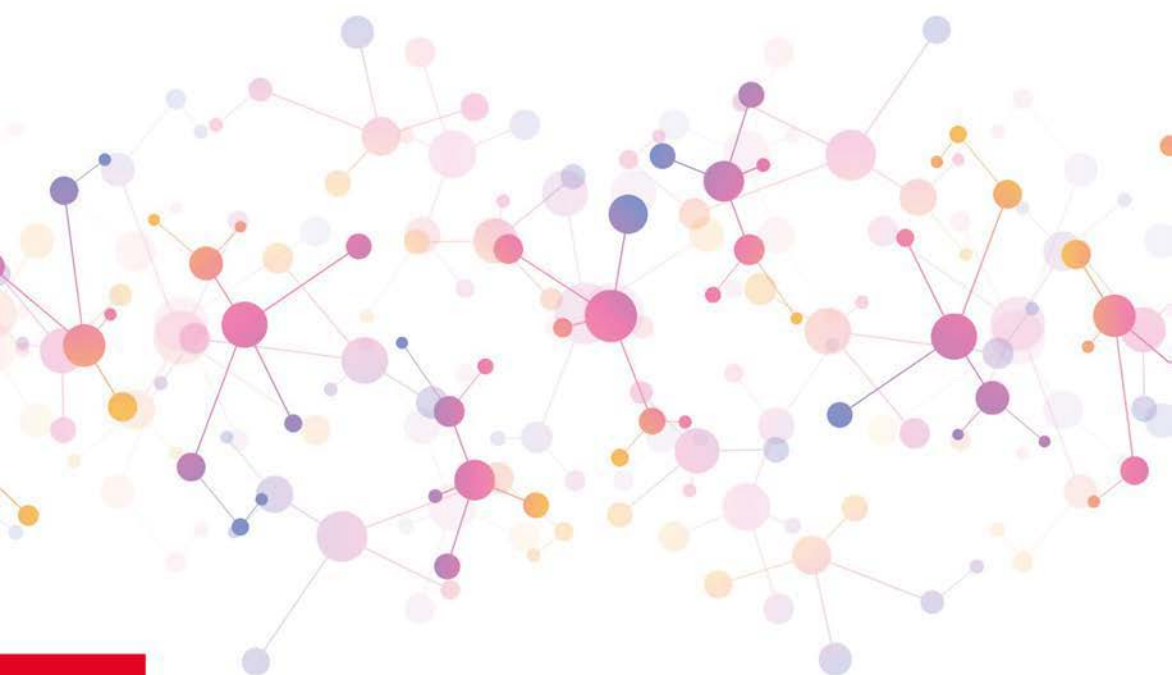


Jolanta Mazurkiewicz-Sokołowska (ed.)

Conceptualisation as a Biocognitive Phenomenon and Part of the Faculty of Language



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Introduction

The assumption of the crucial role of conceptualisation in the faculty of language arose from the results of investigations of syntactically ambiguous sentences. These investigations, conducted with Generative Grammar tools using grammaticality judgement tests, showed the impact of semantic features and the dependency on the semantic context (Mazurkiewicz-Sokołowska 2006). This became even more apparent when, following the aforementioned results, an integrated approach to the faculty of language was proposed (Mazurkiewicz-Sokołowska 2010). It was later supported by a series of investigations of conceptualisation as a multisensory phenomenon including emotions, going inline with the concept of embodied cognition (see for example Mazurkiewicz-Sokołowska 2015, 2017, 2019) and bringing the multidimensional and multisensory concept of conceptualisation (Langacker 2008) into focus.¹

The view of conceptualisation as a biocognitive phenomenon has both genetic and social foundations, as the way in which psychological, cognitive, social and linguistic skills develop in individuals largely depends on the interplay of genetics and the social environment.

[I]n the same way that duplication-and-evolution might result in evolutionary innovation, for example of the body plan, duplication-and-evolution of cognitive modules might lead to cognitive innovation. Such cognitive modules may be thought of as cortical circuits that arise [...] due to inherent (genetic) properties of the developing brain and the influence of the environment (Shukla 2005: 125).

According to the evidence that “the mature form of the cortex has some innate properties but these are tuned by the developmental history of the animal” (Shukla 2005: 124) cortical circuits are viewed as “(i) moulded by genetic determinants in the form of molecular and intrinsic, electrical and cellular signals, as well as (ii) an interaction with the environment, mainly as changes in the

¹ This monograph is a result of the investigations of the “Cognitive linguistics, biolinguistics” research group functioning at the Institute of Linguistics (University of Szczecin) under the supervision of the editor of this book, in cooperation with several invited researchers.

patterned activity received at the cortex” (Shukla 2005: 124). Therefore, it is assumed that cortical computations represented in the cortical circuits have “both innate and environmentally driven components” (Shukla 2005: 124).

