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Another Step Towards the Dialogue Between Neuroscience and Literary Studies

- Arthur Jacobs/Raoul Schrott, Gehirn und Gedicht. Wie wir unsere Wahrheiten konstruieren. München: Hanser 2011. 528 p. [Price: EUR 29,90]. ISBN: 978-3446236561.

What would happen if a well-known psycholinguist were to meet a novelist-translator and they decided to work together? They would most likely discuss their common interest and field of work which is language. They would express their point of view on this subject and discuss the perspective gained from their educational background. They might reflect on fundamental questions such as: How does language affect our thinking? Why are we immersed in reading of literary texts? Why are verses short? What is the function of literature? If they were then to write a book together it would most probably bear the title *Brain and Poetry*.

Indeed, this is what happened recently, the result of which is the book entitled *Gehirn und Gedicht. Wie wir unsere Wahrheiten konstruieren*, written collaboratively by Raoul Schrott and Arthur Jacobs. This vast book of more than 500 pages is undoubtedly a pioneering work: *Gehirn und Gedicht* is not only a dialogue between two ›workers of language‹ but an introduction to neurosciences and a synthesis of knowledge from neurolinguistics, evolutionary biology and evolutionary aesthetics, linguistics, rhetoric and literary criticism. An index could have been useful for the orientation in this book which forms an almost solid bridge between the often discussed ›two cultures‹. And consequently, the style of the book is as hybrid, including quotations from literary texts and scientific essays, graphs, pictures of functional brain imaging data, as well as didactic ›boxes‹ where specific topics are discussed.

It is difficult to summarize so much knowledge and impossible to analyze it in its totality, so I will deal with selected topics. Box 1 (cf. 24), for example, discusses mirror neurons. In the 1990s, researchers at the University of Parma, such as Giacomo Rizzolatti, Vittorio Gallese and others, showed that the brain of a monkey contains ›canonical neurons‹ and ›mirror neurons‹. The researchers observed that canonical neurons discharged both when monkeys saw a particular object and when they performed movements directed towards the same object. Mirror neurons, on the other hand, discharged when the monkeys watched someone interacting with the object, or even watching a representation of someone interacting with the object. Therefore, the monkeys' object observation determines the activation of the motor program that would be required if they were actively interacting with the object. The researchers of Parma concluded that to observe objects is equivalent to automatically evoking the most suitable motor program required to interact with them. Looking at objects means to ›simulate‹ a potential action unconsciously. Yet the very existence of mirror neurons in the human brain and of neural correlates of emotions like empathy remains controversial. Jacobs and Schrott quote scientists who worked on similar issues, such as Chris Frith and Tania Singer, the pioneers of the studies on empathy. The data from experiments by Tania Singer suggest that empathizing with the pain of others does not involve the activation of the whole pain matrix, but that of those second-order representations containing the subjective affective dimension of pain. In these studies empathy is considered as a complex phenomenon that includes emotional contagion and perspectives resulting from historical-cultural processes. These studies mentioned by Jacobs and Schrott promote a new understanding of empathy and identification,

two old critical concepts of literary criticism. When we read or listen to stories we imagine an environment in which we might act ourselves. Reading fiction also sets in action the neural narratives, ultimately aimed at coordinating the movements of our body. On a neural level, a described or imaginary reality makes the same processes activated *vis-à-vis* a solid reality. The reader is regarded as *embodied*. The new conception of ›embodied semantics‹ postulates that the neuronal structures we activate when performing an action also participate in the semantic dimension of language. The *ACE (action sentence compatibility effect)*, introduced by Glenberg and Kaschak, proves that an action described in a sentence may have an impact on, or at least encourage, a subsequent real action. For some neuroscientists discussed in *Gehirn und Gedicht*, these results should be sufficient to determine the origin of language in gestures. Yet still other experiments, for example those of Friedemann Pulvermüller and his team, have shown that the processing of words, which describe actions with arms, legs or the mouth, activates the same neuronal zones that are involved during the action with the described body parts. According to the studies of Lakoff and Johnson, this phenomenon occurs not only for actions, but for ›abstract‹ or symbolic terms, especially metaphors, whose importance has been stressed in current neuroscientific research.

The idea that emotions and not only cognition can be embodied is another main topic of this study. In fact, Arthur Jacobs is one of the coordinators of the cluster »Languages of emotions« at the Freie Universität of Berlin, a project convening experts of emotion and language from disciplines as diverse as: anthropology, biology, film studies, history of art, literary history and criticism, musicology, philosophy, political science, (neuro-)psychology, psychiatry, sociology, linguistics, and theater studies. Schrott and Jacobs affirm that in the 20th century both the psychology of language and linguistics widely neglected affects in language. Combining methods and theories from the fields of psychology, linguistics, media studies and neuroscience, these researchers are trying to close these gaps. They describe, for example, the *Berlin Affect World List*, which contains thousands of nouns and verbs expressing negative and positive affects. Although literary texts arouse emotions in readers, very little is known about how emotional aspects are involved in the understanding of literary texts. In my opinion the analysis proposed by Jacobs and Schrott reaches an integration between the emotional and the cognitive aspects of text comprehension: emotions help literary readers determine what knowledge is relevant to the situation and must be activated; readers attempt to construct a coherent mental representation of the text. The emotional aspects trigger the joy of reading and the empathetic responses to the literary world. This study also discusses nonverbal communication, such as gestures, the oral cultures or the importance of musical elements in poetry.

