image with more important effect with respect to the first route.

Giuseppe Bompreszi’s paper, “Bontempelli, Calvino, Montale and Luzi: Thoughts on Metaphor within Contemporary Italian Literature”, specifically focuses on live metaphors taken from Italian contemporary literary texts. Bompreszi outlines a theory of literature which should be able to provide an explanation to the specificities of literary texts when compared to other kind of texts. Quoting Miller (2002), Bompreszi states that “Literature derails or suspend or redirects the normal referentiality of language. Language in literature is derouted so that it refers only to an imaginary world” (Miller 2002: 18). He focuses his attention on Roman Jakobson’s view on poeticness, a property identified as the core characteristic of literary texts. However, Jakobson maintains that metaphor is the most prominent figure of speech in poetry, whereas metonymy is the most important scheme in prose. In order to criticize Jakobson’s view, Bompreszi analyses the use of metaphor in four Italian authors, providing two counter-examples from poetry and tales.

In the tale *The Good Wind* (1961), Massimo Bontempelli introduces some figurative expressions Italians use in ordinary communicative interactions. The tale presents both metaphors and metonymies as expressions we no longer perceive as non-literal, since they have entered our everyday language. Only by an effort of abstraction we could get to consider them as figurative. Bompreszi argues that the tale can be read as the aesthetic realization of the theory of metaphor, according to which we should hypothesize a plurality of worlds in order to make sense of an utterance which is not referentially coherent with the actual world. In *The forest on the Superhighway*

(1966), Italo Calvino clearly mentions the alleged wood to refer to something else: a heap of billboards. As Bomprezzi argues, this is not a metaphor because this case is more similar to an epistemological misinterpretation. The children of the tale have a model, which is in a sense a metaphor, but allows them to infer something true, despite its being false, with a funny effect.

In *I Have Often Met the Pain of Living* (1925), Eugenio Montale does not properly use metaphor but more precisely “objective correlatives”, i.e. denotation of specific things and/or situations, to evoke a feeling without necessarily speaking of that feeling as such. For instance, the “pain of living” is evoked by “the obstructed brook that gurgles”, “the shrivelling up of the burnt leaf” and “the collapsed horse”. These expressions *represent* the suffering of being-in-the-world in physical terms, i.e. without referring to psychological states. In *Under the Yoke of Metaphor* (1935), Mario Luzi invites the reader to consider metaphor not as a “further-ness” or something that comes after the literal or a shared background of successful communication in its turn connected to a shared world. Metaphor is rather the very condition of human being, to whom any object is symbolically intentioned. Therefore metaphor comes first, before the literal, and – as Bomprezzi suggests – “the world is never the correlate of an empty and simple faculty of ‘seeing’”.

2. Epistemology of metaphor

Overall the first two papers concern the language poets as well as laymen use to express metaphor and the theories scholars have introduced to explain such a complex cognitive-linguistic phenomenon. The following papers focus on science as the special field where metaphor’s argumentative power can better display its effect.

In “Features and Functions of Scientific Metaphors”, Massimo Sangoi aims at understanding why and under which conditions metaphor, which is omnipresent in scientific discourse, can really contribute to knowledge increasing. As several studies have shown, metaphors are essential not only because of their communicative and pedagogical functions, but also (and more interestingly) because of their epistemic role.

Sangoi reviews the debate on this topic to show why metaphors can play an essential role in theory-making. In order to understand the role and the heuristic effectiveness of metaphors in scientific reasoning, he outlines the cognitive mechanisms underpinning the effects of this figure of speech.