Thus, while considering linguistic theories like Principles and Parameters and the biological foundation of language, it is suggested that “the core computations that underly language (i) have an innate component, determined by genetic and cellular factors intrinsic to the developing brain, corresponding to the ‘Principles’, and (ii) their precise nature is shaped by activity patterns, determined by the nature of the incoming, language-relevant signals, which would correspond to the ‘Parameters’ ” (Shukla 2005: 124).

The interplay of genetics and the social environment can be supported by the activity and intersubjectivity of mirror neurons due to the neurobiological resonance arising on the basis of the schemas stored in the human brain as a result of social interactions, allowing humans to anticipate the behaviours and intentions of others, to empathise with their emotional states and to imitate their actions, not only by seeing them but also by only imagining them (Bauer 2006: 16–23, 76). Neural activity and environmental interaction determine each other. In childhood, mirror neurons store working models with information about human social behaviours, available while children play and interact with others. The lack of opportunity to practice different sequences of actions causes children to be awkward and withdrawn in their behaviours and body language. Adults, however, also need opportunities to train different roles, to practice and reflect on various behaviour styles and feelings (Bauer 2006: 62–71). The more intersubjective schemas individuals possess, the better social competences they demonstrate (Rizzolatti 1992, Rizzolatti and Craighero 2004, Bauer 2006).

The assumption that conceptualisation – which is multimodal in nature due to its multimodal conceptual substrate and concepts based on image schemas (Johnson 1987, Lakoff 1987, Krzeszowski 1997, Cienki 1998, Hampe 2005) being at the same time identified with linguistic meaning (Langacker 2008) – is a biocognitive phenomenon, goes in line with the view of the faculty of language as a bodily organ (Chomsky 2005). Consequently, both the faculty of language and conceptualisation arise from the activity of the dispersed neural networks that can generally be viewed as an organised functionality. Referring to all mental phenomena of various modalities, conceptualisation appears to be imagistic in nature and contains elements such as metaphorisation processes (Lakoff and Johnson 1980, Johnson 1987, Lakoff 1987, Grady 1997, Kövecses 1986, 2020), processes of mental integration (Fauconnier 1985, Fauconnier and Turner 1998, 2002) and emotions (Kövecses 1990, 2000, Schwarz-Friesel 2007).

What is more, the assumption about the importance of the (multimodal) conceptualisation for the faculty of language becomes more and more plausible due to the impossibility of establishing “language specific” mechanisms (Boeckx

2013) at the same time supporting the claim that there are no strict boundaries between linguistic and non-linguistic knowledge (Langacker 2008).

An undertaking to create such an integrative complex approach would demand support from investigations including various linguistic categories from the subjective (first-person), intersubjective (second-person) and objective (third-person) perspective based on intuition, social interaction and neuroimaging, as proposed by Zlatev (2008). Bearing in mind the enormity of such an undertaking, the investigation object serving as the empirical basis for the theoretical argumentation in this volume was reduced to only one linguistic category, i. e. the category of prepositions. The choice of the preposition as the object of the study was motivated by the fact that the members of the preposition category are relational as well as highly polysemous, enabling both the analysis of the syntactic and semantic dependencies, giving insight into mental processing and conceptualisations. Prepositions constitute a varied and fuzzy category regardless of whether they are analysed in the context of one specific language or from a cross-linguistic perspective. The monograph, therefore, focuses on prepositions related to each other in a variety of ways, both within one language and across languages, looking at: Polish *na* (on) and *do* (to), German *auf* (on) and *an* (on, at, by), Italian *su* (on), French *sur* (on), Norwegian *på* (on, at) and *i* (in) and English *by* (due to its correlations with the German counterpart *an*). An additional motivation was the experience the authors of this volume possess in relation to their investigations of prepositions (see, for instance, Brenda 2014, 2015, Mazurkiewicz-Sokołowska 2016, Brenda and Mazurkiewicz-Sokołowska 2022, Kwapisz-Osadnik 2021, 2022, Ochmańska 2021, Osiewicz-Maternowska 2021, Pilarski 2021, 2022, Kwapisz-Osadnik and Piegzik 2023, Mazurkiewicz-Sokołowska 2023a, b).

