THE LANGUAGE OF THE HUMAN SCIENCES:
THE COGNITIVE ROLE OF METAPHOR AND NARRATIVE

Lecture

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This lecture is about the relation between the linguistic dimension of the human sciences, in particular the cognitive role of figurative language, with a focus on metaphor and narrative and the related methods of conceptual analysis and discourse analysis.

Apart from artefacts, visual images, statistics and mathematical formulae, written and spoken language is the primary medium by which scientific knowledge is represented and communicated. In the last decades there has been an increasing interest among social and cultural scholars in language as an object of study in itself. This is reflected in the rapprochement between the sociocultural and historical study of science and literary and linguistic theory. The so-called Linguistic Turn and the constructivist approach of science as a sociocultural phenomenon have advanced the awareness of the role of language in the representation and communication of scientific knowledge. The interaction between scientific knowledge and wider sociocultural, including commonsensical, meanings, can be pinpointed in particular in the language in which such knowledge and meanings are expressed. Both scientific knowledge and broader sociocultural understandings of the human body, mind and behavior are not direct representations of pre-given 'natural' phenomena, but constituted on the basis of various and changing interpretations which are embedded and expressed in language including its figurative styles.

Two perspectives on language

In daily life as well as in science we depend on language as the most important medium through which we express and understand the world as meaningful. Language both enables and limits our understanding of what we call reality. Is language or can language be a neutral medium for scientists to represent their knowledge about what they consider as the reality of external nature or, with regard to the human sciences, of human beings, their body, mind and behavior? Basically, there are two answers to this question. Yes, language can and should be a neutral medium and as such it does not affect the substance of knowledge itself. No, language is not and cannot be a neutral medium for representing knowledge, but it colors and even shapes that knowledge. These diverging answers are rooted in two fundamentally different perspectives on language, what it is and what it does, and they are also related two antagonistic epistemological positions:

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(1) The mimetic or realist mirror theory of language, which is closely related to positivist empiricism and to the view that scientific knowledge is fundamentally different from common sense and broader cultural meanings.

(2) The constructivist theory of language which is the result of the so-called Linguistic Turn, and which is related to a social-constructivist view of science. This perspective implies that the domain of science is not separate from other social and cultural activities because both scientific knowledge and social and cultural meanings depend on language that is inherently interpretative and often figurative.

The mimetic perspective

With regard to science the realist mimetic mirror-theory has been defended since the Scientific Revolution by natural philosophers who laid the groundwork for the rationalist and empiricist framework of the natural sciences. They considered the development of natural science as a progressive movement from the darkness of ignorance and superstition, from unproven religious beliefs and metaphysical principles towards the light of realistic, true, exact and pure knowledge. The scientific method was supposed to be free from emotions, cherished beliefs, literary fantasy and wishful thinking. Science was based on 'hard' empirical and rational verification through disinterested observation, experimentation, inductive reasoning, quantification and the use of mathematics.

This ideal of objective science implied a distrust of language, in particular language as it was used in daily life, rhetoric, storytelling, fiction and poetry. Ordinary, rhetorical and literary language was full of intuitive associations, imprecise and ambivalent suggestions, misleading terms, symbols and analogies, subjective intentions, misleading rhetoric, and deceiving figurative and poetic embellishments. All of this would blur, misrepresent, and distort the straightforward representation and transparent communication of pure scientific knowledge. Common-sense and literary language, in which the meaning of words is often imprecise and ambiguous, was one of Francis Bacon's idols that hampered scientific progress. Also, the rationalist philosopher and mathematician René Descartes and the empiricist John Locke condemned poetic speech and metaphors as misleading; figurative language did not meet the philosophical and scientific requirement of clarity and accuracy. Quantitative data and mathematical formula provided a far more objective and reliable medium to convey scientific knowledge.

Even natural scientists, however, depended on language in order to communicate their discoveries and knowledge. Any linguistic misrepresentation of scientific information should be carefully avoided by using a purified language that functioned as a direct and clear mirror of the realities which scientists uncovered. Like mathematics, scientific language should be straightforward and unembellished, and it should avoid all the ambiguities and distortions that were inherent in language as it was used in social

communication, in politics or literature. Such culturally embedded language was a barrier between natural reality and knowledge of it. Scientific language, on the other hand, should be a neutral and transparent medium of clear and accurate thought and description. Scientists should maintain a constant diligence to keep language pure so that it served like crystal-clear window through which nature could be seen as it really was. They should use language in such a way that nature, as it were, spoke for itself.

In the nineteenth and twentieth centuries the mimetic-realist ideal of science entailed several systematic attempts, for example in the logical positivism of the Vienna circle and in Anglo-Saxon analytical philosophy, to develop a purified and formal scientific language, which would enable scientists to describe their observations of reality objectively. The philosophers Bertrand Russell and George Edward Moore, for example, tried to determine the boundary between, on the one hand, language as it should be used in science according to the strict rules of formal and mathematical logic, and, on the other, language as it is used in wider culture, in daily life as well as in literature, which they considered imprecise, suggestive, and misleading.

This striving for a pure scientific language is still reflected in many technical writing guides for scientists. They are urged to avoid rhetorical, literary or expressive language, to exclude ambiguity and multiple meanings, to use depersonalized, unembellished language, passive constructions and to avoid the direct, personal voice of the scientist. The *Publication Manual* of the American Psychological Association (APA) for example, explicitly admonishes psychologists to shun figurative language as much as possible because it would obscure their research accounts.

Some years ago, the Royal Dutch Academy for Science organized a conference about 'Image in Science'. It started with a warning, which in fact not only questioned the cognitive value of images, but also disqualified figurative language: it should be excluded from science as much as possible:

> *Images can be helpful in order to illustrate or to communicate a knowledge claim but they can never prove or clarify a factual statement. Scientists should always stick to the aim to present knowledge in clear statements that are straightforward and unambiguous. However, science has not yet succeeded to exclude images and figurative language completely.*

The constructivist perspective

The implicit assumption of the philosophers of the Scientific Revolution, logical positivists, the APA-manual and the conference-organizers of the Royal Dutch Academy is that if scientific language is kept pure, free from figurative, rhetorical, literal ornamental and subjective distortion, it can reflect knowledge about reality in a neutral, direct, unmediated and fully transparent way. They hold on to the realistic and

common-sense position that language is representational, that its 'correct' use of 'neutral' words guarantee a mirror representation of reality. This position has been undermined since the mid-twentieth century by the so-called Linguistic Turn in philosophy, literary and cultural studies, and the sociological and historical study of science.

The Linguistic turn and its far-going epistemological implications have fundamentally changed the view on how language and reality are related to each other, in culture in general as well as in science in particular. Rejecting the notion of language as a mere instrumental medium for the representation of reality, it emphasizes the formative role of language. Without language reality could only be experienced as an incomprehensible and meaningless chaos. Any sense of reality as ordered, structured and consistent is impossible without and outside language. However, language cannot be a neutral medium for reflecting reality. Meaning, interpretation and perspective are intrinsic in language. Talking or writing about something cannot be separated from what it is in a particular perspective. Language shapes the way in which we perceive and understand reality, in ordinary life as well as in science. It is part and parcel of culture, the interpretative schemes with which reality in a certain culture is understood and given meaning. Without the appropriate categories and terms to describe and at the same time order reality in a certain way, there could be no distinguishable object of scientific study. In a negative sense language delimits what scientists can investigate and know and in a positive sense it is constitutive of what they can investigate and know. So, in this perspective language is not a merely instrumental, representative medium that does not affect the substance of scientific knowledge, as the realist-mimetic position assumes.

Nietzsche: truth as a linguistic illusion

One of the first philosophers who explicitly and radically put forward this criticism of the realist-mimetic perspective was Friedrich Nietzsche. He pointed out that the mirror-theory of language was utterly naïve, misleading and biased. He argued that any description of the world, all talking or writing about 'facts' or 'truth', is never without an inbuilt perspective and interpretation. His point was that there are no indisputable facts and truths apart from the language in which they are expressed, that linguistic expressions do not reflect reality, but are interpretations, meanings or versions of reality that impose a man-made order upon it. In his view the use of language is connected to social power and struggles through which some people or groups of people can impose their particular, often self-interested, interpretations and meanings, presented and labelled as truth, upon other people or social groups. Nietzsche characterized truth as a linguistic illusion or dream, which is construed and upheld by the frequent use of figurative language: rhetoric, metaphors and other tropes. Instead of reality determining the order of our language, he says, our language determines how we define and perceive the world in a supposedly stable and coherent way. The use of language serves the purpose of satisfying human needs, instincts, emotions, desires, and interests. All

interpretations are illusions, useful if they fulfil human needs, but not reflecting anything which can be called true. All attempts to describe the world in a 'realistic' or 'truthful' way result, according to Nietzsche, in nothing more than anthropomorphic fictions. 'Truth' is not more than the qualification for an interpretation of reality that provides order, certainty, reassurance, stability, continuity and identity in human life. But such a 'truthful' interpretation is misleading because the world and human life are instable, unpredictable, transient and miscellaneous. Reality cannot be grasped in fixed categories but escapes us again and again. Nietzsche's view on language had radical moral consequences, because the epistemological categories of 'truth' and 'falsity' (the distinction between valid and invalid knowledge) are also intrinsically associated with the basic moral categories of good and evil. Belief in truth seems to be a moral stand, but if truth is man-made and arbitrary, so are morals. With his statement 'God is dead', he indicated that there are no fixed standards for truth and morality anymore.

