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Times change, values change: Criteria for attributing *language* in species comparative research

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ABSTRACT Charles Darwin's idea of a common origin of species stimulated cross-species comparative research on all kinds of phenomena, among them *language*. Research on language, however, is faced with the problem of defining the term at issue. Across times and disciplines, researchers ascribed a notoriously diverse set of properties to the faculty of language. The consequent ambiguity surrounding the term still exists, which is – as we hypothesize – the result of divergent scientific norms and historical influences. The current chapter aims to reconstruct three selected properties of language that historically had an important impact on species comparative language research, but which emerged in fact from social norms and subjective values, namely: (i) the *norm of directed progress*; (ii) the *oral norm*; and (iii) the *behavioristic norm*. The idea of *primitive* compared to *more complex* species (i), for instance, marginalized the complexity of birdsong. A narrow focus on the oral modality (ii) precluded the serious investigation of gestures in humans and non-humans. Also, excluding inner mental processes from the area of scientific knowledge (iii) disqualified non-humans from cognitive comparison. In the history of the species comparative language discourse, those value-based norms often created a narrative of human specialty by constraining the applicability of the defining properties to a narrow subset of skills. The current chapter aims to reconstruct the change of values over time in order to point to

recurring thoughts and methodological pitfalls such as sampling biases, a priori assumptions and anthropomorphism. By consulting the history of the language discourse, it is possible to explain and reveal the aftermaths of the norms, which strongly influence current research using cross-species comparisons and consequently enter current debates about language definitions.

KEYWORDS cross-species comparative sciences, history of science, language theory, meta-research, values in science

1 INTRODUCTION

Some scientists consider language to be the "most salient behavioural difference" and "separator" between humans and non-human animals (Wallman, 1992, p. 5). From cross-species comparative perspectives, prominent questions are: *Is human language unique?* (e.g., Smit, 2016) and *Do other species possess analogue or homologue language abilities?* (e.g., Fitch, 2017). Yet, underneath those and similar questions rests an ongoing discussion about the definition of language. The closer life sciences investigate the topic, the more a theory of *language* disintegrates. Instead of a commonly shared definition, there remain constructions with sometimes incompatible conclusions (see Botha, 2016; Wacewicz & Zywiczynski, 2015). For instance, for some scientists the communicative function of language is a side effect complementing the more important *system of thought* (e.g., Chomsky, 2011), while for others it is the other way around where the function of communication caused "language to be a vehicle of thought" (e.g., Okanoya, 2017, p. 1).

The apparent lack of unity between scientists regarding the defining properties of language is as old as the debate about the origins of language. According to Rudolf Botha (2016), this might have its roots in (a) conflicting judgments about the theory at issue, (b) different ideas about the methods of finding evidence, and (c) divergent interpretations of the strength of evidence. Consequently, in all aspects, it is the scientist's *judgment* that is at the core of diverging assessments. Judgments, however, are not made by unbiased brains, but are underpinned by a set of implicit historical influences and social values. Those values – sometimes denot-

ed as *social norms* – not only influence judgments on (a) to (c), but also leave their marks on the theory of biological evolution and linguistic ontology that scientists employ. For that reason, it is the aim of the current chapter to focus on social norms influencing the assessment of the design properties of language. Norms are especially potent where "social categories and the images they embed are inescapably value-laden" (Davis, 2013, p. 554). That is assumed to be the case with the species comparative language discourse, where scientists try to create a valid human self-conception with reference to a supposedly unique human characteristic, namely language. Given the entanglements between science and values or norms, it appears to be more productive to monitor them instead of combating them in their entirety. The current chapter aims to present three examples of how historical norms influenced, and sometimes still influence, the discourse. Unveiling those historical norms might help future empirical research in clarifying the experimental design, the formulation of questions and subsequent interpretation of data. As such, the chapter contributes to the process of scientific self-correction.

