Punctum, 3(2): 33-60, 2017

Metaphorical modelling as research method in semiotics

Katre Pärn

Perhaps the most intriguing aspect of the problematics of methodology in semiotics concerns the more fundamental question of the disciplinary nature of semiotics – whether semiotics is, or should be, a theoretical discipline or an empirical discipline – or both – and the particular modes of inquiry deemed proper for each perspective. Although debating over the disciplinary nature, or, to put it more simply, over how to practice semiotics, in those terms might seem a thing of the past, the problematics reveals its acuteness each time the relationship between theories, methods and practices/applications, as well as their scope and meaning in semiotics is discussed. Yet what remains also latent in these discussions is a more fundamental question of the particular 'brand' of 'science' and 'scientificity' that semiotics is expected (or not) to align with. One of the results of leaving these issues implicit and unarticulated is the divide often seen between theory and method, or theoretical and empirical semiotics.This article attempts to demonstrate how modelling functions as a bridge between theory and method. Yet the value of this bridging depends exactly on acknowledging the more fundamental layers of semiotic inquiry. The main aim of the paper is to propose and develop the concept of metaphorical modelling as a particular methodological tool in semiotic inquiry as well as the humanities more broadly. The role of metaphors in science is a known issue, however, there are few approaches that deal with it explicitly in the humanities, and as a methodological issue. The use of theories and concepts viewed as method brings to the fore the role of language in methodology. Thereby an awareness of the metaphorical functioning and processing of language becomes necessary for understanding how theoretical language is used in research.The article attempts to show that the traditional distinction between theoretical concepts as precise, literal and analytical, and metaphor as imprecise figure of speech is not adequate for understanding how theoretical constructs are used in the humanities in general and semiotics in particular. From this perspective, one can notice that the metaphorical use of theories, constructs and models has been central in the humanities and semiotics for a while. Thus better understanding of metaphor and of the metaphorical

DOI: 10.18680/hss.2017.0014

use of theoretical constructs could provide a basis for more explicit, precise and systematic use of metaphorical modelling as one specific and valuable mode of inquiry among others. After explicating the connections between method, theory, modelling and metaphor, the article examines these issues in the context of semiotics, more particularly as pertaining to the cross-domain use of a model of the sign and cross-disciplinary use of models of language.

KEYWORDS theory as method, metaphor, travelling concepts, semiotic modelling, metaphorical modelling

> Here as always the metaphorical usage has methodological priority. If a word is applied to a sphere to which it did not originally belong, the actual 'original' meaning emerges quite clearly. Language has performed in advance the abstraction that is, as such, the task of conceptual analysis. Now thinking need only make use of this advance achievement.
>
> Hans-Georg Gadamer, *Truth and Method*

Introduction

The distinction between sciences and humanities has many overt as well as covert consequences for methodology in the humanities in general and semiotics in particular. It orchestrates our way of thinking about 'doing science' and 'being scientific', whereby only particular methods, ways of theorizing and use of language is considered as properly scientific. As a result, there is a parallel movement in the humanities: one models humanistic research after the sciences, the other models the humanities as an opposite to the sciences. In the midst of this dynamics of 'own and alien' built on grand categories of quantitative vs qualitative, objective vs subjective, empirical vs theoretical etc., it is easy to lose from sight the more subtle forms of research specific to the humanities and the unique value the knowledge created by those means provides not only *about*, but also *for* the object domain of the humanities.

The use and usefulness of metaphor as a research tool is one of them, as the traditional ideals of scientific language make it difficult to recognize and appreciate to what extent theories, theoretical concepts and models function as metaphors and have specific value as such. This forms the basis for the conception of metaphorical modelling as a research method.

Short of offering a fully developed view of this mode of modelling, I aim to sketch out the main tenets of this approach and thereby to demonstrate why and how it has been used, knowingly or unknowingly, all along in the humanities. What has been missing is a fuller recognition of this mode of modelling as a methodological possibility. As language – theoretical

or otherwise – is our main research tool, understanding the cognitive, linguistic, discursive, etc. mechanisms of metaphor is crucial for understanding the implications of our language use. This affords more explicit awareness of how metaphorical modelling could be used more knowingly and systematically or without the hazards attributed to non-literal use of language.

This aim in mind, I will first introduce the background that frames the issue of methodology in the humanities and thereby in semiotics. Then I proceed with discussing the specificities of theory in the humanities, among them the use of theory as method. After that I will examine the issue of modelling that is seen as a central activity in science, but has been discussed far less in the context of the humanities. Yet, in the humanities, models and modelling have been extensively discussed on the level of object of study that helps to bridge the issue of modelling with that of metaphor. Also, I will introduce different views on 'successful careers' of metaphors in scientific discourse. This will provide a platform for analyzing the metaphorical use of theories, concepts and models in the humanities more broadly and in semiotics more specifically.

The paper aims to bring together various theories of metaphor and scientific modelling that implicitly or explicitly pave way for reconceptualizing a metaphorical use of theories, theoretical concepts and models as a specific mode of modelling that entails certain transformations and is accompanied by awareness of the 'as if' nature of the process. Far from claiming that all theories are metaphors, I rather want to demonstrate how this perspective helps to develop a more critical stance towards the different modes of using theories borrowed from other disciplines or domains in semiotic research.

On methodology

A discipline – a field of study – is an ordered body of knowledge defined through its subject matter. The disciplinary knowledge is usually organized into theories, that is, structures of ideas describing, interpreting and/or explaining the subject matter. Yet disciplines are not simply ordered bodies of knowledge but also 'disciplined' ways of acquiring knowledge; in other words, disciplines are also defined through their methodology – a body of tools and techniques used for creating new knowledge.

As creation of new knowledge always involves some kind of method, it should follow that the core issue of methodology concerns its capacities in knowledge acquisition. However, methodology does not obtain its central position in scholarly concerns only due to its role in the creation of knowledge, but also because method became a means for determining the discipline's position – and thereby its value – in the system of knowledge in general and in the system of academic disciplines in particular. Instead of the classification of bodies of knowledge on the basis of their subject matter, the new classification assigned a more central role to the kinds of methods used in particular disciplines. Thus, specific methods are used as

a shorthand diagnostic for determining whether the discipline is to be considered scientific or non-scientific. As a consequence, in this new classificatory scheme, a discipline can change its position in the system of knowledge by changing its methodology.

This has considerable impact on the way the issues of methodology are perceived. Therefore it should come as no surprise that the question of methodology is surrounded by a certain degree of anxiety in the humanities and social sciences. Not only is there a methodological divide between the natural sciences and humanities as modes of inquiry; while the former are well aware of their common methodology, there is no similar consensus about the methodology of the humanities (Gadamer 2006: 7, Raymond 1982). The methodology-based system of classification and the well-defined scientific methodology make this lack of equal humanistic methodology a problem.

A contributing factor in this methodological anxiety is the narrow interpretation of science that not only conceives science as a method-driven enterprise but also delimits it with particular methods derived from natural sciences – the so-called scientific method. Hence it is only via this methodology that a discipline can produce scientific knowledge – be a scientific discipline with all the benefits of that status.[1] As a result, many academic fields of inquiry, particularly those that study humans, culture and society, are 'demoted' to the class of non-scientific disciplines.[2] A more acute factor in this anxiety is that exclusion from the narrowly defined sphere of science has been and still is perceived as 'demotion'. The dominant model of the academic world is still hierarchical, science being considered if not the pre-eminent form of human intellectual activity, then at least the pre-eminent scholarly enterprise that, as such, should serve as the model for all other academic disciplines. Becoming 'scientific' tends to be perceived as desirable, a promotion, regardless of what the model actually entails in terms of knowledge about one's object of study. As a result, the desire to be scientific tends to precede the desire to acquire a specific kind of knowledge about a specific domain. Thus instead of posing the problem of methodology from the perspective of desired or possible standards of reasoning or knowledge in a particular domain, this results in a habit of perceiving particular set of methods or modes of inquiry as being more proper and subsequently their specific epistemological affordances as the desired standards for academic knowledge. This forms a background for discussions on methodology in the humanities that is difficult to disregard.

This is not simply about scientism – the over-valorization, promotion or imitation of scientific modes of inquiry. What is of interest here is the question to what extent this situation hinders the epistemological and methodological emancipation of the 'other' disciplines, guides the understanding of epistemology and methodology, and does not allow recognition of the value of particular modes of knowledge creation used in the humanities. The distinction between natural sciences and humanities runs so deep that even the idea of emancipation, of autonomy of the humanities, tends to be conceived in terms of opposition to the natural sciences.