As a linguistic phenomenon, metaphor is an act of transfer of a word or phrase from one domain to another grounded in some similarity between the domains. In this transfer some properties are selected, while others are ignored according to some relevance criteria, which are based on the context and the conceptual frameworks of the domains involved. Following Lakoff and Johnson's theory (1980), Sangoi highlights the fact that metaphor is not just a linguistic matter, but it rather concerns our thought and action. Metaphors are indeed rooted in our experience, so they are not on the same level of any metaphorical linguistic expression met in spoken or written speech. Well-known examples of conceptual metaphors are LIFE IS A JOURNEY, ARGUMENT IS WAR, TIME IS MOTION, SADNESS IS DOWN, etc. Their source is provided by Gestalten, i.e. "image-schemata" directly emerging from our bodily experience or representations of more familiar domains. Many linguistic metaphors can be derived from such conceptual metaphors: for example, sentences such as "Sam's life took an unexpected direction after he met Jenny" and "Mary was at a crossroads, she did not know which way to go" are different manifestations of the same LIFE IS A JOURNEY conceptual metaphor.

First, Sangoi considers some influential theories of metaphor, such as Max Black's *interactive view* (1962) and its developments, George Lakoff and Mark Johnson's *conceptual theory of metaphor* (1980), and the *structure mapping theory* proposed by Dedre Gentner and her colleagues (1982, 1993). This leads him to explore Indurkha's interaction-based approach (Indurkha 1992), with particular reference to the creative side of metaphor. In this framework, cognition is characterized by an interaction between a cognitive agent and her environment, which are equally essential to determine the structure of our conceptual system (Indurkha 1992, 2006, 2007). Reassessing Black's theory on the mechanisms of projection and accommodation, Indurkha shows how metaphor can bring new possibilities of meaning into being (Indurkha 2006). Second, Sangoi shows how different views about scientific theories could influence the attitude towards metaphor and prejudice the expectations as to its actual import in scientific reasoning. In this respect, pursuing the analysis in the direction suggested by Mary Hesse, he argues that moving from an approach focused on the syntactic structure of theories (Duhem, Hempel, Popper, etc.) to those approaches that are more interested in the semantic (Suppes, Van Fraassen, Suppe, etc.) and cognitive (Giere, Machamer, Glennan, etc.) aspects of theories brings out the centrality of the activity of representing things or situations (based on the recognition of similarity) as an essential connection between metaphor, cognition and theorizing. In doing so, Sangoi takes a

look at several issues that have been extensively discussed in the philosophy of science, such as theory ladenness, underdetermination of theories by data, idealisation, etc. Finally, he shifts the focus on some cases of metaphor that seem to play a constitutive role in scientific theories. This allows him to show the mechanisms highlighted in the previous analysis at work in concrete situations.

Valentina Favrin and Pietro Storari, in “The Role of Metaphor in Mary Hesse’s Language Theory”, address Mary Hesse’s epistemology. Her thought questioned the very idea of an ideal language supposed to perfectly fit a world whose ontology should reflect the hierarchical structure of Aristotle’s categories (Arbib and Hesse 1992). According to Logic Empiricism, scientific language should be the mirror of nature. According to her, scientific language is instead nothing but a refinement of natural language, where metaphor maintains its priority over literal language, thereby allowing the adaptation of the discourse to a progressively extended worldview. Therefore understanding scientific language is not reducible to the assignment of an external referent in the world, but rather should incorporate recognition of the family resemblances a linguistic community takes as more salient. Wittgenstein’s notion of “family resemblance” is indeed used in Hesse’s theory of language to identify a set of properties belonging to different objects and a strategy for the selection of the relevant properties. Family resemblance allows considering objects as members of the same class and then categorizing them under the same concept. However the relation of similarity is not simple, being a matter of degrees and respects. So, if on the one hand it is quite immediate to regard certain objects, qua provided with specific properties, as central to a class, on the other hand any categorization involves some degree of vagueness, because the properties some of its members have set them at the periphery of the class, what sometimes makes the categorization itself problematic.