2 FROM SCALA TO CONTINUUM: TELEOLOGY IN BRAIN ARCHITECTURE

In 1999, the primatologist Frans de Waal wrote: "the comparative aspect of comparative psychology is essentially anthropocentric: extrapolations are generally from animals to humans along a *linear progression from lower to higher* forms" (de Waal, 1999, p. 257, italics added). The direct consequences of what de Waal criticizes are spelled out for the language discourse by Martin Sereno:

> There is a powerful perennial tendency outside fields explicitly focused on evolutionary processes to think of evolution in terms of a 'Great Chain of Being' and to ignore the mosaic nature of evolution. Thus, birdsong has often been dismissed as a model of human language for the reason that monkeys seem much smarter than some birds (Sereno, 2014, p. 5).

The observation from Sereno and the phenomenon addressed by de Waal belong to a social norm whose validity in fact was supposed to belong to a bygone era. There is talk of the norm of *directed progress*, also known as *Scala Naturae* or *Great Chain of Being* (Ghiselin, 2005; Hodos & Campbell, 1969; Ruse, 1996). Behind the idea of a *Scala Naturae* there is the assumption that evolution proceeds in a linear *upward* way from a simple or *primitive* condition towards an *improved* (mostly human) state.

Although some researchers stick to the metaphor even today (e.g., Lourenço & Bacci, 2017, p. 1 "[...] with Homo sapiens putatively at the top of the scale"), this is not how evolution proceeds. Evolutionary processes are initiated by random variation with natural selection, but they are not directed towards a *most sophisticated* end state (Johnson, Lahti, & Blumstein, 2012). Indeed, as mentioned by Sereno, until the beginning of the 20th century, species were divided into *lower* and *higher* ones. Birds, at this point, are just one example for an allegedly *primitive* species among others (see Hodos & Campbell, 1969). The empirical foundation of the idea was laid in earlier works by neurologists Hughlings Jackson (1835–1911) and Ludwig Edinger (1855–1918), to name a few. Jackson was highly influenced by Herbert Spencer (1820–1903), also known as "Britain's chief prophet of Progress" (Ruse, 1996, p. 30). Following Spencer's teleological assumptions about evolution in general,[1] Jackson proclaimed a "climax of nervous evolution" (Jackson, 1884, p. 591) where *higher* neurological areas – such as the cortex – suppress the function of the *lower* parts (York & Steinberg, 2011). Edinger came to similar conclusions when he compared brains of fish, birds, amphibians and mammals. He was the first to assign the names *palæëncephalon* to *lower* brain areas and *neëncephalon* to the *higher* ones. The names were later modified into *paleocortex* and *neocortex* by Dutch neurologist Ariëns Kappers (Kappers, 1929). The prefixes *paleo-* and *neo-* were supposed to represent the alleged age of their evolutionary origin. Edinger identified the palæëncephalon in all species, but he found the neëncephalon only "above fish [where] it increases to that enormous organ, the cerebrum, which in man fills almost the entire skull" (Edinger, 1908, p. 438).

1 "Evolution is a passage from the most simple to the most complex" (Jackson, 1884, p. 591)

The typical narrative of that time leads from *primitive* reptiles to humans *at the top*. As a consequence of that narrative, scientists considered birds as incapable of any "intelligent action" because of their "purely instinctive behavior" which is "governed by emotion" (Emlen, 1948, p. 37). Similar statements can be found frequently at the beginning of the 20th century, for instance in a book from Judson Herrick, who was a comparative neurologist and publisher of the *Journal of Comparative Neurology*. He wrote: "It is everywhere recognized that birds possess highly complex instinctive endowments and that their intelligence is very limited" (Herrick, 1924, p. 213). Those claims found their way into classic textbooks such as *Principles of Animal Psychology* from Maier and Schneirla: "Birds possess an extensive repertoire of highly stereotyped activities" and "seem to behave rather stupidly" (Maier & Schneirla, 1935, pp. 235 & 478). Bird's *primitive* origin and their *simple* brains were perceived as exhibiting reflexes and instincts only,[2] while "in the mammals we meet a brain which has so large a neëncephalon that we may well expect a subordination of reflexes and instincts to associative and intelligent actions" (Edinger, 1908, p. 453).