The narrow interpretation of science functions as a model for the humanities in many covert ways, regardless of whether a discipline is modelling itself after science or as its opposite. These dependences on the scientific model make them liable to hidden traps, as these dependences and resulting methodological tenets cannot be understood, questioned or challenged without acknowledging the particular 'brand' of science they were modelled after or against.

The perceived need to construct a common, unified methodology for the humanities and/or social sciences as distinct from natural sciences is but one example of this dependency. From that perspective, both qualitative methodology and the post-positivist approach are modelled after science. For example, St. Pierre argues that qualitative inquiry offered as an alternative to positivist methodology in the social sciences still relies on the markers of positivism, such as systematicity, linear processes, technique, transparency of language, accurate observation, representation, etc., thereby idealizing and normalizing the particular form of science that *equates knowledge with science* (St. Pierre 2013: 654 – emphasis in original). Even the view that the natural sciences use a nomothetic approach and focus on the general and systematic while the humanities use an idiographic approach and focus on the unique and individual was presented by Wilhelm Windelband at the turn of the 20th century as a reaction against positivist tendencies in the humanities and in line with Wilhelm Dilthey's rejection of the search for laws and regularities as the aim of the humanities; yet it downplays a long history of a nomothetic tradition in the humanities that precedes the birth of the natural sciences (Bod 2013: 257). Thus the humanities actively co-construct themselves as cultural other for science, whereby anything that is perceived as derivative of natural science ought to be avoided in humanistic research regardless of its history or actual practices.[3] Disciplines, methodologies and modes of inquiry are co-dependent cultural systems that model and construct themselves not only according to their own historical trajectories or immanent logics, but also in dialogue with whatever they perceive as their cultural other.

This is to arrive at Feyerabend's (2010) anti-methodology perspective, that is, to a view that the broader methodological frameworks impose a false order and limitations on the lively, diverse modes of scholarly practice that use and should use whatever methods necessary for creating desired knowledge. Methods are for solving problems, not for defining disciplines. Scholarly inquiry should be, above all, methodical, not follow blindly a particular methodology. Especially as the methodological anxiety that directs the perception and construction of methodologies is caused by mechanisms external to actual research practices.

Further, the prevailing tendency to construct the debate or divide between science and the humanities on the level of methodology, rather than that of epistemology or ontology, is also a latent impact of the method-driven model of science. It has been pointed out that often the disagreements about results or research practices are misdiagnosed as disagreements about methodology while actually they are disagreements about epistemology or ontology.

But the latter remain unarticulated aspects of our research, as they are taken for granted as appendages of methodology. As Yanov and Schwartz-Shea (2006: xviii) put it, methodology can be seen as 'applied ontology and epistemology'. Yet the method-driven conception of science tends to obscure disciplinary epistemological or ontological assumptions and avoid questioning the possibility, function and relevance of particular kinds of knowledge in particular contexts.

In other words, there is an undercurrent that assigns value to certain methodologies independent of local research aims. This undercurrent also forces us to construct overarching methodologies and latent epistemologies modelled partly after the 'other' and therefore to some extent disconnected from local disciplinary aims. And it tends to see research as a technical process, not as a form of intellectual and creative inquiry that is necessarily methodologically and epistemologically plural.

On theory

The conception of theory in relation to method is another context where the covert influence of the narrow interpretation of science is at play. Science, conceived as a method-driven enterprise, assigns a specific position and role to theories. In turn, there is a common view that the humanities tend to be a more theoretical enterprise, and its theories are markedly different from scientific theories. In part, this view has its historical roots in the modern divide between science and other modes of inquiry, as introduced by Auguste Comte, who distinguished sciences as empirical disciplines from 'speculations' (Raymond 1982: 779, St. Pierre 2012). This introduced the most pronounced divide between knowledge afforded by method-driven research and that afforded by theory (as speculation) – a divide that made it necessary to introduce 'scientific theory' as a special type of knowledge structure, always differentiated from 'other' kinds of theories.

However, the often-criticized theoretical nature of the humanities is not about lack of grand methodology or of empirical humanistic research, but derives from the specific relationship between theory and method in sciences that places higher value on methods and empirical evidence. Thus in the face of new evidence gathered via method-driven empirical research, theory, understood as description or explanation of an empirical domain, should be rejected or changed, if necessary. Theory should ultimately mirror reality, even if its adequacy as true representation is uncertain. In the humanities, theories are not as dependent on empirical evidence, or rather, the dependence is of a different kind.

This difference does not stem from research practices or even from the interpretive mode of theorization, but ultimately from the nature of the object of study which is constituted by knowledge and thus mutable by it. As semiotic phenomenon, it is at the same time mind-de-

pendent and mind-independent (cf. Deely 2009). Moreover, the humanities study culture and are themselves part of culture. Therefore theorization, in one way or another, changes the object – our understanding, mode of experiencing it and thereafter interacting with or performing it – perhaps as much as theory is or should be constituted by the object. But this allows a theory, however removed from empirical reality, to be nevertheless practical, a 'productive fiction', to use Ricoeur's (1979) concept.

This specificity of the object domain has immense impact on the usefulness or even tenability of theory as mirror-type representation, explanation of the empirical world and basis for predictions. Sometimes it has driven the need to justify the value of the humanities through posing alternative functions for theorizing, such as bringing about change, overturning the exposed structures, as legitimate alternatives to prediction (e.g. St. Pierre 2012: 495). Yet from a more profound perspective, recalled by Ricoeur (1974), the humanities, because of the unique relations they have with their object domain, can be nothing but mirror-type representations. But the direction of the reflection is different. To paraphrase Ricoeur's discussion of the poetic text, theories, too, speak of possible worlds and of possible ways of orienting oneself in those worlds; they open up and discover, for the subject, the possible ways of being-in-the-world (1974: 106). Thus, in addition to whichever mode of reference they have to the world, theories are also for the subject capable of self-reflection. And cultural systems are also 'subjects capable of self-reflection', and they become self-reflective partly because of this theorizing.

Therefore theories in the humanities, however divorced from the immediate empirical world, are nevertheless means for self-reflection for subjects. This capacity remains even when the theories construct novel, (im)possible or alien worlds (or interpretations), as they always expand our 'self-understanding in front of those novel worlds' (Ricoeur 1974: 101). This aspect is crucial for understanding the particular forms of theory and theorization in the humanities. But before elaborating this 'productive' aspect of theorization further, a few remarks should be made about the instrumental value of theories in research.

What interests me here are the specific modes of inquiry in the humanities that bridge theory and method by turning theories into methods, taking them as 'thinking tools', means for analysis. Theories, after all, are not simply systems of knowledge, but systems of concepts, providing conceptual grids, a language for describing, analysing, conceptualising, and modelling one's object of study. All observations are always mediated by language and knowledge, and therefore they are never uninterpreted perceptions but always 'seeing as' and 'seeing that' (Hanson 1958: 19-21). But in the humanities, language also functions explicitly as tool for analysis, that is, as method. Thus there have been many approaches that dissipate the stereotypical relations between theory and 'world', theory and method, as well as theory and research. This type of theory-driven (empirical) research has been suggested, for example, by Mieke Bal who called for seeking a heuristic and methodological basis for the humanities in concepts instead of methods (Bal 2002: 5).[4]

This conception was already present in theory-driven criticism – an application of theory in interpretation of particular works, in literary studies, film studies, art studies, etc. Importantly, the theory-driven mode of inquiry entered into literary studies not simply as a methodological shift but more fundamentally as an epistemological break from the framework that sought a unitary, 'correct' or intended interpretation, offering instead a sort of epistemology of 'as if'. And it received resistance precisely on epistemological grounds.[5]

Noteworthy about the concept-based methodology for cultural analysis proposed by Bal is the shift of emphasis from interpretation to analysis, to use of a particular language of description for modelling the object of study in a particular way. But before turning to the question to what extent this conceptual language is used metaphorically, a few remarks on models and modelling in the sciences and the humanities.

On modelling

The view is by now quite common that science is about modelling and theories are (sets of) models, albeit but one type of models. Suppe (2000: S109-S110) considers models, not (empirical) theories, to be central to science. 'Doing science' is above all modelling. On this ground, William Silvert has even asked whether modelling should not be treated as a separate discipline (Silvert 2001). More importantly, this perspective allows positing the question of the relations between theories and world as that of relations between models and world. This has perhaps more semiotic than philosophical value, as models are by definition semiotic structures.[6] A model as such is a 'representation [...] in the very general sense of 'standing in' or 'standing for' the phenomena themselves or the logic of their functioning' (Duranti 2005: 419).