Structuralist linguistics, language games and phenomenology

The structural theory of Ferdinand de Saussure, formulated in the early twentieth century, was one of the first systematic criticisms of the mirror-theory of language. The meaning of words, De Saussure explained, is not determined by the things and phenomena in reality to which they refer, but their meaning emerges from the structural system of language itself, from the relations of words to other words, especially oppositions and dualities. Words are not pictures of the world. There is a gap between words and the phenomena in the world outside language to which they refer. Whatever the relation between language as a symbolic system and reality is, it is, because of this gap, arbitrary by definition. In fact, this had already been suggested by William Shakespeare when he wrote in his play *Romeo and Juliet*: 'A rose by any other word would smell as sweet', implying that the names of things do not affect what they are by themselves.

Another, more sociologically oriented theory that stresses the impossibility of language to reflect reality accurately is Ludwig Wittgenstein's notion of the language game. Wittgenstein argued that the meaning of words are constructions which are embedded in culturally specific language 'games' with their own rules which determine what can and what cannot be said. The collective employment of language as a medium of communication determines the meaning of words, and these meanings can change as practices change. Wittgenstein compared learning a language with learning the socially agreed-on rules of a game.

An influential philosophical school that has contributed to the Linguistic Turn is phenomenology. It is an elaboration and broadening of Immanuel Kant's epistemology. Kant argues that we can never scientifically know reality in itself ('an sich'), as it is in itself, but only as far as we grasp reality as it appears to us ('für sich') through the a-priori modes of our sensual perceptions and categories of rational understanding. The basic idea of phenomenology is that this not only holds good for science, but for human

experience of reality in general. All experience and knowledge are shaped by intentional consciousness which constitutes the human mode of 'being in the world' including our bodily experiences, intuitions, moods, imaginations, aesthetic sensibilities and attitudes; our values, purposes, capacities and skills and, more in general, our integration in culture. For the common-sense as well as the scientific understanding of the world, we depend on concepts, models and discourses, and these are processed by the filter of physical and sociocultural experiences.

The French phenomenological philosopher Maurice Merleau-Ponty argued that language on the one hand and experience of and thought about the world on the other cannot be separated. Language is much more than a means of communication; it shapes and organizes thought and human experience. Language does not reflect any essence of things in the world, but, through the interplay and combinations of words and sentences in discourse, bestows meaning upon them. This is the expressive dimension of language, emphasized by Merleau-Ponty. Language should be seen as display, a demonstration of a perspective on the world, rather than being judged in terms of representation which can be either exact and true or flawed and distorted. Truth about the world is not a pre-given quality that is revealed in language, but it is shaped, established and expressed in language. Like all forms of experience and knowledge, those of science are grounded in the perceptual and meaning-making operations of human consciousness.

This approach, which attributes the same ontological status to expressive language as other physical, social and cultural phenomena, has been elaborated more recently by post-modern philosophers such as Michel Foucault. His view on science as a specific form of discourse, which does not reflect any given truth to be discovered, but constitutes it, and his analysis of the history of the human sciences as an interplay between knowledge and power, bears the stamp of Nietzsche's philosophy. Foucault focuses on the discourse of the human sciences as they originated from around 1800 on in specific institutions, such as hospitals and prisons, where knowledge about human beings was generated. In his view discourse is a more or less systematic network of definitions and statements which imply a truth-claim as well as practical effects in the social world. Discourse is embedded in relations of power between the scientific expert and the human being investigated and presents itself as an authoritative interpreter of factual reality, which results in a particular perspective and organization of that reality, for example in terms of true versus false knowledge, or of normal and abnormal human conditions and behavior.

Paradigms

The epistemological implication of the Linguistic Turn largely corresponds to modern epistemological theory, in particular Thomas Kuhn's notion of paradigms: the idea that empirical observation, fact-finding, and scientific knowledge does not provide a mirror image of the investigated reality, but that they are always imbedded in an interpretative framework of defining and organizing concepts, theories, models, methods and also

material artefacts such as observational instruments. Science is not directly about what and how reality is, but inevitably about a framed observation and explanation of what and how of reality. Such intellectual frameworks are not static, but they may change in history. Since definitions, theories and methodologies are not only expressed in mathematical formula, but also and even more formulated in language, we can also say that scientific activity and knowledge are largely embedded in language. Kuhn himself has compared paradigms with metaphors and others have pointed out that a paradigm-change or a revolution in science usually manifests itself in a new scientific language: new terms and categories, new metaphors and analogies, new discourse and rhetoric. Moreover, the paradigmatic language of science is not separate from the use of language in the rest of society. Scientific interpretations of reality are constituted, displayed and circulated in language which draws upon and overlaps with the language in broader sociocultural settings. This insight underscores the embeddedness of science in society and culture, that there is not a fundamental difference between scientific practice and knowledge and other social and cultural activities and ways of understanding.

Social constructivism

Such epistemological insights have deeply influenced the sociological and historical study of science and advanced the social constructivist approach. Social constructivism holds (1) that scientific knowledge is constructed or shaped rather than discovered as naturally given, and (2) that as such science is embedded in society and culture. And the Linguistic Turn has advanced the highlighting of scientific language - its conceptual, grammatical, rhetorical, metaphoric, discursive and narrative styles which are not only the representational and communicative means, but also a shaping factor of knowledge - as an object of study in itself. As a consequence, new questions about science can be raised: how scientific knowledge is shaped or made in language (including literary tropes and figurative speech); and how the linguistic dimension of science can throw light on the interconnectedness of scientific knowledge and other sociocultural meanings. Scholars in social and cultural studies of science have become more sensitive to and reflexive about the role of language, not only with regard to the sociocultural world they study, but also with respect to their own use of language in reporting their knowledge in speech and writing. Their own discourse is not only descriptive and explanatory but may also be expressive (conveying particular meaning and judgement); rhetorical (attracting attention or convincing other scholars or the wider audience); evocative (provoking their response); and literary (endowing scientific knowledge with aesthetic qualities and thus seducing readers). Briefly, *what* scientists say or write cannot be separated from *how* they say it or write about it.

Social constructivism and the Linguistic Turn have undermined the positivist assumption that scientists explore and represent reality directly and transparently. The established realist image of (natural) science has been unmasked as scientist ideology, that is the self-interested way in which scientists themselves presented and legitimized science as

an autonomous, special and superior form of knowledge at a distance from muddy common-sense experience and all non-verified knowledge in society. Neutrality and transparency are not so much inherent qualities of science as central in the image that scientists presented of themselves and their research. An important part of their self-representation is the claim that their discourse is pure and crystal-clear while that of others, who are not scientifically competent, is imprecise and foggy. The very scientists who since the Scientific Revolution suggested that their language was unambiguous and transparent, at the same time, however, tacitly employed metaphors to describe nature in terms of 'atoms', 'forces', 'attraction', 'gravitation', terms borrowed from philosophy and referring to things that had not been empirically observed and that were given meaning by comparing them to phenomena that were known in daily life, in particular mechanical devices such as clocks and machines. They also imagined God as a great watchmaker and the endeavor of natural science itself in a gendered metaphor, as a male struggle for mastery and control over a mysterious and fickle female nature.