By recognizing similarities and differences among objects, the process of categorization implies a loss of information. If we tried to restore all the information by making explicit the conditions whereby a category has been applied to certain objects, the analysis would enter into an infinite regress and we would never come to completely explain concepts through the resemblances of their properties. Going to the origin of the act of recognizing similarities cannot be put into words and we need to stop at a point where concepts cannot no longer be explained by further new concepts. At this primitive point we can neither rest on resemblances established beforehand, nor on a theory providing a strategy for the selection of relevant properties (Hesse 1974). A literal description of the primitive concept is then impossi-

ble and we can only rely on exemplification. Therefore, the *explanans* is constitutively a metaphorical redescription of the *explanandum*. Hesse's theory of language questions the very notion of literality, as the peculiar characteristic of metaphor is to have a fluctuating meaning which cannot describe the world in terms of classical logic or formal semantics.

In "Gaia Hypothesis: The Metaphor of Planet Earth as a Living System", Sara Matera considers a specific metaphor, *Gaia*, as metaphor of the Earth, wondering whether it could be considered a step to scientific theory. The *Gaia* hypothesis has been formulated by Lovelock and Margulis at the end of Sixties. *Gaia* is the name they assigned to the planet Earth considered as a whole as a living being. In their opinion, *Gaia* would have faculties and powers far superior to the sum of its single components (Lovelock 1979). A decrease in entropy in the atmosphere of the planet would have been a sign of the presence of life. In particular, *Gaia's* atmosphere would have been optimally kept and settled by living beings in the surface, i.e. the biosphere. In spite of large-scale variations, *Gaia* has been able to maintain the optimal condition for life in the planet through a complex process of cooperation among all its parts: biosphere, soil, oceans and atmosphere.

Matera is particularly interested in the relationship between *Gaia* and the mankind. The point is that, on the one hand, Man is part of *Gaia*, but, on the other hand, human activities have been provoking disastrous effects on her. This could seem a paradox, as if *Gaia* wanted to destroy herself. According to Lovelock, the awareness of ecological dangers and the effort in laws and technologies against earth destruction are just examples of auto-regulation processes *Gaia* uses to hinder human lumbering presence on the planet. This is indeed *Gaia's* peculiarity: remaining itself despite of radical changes and human attempts at life survival on Earth. However, even though Lovelock presents *Gaia* as a scientific theory, many scholars have questioned it and argued that it can be seriously considered just an interesting and illuminating metaphor, but one that is unable to shed light on the causality mechanisms as a real scientific theory should do (Kineman 1997, Gould 1997).

Matera wonders whether *Gaia* is just a rhetoric tool, as literary metaphors usually are, or rather a scientific metaphor. She argues that, in literary texts, metaphors serve to evoke images, while in science they are used to make complex concepts easier to understand, by linking them to better-known, everyday concepts. *Gaia* seems to have both these features: on the one hand, the name *Gaia* makes it look like a person and immediately evokes the feeling of being part of a living system; on the other hand, the term *Gaia* remembers the Greek mythological *Gea*, the mother Earth, and

makes the hypothesis easier to understand for the public. A scientific metaphor has indeed three functions (Bradie 1999): a rhetoric function to popularize and divulge scientific theories; a heuristic function to make new discoveries; and a cognitive function to offer a new explanation to phenomena or processes in nature. Matera argues that *Gaia* displays all these three functions and thus can be considered a scientific metaphor. What is at stake is rather the truthfulness and usefulness of *Gaia* as scientific metaphor. As Matera points out, a scientific metaphor should evoke meanings which are not theoretically misleading, even though they are useful from a practical point of view. However, this is precisely the reason why *Gaia* hypothesis has been criticized: its manifest finalism seems to suggest a (non-scientific) optimism about *Gaia* and the future of mankind.

3. Arguing with metaphors

The two following papers address the role of metaphor a) in a broader sense by wondering how we acquire concepts and whether they are in some way bound to metaphorical language and b) in a more narrow sense by analysing specific arguments possibly containing similes and/or metaphors, as in the case of *quaternio terminorum*.