Chapter 1 deals with the biocognitive foundations of “conceptualisation” and refers to the problems and challenges of an integrative approach giving insight into the current discussion on the opportunities to converge the generative and cognitive positions in the context of the recent development of biolinguistics. Chapters 2–4 highlight the syntactic features of the prepositions, examining them from the perspective of Generative Grammar, the Principles and Parameters Theory, the Minimalist Program and the cartographic approaches of Noam Chomsky (1981, 1995, 2000, 2005) in relation to the case status of the preposition category. Chapters 5–9 emphasise the role of conceptualisation, investigating the meanings of selected prepositions from the perspective of cognitive linguistics (see, for example, Lakoff and Johnson 1980, Johnson 1987, Lakoff 1987, Langacker 1987, 1991a, b, 2000, 2008 and Talmy 2000). Chapter 10 takes up the question announced in the title of the book concerning the status of conceptualisation. It presents it as potentially the main factor in relation to the faculty of language considering conceptualisation as the basic component of the faculty of

language, viewing both as biocognitive phenomena. It deals with the concept of thinking, that, according to Lakoff and Johnson (1999), depends on the structure of the cognitive system and the meanings of concepts being more than a manipulation of abstract symbols. This is supported by the hybrid approaches to meaning (Borghi and Caruana 2015), whose main thesis is that conceptualising meanings can occur both on the basis of the linguistic and embodied knowledge (Louwerse 2011). While Chapters 2–9 are kept within the subjective and inter-subjective perspective, Chapter 10 deals with the objective perspective as well, giving insight and discussing the neural representation and processing of space and prepositions (Noordzij et al. 2005, Binder et al. 2016, Shebani et al. 2021).

Jolanta Mazurkiewicz-Sokołowska

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Jolanta Mazurkiewicz-Sokołowska

Chapter 1: Towards an integrative approach of the faculty of language

Abstract

Chapter 1 deals with the question concerning the current tendency to converge the generative and cognitive positions shedding light on the biocognitive foundations of “conceptualisation”. After a brief discussion of the problems and challenges regarding an integrative approach to the faculty of language, main assumptions of biolinguistics as well as the current direction of its development are taken as the focal point. The rapprochement of the generative and cognitive positions, and the role of syntactic and semantic information in the faculty of language, are in the centre of considerations.

Keywords: generative linguistics, cognitive linguistics, biolinguistics, cognitive semiotics, conceptualisation

Introduction

Since Chomsky’s famous question about the mental representation of language and the language acquisition mechanism,¹ there has been a clear shift in the way of viewing the faculty of language from an analogous, computer-like mechanism, through digital processing, to a biological understanding.²

As reported by Pelkey (2023: 2–4), this shift from computational toward organic, experiential cognitive science was triggered by the work of such researchers

Jolanta Mazurkiewicz-Sokołowska, University of Szczecin, ORCID: 0000-0002-0699-5518.

- 1 Language acquisition mechanism was previously viewed as a language acquisition device (LAD) or a processor, and over time, as the universal grammar (UG) characterised by principles and parameters (in the Government and Binding Theory, Chomsky 1981) and finally characterised by simplified and reduced rules (in the Minimalist Program, Chomsky 1995).
- 2 The term “computer like” is used deliberately as the term “computational”, traditionally related to digital processing, is also used in neuroscience and not only in the traditional branch viewing brain activity as analogous to the digital one but also in the connectionism and computational neuroscience constructing mathematical models of cognition based on behavioural studies (connectionism) and on neuroanatomical and neurophysiological investigations (computational neuroscience).

as Fillmore (1976), Kay and McDaniel (1978), Lakoff and Johnson (1980), Marvis and Rosch (1981), Talmy (1983), Johnson (1987) and Lakoff (1987) revealing the difference between the “first generation” and “second generation” of cognitive science according to Lakoff and Johnson (1999). It is worth noting that the theories and approaches in the field of cognitive linguistics and embodied cognition tend to be viewed as “a research program rather than a well defined theory” (Shapiro 2019: 2, in Pelkey 2023: 3) with clear connections with cognitive semiotics (Gibbs 2005, Foolen et al. 2012, Koch et al. 2012, Zlatev 2010, 2018). In particular, works on “the development of philosophies of perception and movement” (Merleau-Ponty [1945] 2012, Sheets-Johnstone 2011) contributed to the view of embodied cognition in cognitive linguistics (Pelkey 2023: 4). Interestingly, approaches to the embodied cognition which were divided into “embodied”, “embedded”, “enacted” and “extended” (4E) have now been expanded by another 4E’s: “ecological”, “emotional”, “evolutionary” and “exaptative” (Pelkey 2023: 7). The last four emphasise (i) “the biological conditions and physical/spatial environments that underpin cognition and communication”, (ii) “the necessary role of feeling in concepts and conceptual systems; incorporating affect into semantics and semiotic theory”, (iii) “the same ongoing, processual interdependence between ourselves as organisms and our environments [that] also applies to our languages and conceptual systems, enabling continuity and useful stability in the midst of variation, difference, and change” and (iv) “recruiting basic bodily structures, experiences, and neural networks inherited through biological evolution for more abstract purposes such as conceptualization and critical/reflective reasoning”, respectively (Pelkey 2023: 7).