Considering the centrality of models in science, it might be somewhat surprising that the topic has not had as explicit and extensive presence in discussions on knowledge structures and practices in the humanities. One reason for this might be due to the fact that models are seen as representational structures, yet theories in the humanities are seen rather as interpretive.[7] Therefore the issue of models is discussed in the humanities more frequently on the level of object of study: the humanities study, search for and interpret models that exist in their object domain. Yet whether theories are 'representational' or 'interpretive', on a more fundamental level, theorizing is always modelling. Nevertheless, there is an important difference between 'representational' (or mirror-type) modelling and 'creative' modelling, and interpretive theories are often of the latter kind. The latter are modes where theories and concepts become not only 'reproductive', but also 'productive' *sensu* Ricoeur (1979).

On a more particular level, a lot has been written about the forms and functioning of models and theories *qua* models in science. Drawing on Max Black (1962), I will highlight aspects relevant to the current discussion. Firstly, there are different types of models, but all of them

represent a structure, abstract or material, of the object, real or imaginary. Models are realized in a different medium (or modelling system) than their objects, therefore the relationship between them must be mediated by some rules for translating or conventions of interpretation (Black 1962: 220-23). Theoretical constructs as models[8] are usually representations of an abstract structure, although their degree of abstraction may vary. The models that aim to represent abstract structures of the original are isomorphic, that is, they share with their object the same structure or pattern of relations (222). As the same abstract structure can be embodied by a variety of phenomena, abstract models and modelling systems have more domains of application, yet due to their high level of abstraction, they lead, at best, to a 'plausible topology' (Kenneth Boulding, quoted in Black 1962: 224).

Another crucial aspect, next to the degree of abstractness, is the direction of modelling. Models are not only built from observations or data, that is, they are not necessarily object-specific (however general the object may be), but often pre-existing models are used to describe or represent new objects or domains, that is, models are applied in new situations. Both of these aspects, as I will discuss below, connect models to metaphors.

For example, a well-known presentation of these two directions of modelling is Clifford Geertz's distinction between two types of models: 'models of' and 'models for' (Geertz 1973: 93-94). Alessandro Duranti, in turn, uses this distinction on the level of scholarly practice for evaluating models created and used by scholars. For example, Chomsky's theory of syntax is a 'model of', whereas organisms used by biologists to make predictions about humans are 'models for'. Also, he notes, metaphors used in research are instances of 'models for', as when musicologists use the metaphor of 'conversation' to understand what jazz musicians do when they play together. Moreover, he observes that 'models of' have a tendency to be more constraining and closed areas of inquiry, while 'models for' have a tendency to be more open-ended frames of inquiry (Duranti 2005: 421).[9]

This can be compared to Ricoeur's (1979) distinction between two forms of reference: the 'reproductive' reference of the image and the 'productive' reference of fiction,[10] mentioned above. Different from the reproductive mode, the productive way of reference does not copy a pre-given reality but has the ability to shape, transform, and thereby to develop and increase reality. Not surprisingly, Ricoeur also brings metaphor as an example of this kind of productive process, a form of 'seeing-as' created by language, distinct from 'seeing this or that'. And it is this 'seeing-as' that is capable of redescribing reality in new terms. Lotman (2011) has described a similar mode of modelling as characteristic of artistic modelling – artistic models are at the same time means for storing information and developing new meanings, thus have the capacity to increase the information stored in them. As such, they are, in his view, a symbiosis of scientific and play-type modelling.

Thus there is a close connection between artistic modelling and the specific mode of modelling I aim at with the notion of creative modelling – or perhaps one should use the Ricoeur-

ian notion of 'productive modelling' instead –, and as the above sources make obvious, metaphor plays an important role in that activity.

The connection between models and metaphors was made already by Black when he talked about the specific use of models in science as more than expository or heuristic devices. In these cases a description or a model of an entity belonging to an unproblematic, more familiar or better organized domain is translated into a problematic, less familiar domain. When the problematic domain is not simply modelled 'as if', but 'as' something else belonging to an otherwise disparate body of knowledge, the use of these kinds of models resembles that of metaphors (Black 1962: 228-38). But to develop this perspective further, I will first give an overview of the functioning of metaphors and views on their role in scientific discourse.

On metaphors in scientific discourse

One way or another, language is the main instrument of research in the humanities. Therefore awareness of the various modes of functioning of linguistic signs is essential. Among them is the subtle dynamics between literal and non-literal, metaphorical use of language. A lot has been written about metaphors and their role in the process of knowledge acquisition. I will only briefly summarize the aspects most relevant for current discussion.

Firstly, metaphors are not simply ornamental or rhetorical devices, but cognitive tools (e.g. Eco 1983). They are means for establishing correspondences between previously remote semantic fields (Ricoeur 1979: 130) or concepts from disparate domains of knowledge (Bowdle and Gentner 2005: 193) and as such, are sites and media for knowledge transfer (Maasen and Weingart 2010: 34). They can be seen as a mode of analogy or comparison, yet of a specific kind, since taken literally, metaphorical comparison is false. Metaphorical counterparts have identity only through metamorphosis (Aldrich 1968: 74), which enables them to establish correspondences between otherwise non-identical, domain-specific properties (Bowdle and Gentner 2005: 194). More specifically, the metamorphosis, or 'intellectual operation' (Black 1954/55: 293) is not about seeing that 'A is like B', but seeing 'A as B', as something other than what it literally is – and this, in turn, causes shifts in meaning of the source domain[11] as well. This constitutes the specific metaphorical mode of 'seeing-as' – the mode of thinking about something in terms of something else that, outside of a 'certain conformity or analogy' (Fontanier, quoted in Ricoeur 1979: 133), has no obvious relation to it.[12] It follows that metaphors cannot be reduced to simple comparison between the two domains without the loss of relevant insights (Black 1954/55: 293) or of a capacity to produce 'emergent meaning' (Beardsley, quoted in Ricoeur 1974: 99).

But the correspondences they posit are not between things, but between 'the way language defines things', the 'subtle network of propositions between cultural units' or 'cultural

information' (Eco 1983: 235-36), or, in the context of research, between disciplinary conceptions and domain-specific knowledge. More specifically, metaphorical comparison is described as an asymmetrical, non-reversible (Ortony 1993, Glucksberg and Keysar 1993)[13] process of feature matching or structure mapping that presumes an isomorphic system of relations between source and target (e.g. Bowdle and Gentner 2005) – or establishes it. Metaphor, as Black (1955/56: 291-92) suggests, selects, emphasizes, suppresses, and organizes features of the target domain, and thereby interactively filters and transforms the way the target is seen and brings about shifts in attitude (Black 1954/55: 289). This also underlies metaphor's power to change discourses and thereby reorganize reality (Maasen and Weingart 2010: 21). Most importantly, the results of this process are open-ended and unpredictable.[14]

This readily shows that metaphorical comparison can be viewed as a type of *modelling*, but a specific type that involves interaction, transformation and awareness. Metaphorical modelling is an analytical, methodological activity, not rhetorical, although it inevitably has rhetorical effects. But before discussing this particular mode of modelling further, I will examine views on the use of metaphors in scientific discourse.

Although language as such is often viewed as a fundamentally metaphorical sign system, a distinction is made between literal and metaphorical use of language. In the context of science, the attitude towards the use of metaphorical language has been ambivalent, ranging from denying it a place in scientific discourse to making full use of its particularity. In Andrew Ortony's words:

> Science is supposed to be characterized by precision and the absence of ambiguity, and the language of science is assumed to be correspondingly precise and unambiguous – in short, literal. For this reason, literal language has often been thought the most appropriate tool for the objective characterization of reality. [...] Other uses of language were meaningless for they violated this empiricist criterion of meaning. [...] A different approach is possible, however, an approach in which any truly veridical epistemological access to reality is denied. The central idea of this approach is that cognition is the result of mental construction. Knowledge of reality, whether occasioned by perception, language, or memory, necessitates going beyond the information given. [...] In this kind of view – which provides no basis for a rigid differentiation between scientific language and other kinds – language, perception, and knowledge are inextricably intertwined. (Ortony 1993: 1-2)

Thus the attitude towards metaphors in academic discourse reflects more fundamental epistemological views on language.[15] Accordingly, two alternative forms of a 'successful career' have been proposed for scientific metaphors.