Another important *leitmotiv* of the study is the function of literature, the main subject of evolutionary aesthetics.[1] The two authors try to consider literature as an actual factor in the adaptation to one's environment. They discuss the research of the literary critic Keith Oatley, who considers curiosity while reading as an important manner of assimilating new knowledge to cognitive schemata or to accommodate schemata. Further emotions arise if the reader enters the world of the story and responds to the story's characters with sympathy through personal memories of emotion and identification with characters' goals and plans. Great literary texts allow readers to respond creatively, to feel moved, to understand some of the relations between actions and emotions, and sometimes to stimulate cognitive change. These adaptative functions of literature are also studied by Winfried Menninghaus, who is the initiator of the cluster »Languages of emotions«. Schrott and Jacobs do not only consider the philogeny of literature, but also its ontogeny, because the literary language finds its roots in children's language. They accurately describe the evolution of language in the human being and quote from studies which demonstrate that children have a ›magical‹ approach to language and the world:

children use a word like ›mamma‹ without knowing the content to produce effects in their environment and to explore it. Children are also very sensitive to the musical and prosodic aspects of language, which are fundamental in poetic texts. These examples show that poetical texts quoted in Schrott and Jacobs' book best prove the possibilities of our cognition and permit the combination of neurological empiricism and poetological phenomenology.

Conclusion and further discussion

Unfortunately discussion of cognitive poetics, which is a school of literary criticism that studies written and oral texts as the product of human mental processes, is limited to the last chapter of the book. In this section Schrott and Jacobs discuss the important empirical studies by David Miall and Don Kuiken, who analyzed the processes of foregrounding during literary reading. This concept is very similar to the ›defamiliarization‹ introduced by Shklovsky,[2] for whom art is a process whose function is to see the world anew. In fact, art ›deautomatizes‹ our perceptions by making the forms difficult and unfamiliar. In literature the process of foregrounding concentrates on the disruption of everyday communication and enables literary texts to present new meanings, with an intricacy and complexity that ordinary language does not allow. The hypotheses of Miall and Kuiken, which were tested empirically, show that foregrounding is related to certain effects, such as strikingness, reading time, and affect. These findings are also important for the evolutionary function of art and literature that Jacobs and Schrott have highlighted.

Compared with recent neuroscientific publications like *The Tell-Tale Brain* (2011) by V.S. Ramachandran[3] the book of Jacobs and Schrott shows its specificity: its focal point is on language and literature. For instance, the study of Ramachandran discusses disorders like *agnosia, aphasia, synaesthesia* but only chapter 5 is dedicated to the evolution and the function of language. When he deals with art or aesthetic phenomena (chapter 7 and 8) he solely refers to our visual sensibility. Compared to Jacobs and Schrott, Ramachandran overstates the importance of mirror neurons which in his perspective allow us to empathize with one another (chapter 4), appear to be the key for the understanding of autism (chapter 5) and may have also played a role in the acquisition of language (chapter 6). Paul Bloom's *How Pleasure works* (2010)[4] has also a broader approach to literature, because he analyzes our pleasure in reading fiction in relation to other sources of pleasure like food and sex. Pleasure is in his view not purely sensory because it is affected by what we think about the object we are getting pleasure from; this hidden nature of objects that really matters is what Bloom calls the ›essence‹ of the object. A bottle of wine from a famous producer is more pleasant for us than one without an indication of its origin. Bloom criticizes literary theorists like Lisa Zushine and Keith Oatley who think that the evolutionary function of literature is to acquire social competence because we are able to empathize with fictional characters as well. He thinks that while we take pleasure from fictional worlds as presented in novels and movies, on television and in daydreaming we react to them as if they were real events, but in the mean time we know that they are fictional. This complex reaction towards fiction is called ›alief‹. Thanks to this peculiar state of mind we appreciate literary reading because it allows us to experience imaginary situations when the real pleasure is inaccessible, too risky or harder to achieve. Compared to Bloom's study the book of Jacobs and Schrott expresses a more traditional view of pleasure.

Today in literary criticism an ongoing discussion is taking place, in forums like *Poetics*, *Cognitive Philology* and *Scientific Study of Literature* and others, on the use and abuse of cognitive psychology and neuroscience in the literary studies. This debate and other studies

on cognitive poetics could be easily integrated with the study of Jacobs and Schrott. In any case this book will be a milestone for further discussions.

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Notes

[1] Cf. Anatole Pierre Fuksas, The Descent of the Novel, *Cognitive Philology* 1 (2008), http://padis2.uniroma1.it:81/ojs/index.php/cogphil/issue/archive (29.07.11).

[2] Cf. Viktor Shklovsky, Art as Device [1917], in: V.S., *Theory of Prose*, transl. by Benjamin Sher, with an introduction by Gerald R. Bruns, Elmwood Park, IL 1990, 1–14.

[3] Cf. V.S. Ramachandran, *The Tell-Tale Brain. Unlocking the Mystery of Human Nature*, London 2011.

[4] Cf. Paul Bloom, *How Pleasure Works. The New Science of Why We Like What We Like*, New York 2010.

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