However, the not-fully-resolved question regarding the autonomy of syntax and the role of semantics in the faculty of language still remains. Actually, it led, in the 1970s/1980s, to the development of cognitive linguistics that view language as a part of cognition organising and structuring conceptual material (Talmy 2000) based on conceptual metaphor (Lakoff and Johnson 1980), conceptualisation processes (Langacker 1987, 1991) and conceptual integration (Fauconnier 1985, Fauconnier and Turner 1998, 2002). As a result, generative and cognitive positions became antagonistic and incompatible for many years.

Currently, biology appears to be the common ground for both positions, bringing them closer to each other since generativists started considering language as a biological object like visual, immune or digestive systems (Chomsky 2016, Berwick and Chomsky 2016), and cognitivists acknowledged “that language might emerge owing to substantial innate specification peculiar to it” (Langacker 2008: 8). As a result, cognitivists do not categorically reject genetically transmitted language specific schemas viewing genetic endowment for language as “resid[ing] in adaptations of more basic cognitive phenomena [...] be[ing] analogous to the physical organs of speech” (Langacker 2008: 8). Taking place as

the dispersed activity of neural networks (Mazurkiewicz-Sokołowska 2010: 214), the faculty of language, viewed as a biological object anatomically and physiologically compared to an organ or a system, constitutes a kind of organised functionality of neural networks.

As the neurophysiological basis of language is currently taken for granted, neurolinguistics becomes more and more important for both biolinguistics and cognitive linguistics, drawing from the neurolinguistic findings. In consequence, the postulate of seeking the biocognitive reality of the faculty of language is coming to the fore (Kardela 2023: 191–198).

Since the genetic code was discovered in the 1960s, “information” has appeared to be a key element that constitutes life together with matter and energy (Favareau and Kull 2024: 35). Molecular biology defines “information” referring to the “Central Dogma” proclaimed by Crick (1970) as “the precise determination of sequence, either of bases in the nucleic acid, or of amino acid residues in the protein [that] cannot be transferred from protein to either protein or [back towards the originating] nucleic acid” (Favareau and Kull 2024: 36). Additionally, in the biosemiotic perspective “information” “is not only transported or streams through a channel but as a set of signs it has to be understood and can be misunderstood” (Hoffmeyer 2008: 61, in Favareau and Kull 2024: 36). Importantly, the experience is always related to the “subjective now”. The decisions and interpretations made by an organism result from its “active non-deterministic agency and choosing between simultaneously available possibilities” (Favareau and Kull 2024: 42).³ Organisms are viewed as “anticipatory systems” which can make “predictive models (of themselves and of their environments) and use these models to direct their present actions” (Rosen [2010] 1985: 365–366, in Favareau and Kull 2024: 43). It is “the interactive shaping of a physically instantiated set of evolvable constraints and system biases [...] first and foremost a bodily-configured orientation for the negotiation of indeterminacy” (Favareau and Kull 2024: 43) staying in line with the enactive perspective: “an embodiment

3 As mentioned by Shapiro (2021: 143) “even the smallest and simplest cells have the molecular tools to respond cognitively to a broad range of environmental opportunities and threats” (Shapiro 2021: 143). Many types of bacteria are able to move; they are “highly versatile when it comes to guiding their swimming motility” (Shapiro 2021: 136); they communicate via chemical signals with other cells and are able to distinguish “clonally related cells (self) from the unrelated cells, either of the same or different species” (Shapiro 2021: 136); they can detect attacks and “send out a danger signal to the population” (Shapiro 2021: 136). Among the “most complex cognitive processes that bacteria undertake are establishing symbiotic relationships with eukaryotes” occurring through “multiple steps of chemical dialogue” (Shapiro 2021: 139). As mentioned by (Shapiro 2021: 143), “[e]volution has succeeded in generating functional cognitive capabilities from very limited cellular and molecular components and [...] [c]ognition is likely to prove an essential feature of all successful cellular survival, growth and reproduction”.

that has been accomplished in interaction with a world” (Favareau and Kull 2024: 43).

Bearing in mind the intrinsic nature of the faculty of language as the aim of the present considerations, biocognitive foundations of conceptualisation need to be discussed first.