One of them, the 'metaphor career hypothesis' proposed by Brian F. Bowdle, Dedre

Gentner and others (Gentner, Bowdle, Wolff and Boronat 2001; Bowdle and Gentner 2005) sees it as a process resulting in conventionalization of the metaphor through extraction and retention of the structural abstraction, a domain-general metaphorical category which may become lexicalized as the secondary sense of a base concept. As a result of this process, interpretation of conventional metaphors does not require recourse to the source domain and can ultimately lead to a dead metaphor that has lost all semantic connections with the original source domain by acquiring new, target-domain-specific meaning (for example, 'blockbuster' in cinema). As a result of this process, the metaphoricity of the concept disappears but polysemy remains.[16]

As literal, unambiguous or even formalized language is seen as standard for scientific discourse, this career model seems to fit the desired trajectory for 'scientific metaphors'. There is common agreement that metaphors play a role in the discovery process, and that some degree of tolerance for loose analogy is important for creativity (Gentner and Jeziorski 1993: 476). Yet although analogies and metaphors are seen as useful tools, they are, nevertheless, deemed functional only in the beginning of research, during the phase of discovery, as sources for new insights and hypothesis, providing initial description for unknown phenomena, or as a surrogate descriptive language where there is no domain-specific language of description. Probably for this reason most of the discussions on scientific metaphors have concerned their heuristic role and innovative, generative aspects, not 'the subsequent hard and dirty work of testing, elaborating, confirming, discharging, adjusting, combining, formulating, arguing, communicating and establishing specific scientific metaphors' (Knudsen 2005: 374). During their further 'career', scientific metaphors should be clarified, verified and adjusted by empirical evidence and developed into more precise concepts, or disregarded and replaced with more exact terminology. Thus conventionalization does not only proceed by development of a domain-general abstract structure, but also by furnishing the metaphorical concept with domain-specific data-driven knowledge that will, ultimately, become the basis for formulating its new domain-specific meaning.

Metaphors can also be expanded conceptually and bring about broader matching between domains, opening the source domain for further transfers of related metaphors (Bowdle and Gentner 2005: 212, Knudsen 2005: 374). But these 'scaffolding metaphors' (Knudsen 2005) typically follow the same 'career-path'. During the 'career', as Knudsen observes, the innovative explicit metaphors turn invisible as metaphors. They become used for communicating established ideas and for promoting communal interpretation of the metaphors. Yet, she observes, they do not necessarily die, as their metaphoricity can be re-opened for pedagogical purposes or re-interpreted in the light of new knowledge (Knudsen 2005: 387-89).

This model of 'career' is not used[17] only in the natural sciences but in the humanities as well. For example, Doris Bachmann-Medick (2016: 17) describes the characteristic dynamics of cultural turns in similar terms – from analytical concept to metaphorization of the concept

to becoming again a specific, non-metaphorical analytical concept that can be used in examining and analyzing various phenomena in the target domain.

An alternative model of a successful 'career' for a scientific metaphor has been put forward by Sabine Maasen and Peter Weingart (2010). In this view, a metaphor that has entered into scientific discourse is not doomed to die, but has value as a living metaphor that remains capable of continually enriching the target domain with new developments in the source domain. They view metaphors as 'nomadic' entities that travel from one discourse to another, and interact with these discourses in unpredictable, location-specific ways. But thereby metaphors also produce linkages between discourses, and as such, have a decisive role in the diffusion and (re)organization of knowledge. Travelling from one discourse to another, they can create networks of discourses, both scientific and non-scientific, and they 'help to understand how, gradually, discourses are transformed, scientific paradigms shift, world views are overturned' (Maasen and Weingart 2010: 38).[18] As argued already by Arbib and Hesse (1986: 156) scientific revolutions are, in fact, metaphoric revolutions, and theoretical explanation should be seen as metaphoric redescription of the domain of phenomena.

In other words, metaphors are mechanisms of knowledge dynamics and central characteristics of their 'career' are transferability, connectivity, discourse-specific processing and transformation of meanings previously produced and established in other discourses (Maasen and Weingart 2010: 22, 39). Instead of remaining in use due to conventionalization, the success of a metaphor can be measured by the multiplicity, diversity and richness of the discursive interactions it has, as well as the scope of the discursive network it forms. Metaphors, after all, can ultimately reorganize reality or, instead, disappear from use.

As an example, Kay's (2000) study revealed how the metaphorical landscape of the genetic code is not only an indication of the discursive/paradigm shift in biology, but exemplifies a broader emergence of information thinking brought about by the rise of the communication technosciences – a shift that pervaded many disciplines and entailed complex interaction between cybernetic, information theoretical, linguistic, and in biology even biblical discourses. The metaphor of information, serving as conceptual link between the disciplines, produces apparent, albeit superficial conceptual unity that, in turn, reinforces the spreading of the paradigm. And due to the discursive and disciplinary linkages and associated social valence it provides, the vocabulary persists despite the reformulation of its 'contents'. 'Successful' metaphors, as Maasen and Weingart (2010: 21) suggest, are characterized by possessing the prestige of a dominant discourse.

The main difference between these two models of successful careers of scientific metaphors resides in their scope. Gentner, Bowdle *et al.* concentrate on the use of metaphors in particular disciplinary contexts, their model describes the career-path of a metaphor within a particular discipline or theory. Maasen and Weingart concentrate instead on particular metaphorical constructs and study their use across discourses and disciplines. Thus their model

does not deny the possibility that these constructs become locally conventionalized, but neither does it presume it.

Moreover, even if active metaphors can be quite easily detected on the surface level, there are more covert undercurrents created by the metaphorical nature of language as such. As a mode of comparison or (re)cognition of similarity, metaphor is about the establishment of generic relationships (Ricoeur 1979: 131) – metaphors involve categorization. Glucksberg and Keysar argue that as any other process of abstraction, metaphorical comparison leads to a new (metaphorical) category that includes both source and target domain, with the source domain being the prototypical exemplar of the attributive category.[19] This also explains, in their view, the non-reversibility of metaphorical comparison (Glucksberg and Keysar 1993). However, due to their polysemous nature, these categories produce chains of 'family resemblances' (Arbib and Hesse 1986: 152) rather than clear-cut taxonomical categories. Therefore the metaphorical use of language is accompanied by constant categorical restructuring of semantic fields. More importantly, although as metaphorical categories these are 'unnatural' and unliteral, through frequent use and conventionalization of the metaphors involved, they become habitual, 'natural' ways of seeing the world. Thus, for example, there is nothing strange about seeing physical, biological and cognitive processes as informational, sub-classes of a more general and abstract conception of information. Yet there remains the question of the metaphorical nature of this underlying abstract category. Thus it is also through the establishment of these new categories that metaphors shift the meaning of the source as well as target domain, and ultimately change reality.

On metaphorical modelling

As already argued above, the approaches to metaphor as a means for establishing isomorphic relations or other type of mappings between the source and target domains show that metaphorical description is a form of modelling and metaphors are models. More precisely, metaphors function as 'models for', they are media for transferring knowledge from one domain to another in non-literal terms. More specifically, metaphorical modelling is a mode of 'modelling as' – modelling the target domain 'as' something else, yet not taken literally as such. On this basis they differ from other modes of analogical modelling. But it is also important to emphasize that in the context of theoretical modelling, 'non-literal' does not mean 'not-to-be-taken-seriously', but refers to a quite different attitude of taking the modelling as legitimate despite its 'as if' nature.[20]

However, although, the notion of metaphorical modelling can pertain to any systematic instantiation of metaphorical correspondence, what I am interested in here is more specifically the metaphorical use of theoretical knowledge structures. As Maasen and Weingart (2010: 21)

argue, any idea, concept, model or theory that travels from one discipline to another can be seen as metaphor.

To return to Black's observation that certain uses of models in science resemble metaphors, the reason for this resemblance is precisely their nomadic and creative nature (Black 1962: 237). Moreover, he argues that this kind of use is not unique to the sciences but used in other disciplines as well, therefore this understanding helps to reduce the gap between sciences and humanities (242-43). Nevertheless, Black ultimately still draws a sharp distinction between metaphor as transfer of a system of commonplaces and these metaphor-like models – theoretical constructs, systems of concepts and ideas that can be deployed systematically. Therefore he introduces the concept of 'conceptual archetype' for the latter instances (241). I see no reason for this distinction, as ultimately it is not what is transferred – commonplace or disciplinary knowledge, imagery or concepts – but the particular, non-literal and transformative mode of this process that the concept of metaphor captures.

There is, by now, a rather general awareness of the ubiquity of these kinds of borrowings and boundary-crossings in the humanities, fuelled by and fuelling interdisciplinarity. Theories, concepts and models as abstractions and generalizations 'travel' well – across spatial/geographical, temporal, political, social and cultural frontiers, as well as institutionally, discursively, from one field or domain to another (Said 1983, Perry 1995, Bal 2002, Neumann and Nünning 2012).