Science as mediated activity

The assumption that scientific knowledge is an autonomous, direct and objective reflection of reality has been replaced by the social constructivist view that science, in all of its dimensions (research questions, hypothesizing, methods, contents, application) is mediated, that is infused with perspectives. This holds good even stronger for the human sciences. Compare the two diagrams representing, in a nutshell, contrary perspective of how the human sciences are organized and situated in society and culture. The first represents the realist or positivist (rationalist-empiricist) model established since the Scientific Revolution and more or less continued in the positivist approach. The second shows the social-constructivist model which has become current in the sociology and history of science. The first model suggests that science is basically unmediated, the second one that it is mediated on different levels.
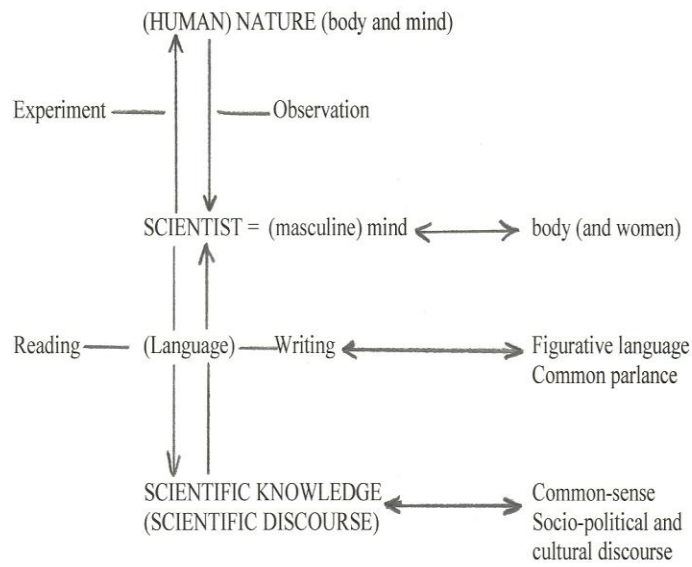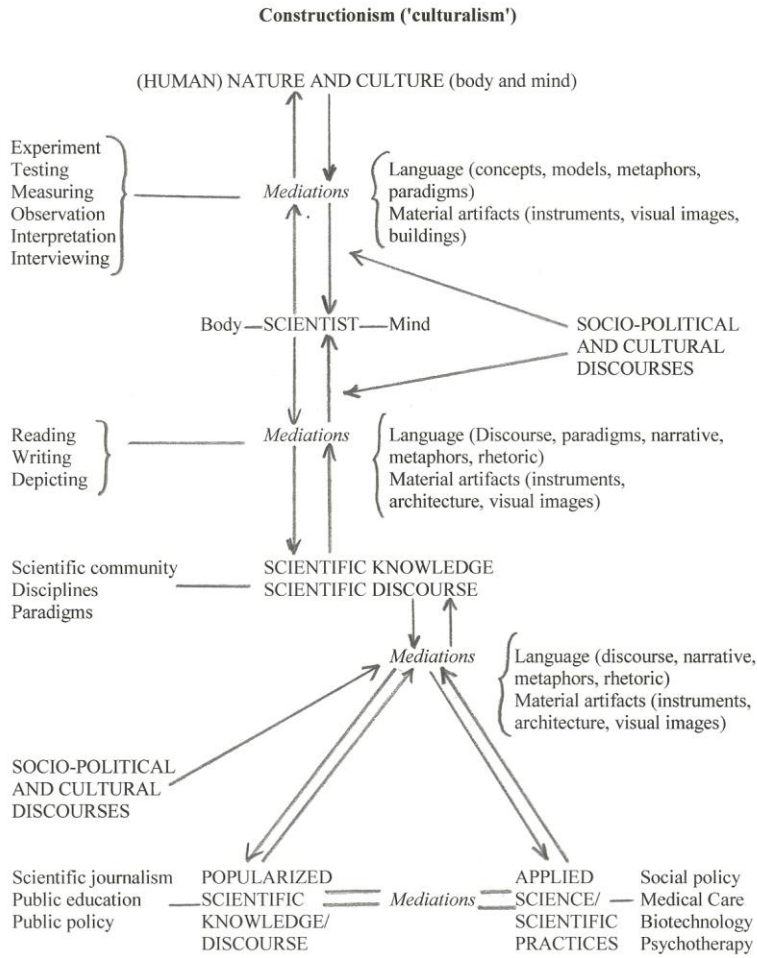
Empiricism/realism/positivism ('naturalism')

(HUMAN) NATURE (body and mind)

Experiment ——— Observation

SCIENTIST = (masculine) mind ⟷ body (and women)

Reading ——— (Language) ——— Writing ⟷ Figurative language
Common parlance

SCIENTIFIC KNOWLEDGE ⟷ Common-sense
(SCIENTIFIC DISCOURSE) Socio-political and
cultural discourse

Figure 1

Constructionism ('culturalism')

(HUMAN) NATURE AND CULTURE (body and mind)

Experiment
Testing
Measuring
Observation
Interpretation
Interviewing

Mediations

Language (concepts, models, metaphors, paradigms)
Material artifacts (instruments, visual images, buildings)

Body — SCIENTIST — Mind

SOCIO-POLITICAL AND CULTURAL DISCOURSES

Reading
Writing
Depicting

Mediations

Language (Discourse, paradigms, narrative, metaphors, rhetoric)
Material artifacts (instruments, architecture, visual images)

Scientific community
Disciplines
Paradigms

SCIENTIFIC KNOWLEDGE
SCIENTIFIC DISCOURSE

Mediations

Language (discourse, narrative, metaphors, rhetoric)
Material artifacts (instruments, architecture, visual images)

SOCIO-POLITICAL AND CULTURAL DISCOURSES

Scientific journalism
Public education
Public policy

POPULARIZED SCIENTIFIC KNOWLEDGE/ DISCOURSE

Mediations

APPLIED SCIENCE/ SCIENTIFIC PRACTICES

Social policy
Medical Care
Biotechnology
Psychotherapy

Figure 2

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The first difference concerns the way how human beings are defined as object of science. Whereas the first model assumes that human body and mind can be studied in the same natural-scientific way as non-human nature, in the second model human beings are part of nature as well of culture, and they are the object of the biomedical sciences as well as human sciences such as psychology, educational theory and sociology which apply the theories and methods of the cultural and historical sciences, such as qualitative research, interpretative hermeneutics, and discourse analysis.

The second difference is that whereas the first model restricts the domain of science to scientific knowledge (and perhaps its technical application) as such, as if it is a kind of free-floating phenomenon and more or less isolated from the rest of society, the second model includes all of its ramifications, such as practices, applications and popularization, which are socially and culturally shaped.

The third and crucial difference involves the connections between the object of science, the scientist, scientific knowledge and the wider sociocultural context. In the first model the wider context is lacking: science appears as an autonomous activity apart from any sociocultural influence and the scientist seems to be some sort of free-floating and objective mind. Also, the connections between the other three components of science (object, subject and cognitive contents) are direct and one-dimensional. In the second model the connections between the scientist, as a physically, socially and culturally embodied and embedded human being, the object of knowledge, the resulting knowledge, scientific practices and the wider social and cultural context are mediated at different levels:
- that of research and discovery resulting in knowledge;
- that of communicating (talking and writing about) knowledge to other scientists and a broader audience;
- that of the interrelations between scientific activities and knowledge, the involved material artefacts and context, practical applications, wider dissemination in society as well as social, cultural and political influences.

In the first model science is unmediated: it is about the discovery of how things really are. The basic assumption is that good science mirrors an objective, mind-independent reality and that the language (and also the quantitative data and visual illustrations) by which scientific knowledge is represented and communicated, is a neutral and transparent means. Science presupposes a radical separation between the subject (the privileged scientific mind) and human beings as scientific object. This model suggests that science, as a disembodied, de-contextualized and purely intellectual endeavor, can provide pure knowledge and is independent from the rest of society and culture with all their muddled and distorted forms of knowledge.

In the second model human science is mediated: it does not mirror reality, but its mediations shape or construct scientific views and representations of reality. The basic idea is that science is about interpretations of what or how human beings are.

Observation is mediated by concepts, models, perspectives, theories, material artefacts, and social and cultural assumptions and meanings. The body of the scientist, his or her experience of it, material artefacts, such as research tools and equipment, and the material environment, buildings such as laboratories, museums, hospitals, psychiatric institutions, schools and prisons may be involved in the practice of science and the production of scientific knowledge. Furthermore, scientific practice and knowledge are embedded in the social and cultural world of which scientists and those who use or consume scientific knowledge are part. This implies that there is not a fundamental difference between scientific knowledge and practice and other social and cultural activities and ways of understanding. Scientific discourse is not privileged in relation to various other discourses.

As a consequence of the post-modern, the humanities and the cultural, and to some extent also the social sciences have turned upon language as a primary object of research. Its grammatical, rhetorical and narrative structures constitute and impose form upon the subjects and objects that appear in the cultural order of meaning including science itself. Scientific and common-sense knowledge is mediated by linguistic forms and thus they are both an intrinsically part of culture. This position implies that one should not distinguish linguistic forms from non-linguistic reality: language has as much reality as the material and cultural objects of the physical and social realm to which it refers. This approach of language has had an important impact on various forms of sociology and cultural history which focus on culture as a system of meanings in which social life as well as cultural and intellectual activities, are embedded. The central idea is that reality, whether it refers to the natural or the cultural world, can only be represented in a mediated way through the linguistic forms (texts, rhetoric, tropes, discourses and narratives) which circulate in society.

The formative linguistic dimension of science can be studied through conceptual and discourse analysis in general and in particular by identifying and clarifying the metaphors and narrative structures used in science.

Metaphor: substitution-theory

What is metaphor? The simplest definition is that of using a term or concept in a context in which it is normally not used and through which such a term or concept adopts a new, unusual meaning. The *Oxford English Dictionary* says that metaphor is 'a figure of speech in which a name or descriptive word or phrase is transferred to an object or action different from, but analogous to, that to which it is literally applicable.' In other words, metaphor evokes analogy by describing and understanding something in terms of something else that usually belongs to another category, but now as if they are similar or comparable. The thing described is the *topic* and its comparative description is the *vehicle* of a metaphor. For example, in the statement that life is going up and down a ladder, life is the topic and ascending and descending a ladder the vehicle. This definition of metaphor (*Metapherein* meaning carry over or transport), which goes back

to Aristotle's *Poetica* (335 BC), implies that it a stylistic and rhetorical ornament, which serves expressive and evocative purposes in poetry or can be used to explain something complex in a simplified and concise way or to describe something new and not yet understood in terms of more or less familiar cultural categories or objects. In this perspective, which is called substitution-theory. metaphors can always be replaced with a literal, more accurate description.