Metaphors We Live by (Lakoff and Johnson 1980) can be mentioned as one of the earliest works dealing with the phenomenon of “conceptualisation”, followed by works on “image schemas” Johnson (1987), Lakoff (1987), Sweetser (1990), “ideal cognitive models” (Lakoff 1987), concepts of “prototype” and “category” (e.g. Rosch 1975, 1978, Croft and Cruse 2004), “frames” (Fillmore 1982), “mental spaces” (Fauconnier 1985) or “mental integration” (Fauconnier and Turner 1998, 2002). As “conceptualisation” understood in the sense proposed by Langacker (1987, 2008), i.e. bringing together all mental phenomena, not only incorporates all the concepts mentioned above but also each effect of every conceptualisation process, Langacker’s Cognitive Grammar is taken as the reference point in further discussion as the most suitable for the issue at hand.

The rest of the paper is organised in the following way: Section 1 deals with biocognitive foundations of the phenomenon of “conceptualisation”, Section 2 discusses the problems of a potential integrated approach to the faculty of language, Section 3 presents the assumptions of biolinguistics and finally Section 4 looks at the generative and cognitive positions pointing to the possibilities of rapprochement.

1. Biocognitive foundations of the phenomenon of “conceptualisation”

It seems reasonable to start by looking at findings from the studies of evolution and genetics. As “[e]volution has succeeded in generating functional cognitive capabilities from very limited cellular and molecular components [...] [c]ognition is likely to prove an essential feature of all successful cellular survival, growth and reproduction” (Shapiro 2021: 143). Moreover, cognitive innovation is likely to be an effect of the duplication-and-evolution of cognitive modules by an interplay of inherent (genetic) properties of the brain and the influences of the environment (Shukla 2005: 125).

The interplay of biological and environmental conditions for cognition has to be taken into account while considering the format of humans thoughts: Do people think in pictures, propositions or in both formats? In this regard, there are clear arguments against visual “pictures in the brain”:

(i)

a retinotopically mapped area of the cortex [...] activated during mental imagery in no way supports the assumption that such a pattern of activity corresponds to the mental images that we experience [...]. Moreover, when topographically organized regions of cortex map visual space they only map two-dimensional retinotopic space. Yet mental images are not only experienced as three-dimensional, but such basic experimental phenomena as mental scanning and mental rotation occur equally in depth or in the plane, so any format explanation would have to apply to three-dimensions (Pylyshyn 2003: 115–116);

(ii) humans

are extremely good at orienting in space without sight [...] If we orient to several landmarks in space, then we can associate objects of thought with these landmarks, just as we do in vision. And just as in vision, we can derive spatial properties of images from this capacity when we project images into perceived allocentric space. *None of this requires that we assume a spatial display in the head; the one in the world will do!* (italics by Mazurkiewicz-Sokołowska) (Pylyshyn 2003: 117);

(iii) the fact that “images on the retina/cortex have yet to be interpreted, while mental images are the interpretation” (Pylyshyn 2003: 116).

However, the question whether humans think in pictures (meaning images) or in propositions remains open. An explanation for this state of affairs is that “neither language nor pictures are sufficient to represent the content of thought and [...] most thought is not available to conscious inspection” (Pylyshyn 2003: 113). This is why there are varying findings concerning this issue: (i) “words can be represented both in a verbal and imaginal mode” (Paivio 1971), (ii) they can be represented as perceptual symbols (Barsalou, 1999); or, while accurately considering spatial expressions especially important for this volume, there is evidence for (i) verbal proceeding (Clark and Chase 1972), (ii) verbal or visual proceeding (Macleod et al. 1978) as well as for (iii) a dual-model that assumes that verbal proceeding occurs always while visual is optional, viewed as an extension of Paivio’s (1971) dual-coding hypothesis (Noordzij et al. 2005) mentioned above.

The role of experience for conceptualisations, however, appears to be the most important. As confirmed by evidence from animal psychology, brain imaging, and neurological studies, “all aspects of experience”⁴ can take part in concept acquisition and composition (Binder et al. 2016: 141). Experience is involved in learning both concrete and abstract concepts, with its role being especially

4 including “not only sensory perceptions, but also affective responses to entities and situations, experience with performing motor actions, perception of spatial and temporal phenomena, perception of causality, experience with social phenomena, and experience with internal cognitive phenomena and drive states” (Binder et al. 2016: 133).