Because of this line of argumentation, birds were excluded from the mainstream of comparative language discourse, especially from the 1880s to the 1950s (see Baker, 2001, for more details). Birdsong was perceived as something purely instinctive, in stark contrast to intentionally produced human language. While language "must be learned laboriously by the human child", song was considered to be a "purely innate code", hard-wired and genetically determined (Lorenz, 1949/2002, p. 74). In 1951, Otto Koehler noticed that common field guides for songbirds did not mention *subsong* (German 'Jugendgesang') because most scientists did not expect learning to be involved in song acquisition (Koehler, 1951). The birds' small and light brains were not considered to be an ecological adaption for flight, but interpreted as indicator for their *primitive* status (Emery, 2006). Some were convinced that birds and their *reptilian brains* would "lack the neural machinery for verbal communication" (MacLean, 1977, p. 159). A sampling bias towards chicken, quail or pigeons further

2 Edinger admittedly adds: "instincts whose perfection is so great that it has not always been possible to distinguish them from activities which are dependent upon the cortex" (Edinger, 1908, p. 451)

reinforced prejudices as exemplified by a passage from psychologist David Premack: "Although the rat and pigeon may have property-identifying tags, I rather doubt that I could exploit these tags, associating different pieces of plastic with each of them, thereby teaching these nonprimates something functionally equivalent to the words *color of, shape of* and the like. Yet this is exactly what we have been able to do with the chimpanzee" (Premack, 1983, p. 133). Note that parrots and corvids are able to perform those tasks very well (Güntürkün & Bugnyar, 2016; Güntürkün, Ströckens, Scarf, & Colombo, 2017), but unlike primates, bird behavior was usually interpreted from a low-level perspective. While birdsong was often seen as mere expression of the callers' emotional state (Thorpe, 1958), primate signals were considered "referential", as means to "convey information about salient objects and events in the environment" and "allow individuals to make adaptive responses" (Hauser, 2000, p. 463; but see Liebal, Waller, Burrows, & Slocombe, 2014, p. 171 for the classical dichotomy between intentional and emotional signals in primate communication).

Back in the 1960s, the neurologist Harvey Karten wondered how "the richness of avian behaviour" could exist without "the presence of an intact neocortex" (Karten, 2015, p. 4). But it took until the 21st century to change the perspective on the significance of birdsong drastically (Emery, 2006; Shimizu, 2009). Only very recently, a consortium recognized the *old* bird brain nomenclature as wrong, misleading and motivated by a *norm of progress*. The Avian Brain Nomenclature Consortium decided to rename and reassess large areas of the bird brain and "eliminated all phylogeny-based prefixes (palaeo-, archi- and neo-) that erroneously implied the relative age of each subdivision" (Jarvis et al., 2005, p. 155). The new paradigm encouraged scientists to question the cognitive performance ranks across species and to proclaim gradual parallels between birdsongs and human language in terms of neural circuits (Nottebohm, Stokes, & Leonard, 1976), vocal learning (Thorpe, 1958), imitation (Marler, 1970) and dialects (Baker & Michael, 1985). The failing of the *norm of progress* did now encourage an unbiased debate about what scientists believed to be the shared biological substrates of *language* (see Doupe & Kuhl, 1999). Although implicit indicators sometimes still point to the persistent presence of the norm of progress in current literature (Ullrich, Mittelbach, & Liebal, 2018), the debate no longer explicitly excludes cer-

tain species based on their phylogenetic distance to humans (Güntürkün et al., 2017). Widening the scope to non-mammalian species revealed traits in songbirds that were supposed to be uniquely human, such as critical learning periods (e.g., Bolhuis, Okanoya, & Scharff, 2010), social shaping of babbling (e.g., Goldstein, King, & West, 2003), phonology (e.g., Yip, 2013), syntactical structure (e.g., Berwick, Okanoya, Beckers, & Bolhuis, 2011), specialized brain circuits (e.g., Jarvis, 2013), and genes related to vocalizations, such as the transcription factor FoxP2 (e.g., Scharff & Petri, 2011).