Yet these approaches to travelling theories, while acknowledging the metaphorical nature of some of the concepts that travel, do not necessarily conceive the travelling concepts as such to be fundamentally metaphorical. Although these studies frequently outline the same processes of knowledge dynamics as Maasen and Weingart, they do not connect the broader implications of the travelling concepts to their functioning as metaphors.[21] Yet the value of recognizing the metaphorical nature of these concepts resides in the capacity of the notion of metaphor to explicate these processes and mechanisms of dynamics and innovation, as well as the conventionalisation and naturalisation of these borrowed constructs in new contexts. In other words, it allows us to take into account various 'career-paths' metaphors can have in different contexts.

The main reason why these approaches refrain from viewing travelling concepts as metaphors seems to be the quite narrow conception of metaphors they employ. For example, Neumann and Tygstrup (2009), drawing on Kirstin Wechsel, elaborate quite extensively the role of metaphors in knowledge dynamics and innovation, and also note that travelling concepts often work as operative metaphors. However they ultimately see metaphors as being constrictive and lacking analytical precision. Therefore in their view, once metaphors have done their creative work, they have to be integrated into disciplinary theories and translated into a method in order to function as interpretive techniques (Neumann and Tygstrup 2009: 10). Thus scholars of travelling concepts routinely posit a principal distinction between theoretical/analytical concepts and metaphors,[22] and therefore fail to acknowledge the metaphorical functioning of theories and concepts transposed into new and disparate domains.

In many ways, this view can be seen as yet another remnant of the narrow interpretation of science that opposes metaphorical language to scientific language and prescribes to the latter literality and lack of ambivalence. In this view, theoretical concepts cannot be at the same time metaphorical. It is this opposition that I would like to overthrow, not only because it is inadequate from the perspective of actual use of theoretical language in the humanities, but moreover, it obscures the implications, useful or otherwise, of the metaphorical functioning of these concepts and theories.

Another reason for this disregard results from the workings of these metaphors themselves. The abstract metaphorical categories created in the process of metaphorical redescription of an object domain become natural and habitual ways of classifying objects, in other words, they reconfigure and restructure our perception of the world. Certain domains or phenomena come to be seen as close, related or of the same kind on some more fundamental level. As a result, the application of the concepts does not seem metaphorical anymore. If nothing else, this naturalizing effect of metaphorical redescription calls for more acute awareness of the metaphorical nature of these kind of processes.

What I would like to bring forth through the notion of *metaphorical modelling*, therefore, is an understanding that (1) any instanciation of metaphor is a process of modelling of a specific kind; (2) the precision or vagueness of a metaphorical modelling depends on the precision and/or systematicity of the source model and its application; (3) theories, concepts and models become metaphorical as soon as they travel to a new and sufficiently disparate domain; and (4) the underlying category they establish is metaphorical in spite of its abstractness or conventionalization. This understanding affords fuller, more critical awareness and appreciation of the impact this process has on these knowledge structures, domains and, ultimately, on our sense of reality, if not on the reality itself. That is, the notion of metaphorical modelling aims to draw attention to the three equally important aspects of the use of theories *qua* metaphors; skill of modelling, awareness of its 'as if' nature, and recognition of the productive, creative potential resulting from its transformative character.

In other words, metaphors are not necessarily vague and theories, concepts and models are not necessarily literal. Metaphor can be as complex, elaborate, precise as its vehicle, that is, the theory, concept or model that is carried to a new domain. The pre-defined distinction between metaphors and theoretical/analytical concepts is neither useful nor adequate and creates an illusion that theoretical constructs are domain-independent abstract tools that escape the problems of metaphorical processing simply due to being abstract and elaborate, or vice versa – certain words or concepts are unprecise or vague simply because they are used metaphorically. Metaphors are not a lesser form of knowledge structures, but rather, as cognitive tools and intellectual operations, they involve greater complexity associated with play-type modelling (cf. Lotman 2011).

The most important characteristic of metaphorical modelling stems from the 'seeing-as'

quality of metaphors. Metaphorical modelling is 'modelling as'. While scientific models are above all simplifications, metaphorical models are transformative. If 'literal' modelling of a domain can be an accurate description or interpretation of the domain, metaphorical modelling – literally speaking – never is. To model something or use a model metaphorically is to transform them into something that they are not. Yet this inaccurate description might nevertheless be useful. Making sense of the ubiquity of this kind of modelling in the humanities is about making sense of the use and usefulness of these metaphorical transformations. But it also affords more critical awareness when the transformation becomes useless distortion.

Over time, the humanities have been fundamentally transformed by metaphorical modelling, as mind-dependent sociocultural phenomena are the ideal object for this kind of approach. In many ways it has proven itself to be a fruitful method of research, yet unrecognized as such due to stereotypical ways of conceiving 'proper' modes of inquiry. Acknowledging this mode of research as one among other 'legitimate' methods is not only an emancipatory move, but is necessary for developing it further and taking fuller advantage of the technique as well as avoiding its hazards. We know a lot about metaphors, but very little about the ways metaphorical thinking and modelling is practiced in the humanities.

On metaphorical modelling in semiotics

The issue of metaphorical modelling is particularly interesting in the context of semiotics for several reasons. Firstly, because contemporary semiotics developed and flourished to a great extent through borrowing theories, concepts and models from other fields, as well as through further travels of these semiotically transformed constructs to other disciplines. In many ways, semiotics gave rise to the interdisciplinary landscape of the humanities through these borrowings and could perhaps be seen as one of the prototypical examples of the use of metaphorical modelling. Secondly, the models have not travelled only between disciplines, but also within semiotics, as it broadened its scope of studies from cultural to social to biological, from human to non-human domains. Semiotics studies phenomena that belong to domains that have been traditionally seen as if not fundamentally different, at least significantly disparate, and theoretical instruments have travelled between them quite freely. Thirdly, there is a strong 'scientific' and/or formal theoretical tradition in semiotics that brought about a specific awareness and attitude towards theorizing and modelling.[23] Central semiotic theoretical constructs are often highly abstract, general and quite formal. And, as has been noted, abstract theories and models travel well. In combination with the above-mentioned factors – use of borrowed models, cross-domain object of study and abstract mode of theorizing – modelling in semiotics has very often taken the form of a rather precise and systematic metaphorical modelling, although it has not necessarily been seen as such.[24]

Therefore semiotics provides a fruitful field for studying the forms and workings of metaphorical modelling, and this perspective on theoretical constructs in semiotics can bring about new and interesting questions about these semiotic constructs and practices, as well as shed light on how and why these constructs have developed and travelled the way they have. Although detailed study of these issues goes beyond the scope of the current paper, I will try to illustrate some of the issues at stake through a few examples.

Central in these cases is the abstract and often formal mode of theorizing characteristic of (general) semiotics. This level of abstraction has itself been to some extent achieved and sustained through a metaphorical process. We recall Vyacheslav Ivanov's dictum that 'the fundamental role of semiotic methods for all the related humanities may with confidence be compared with the significance of mathematics for the natural sciences,' although, as he adds, descriptions made in terms appropriate to the humanities are far from the precision of matemathical terms (Ivanov 1978: 202-03). The relationship between mathematics and semiotics is a playground of diverse forms of borrowings. Semiotics was modelled *as* mathematics for the humanities, mathematical ideals of formalization and abstraction, as well as models were transposed into semiotics and transformed its practices of theorization. Yet the transfer was never straightforward, but accompanied by awareness of the fundamental difference between semiotics and mathematics. Theorizing with the aid of these mathematical ideas in semiotics was performed metaphorically, in a non-literal way.[25] But to be sure, mathematics was only one inspiration behind the abstract mode of modelling in semiotics.

This leads to an interesting question about the relations between abstraction, generalization and metaphoricity. There is certainly interdependence between those aspects, as the cross-disciplinary and cross-domain use of these notions necessarily abstracts them from local contexts and thereby also fuels their further travels. Yet it also brings about a question: do these domain-general models, originally borrowed from other fields permit us to avoid metaphoricity through abstraction, as it is habitually assumed, or is the underlying general category nevertheless metaphorical?

For example, the cross-domain use of the model of semiosis has resulted in debate about the 'general and fundamental sign processes', more specifically the question to what extent the model of the sign 'derived' from linguistics or other human sign processes results in a false conception of the human symbol as the archetypal form of sign relations (Favareau 2007: 11). However, since metaphorical modelling leads to categorization that posits the source domain as prototypical instance of the class, this archetype can be seen as problematic only if one disregards the metaphorical nature of this 'derivation' and assumes a different ontological commitment. Therefore the search for a model of semiosis that is abstract enough to be suitable for a description of 'more general and fundamental' sign processes, in the light of which human symbol use is a 'more specific and derivative' instance (Favareau 2007: 11), provokes questions about the nature of the relations between phenomena brought together by the model.