prominent in the latter including complex situations and events as well as different “distribution of content over entities, space, and time” (Binder et al. 2016: 161–162).⁵ What is more, abstract concepts “tend to have stronger affective content than do concrete concepts” (Binder et al. 2016: 162).⁶ Affective states “have consistent and discriminable patterns of physiological responses, facial expressions, and neural correlates” (Binder et al. 2016: 142), including basic emotions (anger, fear, disgust, sadness, happiness, and surprise, Ekman 1992) viewed as biologically predetermined and culturally universal but being “somewhat influenced by experience” as well (Binder et al. 2016: 142). As mentioned by Binder et al. (2016: 162),

[e]xperiencing an affective or cognitive state or event is like experiencing a sensory-motor event except that the object of perception is internal rather than external. This expanded notion of what counts as embodied experience adds considerably to the descriptive power of the conceptual representation, particularly for abstract concepts.

The most important fact for the question in issue is that “all concepts [...] must ultimately be grounded in experience, albeit experiences that are sometimes very complex, distributed in space and time, and composed largely of internal mental events” (Binder et al. 2016: 162). Also concepts which are learned “directly via language and with only very indirect grounding in experience [...] are ultimately grounded in experience [...] through language that refers to experience” (Binder et al. 2016: 167).⁷

What is more:

[s]ensorimotor and limbic areas are essential for grounding language in action, perception, and emotion; the periphery of the perisylvian cortex engages in combinatorial semantics; and multimodal convergence zones in [the] prefrontal, anterior temporal, and inferior parietal cortex are essential for processing of abstract meanings generalized over variable concrete instantiations. Thus, widespread cortical regions and cortico-cortical long-distance connections provide the machinery for holding together and integrating semantic representations and circuits. However, different areas make very specific contributions to meaning processing, as evidenced by area-specific signatures of category-specific impairments and activations (Pullvermüller 2013: 470).⁸

5 “[A]bstract concepts seem “abstract” because their content is distributed across multiple components of situations” (Binder et al. 2016: 162).

6 Abstract words reveal an embodied-semantic link to the knowledge about emotions activating the anterior cingulate cortex (relevant for emotion processing), showing that “at least some abstract words are semantically grounded in emotion knowledge” (Pullvermüller 2013: 464).

7 For evidence concerning the representation of concepts in neural systems, see, for instance, Binder et al. (2016).

8 For details concerning processing meaning in mind and brain, and neuroscientific integration of semantic models, see, for instance, Pulvermüller (2013).

The following neuroimaging findings show the functional relevance of sensorimotor systems to semantic processing:

words related to sounds activate auditory brain areas in [the] left superior and middle temporal gyrus [...], words referring to actions activate motor regions in the fronto-central cortex [...], words pertaining to colours engage temporal regions of the brain [...] and words denoting spatial relations (i.e., spatial prepositions) activate left inferior parietal regions [...]. Findings from neuroimaging are supported by behavioural investigations showing motor language interaction effects when subjects are required to process action-related language while engaged in motor activity [...]. For example, Shebani and Pulvermüller (2018) have shown that performing movements with the hands and feet has a causal influence on the processing of action words by differentially impairing or enhancing working memory for arm- and leg-related action words depending on movement type (Shebani et al. 2021: 1–2).

While discussing the embodiment, the somatosensory networks of the cortex should be mentioned first. They represent “body location (somatotopic representation), body position and joint force (proprioception), pain, surface characteristics of objects (texture and temperature), and object shape” (Binder et al. 2016: 136). The somatosensory network is important while considering the spatial cognition. Representation and processing of spatial space and prepositions are discussed in Chapter 10.

The following sections concentrate on the problems concerning an integrated approach to the faculty of language. The role of conceptualisation in the faculty of language is further discussed in Chapter 10 as well.

2. An integrated approach to the faculty of language – problems and challenges

Creating an integrated approach to the faculty of language is a very difficult endeavour. This is so, first of all, because, despite mounting evidence from various fields of research, all of the analyses and interpretations still happen within a given paradigm that influences “setting research goals, adopting a specific anthropological vision including philosophical views on functioning of the mind” (Stalmaszczyk 2023: 19). Thus, being limited by a selected paradigm, and by an anthropological and philosophical point of view, the analyses and conclusions cannot lead to any generalising statements, especially when the analysed object, like the faculty of language, is very complex and supposed to be treated as a whole, fulfilling the condition of biocognitive and psychological reality.