In sum, there are various reasons why birdsong became a model for comparisons with human language. However, an additional important reason for the interest in birdsong might also be its vocal modality, shared with human language. The oral-vocal modality did and still does motivate researchers to assume a close relationship between human and bird utterances, which implies another social norm that is described as *oral norm* hereafter.

3 FROM SPEECH TO GESTURE: OVERCOMING A TOO NARROW CONSTRUCTION

Until the middle of the 20th century, scientists had no doubt that one decisive characteristic of *language* was its verbal nature, and more specifically, the oral modality, which has a number of important implications. The American psychologist James Coleman wrote the popular sentence: "The fish will be the last to discover water" (Coleman, 1960, p. 59). Thus, the fact that the oral-vocal modality was set as a defining feature of language was rarely noticed. Authors from the early modern period interpreted *speech* and *language* as being inextricably linked with each other (Serjeantson, 2001). The linkage entails that "language is a necessary condition of thought [...] and was translated by the body machine into action [= *speech*, added by author]" (Kiriazis & Slobodchikoff, 1997, p. 365). Linguist Edward Sapir implicitly continued to share those ideas in 1921, when he published an influential textbook titled *Language: An Introduction to the Study of Speech* (Armstrong & Karchmer, 2009). In his famous article *The Origin of Speech*, Charles Hockett wrote that the "vocal-au-

ditory channel" is the most obvious design feature, which "appear[s] so trivial that no one looking just at language would bother to note" (Hockett, 1960, p. 6). Consequently, scientists using cross-species comparisons continued to promote an oral picture of language: "a language, if it is to achieve its full potentialities, must be a language of sounds" (Thorpe, 1958, p. 537). The implicit preference for oral-vocal utterances similarly affected research on primates:

> If one were looking for parallels with the process of human vocal learning, the most obvious place to look would be in our closest surviving relatives, the apes and monkeys. Surprisingly, no one has yet discovered a non-human primate with any facility for vocal imitation (Marler, 1970, p. 669).

Peter Marler wrote this sentence after at least six failed attempts to teach verbal utterances to various ape species (see Kellogg, 1968; Miles, 1997; Radick, 2007). To what extent those teaching attempts are informative is the matter of an ongoing debate on a methodological and semantic level (e.g., Kellogg, 1968; Lameira, 2017). However, in the 1970s those results led researchers to conclude that apes were of little use in research about vocal learning:

> In broaching the comparative investigation of vocal learning it might seem logical to study the abilities of nonhuman primates in this regard. This approach has yielded results which though interesting in themselves, are in some respects disappointing. [...] Thus, apes demonstrate no great facility for vocal imitation (Marler, 1970, p. 1).

> Evidence on hand suggests that the socioecology of present-day non-human primates is an unsatisfactory springboard for vocal learning of any consequence (Nottebohm, 1972, p. 133).

The reasons why Marler and Nottebohm preferred the communication of songbirds over primates when comparing human language to non-human forms were grounded in their reservations towards other, non-verbal means of communication. Until the 1960s those reservations also inhibited the realization of suggestions from the psychologists Robert

Yerkes and Lev Vygotsky, who promoted the teaching of visual-gestural signs or symbols instead of vocalizations (Vygotsky, 1934/1986; Yerkes, 1925). To understand the delay in implementing those suggestions, reference to the separate deaf-discourse provides valuable insights. The institutional education of deaf students at the beginning of the 20th century was dominated by the so-called *oral method*. The use of *manual gestures* was mostly forbidden at schools for deaf students in Europe and North America (McDonnell & Saunders, 1993). Instead, deaf students were forced to learn oral utterances. As a result of inadequate *oral* teaching methods, students suffered dramatic deterioration of education and frequently became functional illiterates (Sacks, 1990). One reason to suppress manual and to force oral communication was a long held conviction that manual signs cannot be a *natural language* and must be *deficient* compared to oral sounds:

> Beside speech there is no other generally used universal sign system. [...]. Other sign systems, like the deaf-mute language [...] are either transposed, restricted or parasitic (Lotz, 1950, p. 712).