In “Metaphors and the Ontogenesis of Universals”, Vincenzo Fano and Tommaso Panajoli focus on the relation between metaphor and perceptual concepts, like colours and physical sensations, and defend a philosophical thesis on their ontogenesis. They aim at understanding how we come up with perceptual concepts and the extent to which metaphor could intervene in this process. The authors firstly introduce a definition of concept and consider different philosophical positions on the ontogenesis of concepts. While the role of metaphor is now ascertained as regards abstract categorization, it is not so in the case of more basic levels of categorization, utterly when dealing with perceptual experience. Indeed, referring to a wide series of examples on abstract concepts such as love, discussion, time, and so on, Lakoff and Johnson (1980) have shown that the conceptual framework through which we understand and categorize the world is shaped by metaphor. However, the occurrence of transference mechanisms is confirmed by several studies on synaesthetic experiences (cf. Marks 1996, Cacciari 2005) and, based on those studies, are also confirmed the relations that psychologists and linguists have inferred between cognitive processes and figurative language. Synaesthesia is a particular kind of metaphor combining two or more sensory domains based on similarities between the data they afford,

whereby it establishes a connection between language and perception. Synaesthetic experiences are prototypical examples of embodiment, held to allow giving linguistic expression to the interactions happening in the sensory domains. Thanks to their experiential grounding, synaesthesias act as *linguistic passe-partouts*, providing access to complex perceptual experiences and effective ways of communicating them. In the light of these characteristics, the authors argue that this kind of metaphor takes part in the apprehension of perceptual concepts.

When compared with perceptual properties, the process of categorization struggle to domesticate the variety which occurs in experience. What seems essential in the metaphorical mechanism is the effect of *prototypicality*. In this respect, the authors embrace an Aristotelian point of view: as metaphors are based on the recognition of analogies, they are likely to bridge the gap between the world and the words. Thus metaphors, engaging abductive reasoning as well as imagination and creativity, imply an “immediate learning”. As Fano and Panajoli state “the analogical mechanisms of approximation, intuitive knowledge and creative expression (metaphor) would therefore be the basis of the ability to abstract from experience, to universalize the qualities that in appearance are presented to us as disparate and unrelated”. However, following Aristotle’s view, the authors argue that these features make metaphor more coherently placed in the field of argumentation than in science.

Claudio Ternullo and Giuseppe Sergioli, in “Fallacious Analogical Reasoning and the Metaphoric Fallacy to a Deductive Inference (MFDI)”, are concerned with fallacious analogical reasoning and, in particular, the Metaphoric Fallacy to a Deductive Inference (MFDI), recently discussed by Brian Lightbody and Michael Berman (2010). The authors describe the structure of *analogical reasoning* and of *fallacious analogical arguments* and show that, in some relevant cases, the kind of fallacy involved in MFDI can be more properly described as a *quaternio terminorum* and therefore there is no need to introduce a new fallacy. Analogical reasoning thrives indeed on comparisons which are very frequent in everyday language and play an important role in human reasoning. A fallacious analogical argument establishes a *faulty analogy* as its conclusion. In the authors’ view, metaphors – because of their intrinsic ambiguity – are particularly likely to deceive us as to correctly assess the strength of an argument, i.e. the proper attribution of a certain analogy as its conclusion. *Quaternio terminorum* may appear *prima facie* strong and *formally valid*, but it is actually based upon lexical ambiguity.

Quaternio terminorum, or fallacy of four terms, was coined in the context of the Aristotelian syllogistic theory. The basic syllogism consists of a *major* (P₁) and a *minor* (P₂) premises and a conclusion (C) containing three terms: the subject, the predicate of the conclusion, and a third term (*the middle term*), which connects the subject of the first premise to the predicate of the second premise. *Quaternio terminorum* occurs when a syllogism has four terms rather than three, as required. The authors present the following example:

(P1) A star is a massive luminous ball composed of plasma in hydrostatic equilibrium.

(P2) George Clooney is a star.

(C) George Clooney is a massive luminous ball composed of plasma in hydrostatic equilibrium.

The reasoning involved in this argument is fallacious because of the dead metaphor “star” which is used in its literal meaning (*celestial body*) in the first premise and in its figurative meaning (*movie celebrity*) in the second one.