If the concept taken from the human domain (that 'semiosis' inevitably is) is developed into an abstract model that could be applied in disparate domains, then to what extent is the unity of these domains nevertheless based on an abstract metaphorical category resulting from the application of the model? What is the ontological status of this more fundamental similarity? Is human symbol use derivative in terms of modelling or derivative as a phenomenon? Are certain biological sign processes more fundamental semiotic processes or are biological and cultural sign processes nevertheless fundamentally different, and the need to conceive their relations in fundamental-derivative terms is prompted by metaphorical modelling of the disparate domains? This is not to claim anything for or against either of the possibilities, but to point out that the relationship between metaphorically general and fundamentally general needs examining, and more explicit understanding of metaphorical modelling is necessary to be precise about the nature and value of the knowledge acquired, as well as for using this mode of knowledge acquisition when deemed useful.

The use of the model of language illustrates another aspect of the knowledge dynamics afforded by metaphorical modelling. Saussure's claim that due to the arbitrary nature of linguistic signs, language realizes better than other systems the ideal of semiological process and linguistics, therefore, can become a master-pattern (*patron général*) for all branches of semiology (Saussure 1959: 68) was almost an invitation for extensive metaphorical conversion between linguistics and semiotics. He might have meant that linguistics as a more advanced science will lead the way for the other branches (Krampen 1987: 64), but translator Wade Baskin's interpretation came to be historically more accurate.

The year before this translation appeared, Claude Lévi-Strauss published his *Structural Anthropology* that made this new mode of linguistic borrowing infamous. To be sure, linguistic analogies and metaphors had been used before, but the structuralist approach entailed an important shift towards metaphorical modelling as a method of analysis. Moreover, this new methodology of 'deriving from language a logical model which, being more accurate and better known, may aid us in understanding the structure of other forms of communication' (Lévi-Strauss 1963: 83) involved twofold metaphorical modelling – positing language as model for other cultural systems, yet language was not understood in purely linguistic terms, but mediated by mathematical thinking.[26] This mediation, as Lévi-Strauss indicates, was crucial for shifting the study of language from the human scale to the microscopic and macroscopic scales, that is, to model non-observable phenomena. Lévi-Strauss called it 'statistical modelling' of (socio-cultural) phenomena (e.g. Lévi-Strauss 1963: 283-84) and this 'statistical modelling' is a metaphorical, not a literal application of mathematics. Similar logic governs his application – or transposition – of the 'phonemic method' to anthropology, into *another order of reality*, accompanied by the warning that linguistic methods should not be applied literally (1963: 34-36 – emphasis in the original). He labels this approach analogical, but it entails much more than that.

This 'mathematical mediation' was crucial in facilitating the useful exchange between language and other semiotic systems, as it helped to construct a model abstracted from natural language, not only substantially but also in scale. What is at stake in this linguistico-mathematical matrix is the difference between studying various cultural phenomena as relational structures and studying them *as language as relational structure*, since it was the recourse to language (which from the perspective of aiming for pure abstraction could have been avoided) that made all the difference from the point of view of methodology as well as remodelling the object of study. The former would have led (and to some extent, did lead) to the application of various 'mathematical' approaches for modelling the target domain, the latter brought about an extensive transfer of various linguistic theories, resulting in plural methodologies as well as broadening the 'domain of language'. But it also gave birth to a branch of semiotics that was radically different from the tradition that grew out of philosophy and logics. Not to mention the impact semiotics had on linguistics in turn, or how the changes in intensity of borrowing have over time caused changes in how related the disciplines consider themselves to be to one another. More broadly, once the language-like nature of other semiotic phenomena was posited through this kind of metaphorical modelling, it opened a road for importing theories from other domains of language use – rhetoric, literary studies, narratology, etc. – into other cultural domains, resulting in the ever-expanding field of travelling theories and concepts we have today.

However not all instances of applications of linguistic theories and concepts were mediated by 'mathematical' thinking. The prevalent aim, especially during the structuralist phase, was to reconceptualize these borrowed concepts as more general semiotic concepts, following the traditional logic of development of scientific terminology. Yet the metaphors did not necessarily settle into a conventional model, but remained dynamic points of exchange between the domains. Characteristically, post-structuralist and many more contemporary approaches were/are already more interested in the dynamics, not conventionalization of knowledge.

For example, in the semiotics of cinema Christian Metz started by applying certain linguistic concepts that describe the pertinent traits of language in analysis of cinema, to determine the adequacy and more precise sense of the notion of a 'language of cinema' (cf. Metz 1964, 1971). In terms of the particular concepts involved, this was done rather systematically and often this metaphorical modelling led to locally precise concepts, yet the concept of a language of cinema itself never settled, nor acquired a new precise conventional meaning. Instead, as linguistics as source domain itself changed, new models became available for the semiotics of cinema as well as for film studies more broadly. After 'structuralist' linguistics, John M. Carroll proposed a research program based on Chomsky's transformational-generative linguistics, thereafter Halliday's systemic-functional linguistics was adopted by contemporary scholars of multimodal semiotics, etc. As such, the semiotics of cinema and various sub-branches of cultural semiotics more generally became an example of the potential of metaphor to constantly enrich the target domain with new developments in the source domain.

The most crucial aspect of these semiotic approaches was the shift in the mode of using the borrowed models. This becomes apparent when one compares them to other modes of applications of linguistic concepts in film theory. On the one hand, there were more literal 'linguistic readings' of cinema, where, for example, objects in the frame were taken as nouns, actions as verbs, shots were read as sentences etc. Thus cinematic literacy was conceived as being founded on ordinary language processing in the most basic sense. But also, numerous film grammars were written, where 'language', 'grammar', etc. were taken as 'mere metaphors' to frame aspects of cinema in terms of these notions. Thus in the semiotics of cinema, there was a shift away from both a literal application of linguistics and from simple figurative use, towards more precise, analytical abstraction and transformation of linguistic models for modelling cinema *as* language.

As the concept of language of cinema never settled down and conventionalized into an exact definition, as was expected from metaphors in scientific discourse, many film scholars saw the entire approach as flawed. If it cannot explain what this thing called film language is, one should conclude that it does not actually exist, therefore the use of linguistic models is inappropriate. Yet, as many film semioticians were 'forced' to reflect, the entire approach was different and the existence of film language was not conceived ultimately in ontological terms. Through the constant borrowing of new models from linguistics, the semiotics of cinema had shifted its own approach from an ontological one, testing the validity of the metaphor, to a methodological approach providing new ways of understanding and analyzing cinema with the aid of linguistic models.[27] Moreover, through the application of various borrowed models, the semiotics of cinema brought about a fundamental methodological shift in film studies, more precisely, a shift from film theory to film studies as an analytical enterprise.

More generally, this kind of metaphorical modelling also facilitated the integration of the research domain of semiotics. After that, new theoretical or methodological frameworks could be imposed upon the newly unified domain. Of course, the difference between the 'linguistic approaches' and more mature semiotic approaches must be recognized, if not for any other reasons than to understand how semiotics became and remained a separate discipline, and was not simply another episode in the sequence of interdisciplinary cultural turns. Yet there is a certain similarity between the methodology of semiotics during this period and the one used by the interdisciplinary network that produces continuously shifting 'cultural turns' today. And this similarity concerns precisely metaphorical modelling.

From that perspective, it is easy to understand why semiotics is sometimes still seen as a phase in the ongoing interdisciplinary project, a phase whose vocabulary became if not outdated, then less relevant as new vocabularies emerged. And this view of semiotics is quite different from the one that conceives semiotics as mathematics for the humanities, a base discipline whose models should be fundamental and thus timeless, not one interpretive vocabulary among others. In other words, the landscape of the humanities itself has changed and the

toolbox-based or 'turn'-based interdisciplinary thinking has inevitably impacted on the role semiotics has or could have in the humanities.

Thus better understanding of metaphorical modelling helps to understand how semiotics as a discipline and its 'proper' models were and are established, but also the disagreements or misunderstandings about the nature and meaning of the 'proper' models. At the same time, it helps to understand the contemporary cultural theoretical landscape and the position of semiotics, its theories and models within it. This concerns both the general attitude towards theoretical constructs, related ontological commitments, aims and modes of application, as well as the role of metaphorical modelling in knowledge creation and dissemination. Most importantly, it should be recognized as a useful method for knowledge production, always accompanied by critical evaluation of its usefulness.