> Ideographic language systems, in comparison with verbal symbol systems, lack precision, subtlety, and flexibility [...]. Comparatively, a verbal language is more abstract (Myklebust, 1964, p. 241).

It took decades of research by early pioneers like William Stokoe, Robert Johnson, Adam Kendon and Scott Liddell (linguists); Edward Klima and Ursula Bellugi (psychologists); and Harlan Lane and John van Cleve (historians) to uncover, challenge and overcome the pre-empirical claims as expressed by Lotz and Myklebust (see Ullrich, 2016). A new generation of researchers broadened the – in their view – too narrow perspective on *language*. For them, language entails more than the oral-vocal modality. Rather, it includes gesture and body posture (Goldin-Meadow & Brentari, 2017; Kendon, 2008; McNeil, 1992). By and large, the defining properties of language became independent of modality associated with an increasing promotion for multimodal or cross-modal accounts of human language (Vigliocco, Perniss, & Vinson, 2014).

The cross-species comparative language discourse absorbed many of the ideas sketched above. However, it was only after *American Sign*

Language was acknowledged as a natural *language*, and only after the failure of oral-vocal in contrast to alleged success of visual-gestural experiments with apes (Gardner & Gardner, 1969; Premack, 1971) that the gestural origin was reconsidered (Hewes et al., 1973). While the results of both the oral and gestural *ape language* experiments received fundamental criticism after their publication (Leavens, Bard, & Hopkins, 2010; Rivas, 2005; Terrace, 1979), the idea that the defining properties of language are independent of their modality became prevalent. Nowadays, research focuses both on oral accounts (Lameira, 2017) and on gestural accounts (Liebal, 2017), but most importantly, there is an increasing attention on an integration of multimodal or cross-modal research (Partan & Marler, 1999; Slocombe, Waller, & Liebal, 2011). In fact, the last two decades of multi- and cross-modal research have shown that the use of a certain modality is not necessarily a marker for sophisticated communication but may rather be explained by environmental conditions (Partan, Fulmer, Gounard, & Redmond, 2010; Waller, Liebal, Burrows, & Slocombe, 2013). The more the defining properties of language became independent of normative attributions about modality, the more types of animal communication could fit the concept of *language* in principle. However, some scholars strictly reject that perspective, claiming that the external features of language are ontologically different from the inner mental functions (Bolhuis, Tattersall, Chomsky, & Berwick, 2014). This demands a closer look on the presumed dichotomy of *internal* and *external*, to understand the historical roots of the *cognitive turn,* which was meant to overcome the *behavioristic norm*.

4 FROM EXTERNAL BEHAVIOR TO INTERNAL PROCESSING: THE EXAMPLE OF INTENTIONALITY

The term *intentionality* has made it to the top of the most discussed defining properties of *language* (see, e.g., Liebal et al., 2014; Townsend et al., 2016). Its usage started with Franz Brentano (1838–1917) who reintroduced the term from scholastic philosophy (Brentano, 1874/2009). Paul Grice (1957, 1969) brought it forward to the language discourse, followed

by Daniel Dennett (1971, 1983) who transferred the concept into the species comparative discourse.