Some examples:
- *Mother Theresa is an angel*. Mother Theresa is an extraordinarily humanitarian, compassionate and careful person. (Mother Theresa is the topic and the angel the vehicle: an earthly human being described as a heavenly, divine-like creature.)
- *Vladimir Putin is a wolf*.' Putin is a cruel, ruthless ruler. (Putin is the topic and the wolf the vehicle: a human being described as a cruel animal.)
- *Vladimir Putin is a hawk*. Putin is a ruler who believes that naked power is the crucial factor in politics and behaves accordingly.
- *Vladimir Putin* is a fox. Putin is a cunning politician.
- *Vladimir Putin is a rat*. Putin is an immoral, untrustworthy, dishonest and deceitful politician, using undercover dirty tricks.
- *The poor are the Negroes of Europe.* This metaphoric statement – the European poor are the topic and 'Negroes' the vehicle – might be explained in two ways: either the poor in Europe are a backward race of savages, or they suffer the same deprivation and oppression as black people in America.
- *The inner Africa of civilized man*. Civilized man appears as the topic here and inner Africa is the vehicle. Under the veil of his civilized appearance, man is essentially still driven by natural instincts and irrational impulses.

The substitution-theory basically assumes that metaphor is a merely a stylistic and rhetorical embellishment of language, which can be replaced by a description in precise terms expressing directly the essential meaning. This theory suggests that metaphor is avoidable and more or less exceptional, that it is part of subjective poetry, literature, and imagination, but that in common parlance and in rational philosophy and science one can or should do without it.

Metaphor: interaction-theory

The idea of metaphor as substitution does not capture the full significance and range of metaphor. There is another approach, so-called interaction-theory, which holds that metaphor is not just stylistic embellishment, but that it is an inherent and indispensable characteristic of our (daily) language and way of thinking. Metaphors express, capture and communicate cognitive dimensions of phenomena that cannot not be conveyed without such figurative speech because there are no straightforward literal terms which would describe and explain these phenomena.

Consider that in daily live we often speak about abstract phenomena (the topic) as if they were concrete things (the vehicle). We speak about time, for example, as if it is a thing that is incessantly moving, flowing and going by: time *goes by, passes*, *flies*, *creeps* or *ticks away*. Also, time is described as a spatial entity as if time can be located: *at* the time (in the past) I was still young; *at* this time, I have grown old; I see you *at* four, *in* three days, be there *in* or *on* time. We say that the past is *behind* us whereas we have the future *before* us, which, by the way, is not self-evident. It is probably typical of the modern and Western future-oriented belief in progress, whereas in other more traditional cultures, the past is in front and the future behind, suggesting that people are oriented towards inherited habits and customs and don't look so much to the future for orientation in life. Typically Western and capitalist is also the speaking about time as if it was an economic resource: time is *money*; time can be *wasted, spent* and *saved*; one can *invest* time in something; one can *win* and *lose* time; some activities *cost* more or less time.

We are hardly aware of the most common metaphors we use in daily life like those of spatial orientations. Up and down, upper and lower, in and out, front and back, on and off, deep and shallow are applied to our emotional condition (*being down* or *upbeat*) or health condition (*coming down* with an illness), social relations (*upper, middle* and *lower* class; being *upwardly* mobile, the *peak* of a career). Also, the use of terms referring to a container if we talk about abstract phenomena such as society is frequent: an *open* and *closed* society; marginal people who have *dropped out* of society; or the idea that there should be *room* for everybody in society. Another example is the way we talk about human reasoning in terms of building and construction as well as movement and travel. Arguments are *constructed*, they are either *strong* or *shaky*, they may be *buttressed* and *founded* or *fall apart*, *collapse* or be *undermined*. Arguments can *lead* or *carry* us somewhere, an argument *runs*, we can *move along* an argument, or an argument can go completely *off the track*. Also, an argument can be qualified in terms referring to the spatial dimension: a *deep* or *shallow* argumentation, trying to *raise* the level of a debate.

The interaction-theory of metaphor, which has originated in linguistic philosophy and has been adopted in cognitive psychology and psycholinguistics, stipulated that metaphor is not just a figurative, ornamental style, but a significant cognitive instrument for making sense of something we do not know or understand. Metaphor advances understanding by describing something new, complex, abstract, unknown or unfamiliar in terms that are already in use for referring to something that is concrete, known, familiar or simple. Terms are transported from familiar phenomena (the source domain) to new, difficult and unknown phenomena (the target domain). Information and knowledge about the source domain of experience is applied to the target domain to open it up for understanding and giving meaning to it. Innovative metaphors require some mental work in creating new meaning and understanding.

In this perspective metaphor is about the use of familiar words in a new context, the use of words and expressions outside their normal, conventional meanings, so that the topic

or the source domain as well as the vehicle or target domain can adopt new meanings. This approach is in line with a view of language in which words don't have an essential meaning, but in which their meaning depends on the meaning of other concepts and the linguistic context in which they are used. The dynamic interaction between the words that are used to refer to the topic and to describe the vehicle may imply interpretive ambiguity and produce new meanings. Therefore, in this approach, there is no sharp distinction between literal and figurative language. Metaphor introduces similarities or analogies that were not there before just waiting to be found as a fact about reality, but it constitutes a dynamic perspective on reality.

Consider again the example *Vladimir Putin is a wolf*. This metaphor does not only give us information about the character of Putin, but it also may offer us a particular perspective on wolfs, the idea that wolfs are cruel, ruthless and dictatorial animals, which is in fact a form of anthropomorphism. By connecting the two terms in this metaphoric sentence, both, in a two-way interaction, adopt new meanings. The same can be said about *Vladimir Putin is a rat*. The substitution-theory would hold that this is condemning, disqualifying statement about Putin and not so much about rats. Following the interaction-theory, however, the question could be asked: isn't this statement insulting for rats rather than for Putin, because rats are undeservedly attributed with all the evil character traits of Putin? (Some people who keep a tame rat as a pet and consider them as sweet animals, would agree.) The statement *Mother Theresa is an angel* not only conveys the message that Mother Theresa is some kind of heavenly figure because of her goodness, but also that angels are apparently compassionate and sacrificing creatures and that they can be seen as some sort of benevolent social workers, which may imply that if people want to be good Christians they should engage themselves for the cause of the poor and helpless. And the phrase *The poor are the Negroes of Europe* cannot not only convey a degrading view of the poor as an inferior race, whose poverty is naturally given or their own fault, but also expresses the assumption that black people, possibly because of their supposed backwardness, laziness or irresponsibility, are indigent by definition and that therefore development aid to African countries is useless and wasted money. If the disadvantaged situation of blacks in the United States is taken into consideration, however, another reading of the statement could be that both groups are discriminated in the Western world, that the poor in Europa are as unprivileged and badly treated as Afro-Americans.

The interactive approach of metaphor makes clear that metaphor does not only play a crucial role in our daily lives, but that they are also widespread in science, in the human sciences in particular. Our focus is on the human sciences, which take the human body and mind as well as behavior as their object of research and which therefore include the realm of nature as well as culture. The mediated character of science manifests itself very clearly in the biomedical and psychological sciences - which does not imply that mediation would not be relevant in other sciences like physics and chemistry.

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Metaphors in the biomedical and human sciences

The nature of man has always been described in metaphoric language. Whereas the Christian understanding of man in terms of an immortal soul of divine origin, equated man with angels, and the soul with a flame, in the natural-scientific perspective their bodies and later also their minds were compared with mechanical devices and energy-machines such as clocks, steam-engines, combustion and electric motors or with chemical plants; the heart was referred to as a pump, colons and bladders as sewage systems, cells as factories or energy plants, brains as telephone switchboards, radio's, radar systems or computers, and life in general was compared with electricity. The rational mind was often described in terms of light (the Enlightenment suggested that reason would bring light in the world and make an end to the dark Middle Ages). When biology emerged around 1800, romantic concepts such as *organism, organisation*, *organische Kräfte*, *Bildungstrieb*, *Gestaltungskraft*, *pouvoir de la vie* and *force vitale* as well as holistic explanatory models became prominent. Biology defined human beings as organisms, and as such in the same category as animals. The organic metaphor was also used to describe and understand the structural order of society. Other concepts used in evolutionary biology such as 'struggle for life', 'natural selection' and 'the survival of the fittest' were current in Victorian society.

Metaphors in evolution theory

The work of Charles Darwin is full of metaphors. He was not the only one who formulated an evolutionary perspective on nature, but the success and popularity of his works were advanced by his accessible and captivating writing style. The central concepts of his theory, 'the struggle for life', 'natural selection' and 'the survival of the fittest' were familiar and appealing for many readers in Victorian society. Such metaphors made his revolutionary view of nature understandable and meaningful in terms of categories and evaluations which were drawn from the cultural world they shared: its bourgeois-liberal realities and values, the capitalist economy of the free market, competition, achievement and merit, the utilitarian ethos and the industrial division of labor and functional differentiation. Darwin's theory of evolution not only reflected existing society, but his picture of nature was not without anthropomorphic elements: attributing animals human characteristics and then the other way around, using animal behavior for pointing out the continuity between animals and humans. Although Darwin himself was not a Social Darwinist, the interactive dynamic of his metaphors may explain how his theory could be used by social and political thinkers as a way to explain human behavior and social relations in a reductionist way in terms of natural evolution.