In some arguments presented by Lightbody and Berman, the lexicalization of metaphor is so deep that the equivocation is unavoidable. In other arguments, on the contrary, live metaphors are created and, therefore, fallacious analogical reasoning is really at work. According to Sergioli and Ternullo, MFDI is only at work whenever metaphors really induce a false analogy and that depends on the satisfaction of what they call ‘principle of lexicality: a metaphor is a *live metaphor* if and only if it is not an already established *lexical item*, or, in other words, if and only if it is not listed among the different meanings of a dictionary item. All metaphors satisfying the principle may give rise to faulty analogies. Metaphors which do not satisfy it are anyway very likely to engender equivocation and, in particular, *quaternio terminorum*. *Live* metaphors really provide new insights on the relations between two different items, while *dead* or *lexicalized* metaphors give rise to ambiguities which invalidate the argument. Therefore fallacious analogical reasoning involving dead metaphors is only affected by the use of *quaternio terminorum*.

4. Experimenting with metaphors

In the volume two ways of experimenting metaphors in argumentation are discussed. The first one tests metaphor comprehension when premises of an argument contain metaphorical meanings. The second one highlights the use of metaphor in thought experiments. The first approach is empirical and based on an experimental design regarding a specific kind of fallacy: *quaternio terminorum*. The second approach is properly philosophical and concerns thought experiments used to understand deeper mechanisms or structures of some phenomena.

Francesca Ervas and Antonio Ledda, in “Metaphors in *Quaternio Terminorum* Comprehension”, use the first method to understand the effect of metaphors in arguments having the structure of a *quaternio terminorum*. As it has been shown in Sergioli and Ternullo’s paper, metaphor as middle term plays a fundamental role in the comprehension of the overall argument. *Quaternio terminorum* is indeed based on the intrinsic ambiguity of the middle term, which might have two different meanings. Ervas and Ledda aim at understanding how of ambiguity of meaning, as occurring in the case metaphor, might influence the comprehension of an argument and whether it could have a persuasive effect in argumentation. In their paper, they discuss in detail four cases of ambiguity – homonymy, polysemy, dead metaphor and live metaphor – in order to understand whether they actually play any role in *quaternio terminorum* comprehension. In their opinion, some pragmatic processes such as disambiguation and modulation are required in identifying the meanings of the middle term in the two premises, and therefore their being true or false. Determining the truth or falsity of the premises influence the overall understanding of the argument.

Focusing on metaphor interpretation, the authors argue that the literal meaning of the source domain shares some semantic properties with the intended, non-literal meaning. Following relevance scholars’ perspective, metaphor interpretation is a context-sensitive modulation process resulting in an “ad hoc” concept (Carston 2002, Vega Moreno 2004), especially in the case of *dead (lexicalized)* metaphors. The process of metaphor interpretation requires more demanding attentional resources to suppress the corresponding literal meaning (Rubio Fernandez 2007), when compared to homonymy disambiguation, where the irrelevant meaning is suppressed by default (Gernsbacher and Faust 1991). Therefore the authors hypothesize that *quaternio terminorum* comprehension should mainly depend on the corresponding cognitive-pragmatic process required to disambiguate the middle term and on the degree of shared semantic properties.

The norming studies of an experiment on the influence of lexical ambiguity and metaphor on *quaternio terminorum* understanding (Ervas, Gola, Ledda and Sergioli 2012), show that most premises containing dead metaphors are considered *true* by participants, whilst premises of arguments containing live metaphors are perceived as *false*. These results could be explained by the fact that participants assigned to premises containing dead metaphors the intuitive truth conditions they have once the pragmatic process of modulation has produced the “ad hoc” concept. In a narrow context, dead metaphors are perceived as true because the encyclopaedic knowledge linked to the everyday use is sufficient to recognize the relevant properties required for the “ad hoc” concept construction. In case of live metaphors, the premises would instead need a wider context to be properly processed to produce the desired imagistic effect and thus to be recognized as true. This, they hypothesize, is the reason why dead metaphors make the arguments more persuasive than others.