The term *intentionality* was introduced in the comparative sciences during the early 20th century, when behaviorism dominated the discourse on language in the United States. The *behavioristic norm* (see Graham, 2015 – here denoted as *doctrine*) arose as a countermovement to 19th-century *animal psychology*, where scientists ascribed *purposes*, *feelings* and *abstract thought* to their study species (e.g., Romanes, 1879; Radick, 2007). For critics of that *anthropomorphic mentalism*, the anecdotal approach of animal psychology was nothing other than unfounded metaphysics (Jamieson & Bekoff, 1992). In order to abandon the *metaphysical* mind-matter-dualism (see also Marko and Wimmer in this volume) and in hopes of unifying science towards a positivist orientation, behaviorists called for rigorously controlled experiments, where the "facts to be observed are external phenomena, physical occurrences in the objective world" (Morgan, 1903, p. 48). For researchers driven by the *behavioristic norm*, any science that does not focus on quantifiable entities (e.g., *introspective psychology*) is not a "proper science" (Radick, 2016, p. 73). In such a climate, a term like *intentionality*, defined by Brentano as *hallmark of the mental* (Jacob, 2014), was difficult to use. Still, it was used by European ethologists because for them descriptions of behavior freed from *mentalistic* vocabulary were hard to sustain. When explaining and predicting behavior, ethologists like Oskar Heinroth (1871–1945), Konrad Lorenz (1903–1989), and Nikolaas Tinbergen (1907–1988) introduced the term "intention movement" (German 'Intentionsbewegung') (Heinroth, 1910/1990, p. 680; Lorenz, 1937, p. 292; Tinbergen, 1939, p. 223). According to the definition of Heinroth, the term *intention movement* serves as a methodological stance, where "the trained behaviour student can derive from their study a knowledge of what the animal is intending to do in the next few moments" (Daanje, 1950, p. 48). However, the understanding of *intention* at this stage of the debate was very different from what Brentano (1874/2009) had in mind when he revived it. As Lorenz once clarified, the fulfillment of an intention movement follows a "biological purpose" (Lorenz, 1937, p. 292). The beating heart has the *biological purpose* to keep the body alive. The heart, however, does not have a *psychological intention* to do so. The ethologists at the beginning of the 20th century did not use the term *intention* in the sense of Brentano's coinage of an inner

mental state. For them, it was a method of explaining behavior as *biologically purposeful* (see Millikan, 1997).

The ethologist Peter Marler was clearly a direct descendant from ethologists with behavioristic influence. In his article *The logical analysis of animal communication*, he warns "about the dangers of the introspective method in animal studies" that comes with "anthropocentric preconceptions" (Marler, 1961, p. 297). In his view, animal communication has to be described as behavior in "objective terms" where "semantics are of doubtful value" (Marler, 1961, p. 299). In an earlier paper, Marler defines language as "a means of communication between individuals, by means of sound signals" (Marler, 1956, p. 245). As for many ethologists, Marler believes that language is first of all a communicative system, whereas research must transfer attention "from pragmatics to syntactics to consider the physical nature of some of the signals used" (Marler, 1961, p. 309). Those statements might be reminiscent of the American structuralist Leonard Bloomfield. His linguistic theory was also motivated by the *behavioristic norm* and led to the conviction that objective research on language must exclusively concentrate on form, including phonology, syntax, or morphology (Bloomfield, 1943; Levelt, 2013).

During the 1970s, Peter Marler started a collaborative project with Dorothy Cheney and Robert Seyfarth to investigate the alarm calls of vervet monkeys. Given his earlier remarks on the value of comparative research, the first sentence of their paper in *Science*, outlining the results from the collaboration, may come as a surprise: "A central but neglected issue in the study of animal communication is that of semantics" (Seyfarth, Cheney, & Marler, 1980, p. 801). Semantics, which he earlier denoted of "doubtful value" (Marler, 1961, p. 299), is now at the centre of the narrative. However, Marler did not turn into an anti-behaviorist. In principle, he opens up the possibility for unobservable mental representations, but he still uses behavioristic vocabulary and sticks to the study of *objective physical phenomena*. It is Daniel Dennett, philosopher and proponent of a concept of *intentionality* in the tradition of Brentano, who celebrates Seyfarth, Cheney and Marler as "new ethologists, having cast of the straightjacket of behaviourism" (Dennett, 1983, p. 343). It is he who exploits the vast potential of the study for his own *intentional system theory*. Dennett borrows his theoretical foundation from Brentano and Grice and uses intentionality in the philosophical rich sense as a form of

directedness of the mind towards a content or object (Glock, 2001). As Millikan (1997, p. 194) once explained:

> The difference between merely biological purposes and intentional purposes is that in the latter case the animal's biological purposes are implemented via the manufacture and use of inner representations.