Furthermore, there is the criticism of:

(1) the virtually exclusive reliance on “digital” representations composed of discrete symbols; (2) the presumed adequacy of simple yes/no judgments of well-formedness; (3) the common neglect of linguistic variation; (4) the sharp distinction drawn between the synchronic study of language structure and the diachronic study of how it changes and evolves; (5) the assumption that language is clearly delimited and self-contained (with respect to other mental faculties, as well as associated phenomena like gesture); (6) the division of language into separate components, such as phonetics, phonology, lexicon, morphology, syntax, semantics, and pragmatics; (7) the focus on regular patterns permitting crisp generalizations (with the attendant difficulty in handling irregularity and generalizations of limited scope); (8) the default assumption of classical categories with strict boundaries, as opposed to prototype categories with degrees of membership; (9) the notion that absolute predictability ought to be the norm, so that anything which fails to achieve it is held to be of little interest; (10) the usual practice of formulating questions in terms of mutually exclusive alternatives (Langacker 2008: 13)

as well as of the idea to separate components like grammar, instead of integrating all components of the faculty of language and seeing them as one complex phenomenon:

The world of discrete units and sharp boundaries is definitely attractive. Dividing makes it easier to conquer. In particular, if meaning can safely be ignored, the description of grammar is greatly simplified (at least superficially). Discrete structures are more readily analysed and more amenable to perspicuous formalization. Also, the categorical statements and strong predictability afforded by discreteness are highly valued in science. Yet language was not necessarily designed for the convenience or predilections of the analyst (Langacker 2008: 13)

highlighting that:

[i]t is easier, for example, to claim that the noun category represents an irreducible syntactic primitive, lacking intrinsic semantic content, than to propose a conceptual characterization that is both linguistically revealing and psychologically plausible [...]. It is easier just to list grammatical markers and state where they occur than to also determine and represent their meanings. An autonomous form of grammatical description is more easily extended to a new language or a new structural domain than is a symbolic account requiring semantic analysis (Langacker 2008: 13–14).

It is hard not to agree with Langacker (2008: 13) that the points (1–10) quoted above have “largely been imposed” and “not discovered in language” (Langacker 2008: 13) and that “grammar, rather than being separate and distinct, is merely the abstract commonality inherent in sets of symbolically complex expressions” (Langacker 2008: 6).

The main question regarding the faculty of language as the research object is what the phenomenon is as a whole and how to investigate it in order to match the biocognitive and psychological reality. This question leads to the next one about

an appropriate approach that would go beyond the current paradigms allowing the conditions of biocognitive and psychological reality to be met. The currently observed trend in the development of biolinguistics towards a biocognitive approach seems to be a good prognosticator in this respect.

3. The biolinguistic approach

Since its beginning in the second half of the 20th century, biolinguistics⁹ has drawn up the mentalistic paradigm of the generative linguistics. The concept “biolinguistics” can already be found in Lenneberg (1967), and the term “biolinguistics” was debated in many interdisciplinary international meetings in the 1970s. Biolinguistics investigates the biological basis of language in order to establish links in the process of the unification of the scientific explanation of the rules of language (Kardela 2023: 184).

Having an interdisciplinary character, biolinguistics draws on the achievements of “linguistics and psycholinguistics, neuroscience and cognitive psychology, experimental research on cognition and communication (including animals), research on language evolution, and many other disciplines” (Stalmaszczyk 2023: 7).

As the actual subject of research should be (i) the mental representations, (ii) processes occurring during cognition, (iii) “linguistic states of mind” (Chomsky 2000: 2), and (iv) “genetic conditions of the emergence of language”, the observable grammatical structures should be treated as data providing information for this investigation (Stalmaszczyk 2023: 13, 19).

The biolinguistic approach focusses in this regard on the component of human biology “that enters into the use and acquisition of language” (Chomsky 2005: 2) and on the question of “how much of language can be given a principled explanation” (Chomsky 2005: 2).

In line with the assumption that language is a mental organ (biological and cognitive, Chomsky 2002: 2), it is postulated to investigate it by tools of physiology and to treat linguistics as a “cognitive physiology” (Anderson and Lightsfoot 2004, in Stalmaszczyk 2023: 13).

What is more, as mentioned by Kardela (2023: 185), questions concerning mechanisms underlying linguistic knowledge and language evolution explored by the broader (or stronger) version of biolinguistics, biolinguistics 2.0, are common for cognitive linguistics, too. The goal to establish the relation between language and the mind/brain, language acquisition, language genesis and evo-

9 For an overview of biolinguistics, see, e.g. Boeckx and Grohmann (2007), Chomsky (2007), Di Sciullo and Boeckx (2011) or Di Sciullo (2016, 2018).

lution are seen as the philosophical-methodological foundations of both biolinguistics 2.0 and cognitive linguistics. According to Pleyer and Hartmann (2019, in Kardela 2023: 187), the “convergence points” between both the strong version of biolinguistics and cognitive linguistics are then: (i) “modularity and domain-specificity”, (ii) “innateness and development”, (iii) “cultural and biological evolution” and (iv) “knowledge of language and its description”.