Metaphors in genetics and biotechnology

A more recent example from the life sciences in which metaphoric language is prominent, is the field of genetics and biotechnology. When in the mid-twentieth

century the DNA, the chemical substance chromosomes are made of, had been unraveled, concepts which were drawn from linguistics, computer-technology, and cybernetic information theory found their way in molecular biology in order to make clear the significance of genes, what they are and what they do. The genetic make-up of living beings was described as a code book, a library, a blueprint, a computer program, a recipe and a telephone directory. The human genome has been referred to as the 'Book of Life', echoing the age-old idea of the Book of Nature as the counterpart of the Book of Scripture: the two books in which God's creation could be read. Genes have been explained in terms of the exchange of information, reading and writing, translating, transcribing, coding and decoding. Genes and its related chemical substances have also been characterized as the 'cell's brains' that animate and construct organisms, as 'law-code', 'executive power', an 'architect's plan', an orchestra, messengers, chaperones, and switches that can be turned on and off. Genes have metaphorically been attributed agency, autonomy, causal responsibility, silence and even selfishness. All of these representations in genetics did not arise from the physical and chemical properties of genes themselves but they were borrowed from other fields of knowledge, such as linguistics, textual analysis, computer science and cybernetics.

Drawing optimistic as well as pessimistic pictures of the applications of biomedical science, the evaluation of biotechnology is even richer in figurative language. Biotechnology has been portrayed as a revolution, a goldmine, a Holy Grail, and the opening of a Pandora's box. It has been associated with the realization of a Brave New World, with playing God, and with committing *hubris* that results in monsters like Frankenstein, Nietzschean supermen, or biological chimeras. Public debates about xenotransplantation – the use of animal tissues and organs for human transplantation – may serve as an example. Proponents appealed upon an image of 'donor' animals that can 'help' us to 'save lives' and thus seemed to invoke a kind of kinship between animals and humans. Organizations that advocate animal rights, on the other hand, spoke of animals that are 'offered' to become 'consumer items for humans'. Whereas scientists characterized the pathogenic-free breeding conditions for their donor-pigs as 'a sort of four-star accommodation' where they can 'live a life of luxury' in circumstances that were contrasted to accepted practices in abattoirs, critics foresaw a 'new bio-industry' that keeps animals in 'bare, sterile, laboratory-like spaces' causing a lot of suffering.

Metaphors in medicine

Medicine is also rich in metaphoric language. In his *Birth of the Clinic: An Archeology of Medical Perception* (1963) about the origins of modern clinical medicine around 1800, Michel Foucault shows how linguistic metaphors were employed to articulate the specific method of the new medical approach. The body of the patient, its health and its diseases, was construed like a grammar of signs in a language that any observant physician, who was schooled in the appropriate and expert methods of clinical medicine, could read and interpret. Another example is the way diseases have been pictured in curative and laboratory medicine with terms borrowed from warfare and hunting:

diseases, bacteria and viruses have been pictured like predatory invader-villains which have to be fought with all necessary armament by heroic, selfless doctor-warriors, and the recovery of the patient has often been equated with a successful conquest. Our immune system has been described as a defensive army countering 'foreign' and threatening intruders and vaccines as the ultimate weapons. (On the other hand, this may have fueled the idea that real wars can be waged with biological weapons, the use of dangerous bacteria and viruses to decimate the enemy.) Such rhetoric often refers to gender relations: think, for example, of the traditional image of science as the male struggle for mastery and control over a female nature.

Metaphors in psychology

From its birth as a scientific discipline, psychology could not do without metaphors. The difficulty for psychologist, in particular with regard to their ambition to establish their discipline as a natural scientific field, was that the mind is not tangible. It is immaterial and invisible, and inaccessible from the outside. This difficulty advanced metaphoric thinking about the mind: it was imagined as if it were a space that is organized in a particular way and in which certain processes or operations take place. In association psychology the mind has been represented as a *tabula rasa*, a blank tablet that has been inscribed with images and ideas which compete with each other for priority and go into relations (associations) with each other. Association psychology adopted mechanical explanations borrowed from physics. Just as the material world consists of particles moved by pulling and pushing forces, the mind is composed of mental elements (ideas) triggered by sensory perceptions and these ideas interact (associate) in a mechanical way and thus result in compound ideas, which are associated with each other in different and ever complex ways. In empirical association psychology mental phenomena can be analyzed in a reductionist way on the basis of the most elementary parts – simple ideas as a direct result of sensual experiences and as representations in the mind of fragments of the outside world – like in physics nature can be reduced to its smallest particles and their mechanical interactions. In rationalist as well as Romantic faculty psychology, on the other hand, the mind was compared, not to a tablet with ideas that mirror the input of sensual observations of reality, but to a lamp that shines on reality and lights up what we can know of it. And the clarifying light of the lamp did not do its work in a mechanical way, but as a synthesizing shaping force. Behaviorists, who focused their investigations on observable behavior, conceptualized the mind as an unknowable 'black box'. The mind has also often been compared to man-made machines or instruments of which the mechanics could be understood, such as clocks, steam-engines, telephone switchboards, radar systems, radios and computers.

Metaphors played an important role in the presentation of psychoanalytic thought. Sigmund Freud, whose impact on the modern view of human nature was as pervasive as that of Darwin, was also copiously endowed with rhetorical and literary talents. Freud was nominated for the Nobel Prize, not for medical science, but for literature, and he was actually awarded with the Goethe Prize for literature for the stylistic qualities of his

scientific writings. In psychoanalysis the human mind is conceptualized in spatial terms as a hierarchically layered depth-structure: the ego is situated between the lower, so to say dark underground level of the opaque Id and the unconscious, and the upper level of the super-ego which seems to be in the bright light of transparency. Freud also described psychic processes in terms of a fluid that is under pressure and that flows from dark reservoirs. Referring to the Dutch water works and polders, he invoked the imagery of flooding, draining, and damning to characterize psychoanalytic theory and its therapy. Not only Freud, but also other psychologists such as William James associated the operation of the mind with a fluid flow: his metaphor for thought or consciousness as a 'stream' is well-known. Freud also drew upon the technology of the steam-engine under pressure to suggest the continuously pushing force of the instinctive Id, which has to find (controlled) release in order to prevent neurosis. And he was well-read in Greek mythology and drama, which he, for example used to describe basic psychological structures and processes like the Oedipus and Elektra-complexes.

Metaphors in neuropsychology

As far as contemporary scientific explanations of mental phenomena are concerned, it is particularly the neuro-physiological sciences that have exerted their influence on the philosophy of mind and consciousness. Hence it is no longer strange to hear scientists claiming that brains think and have emotions. Reacting to these modes of speech, philosophers have come to reflect upon the increasing tendency to reduce mental phenomena to underlying physical processes. There is the metaphor of the brain structured like a vast number of computers working parallel with each other. Neurons are often compared to mechanically controlled digital switches which are put on and off. Other metaphors are also used. Read the following fragment taken from an interview in *Observant* (*24*(3), 7) under the heading 'The brain is like an orchestra'. Alexander Sack, professor of Functional Brain Stimulation and Neurocognitive Psychology at Maastricht University explained his research into new brain stimulation methods for the treatment of people with attention and memory problems as a consequence of a stroke:

> *After a stroke many people suffer from an impaired memory and concentration problems. These are two brain functions you need for almost everything […] For example, when you look at someone, you focus entirely on that person. You ignore other information that enters your brain, such as what else you can see in the room or what you can hear outside. The memory is hard at work too, storing what you see and what is said. In stroke patients, something here has gone wrong – but what exactly?*
>
> *It's too simple to say that the areas in their brain dedicated to memory and attention no longer work properly. People tend to think that every function has its own place in the brain. They picture one of those images where a certain area in the brain – the active area – is lit up in colour. But that would be very*

inefficient and inflexible; for that to work you need to have an implausibly large brain.

In reality, the different brain areas carry out their functions by communicating with one another; that is, by sending information to one another at a certain frequency. Every brain area is full of neurons. If an area wants to 'talk' the neurons transmit signals in a certain rhythm, and the receiver starts to send out the same rhythm. The brain is like an orchestra: there are many instruments but together they play the same music. These are known as brain waves and they exchange a great deal of information, even between brain areas that are far away from one another. For example, the attention and memory network encompasses a number of areas that can engage in dialogue with one another flexibly depending on the task that needs to be accomplished. [...]

We want to pinpoint how different brain areas and networks cooperate. Suppose I disable a certain network node – will the brain area then send that information to a different partner? And does it matter whether I do that in a peak of a brain wave or a valley? We then look at the consequences in terms of carrying out the task. To make this whole process run smoothly we use three different techniques: fMRI to identify the active brain areas, EEG to determine what communication is going on, and brain stimulation through the magnetic coil. No other lab in the world is doing this.