Conclusions

This is far from saying that all instances of modelling are inescapably metaphorical and there are no 'literal' theoretical concepts or models, only to draw attention to the often subtle difference between them. As Eco points out, if language is by nature metaphorical, then what defines humans as symbolic animals is the capacity to discipline and reduce the metaphorizing potential (Eco 1983: 218). The ways in which metaphorical modelling can and should be disciplined remain a subject for further studies. Instead, what I wanted to point out here is that the traditional distinction between theoretical/analytical concepts and metaphorical language is not adequate for understanding how theoretical language works, especially in this new landscape where boundaries between domains and disciplines have been shifted by travelling theories and concepts. Abstract, precise, systematic, theoretical, etc. are not opposites of metaphorical language or modelling. And the use of inadequate categorization is not a means for disciplining or reducing metaphorizing potential but creates a blindspot that does not allow full awareness of the mechanisms whereby theories, concepts and models turn into metaphors, nor appreciation of when or why these theoretical metaphors are actually useful and valuable. Moreover, many aspects of knowledge dynamics, of the development and use of theoretical constructs, both in local contexts and more globally, can be understood when they are seen from the perspective of metaphorical processing.

Metaphorical modelling, in one way or another, is already a valuable research method in semiotics and the humanities. One of the specificities of the humanities is their greater license to invent worlds as well as the practical value of, and need for, creating – indeed, inventing – them. That makes it possible to use metaphorical instruments to a far greater extent than in the sciences. Therefore it is useful to consider the use of metaphors, more precisely, the metaphorical use of theories, not as deviant but as a valid methodological possibility. But as

methodology it nevertheless requires discipline and refinement, if not for other reason than to make sure that we do not create novel worlds while we attempt to study the one we have.

NOTES

1 The adequacy of this model of science as a reflection of actual research practices in particular disciplines is not relevant here. All models are simplifications and this contributes to their power, rhetorical and other.

2 Note that I will use 'humanities' as shorthand to designate the 'non-scientific' research fields. This is a purely practical designation and I do not mean to imply that semiotics is limited to humanistic study.

3 Bod admits that the discovery of the long law- and pattern-seeking tradition in the humanities was unexpected, as Dilthey's and Windelbands distinctions gave the humanities a clear identity that became and still is the dominant thinking about the relationship between the humanities and the natural sciences, despite the fact that the new identity of the humanities as pattern-rejecting disciplines does not correspond to actual practice in the humanities, where nomothetic and idiographic approaches have existed side-by-side (Bod 2013: 257).

4 In the context of social research, a similar perspective is discussed in Murphy and Costa (2015) and (2016).

5 See Knapp and Michaels' attack on the possibility of different interpretations in their 1982 article; the 'as if' approach was raised in this context by Rosmarin (1983).

6 I have discussed elsewhere (Pärn 2016) the important difference between concepts of 'form', 'system', 'structure', 'pattern' and 'model' that have been used in semiotics as well as in other disciplines somewhat interchangeably, yet only the latter of which is semiotic by definition; as different from 'model', neither 'form', 'system', 'pattern' nor 'structure' are necessarily 'semiotic constructs', that is, stand-ins for *something else*, whereas 'model' is by definition that of something else, whether of an existent or non-existent thing is irrelevant. Or rather, their capacity to make present something absent, unobservable and possibly inexistent is part of their semiotic functioning. Thus at least to some extent semiotics is a (separate) discipline for studying models. See also Tondl (2000), Lotman (2011).

7 Another obvious reason is that the issue of modelling in science has been discussed mostly in the philosophy of science that has its basis in the narrow interpretation of science. There is no equal philosophy of the humanities. Therefore most of the discussions have taken place in the context of the natural sciences, incorporating, at best, social sciences and psychology. Thus the philosophy of science has become one of the main institutional vehicles for reinforcing the traditional division between the sciences and 'the others'.

8 By 'theoretical constructs' I mean theories and theoretical concepts, not the specific type

of models Black calls 'theoretical models' (c.f. Black 1962: 226) – the latter is more similar to metaphorical models.

9 Keller (2000) used the distinction, without connection to Geertz, in discussing a specific use of models as tools *for* 'understanding' in molecular biology. Interestingly, she also points to the metaphorical nature of the 'genetic computer' model she studied, or, rather, its obscure status as not just a metaphor nor just a model in the two respective domains of designing new kinds of computers and designing new kinds of organisms brought together by the metaphor. This is a very interesting instance of the productive capacity of metaphorical models.

10 Ricoeur talks about aesthetic fictions, but points out their relation to scientific models. Likewise, there is a long, albeit until recently somewhat forgotten tradition of studying scientific, theoretical entities as fictions, a tradition that in a more explicit form starts with Hans Vaihinger's philosophy of 'as if' (Vaihinger 1935 [1911]); for a more recent discussion on relations between models and fiction, see Suarez (2009) and Toon (2012). More recent approaches have drawn parallels between scientific models and literary fictions, but I would argue, drawing on Ricoeur, that metaphor provides a more condensed and perhaps more fundamental model for understanding some of these mechanisms.

11 Different concepts have been proposed for 'A' and 'B'. I will use the concepts of 'source domain' and 'target domain', with no particular reference to the theoretical framework these concepts 'belong' to.

12 Knudsen (2005: 73) defines the difference between analogies and metaphors: 'Whether the process is regarded as analogical or metaphorical depends on exactly how unrelated the two compared phenomena are considered to be.'

13 For example, with the metaphor 'cinematographic language', it would make sense to look for language-like aspects of cinema, not cinema-like aspects of language.

14 On this basis, analogy is differentiated from metaphor as one-to-one mapping from one-to-many mapping (Gentner and Jeziorski 1993: 476).

15 On this issue, see also Arbib and Hesse (1986, ch. 8) and Gadamer (2006: 427ff).

16 As Black puts it: 'Perhaps every science must start with metaphor and end with algebra; and perhaps without the metaphor there would never have been any algebra' (Black 1962: 242).

17 This is precisely a matter of 'use', as these are knowledge processes governed by human understanding of how things are supposed to work, thus the 'career' of metaphors depends on the views of the community of scholars using it.

18 They base their approach on James J. Bono's elaboration of the idea of ecology of discourses.

19 For example, cinematic language refers to a more general category of language derived from the source domain (natural language) and the latter becomes the prototypical example of 'language' in this new, more general sense.

20 In the context of the arts this cognitive duality has been discussed as the relationship be-

tween this kind of modelling and play by Gadamer (2006) and Lotman (2011). Characteristic of play-type modelling is the capacity to take it seriously while being aware of its 'as if' nature.

21 For instance, they often discuss the heuristic, generative, productive and creative aspects of travelling concepts, yet do not specify the mechanism of this potentiality to innovate, or explain it by some other mechanism, ie. 'translation' (see Bachmann-Medick 2012).

22 For example, Bachmann-Medick (2012: 27) states that as an analytical concept, translation no longer remains on the 'merely metaphorical level'.

23 This has been seen as scientism, yet I would argue that this view disregards the complexity of the situation that becomes more obvious when the metaphorical nature of the procedures is recognized.

24 These models have often been seen as analogical, especially if the theoretical discourse aims to be scientific in the traditional sense. Analogical comparison is deemed more proper for scientific discourse than metaphorical, open-ended mapping (e.g. Gentner and Jeziorski 1993, who also identify the shift from metaphorical to analogical comparison as one aspect of the general change that led to the birth of modern scientific reasoning). Yet the main difference between them is that outside of certain language games, metaphorical comparison is false when taken literally.

25 In my opinion, unawareness of this kind of practice of metaphorical modelling as a specific mode of research was the source of the confusion of Sokal and Brichmont (1997) as they accused postmodernist intellectuals of 'abusing science' – they read literally what was meant metaphorically and, quite obviously, it made no sense, since, taken literally, metaphorical constructs are false.

26 I take information theory and cybernetics, both of which played an important role in this mediation, especially through the works of Roman Jakobson, as its parts.

27 See Pärn (2012), where the study of methods of film semiotics led me to initial questions about the role of metaphor in these approaches.

REFERENCES

Aldrich, Virgil C. 1968. Visual Metaphor. *Journal of Aesthetic Education* 2(1): 73-86.

Arbib, Michael A. and Mary B. Hesse 1986. *The Construction of Reality*. Cambridge University Press.