Furthermore, generativists, especially representatives of the strong version of biolinguistics, are currently more and more interested in cognitive conceptions criticising the modular approach as one-dimensional and separating language research from human cognitive abilities and the cognitive sciences. They also criticise focusing on primitive properties while not paying attention to the biocognitive reality (Boeckx and Theofanopoulou 2014: 404–406, in Kardela 2023: 185–186). Thus, approaches like evolutionary developmental biology (evo-devo) or the Complex Adaptive System (CAS), that investigate gene-environment interactions as well as the complexity of systems, currently have a significant impact on the linguistic conceptions concerning the role of “nature” (environmental factors) and “nurture” (genetic factors) for the development of human social, cognitive and language competences (Pleyer and Hartmann 2019, in Kardela 2023: 187).

4. Towards a rapprochement of the generative and cognitive positions

Staying in the rationalist tradition of Humboldt, generative linguistics views natural language as “an independent domain of inquiry, subject to its own principles that are distinct of thought but, amongst other uses, expressive of it” (Asoulin 2016: 2), and the generative-oriented biolinguistics defines it as:

an internal computational system, a recursive mechanism that produces an infinite set of hierarchically structured expressions that are employed by the conceptual-intentional systems (systems of thought) and the sensorimotor systems to yield language production and comprehension. This particular functional design is strongly shaped by its interface with the systems of thought, rather than by the peripheral process of externalisation inherent in the link with the sensorimotor systems (Asoulin 2016: 2).

Viewing “discrete infinity” and “displacement” as crucial for the generative explanation of human linguistic capacity, the role of the I-language (internalized language, mental state of language competence)¹⁰ is to derive “sound/sign-

10 It is related to grammar, in opposition to the E-language (external language, pragmatic and communicative competences) that is related to the performance and behaviour that consti-

meaning pairs” <SEM,PHON>, “a semantic representation SEM, accessed by conceptual-interpretive systems, and a phonetic representation PHON, accessed by sensorimotor systems, the latter providing instructions to the vocal or gestural articulators” (Chomsky et al. 2019: 235). The properties of this pair “enter into complex thought and intentional planning (e.g., discourse organization) and perception/articulation (internal in self-talk, external in oral or gestural production)” (Chomsky et al. 2019: 235). Generated expressions obtain interpretations from the interfacing systems (i) of the cognitive competence (the interpretive sensorimotor and conceptual-intentional systems) “involved in the determination of entailment and rhyme relations among expressions” and (ii) of the performance that “introduce[s] all sorts of other complicating factors, such as memory constraints, irrationality, etc.” (Chomsky et al. 2019: 238).

The computational system of the I-language is assumed to be “close to uniform”. The properties of language that pertain to perception and articulation are viewed as “ancillary”. The computational system constructs hierarchical expressions, and the mapping from the “narrow syntax” to PHON called “externalization” (EXT) is assumed as perhaps the only “plausible source of linguistic variation” (Chomsky et al. 2019: 242, 244). The I-language provides, as the effect of computation, “hierarchically-structured, language-invariant expressions (entering into “thought” processes of various kinds at the interface with C-I systems)” (Chomsky et al. 2019: 251). Thus, I-language is assumed to be “optimized” relatively to the C-I interface (with EXT ancillary). It “operates over structures [...] and [...] structured objects provide the input to compositional interpretation” (Chomsky et al. 2019: 251).

However, it is worth noting that as Chomsky et al. (2019: 252) themselves admit, conditions imposed by PHON (universal constraints and independent language-specific differences), found by Richards (2016), and Mathieu (2016), may affect the operations of I-language, shedding new light on “the hypothesis that EXT is an ancillary process” (Chomsky et al. 2019: 252).

Staying in the phenomenological tradition of Husserl, cognitive linguistics:

stands out by resigning the imposition of boundaries between language and other psychological phenomena. Insofar as possible, linguistic structure is seen as drawing on other, more basic systems and abilities (e.g. perception, memory, categorization) from which it cannot be segregated. Rather than constituting a distinct, self-contained entity (a separate “module” or “mental faculty”, language is viewed as an integral part of cognition (Langacker 2008: 8).

Cognitive linguistics identifying meaning “as the conceptualization associated with linguistic expressions” (Langacker 2008: 4) views grammar as meaningful

tutes “an infinite set of sentences determined and limited by social convention” (Stalmaszczyk 2023: 12).