Sack talks about the functioning of the brain as if there are active agents in the brain that 'are hard at work', 'store' information, 'communicate', 'send and exchange information', 'send out rhythms', 'talk', 'engage in dialogue', 'play music', 'carry out functions', 'accomplish tasks', 'cooperate' and are 'efficient' and 'flexible', 'have partners', and are members of an orchestra who play instruments and produce harmonious music.

Instrumental and substantial functions of metaphor in science

Although figurative language was (and is) considered as problematic in science because it would obstruct the neutral representation of what was defined as pure and objective knowledge, linguistic analysis of scientific discourse has shown that metaphor has always been part of science in general and the human sciences in particular. Metaphors may carry ideological, moral, and political connotations and thus color or distort scientific knowledge. Not all metaphors are equally useful for generating knowledge and they can also constrain the scope of investigation, hamper new ways of thinking and obscure scientific knowledge, but at the same time it is very difficult or even impossible to do without them. Metaphors are intrinsically part of language in culture as well as in science. Moreover, they may fulfill several constructive, instrumental as well as more cognitive functions in science. The problem is not whether metaphors can be used or not in science, but whether or not they are useful, creative and clarifying. They can have instrumental and substantial functions in science.

With regard to their instrumental function metaphors can be illustrative. They can be useful as a captivating and vivifying means to support and promote an idea or argument in communication, education, popularization, and persuasion in order to make particular knowledge understandable for other scholars, a lay audience or policymakers, to arouse and maintain their interest and commitment or, simply, to get funding for research.

With respect to their substantial cognitive function, metaphors can be heuristic and creative: as tools of thought to open up new questions, perspectives and discussions, to formulate a new idea or hypothesis, to open up possibilities for new research and gaining new insights. Metaphors can introduce a new style of reasoning, a fruitful redefinition of the subject matter and even a new disciplinary field. The metaphors of organism and organization, for example, played a crucial role in the shaping of a new perspective on life which underpinned the formation of biology as a discipline apart from physics, chemistry and physiology. The continuing discussion about the key-concepts of organism and organization and its opposite, the machine-metaphor throws light on the complex and intertwined history of scientific research into the nature of life, of the shaping of new disciplines (biology and later physiology), which emancipated themselves from natural history and medicine, but also distinguished themselves from each other and of the connections between the new life sciences and the wider cultural and social context, for example the Romantic movement, liberalism and industrialism. On all of these three levels (cognitive content, discipline formation and their broader socio-cultural context) metaphors throw light on how these three levels were intertwined and mutually influenced each other.

Metaphors may be indefinite, suggestive and ambiguous, but it is their very indeterminacy, elasticity, and flexibility which can make them productive tools from a heuristic point of view. When scientists within a certain field disagree with each other, metaphors may still enable a shared conceptual framework with enough room for different and controversial views and theories to spin around freely in a productive way, which can lead to new questions and new insights.

Studying the use of metaphor in science is especially relevant for students of the sociology and history of science. Not only do metaphors shed light on the underlying, silent presuppositions of and differences between scientific theories and disciplines, but they may also serve as the anchor point for clarifying how scientific knowledge is connected to broader cultural meanings. Analyzing metaphors can throw light on the underlying affinities and relations between several levels of scientific activity: research and discovery, reporting and communicating to the scientific community or a wider audience, scientific practices, science in public policy, and the interaction between science and society.

Narrative: storied versus logical-analytical discourse

What is narrative? Narrative is a form of storied discourse about real or imaginary human actions and events. Narrative is a form of discourse, but not all discourses are narratives. Discourse in general can be defined as a patterned way of talking and writing: the use of certain terms and concepts together with particular styles of reasoning and argumentation produces coherence and meaning. And if discourse is presented as scientific it implies a truth-claim. A discourse is an integration of words and sentences that conveys a covering meaning that is more than the meanings of the words and sentences and the pieces of factual information viewed on their own. It is at the level of the discourse that the separate units of information, argument and explanation are aggregated into a meaningful whole.

There are various forms of discursive logic that synthesize statements, sentences and pieces of information. The cognitive characteristics of narrative discourse can best be clarified by contrasting it with what in several ways is its opposite: the logical-analytical reasoning and discourse of empiricist and positivist natural science. In the natural sciences, phenomena are observed and analyzed through reducing and abstracting them to decontextualized formal properties which can be objectively measured and quantified. Natural phenomena are explained by identifying them as particular instances of underlying timeless natural laws or statistical patterns of regular relationships. Natural scientific explanations are about repeatable and inevitable cause and effect, mechanical regularities, mathematical equations, statistical correlations, calculability and predictability. Questions about the *why* of natural phenomena are not relevant; natural science is about the *how*, and as such it excludes human categories as values, intentions, motivations and purposes. The rationality of empirical-positivist science entails a specific form of scientific discourse following a set pattern. Scientific reports are typically organized in standard sections: introduction; research-question(s), relevant established scientific knowledge, hypothesis, description of the method and theoretical framework, of the experiments or other type of research, the results, and a discussion of the results. Such a pattern is typical not only for the natural sciences, but also for social scientific research on the basis of quantitative models and statistical methods.

In the empiricist-positivist model of science, a narrative or story cannot be a reliable and verifiable representation of reality. Like figurative language in general, the narrative form of discourse has been disqualified as a literary and therefore by definition unscientific form of discourse. In the cultural sciences, the humanities and also in qualitative social scientific research, however, narrative is prominent on two levels. Firstly, as far as the cultural and social sciences investigate the meanings which people give to their existence, narratives are the object of study. Meanings, in particular subjective experiences are often expressed in the stories people tell about their lives, their experiences and the events and conditions in which they are involved. Secondly, cultural scholars and social scientists often present the results of their research in the form of narrative accounts. They consider narrative as a legitimate cognitive and

discursive form next to the logical-analytical form of discourse, which is the established standard for natural science. Narrative used to be a field of research of literary scholars interested in the formal characteristics of fictional stories, but since the 1980s there has been a growing interest in the cultural and social sciences – there was talk of a 'narrative turn' – in narrative accounts in order to study and understand subjective human experience.

The narrative form of discourse can be defined on the basis of four characteristics which are largely the opposite of the features of logical-analytical discourse. Narrative
1. is holistic and as such about meaning in context;
2. is retrospective and teleological;
3. is about human experience in time;
4. has a moral dimension.

Ad 1. Narrative as holistic and meaningful representation of human experience

Narrative implies a holistic approach of human experience in order to understand it in terms of meaning, motivation and purpose, which are embedded in a designed storyline. Whereas in logical-analytical discourse the meaning of the whole can be reduced to the separate logical steps which make up and order the chain of reasoning, in narrative discourse the meaning of the story as a whole is more than the sum of the parts. The narrative form of discourse forges meaningful connections between sentences or statements by integrating them in a plot that connects the beginning and progression of a story with a purpose and a significant end, a closure. In this way a narrative bestows unity and continuity in a succession of actions and events.

The formation of a narrative is a dialectic process: the whole is formed by integrating the parts, and the parts are selected, grouped and organized from the perspective of the plotline of the story. Organizing a story on the basis of a central plot involves a kind of discursive structuring that continuously moves back and forth from singular events and actions to the central theme and design of the narrative. Through storytelling singular events and actions are integrated in the same order of meaning and therefore in a coherent whole. In a story relevant facts are selected with a purpose in mind, linking the description of *how* things happen with the (either explicit or implicit) clarification of *why* they happen. The plot weaves together a complex of selected events and actions in a storyline with a beginning, a middle and an end. The beginning is not the point before which nothing happened, but the point where the first event is located that is relevant and important for what follows. The middle is the succession of actions and events, described in ascending and descending lines, and highlighted as decisive steps, turning points, crucial transitions, crisis, climaxes or low points. The end of a narrative is not just an abrupt stop, but it takes the form of closure, a resolution: the manifestation of the final and encompassing meaning of the chain of actions and actions.

Narrative understanding is holistic rather than analytic: it is the comprehension of a complex of events by seeing the whole in which the parts are integrated. Narrative understanding is seeing-things-together in the light of a plot, which implies purposes and values. In contrast to logical-analytical explanation, narrative clarification does not subsume events under timeless, abstract and predictive laws and it does not provide an explicit argument, but it makes a story understandable by showing the meaningful pattern of what has happened. Whether a story is understandable or convincing does not depend on general truths, lawful regularity and predictability, but rather on probability, acceptability, credibility and intelligibility in the context of shared cultural meanings. Narratives are embedded in culture and can only be understood through hermeneutic interpretation, that is identifying underlying meanings, analogies, values and patterns of feeling, thinking and experiencing. Narrative plots can be understood because they are recognized in terms of the cultural repertoire of stories we are already familiar with: myths, biblical stories, fairy-tales, novels, drama, romances, tragedies, comedies, satires, (auto)biographies, and historical accounts. In that sense narratives have metaphoric features: they are understandable on the basis of analogies with other stories that are already familiar. Narrative theorists like Northrop Frye and Umberto Eco have explored universal narrative modes which makes it possible to see individual stories as variations on a basic, deep narrative structure. Frye for example argued that the Bible and fairy tales provide universal narrative models, for how to organize stories on the basis on a plot. The structure of the Cinderella story, for example, is embedded not just in fairy tales, but also in novels, films, operas, ballets, and television shows.