Bachmann-Medick, Doris 2012. Translation: A Concept and Model for the Study of Culture. In: Birgit Neumann and Ansgar Nünning (eds) *Travelling Concepts of the Study of Culture*. Berlin: De Gruyter, 23-43.

Bachmann-Medick, Doris 2016. *Cultural Turns.* Berlin: De Gruyter.

Bal, Mieke 2002. Introduction. In: Mieke Bal, *Travelling Concepts in the Humanities: A Rough Guide*. Toronto: University of Toronto Press, 3-21.

Black, Max 1954-1955. Metaphor. *Proceedings of the Aristotelian Society* 55: 273-94.

Black, Max 1962. *Models and Metaphors: Studies in Language and Philosophy*. Ithaca, NY: Cornell University Press.

Bod, Rens 2013. *A New History of the Humanities: The Search for Principles and Patterns from Antiquity to the Present*. Oxford: Oxford University Press.

Bowdle, Brian F. and Dedre Gentner 2005. The Career of Metaphor. *Psychological Review* 112(1): 193-216.

Deely, John 2009. *Purely Objective Reality*. Berlin: Mouton de Gruyter.

Duranti, Alessandro 2005. On Theories and Models. *Discourse Studies* 7(4-5): 409-29.

Eco, Umberto 1983. The Scandal of Metaphor: Metaphorology and Semiotics. *Poetics Today* 4(2): 217-57.

Favareau, Don 2007. The Evolutionary History of Biosemiotics. In: Marcello Barbieri (ed) *Introduction to Biosemiotics: The New Biological Synthesis*. Dordrecht: Springer, 1-68.

Feyerabend, Paul 2010 [1975]. *Against Method.* London & New York: Verso.

Gadamer, Hans-Georg 2006 [1975]. *Truth and Method*. London & New York, NY: Continuum.

Geertz, Clifford 1973. *The Interpretation of Cultures*. New York, NY: Basic Books.

Gentner, Dedre, Brian F. Bowdle, Phillip Wolff and Consuelo Boronat 2001. Metaphor Is Like Analogy. In: D. Gentner, K.J. Holyoak, and B.N. Kokinov (eds) *The Analogical Mind: Perspectives From Cognitive Science*. Cambridge, MA: MIT Press, 199-253.

Gentner, Dedre and Michael Jeziorski 1993. The Shift from Metaphor to Analogy in Western Science. In: Andrew Ortony (ed) *Metaphor and Thought*. Cambridge: Cambridge University Press, 447-80.

Glucksberg, Sam and Boaz Keysar 1993. How Metaphors Work. In: Andrew Ortony (ed) *Metaphor and Thought*. Cambridge: Cambridge University Press, 401-24.

Hanson, Norwood Russell 1958. *Patterns of Discovery: An Inquiry Into the Conceptual Foundations of Science*. Cambridge: Cambridge University Press.

Ivanov, Vyacheslav V. 1978. The Science of Semiotics. *New Literary History* 9(2): 199-204.

Kay, Lily E. 2000. *Who Wrote the Book of Life? A History of the Genetic Code*. Stanford, CA: Stanford University Press.

Keller, Evelyn Fox 2000. Models of and Models for: Theory and Practice in Contemporary Biology. *Philosophy of Science* 67: S72-S86.

Knapp, Steven and Walter Benn Michaels 1982. Against Theory. *Critical Inquiry* 8 (4): 723-42.

Knudsen, Susanne 2005. Communicating Novel and Conventional Scientific Metaphors: A Study of the Development of the Metaphor of Genetic Code. *Public Understanding of Science* 14: 373-92.

Krampen, Martin 1987. Ferdinand de Saussure and the Development of Semiology. In: Martin Krampen, Klaus Oehler, Roland Posner, Thomas A. Sebeok and Thure von Uexküll (eds) *Classics of Semiotics*. Dordrecht: Springer, 59-88.

Lévi-Strauss, Claude 1963 [1958]. *Structural Anthropology*. New York, NY: Basic Books.

Lotman, Juri 2011 [1967]. The Place of Art Among Other Modelling Systems. *Sign Systems Studies* 39(2/4): 249-70.

Maasen, Sabine and Peter Weingart 2010. *Metaphors and the Dynamics of Knowledge*. London: Routledge.

Metz, Christian 1964. Le cinéma: langue ou langage? *Communications* 4: 52-90.

Metz, Christian 1971. *Langage et cinéma*. Paris: Larousse.

Murphy, Mark and Cristina Costa (eds) 2015. *Bourdieu, Habitus and Social Research: The Art of Application*. Basingstoke: Palgrave Macmillian.

Murphy, Mark and Cristina Costa (eds) 2016. *Theory as Method in Research: On Bourdieu, Social Theory and Education*. London & New York, NY: Routledge.

Neumann, Birgit and Ansgar Nünning 2012. Travelling Concepts as a Model for the Study of Culture. In: Birgit Neumann and Ansgar Nünning (eds) *Travelling Concepts for the Study of Culture*. Berlin: De Gruyter, 1-22.

Neumann, Birgit and Frederik Tygstrup 2009. Travelling Concepts in English Studies. *European Journal of English Studies* 13(1): 1-12.

Ortony, Andrew 1993 [1979]. Metaphor, Language, and Thought. In: Andrew Ortony (ed) *Metaphor and Thought*. Cambridge: Cambridge University Press, 1-16.

Perry, Nick 1995. Travelling Theory/Nomadic Theorizing. *Organization* 2(1): 35-54.

Pärn, Katre 2012. Language of Cinema and Semiotic Modelling. *Chinese Semiotic Studies*, 6: 324-32.

Pärn, Katre 2016. Semiootika koht modelleerivate süsteemide reas: eelmärkmeid loomingulisest ja mängulisest modelleerimisest humanitaarteadustes [The Place of Semiotics Among Modelling Systems: Notes Towards Creative and Play-type Modelling in the Human Sciences]. In: Ott Puumeister and Silvi Salupere (eds) *Acta Semiotica Estica* XIII. University of Tartu, 119-261.

Raymond, James C. 1982. Rhetoric: The Methodology of the Humanities. *College English* 44(8): 778-83.

Ricoeur, Paul 1974. Metaphor and the Main Problem of Hermeneutics. *New Literary History* 6(1): 95-110.

Ricoeur, Paul 1979. The Function of Fiction in Shaping Reality. *Man and World,* 12: 123-41.

Rosmarin, Adena 1983. On the Theory of 'Against Theory'. *Critical Inquiry* 9(4): 775-83.

Said, Edward 1983. Traveling Theory. *The World, the Text, and the Critic*. Cambridge, MA: Harvard University Press, 226-47.

Saussure, Ferdinand de 1959. *Course in General Linguistics*. New York, NY: Columbia University Press.

Silvert, William 2001. Modelling as Discipline. *International Journal of General Systems* 30(1): 261-82.

Sokal, Alan and Jean Bricmont 1997. *Intellectual Impostures: Postmodern Philosophers' Abuse of Science*. London: Profile Books.

St. Pierre, Elizabeth Adams 2012. Another Postmodernist Report on Knowledge: Positivism and Its Others. *International Journal of Leadership in Education* 15(4): 483-503.

St. Pierre, Elizabeth Adams 2013. The Posts Continue: Becoming. *International Journal of Qualitative Studies in Education* 26(6): 646-57.

Suarez, Mauricio (ed) 2009. *Fictions in Science: Philosophical Essays on Modeling and Idealization*. New York, NY & London: Routledge.

Suppe, Frederick 2000. Understanding Scientific Theories: An Assessment of Developments, 1969-1998. *Philosophy of Science* 67: S102-S115.

Tondl, Ladislav 2000. Semiotic Foundation of Models and Modelling. *Theoria: An International Journal for Theory, History and Foundations of Science* 15(3): 413-20.

Toon, Adam 2012. *Models as Make-Believe: Imagination, Fiction and Scientific Representation*. Basingstoke: Palgrave Macmillian.

Vaihinger, Hans 1935 [1911]. *The Philosophy of 'As If': A System of the Theoretical, Practical and Religious Fictions of Mankind.* London: Kegan Paul, Trench, Trubner & Co.

Yanov, Dvora and Peregrine Schwartz-Shea 2006. Introduction. In: Dvora Yanov and Peregrine Schwartz-Shea (eds) *Interpretation and Method: Empirical Research Methods and the Interpretive Turn*. Armonk, New York & London: M.E. Sharpe, xi-xxvii.

Katre Pärn is Junior Researcher in the Department of Semiotics of the Institute of Philosophy and Semiotics, University of Tartu, Estonia.

Email: katre.parn@ut.ee