Consequently, Dennett experiences research with vervet monkeys as an opportunity to discuss representations, beliefs, desires and the like in animals. In his opinion, reference to inner mental realities is needed to sufficiently explain and predict the vervets' behavior and to answer questions about language and communication in general. Dennett was not the first to introduce intentionality in the philosophically rich sense into species comparative research (see Révész, 1944; von Glasersfeld, 1974, 1976), but his writings fell on fertile ground at a time when the cognitive turn in linguistics and psychology was well underway. The introduction of intentionality achieved further support from psychologists like David Premack (Premack & Woodruff, 1978) and Michael Tomasello (1985), as well as from the philosopher John Searle (1984). Robbins Burling summarized the consequence of the cognitive shift for the language discourse: "Given that language is inseparably bound up with human cognition, the most promising place to look for the antecedents of language is in primate cognitive abilities" (Burling, 1993, p. 25). Hence, questions about mental phenomena like *reference* (Sievers & Gruber, 2016), *recursion* (Martins, 2012), and *deception* (Oesch, 2016) became the subject of cross-species approaches in language research, with research about intentionality representing just one of many candidates serving as a potential defining property of language.

Peter Marler, like other ethologists influenced by behaviorism, never stepped back from his so-called *objective research approach*. Thus, he continues to use terms like *phonological syntax* instead of *syntax*, *functional reference* instead of *reference*, and explains behavior from the perspective of *biological purpose* instead of *psychological intention*. Marler justifies his position by explaining that "the role of the many dimensions of mindfulness still remains unclear" because of the impossibility of "introspection" and a lack of "appropriate experiments" (Marler, 2000, p. 32). Ethologists in behavioristic tradition nowadays use the term *inten-*

tionality as means of a *biologically purposive behavior* (e.g., Vail, Manica, & Bshary, 2013). In contrast, cognitive scientists often use it in the philosophically rich sense as *psychologically purposive behavior*. The behavioristic norm that banished the mind from *objective science* deceased, but the divergent use of the term *intentionality* still draws conclusions about its historical background. Once used to describe external behavior, it is deployed frequently nowadays to explain internal processing and thereby considered an integral defining property of language.

5 CONCLUSION

We have highlighted the influence of value-driven norms for defining the term *language* in the discourse involving species comparative approaches to language evolution. While the examples presented show how a theory of language was restricted or modified by various values throughout the 20th century, the use of values in science among all disciplines and all times is pervasive, as a body of classic studies (Feyerabend, 1975; Kuhn, 1977; Latour & Woolgar, 1979) and some recent publications (Davis, 2013; Douglas, 2016; Elliott & McKaughan, 2009) testify. However, while it is easy to identify values in research papers retrospectively, it becomes more complicated for contemporary publications because of their implicit character. Certainly, the history of the discourse can teach us that norms still govern recent language definitions. Those norms frame the narrative of publications and constitute the theoretical basis for defining properties as associated with *language*, as suggested by Ray Jackendoff (2010, p. 63): "Your theory of language evolution depends on your theory of language". This chapter adds to this notion that the theories themselves are influenced by subjective norms. Yet, norms and values must not be immediate indicators for *bad science*. Instead, they can motivate scientists to choose a certain study species, to design their experimental procedures, to use a specific vocabulary, and to weigh the evidence found (Douglas, 2016). As shown in the current chapter, values might change over time, but they cannot be excluded from scientific practice. Also, they do not have to be excluded, as values might expose alternative answers to questions where empirical evidence is scarce. Good science is not to

deny subjective influence on scientific practice, but to bring that influence to light. That requires making transparent the individual scientific background of researchers and their personal motivation for the topic. As long as such details are not considered, meta-research about those issues is needed to uncover current norms influencing the discourse and to understand the latest attempts of answering the question: *What is language?*

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