Narrative is not about repeatable and uniform events in nature that are considered the same everywhere and always under equal conditions, but it is about unique and singe events and developments, and it is about unrepeatable change in time. Narrative pays special attention to the variable and unpredictable sequence in which actions and events occur. Narrative is about non-repeatable events and actions which take place in different and changing contexts and which can only be understood in these contexts.

Let me illustrate this with an example. In her dissertation *Narratives of Evolution* (1993) the historian of science Misia Landau has demonstrated how in British and American nineteenth-century paleoanthropology the early evolution of mankind has been presented in the form of stories which share features with fairytales, folktales and hero-myths. Paleoanthropologists identify four formative stages in human evolution: the shift from the trees to the ground (*terrestriality*); the development of the upright posture (*bipedalism*), the development of the brain, intelligence and language (*encephalization*), and the development of technology, morals and society (*civilization*). The occurrence of these stages is presented in the form of a plot about a daring, creative and problem-solving 'hero' who takes, as it were, crucial steps in nine particular episodes:
- An initial situation which is presented as a state of equilibrium in which the predecessors of mankind lead a relatively safe, stable and untroubled existence, usually in the trees like other primates such as apes and monkeys.

- The introduction of the 'hero' who is smaller and weaker than other animals, but who will overcome his humble origins and vulnerability (a common feature of heroes in myths and folkloristic narratives).
- The dislodging of the hero from his habitat by either compulsion or by choice, as a consequence of either a changing living-environment or of a change in the hero (the acquisition of a larger brain or of an upright posture).
- The departure, the beginning of a journey or adventure as a turning-point: the escape from established static existence and the move towards a new existence.
- The test, the facing of a series of challenges in the new, unknown situation and the dealing with a series of tests in order to survive. The successful passing of such tests entails the improvement of the hero (for example growing intelligence and better mobility as a consequence of his upright position) and gaining control over his situation.
- This progress is made possible by the donor, a beneficent force, which is often a nonphysical one: the power of thinking and intelligence. (In fairy tales and folktale the donor is often a magical agent or object: a cloak, sword or a ring.)
- Transformation: the power of thinking and intelligence which provides man with plasticity, initiative, the ingenuity to make tools, and which makes him unique among other animals.
- New tests: the struggle with new environmental challenges which are now faced with the help of the new capacities, and which stimulate their further development and improvement.
- Final triumph: the rise of social bonds and civilization, which make man less dependent on the whims of nature and which set the preconditions for the emergence of modern man. The outcome is victory over nature.

The next step in Misa's analysis is a comparison of six different explanations of early human evolution by some prominent British and American evolutionary biologists and paleoanthropologists on the basis of their particular imaginative reconstructions. She shows that these explanations are in fact embodied in different stories, the various ways they have ordered and related episodes and themes in a particular sequence.

Ad 2. The retrospective and teleological character of narrative

A crucial characteristic of narrative is that telling a story involves a retrospective and teleological explanation of how and why things happen. Stories are not about repeatable and uniform events in nature that are considered the same everywhere under equal conditions and that can be predicted. Whereas the natural scientific mode of understanding searches for an abstraction of reality and universal conditions of verification, and eliminates purpose and direction from scientific knowledge, the narrative mode centers on meaningful relations and sequences of actions and events in order to express and highlight overall direction and purpose.

Narrative integrates a succession of unique and unpredictable actions and events in a contextualized, meaningful and recognizable unity. The sequence in which actions and events are organized suggest direction and purpose, but this sequence is not inherent in the actions and events themselves. Narratives engender their meaning by the arranging and sequencing of events in such a way that the connection between them *is made* significant and comprehensible in terms of direction and purpose. Therefore, the events

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and actions can only be given relevance and order retrospectively. Earlier ones are described from the perspective of their meaning for later ones and on the basis of their contribution to the outcome of the story, such as the fulfilment (or failure) of personal or collective aims. Stories about events and actions in time can only be told after they have happened and have come to a certain conclusion, from which it is possible to oversee and show how and why they have happened.

Ad 3. Narrative: meaningful change in time

Next to space, time is the most important dimension within which human existence takes place. Narrative is a form of discourse that is pervaded by an awareness of the centrality of time and change. Narrative organizes the fluid experience of events and actions in time in a meaningful form, and as such it is closely connected to historical awareness. As far as people do not (want to) experience time just as a random and blind sequence of disparate moments, actions and events that happen without direction, the human experience of time often takes on a narrative structure. Meaningful experience of time depends on a particular awareness of a continuity between the past, the present and the future. With regard to the past this historical awareness hinges on remembering a series of interrelated events and developments that stand out, because from the viewpoint of the present they are considered significant, and they are connected to each other by an implicit or explicit narrative logic.

In the same way we look towards the future not as measured time, indicated by clocks, but in the form of anticipation: expectations, hopes, desires, fears; optimism or pessimism of what the future will bring. By interpreting time in the form of narrative, human beings escape a life that would only be lived in the form of a series meaningless, instantaneous present moments without any sense of purpose. Through narrative the past and the future are made meaningful from the perspective of the present. In order to be part of meaningful temporal order, an event, action or experience must be more than a singular occurrence. It must be related in a meaningful way to other events, actions and experiences that have preceded it or will come after it. Meaningful temporal existence is experienced as an interplay of meanings that unite what has happened in the past, what happens in the present and what possibly will happen in the future. The retrospective temporal ordering of events, actions and experiences in a narrative puts them in a purposeful timeframe: the ending is already known and the beginning of the story and its course can only be understood in light of the ending.

Ad 4. The moral dimension of narrative

Narrative often includes a moral dimension because many stories involve human action that is motivated and oriented towards values and purposes. Narrative gives meaning to human experiences, first by organizing the presentation of selected events and actions in temporally meaningful episodes and then by relating them to each other in such a way that they are relevant in the light of a certain outcome. The end of a story is a

closure which is often about the fulfilment or failure of human desires, goals and purposes and which implies an implicit or explicit moral meaning or judgment. Narratives often carry cultural values about what to do, what to strive for, how to deal with or accept anxiety and certain feelings, about purpose in human life, and also about what should have happened or what has gone wrong. They may provide (positive and negative) models of action. These models and the associated purposes are not simply about the fulfilment of personal desires; they also include commitments to ethical standards and the fulfilment of collective hopes or expectations or of social goals. The demand for closure in a narrative is a demand for moral meaning, for moral judgment, for example in the form of poetic justice, that a wrong doer is punished in memorable way.

To come back to the narratives in paleoanthropology, there are different views about the outcome of human evolution, the symbolic victory of human civilization over nature. For example, on the one hand in terms of hope, on the other hand in terms of uncertainty and possible destruction as a consequence of hubris by which civilization can become a threat to mankind. Compare the very different descriptions by Darwin and by the biologist Thomas Henry Huxley (who was well-known as 'Darwin's bulldog') of the possible outcomes of human evolution.

In his *The Descent of Man* (1871), Darwin wrote:
> *Man may be excused for feeling some pride at having risen, though not through his own exertions, to the very summit of the organic scale; and the fact of having thus risen, instead of having been aboriginally placed there, may give him hope for a still higher destiny in the distant future*.

Eighteen years later Huxley wrote:
> *I know no study which is so utterly saddening as that of the evolution of humanity. Man emerges with the marks of his lowly origin strong upon him. He is a brute, only more intelligent than the other brutes, a blind prey to impulses, which as often as not lead him to destruction; a victim to endless illusions, which make his mental existence a terror and a burden, and fill his physical life with barren toil and battle*.

Storytelling: giving meaning to human existence

Why has there been a growing attention for and interest in narrative in the human sciences, especially in history and cultural anthropology, but also in sociology, psychology and medicine? The reason for this is the feeling that the knowledge tools of the human sciences have to be geared or should reflect the particular characteristics of human existence as it is lived, experienced, and given meaning in ordinary life. Narrative is one of the crucial forms of human understanding and expression through which events and experiences can be endowed with coherence and direction. Narrative

meaning and understanding play a crucial role in making possible the experience of human existence as structured, continuous and purposeful instead of as empty, chaotic, confused and futile. In this perspective there is a similarity and continuity between de world of our practical, everyday experience and the telling of stories.

Since the cognitive turn in psychology during the 1960s, psychologists have pointed out that narrative competence is a fundamental part of human cognitive functioning. Cognitive psychology is about the acquisition, the organization, the processing and the use of knowledge in its broadest sense, not only intellectually but also practically and emotionally. The wide-spread capacity to tell and understand stories, together with its appearance in an early stage of individual as well as cultural development, suggest that narrative understanding is a very basic cognitive structure. In developing narrative competence, children between the age of two and ten learn to produce and comprehend structured story-plots that are evolve around a variety of themes and numerous characters.