Adriano Angelucci, in “On a Few Convergences between Metaphor and Thought Experiments”, explores another experimental path: thought experiments, which are – in the author’s view – a kind of defeasible and non-monotonic reasoning. Angelucci notes that comparing the literature on metaphor and on thought experiments a number of connections between these two domains emerge. In particular, Angelucci draws the attention on three aspects: 1) reductionism: the attempt to reduce the implicit cognitive content of metaphor and thought experiments to a literal formulation has proven misleading in accounting for both of them, 2) appealing to the *tension* within the subject’s conceptual system as a factor that explains both metaphor and thought experiments effectiveness, and 3) the resemblances in the way of reasoning by means of metaphor, thought experiments and scientific *models*, in that they all involve abstraction and projection. Furthermore, he suggests that these three concordances allow to identify another unnoticed epistemic function of metaphor, i.e. its effective contribution to philosophical analysis.

First, both literatures on metaphor and thought experiments present reductionism as a possible approach to understanding of these phenomena. In the case of metaphor, the so-called substitution view of metaphor (Black 1954) has maintained that the same cognitive effect produced by a given metaphor could always be produced, at least in principle, by an equivalent literal formulation of that metaphor. This view relies on three (false) assumptions on figurative language comprehension: i) human conceptual system is essentially literal, ii) metaphor is a deviant use of language, iii) the meaning and truth claims of a metaphor are just those of its literal para-

phrase. Similarly to what happened in the case of metaphor, within the debate on thought experiments, the elimination thesis (Norton 1991, 1996, 2004) claims that a thought experiment is introduced in argumentation when the corresponding straightforward argument would be difficult to develop, in order to facilitate the accomplishment of cognitive tasks. In both cases then, reductionism has consisted in reducing the epistemic virtues of one research object to another object supposed to subsume the first.

Second, both cases rely on a similar cognitive mechanism specifically denoting the kind of reasoning involved in metaphor and thought experiments, i.e. a tension between two different conceptual system in the case of metaphor, within a single conceptual system in the case of thought experiments. In metaphor both literal and non-literal meanings are essential to interpretation, even though they seem to clash for some respect in a given context. Quoting Beardsley, “A metaphorical attribution, then, involves two ingredients: a semantical distinction between two levels of meaning, and a logical opposition at one level” (1981 [1962]: 112). Some kind of tension is involved in thought experiments as well. If in the case of metaphor, the tension occurs between different levels of meaning, in the case of thought experiments it occurs among conflicting *intuitions*, namely between our current intuitions and the intuitions coming from an imaginary scenario, whose consequences clash against a rival theory. As Thomas Kuhn highlighted, the paradox created by thought experiments is intentionally generated by its creator.

Third, both the heuristic power of metaphors and thought experiments can be connected – in a sense – to the notion of model. The epistemic effectiveness of thought experiments rests on a similarity between their functioning and the functioning of scientific models: in both cases two processes take place one after the other: idealization and projection (mapping) from a domain to another. Critical thinking is needed to understand whether such a mapping is sound and useful. Angelucci discusses such a similarity, taking as an example Gettier’s scenarios, and concludes that – given the relation G – Gettier cases “seem to succeed in rejecting as inadequate the standard analysis of knowledge in that they land a strong intuitive pull to the possibility of finding real world instances of the state of affairs described by G” (Angelucci in this volume: 215-216).

Finally, Angelucci considers Daniel Dennett’s philosophy of mind as an example of interaction between the kind of reasoning involved in metaphor and a thought experiment. Not only Dennett used metaphors to express his own theories, but he also deeply understood the potential productiveness of metaphor from an epistemological point of view, as well as the inevitable

risks we mentioned above. In particular, Dennett's argumentation starts with the analysis of a specific metaphor in order to create a specific counterfactual scenario. Dennett explicitly talks about "pedagogically useful metaphors" (Dennett 1987: 22), but even though not always explicitly, this is the way of arguing of other philosophers. And this would show that metaphor has proven to be useful in philosophical reasoning.

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