The French phenomenological philosopher Paul Ricoeur, among others, has also draw attention to the general human capacity to construct and understand stories and its significance for social life. According to Ricoeur narrative capacity is fundamental for understanding other people's behavior and motives as meaningful and purposeful in the context of a larger whole in which they are connected to other acts and events and other social actors. The meaning of separate acts and behaviors can only be grasped as part of the (implicit) story in which they are embedded; understanding acts and behaviors is similar to the comprehension of a story.

Narrative: autobiographical self-understanding and personal identity

Social behaviors are generally motivated and purposeful, and they are connected to other acts and events. The significance of separate events or acts becomes only apparent when one knows the plot or script of which they are part. The fact that a student follows a particular course can only be understood as a fragment of his or her individual story about being enrolled in a specific study, at a particular university, and it cannot be isolated from his or her previous history and his or her motivation, goals and ambitions for the future. If a student's presence in a lecture room would find no place in the series of events, acts, choices, and decisions which make up his or her life, it would be very difficult to see any purpose for being there, participating in a course and being motivated.

From this example it is only a small step to the more general significant role that narrative plays in autobiographical self-understanding and the formation and continuation of personal identity. Some sort of continuity between the past, present and future is a necessary precondition for a life with direction and purpose, and for having an identity. People need some sort of coherent understanding about themselves in order to have a basic sense of identity. This coherence can be found in their implicit

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or explicit ability to tell a continuous and unfolding story about the course of their lives. Each person has a unique set of memories about his or her past life, which is linked to present experiences, and each individual is, in principle, capable of telling a unique story about the development of his or her life - a story that connects those memories with the present condition and experiences as well as with expectations or goals for the future.

Autobiographical self-understanding is based on a retrospective selection and ordering, and also frequent reordering and reinterpretation of events in one's past life in such a way as to create a self-narrative that is coherent and more or less satisfying in the sense that it is in line with, makes sense of and justifies one's present condition and situation. It is a form of appropriation of the past in the interest not only of the present, but also of anticipating the future: autobiographical narrative links up the personal past, the present condition and the anticipation of the future. The experience of self is organized along the temporal dimension in the same manner that the events of a narrative are arranged by a plot in a coherent story. In autobiographical self-understanding life events, acts and motivations are linked in such a way that they bestow existential continuity on the experience of the self.

In the narrativist perspective, we achieve our personal identities and self-concept through the use of the narrative configuration. We make our existence into a whole by understanding it as an expression of a single unfolding and developing story. We are in the middle of our stories and cannot be sure how they will end; we are constantly having to revise the plot as new events are added to our lives. Self, then, is not a static thing nor a substance, but a configuring of personal events into a narrate unity, which includes not only what one has been, but also anticipations what one will be or would like to be in the future.

We can see the narrative dimension of self-identity most clearly in autobiographies. Autobiographers make clear what sort of person they are or have become by selecting and highlighting particular events and experiences which had special significance or were formative, and by arranging these events and experiences in such a way that some sort of unity, development, direction and purpose is established in their life-course. Autobiographers often relate the story of their life as a continuous process with an inner logic leading up to what they have become. In this way, personal narratives are not merely descriptive, but they also explore, explain and justify the self. Interpreting past events from a present point of view and anticipating the future course of their lives, they narrate their lives in terms of a basic plot formula or story-pattern that are often borrowed from genres in the wider culture: the life-course as *Bildung*-process, the discovery of a vocation or destiny, experiencing a radical conversion, the discovery or confession of a secret, the suffering and coping with a trauma, the undertaking of a journey, the fulfilment of (or failure to realize) one's desires, ambitions, or moral purpose, or the quest for and the finding back a lost paradise (coming home again).

Narrative patterns that are common in autobiography refer to stability, regression or progression, and they are borrowed from genres like tragedy (a progressive or stable phase in the life-course is suddenly interrupted by a regression like a serious illness or divorce), melodrama (a regressive phase is followed by a restoration of stability or progression), and the romantic saga (a series of progressive-regressive episodes). Narratives can be seen as extended metaphors. Metaphors suggesting a lost paradise, a journey, a conversion, or a confession bestow on individual life stories something of the already familiar.

Personal narrative in psychology, psychiatry, psychotherapy and medicine

The study of narrative is not only relevant in the humanities, such as history, cultural anthropology and literary studies, but also in sociology, psychology, psychiatry and medicine there is a growing interest in narrative meaning and understanding as a cognitive structure. In the context of research into life stories, biographies and case studies, sociologists and psychologists have turned away from statistics and experiments to narrative as a means to understand individual lives as well the experiences and life-worlds of social groups. The narrative approach in psychology holds that people conceive themselves in terms of stories, which are not just individual, but which are always individualized versions of the more general stock of stories in a certain culture about how life can or should proceed. There is in particular interest in narrative in developmental psychology, especially in the life-span perspective that focuses on the study of the individual life course and the way people understand their own lives, in particular with regard to the restrictions and possibilities in their lives against the background of their social situation and position in society.

In psychoanalysis and psychiatry narratives of and about the life-course of patients or clients, have played an important role. Psychotherapy can be seen as the effort to reconstruct the continuity of a life-story that has disrupted because of a personal crisis so that the experience of continuity between past, present and future has broken down. As a talking cure, psychotherapy is a conscious effort to change the life-story in a form that fits the present condition of the patient or client better than his or her former life story. In the reconstructed autobiographical narrative, which is created with the help of the therapist, one can include disturbing events and experiences in a new way in order to restore some sort of stability and continuity. Psychotherapy is an extended methodological conversation about how to understand, revise and adapt life stories. Therapists can assist clients in the reconstruction of life narratives that have been too restrictive or that have become painful in the light of some discovery about the personal past or of a crisis in the present. Certain events or experiences may be such that it is difficult to include them in an existing autobiographical plot line. The life plot itself must then be revised. Therapists help to construct alternative narratives that incorporate a client's life events in a more coherent, bearable or empowering narrative. There is even a school in psychotherapy now, which calls itself narrativist psychotherapy and in which clients have to write down their life-story and to reflect and work on that story.

In medicine there is a growing interest in storytelling as a counterbalance to what is felt as an objectified and impersonal treatment of patients. Physicians tend to rely on laboratory results and medical technology rather than take time to listen to patients. Also, efficiency and cost benefit rationalities have curtailed the personal stories of patients about their condition and situation. Since the 1960s and 1970s, patients and their organizations, however, have become more vocal: they complain about medical bureaucracy and doctors who lack the time and skills for communication. Some philosophers, ethical theorists, literary scholars, and also doctors themselves, who feel that scientific and technological progress may undermine the human face of medicine, have suggested that one of the solutions would be to give more attention to patients' experiences as these are articulated in their personal stories. Introducing the interpretative methods of the humanities in medicine would be an antidote to the prevailing one-sided scientific and technological model. Physicians should not only deal with diseased bodies but also with patients' stories that reflect the wider meanings of the experience of being ill. According to the American physicians Edward Gogel and James Terry, 'The doctor stands in the same relationship to the patient as the literary critic to the poem'. In a similar vein Kathryn Montgomery Hunter writes that 'physicians need a literary sense of the lives in which illness and medical care take place.' In the last decades, there has been a growing interest in the personal stories of patients: the general idea is that their narrative accounts of their condition, experiences and life-course should be considered in medical diagnosis and treatment. In this way medicine's status as science *and* an art would be restored.

So generally, in medicine, psychology, psychiatry, and pedagogy, which include patient or client-oriented practices like care and treatment, counselling and psychotherapy, or advice and support, personal narrative may play an important role. It provides room for and makes accessible the viewpoints and voices of patients and clients, their personal, subjective experiences: inner thoughts, motives and feelings, aspects of reality that cannot be encompassed by a purely scientific, logical and analytical mode of thinking. This is not only relevant for the practice of the helping professions themselves, but narratives also provide sociologists and historians of these fields with valuable sources about the experiences of patients and clients and their interactions with professionals.

Historical background of narrativism in the human sciences

The interest in (life)stories as valuable qualitative research material in the human sciences reflects an acknowledgement of personal experience and subjective perspectives as a counterbalance to detached and structural perspectives. The social world is understood not any longer exclusively from above by the superior and generalizing gaze of scientific expertise, but through the lenses of the subjective and the particular of those who previously were only the nameless objects of science. The narrative turn was boosted by the liberation and emancipatory movements of the 1960s and 1970s which enabled disadvantaged, marginalized and silenced groups, such as

women, the lower classes, ethnic minorities, gays and lesbians, (psychiatric) patients and victims of all kinds of trauma to make their voices heard and to speak for themselves. Such groups advanced the idea that the personal was political, and that individual life histories could throw light on social inequalities and structural oppression. The narrative turn was also a critical and democratizing reaction to the statistical and objectifying generalities in the human sciences and of hierarchical clinical practices in medicine, psychiatry and psychology. The narrativist approach, which could uncover alternative life-worlds, was geared towards a new therapeutic as well as emancipatory culture that centered on identity movements and empowerment, and on life-worlds. All of this was rooted in the belief that personal storytelling would be beneficial for personal and social well-being. Researchers of such storytelling, however, should be careful not to take such narratives for granted as the expression of authentic inner states. They are mediated by the circulating sociocultural meanings in a particular historical context.

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