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**Translation: a biosemiotic/more-than-human perspective**

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This article contributes to the developing recognition that the challenges raised by the enterprise of translating between languages extend beyond human language. It suggests that there are parallels between the political issues recognised by translation scholars – of exclusion, misrepresentation and speaking for 'the other' – and those raised by biosemiotics, the study of signs in all living systems. Following a discussion of convergence in current developments in translation studies, semiotics and human-animal studies, the article presents an analysis of empirical data, with specific reference to the different meanings of the verb HEAR. The findings demonstrate the anthropocentric assumptions that are embedded in the way hearing is routinely represented, and an argument is presented for the recognition of these in communications about the semiotic resources relevant to non-human life forms. The paper concludes with some reflections on the implications of these issues for the enterprise of translation.

**Keywords:** biosemiotics, semiosis, corpus assisted analysis, human-animal studies, politics of translation

> "There's a lot going on in a bird's song that human ears can't appreciate." (Mooney 2014, cited in Ackerman 2016, 139)
>
> "There's really no such thing as the 'voiceless.' There are only the deliberately silenced, or the preferably unheard." (Roy 2004)

## 1. Introduction

We human beings experience the world through our senses, as other living organisms do. We are aware that we are experiencing these sensations and emotions and we reflect on and communicate about them with others. To do this, we draw on the most extensive and sophisticated range of semiotic resources that any species has been able to develop, including visual symbols, utterances, written language, technologically supported signals across distances (both spatial and temporal), and so on. We engage in meta-semiotic discourse, communicating about our communication – and this journal is an exemplar of this process: a forum for debate about the challenges raised by the variety of forms into which human language has developed, and how those challenges may be met and overcome. This article aims to contribute to the growing

recognition that these challenges extend beyond human language. While the developing field of biosemiotics researches the communicative capacities of all living organisms, the focus here is on *human* communications *about* the semiotic resources relevant to non-human life forms. The paper presents an analysis of empirical data collected for a research project investigating how people talk and write about animals.[1] It focuses on how one dimension of the semiotic resources, experiences and behaviour of other-than-human individuals and species are represented in contemporary English, by examining the different meanings of the verb HEAR. The paper concludes with some reflections on the implications of these issues for the enterprise of translation.

## 2. Challenges of translation

The contrasts between a lay-person's conception of translation – that it entails a fairly straightforward transfer of meaning between languages – and that of those who practise and study it are well documented. Of particular relevance to this paper are such issues as the ever-present potential for "incommensurabilities, disjunctures, and power differentials" (Gal 2015, 226), including the 'colonizing' potential of translations (e.g., Venuti 2000; Tymoczko 2000, 2014), and how to produce translations that can truly respect "the autonomy of the Other" (Appiah [1993] 2000, 428; cf. Tharakeshwar 2009), if, as Temple and Young (2004, 167) acknowledge, "speaking for others, in any language, is always a political issue." To date, discussion of these issues has, unsurprisingly, remained almost exclusively 'intra-species'; that is, concepts such as oppression, colonisation, marginalisation, exclusion and misrepresentation have been addressed in relation to the unequal distribution and statuses of different versions of human language, those who speak them, and the discourses and texts that they generate. Meanwhile, as Cronin (2017, 67) notes, "animals other than the human have been remarkably silent in its [translation studies'] brief history." However, across the humanities and social sciences, as well as in many collectives beyond the academy, increasing attention is being paid both to systematic inequalities between humans and other animals, and to the range of communicative systems that are not reducible to the forms that human languages take.

[1] Terminology is problematic. Humans are also animals, and several ways of encoding references to non-humans have been proposed, especially by those who find unacceptable the binary distinction, and the implications of 'human' as the default from which 'non-human' deviates. However, the fact that (English) language has no accepted form of words to deal with this challenge illustrates one of the issues raised in this paper.

## 3. The 'animal turn'

Space does not permit a detailed survey of the many strands that comprise these developments, so I draw attention here to the issues most relevant to the concerns of this journal. One such strand is the expansion of critiques of social inequalities to include injustices done to the other-than-human inhabitants of the planet, which is motivated in part by the potential for fuller understanding of intra-human conflict, since "the discourse of animality has historically served as a crucial strategy in the oppression of *humans* by other humans" (Wolfe 2003, xx, original emphasis). 'The discourse of animality' includes the many ways in which hierarchies are encoded. One of these is the phenomenon of the 'absent referent' – the term for the means by which members of subordinated groups, of whatever species, are rendered invisible, or erased (Adams 1990; Stibbe 2012). Another is the classification of humans with specified characteristics (skin colour, sex, disabilities etc.) as equivalent to, or inferior to, members of other species (e.g., Bourke 2011; Lundblad 2012; Wolfe 2009). As Taylor (2017, online, no page) expresses it, "intellectual inferiority has been so easily animalized because animals themselves have long been understood as intellectually inferior." And yet another dimension of the 'discourse of animality' is the way many metaphors and similes liken stigmatised humans and/or their behaviours, pejoratively, to those of non-human animals (Goatly 2006). In these various ways, then, the inclusion of other species into critical analyses of social relations, "offers new tools for rethinking transnational circuits of power and identity" (Ahuja 2009, 556).

A second sense in which a non-human perspective aligns with issues of translation relates to advocacy and representation on behalf of the 'other'. There are various categories of people whose perspectives are accessed only indirectly by those researching them, including people with cognitive impairments and the very young. The issue of advocacy on behalf of a social group by its own members is illustrated by Temple and Young (2004), in their discussion of how Deaf interpreters are perceived in social research studies, given the structural constraints on modifying conventional practices so that members of the Deaf community being researched can participate fully in setting questions and can "hold their own" in the "active construction of meaning" arising from the research (173). This issue may be thought of as a continuum. At one end are full participants in the first-hand representation of their own interests, with access to influential communications in linguistic media in which they feel confident. At another point on this continuum are people who have the potential to represent themselves – and others whose interests they share – provided those interests can be translated without loss of authenticity. Then there are the least powerful groups, who are dependent on others to translate on their behalf – and it is here that advocacy for animals' interests is to be considered.

As one author maintains, "[animals] enter policy dialogues only through those who would speak for them," and "speaking for animals means interpreting them, translating their animal minds into human language" (Carbone 2004, 6, 4). However, unsurprisingly, there is no consensus about how this is to be done. At the centre of

this debate is an issue familiar from mainstream translation studies: whether to emphasise the similarities between 'us' (humans) and 'the other' (non-humans), or to recognise – even celebrate – the differences, and find means of accommodating them within the constraints of human language.

The most well-worn research area in comparative human-animal communication focuses on the extent and limits of non-human species to participate in the use of some kind of linguistic semiosis. It is well established, for example, that some primates can learn versions of human-devised symbols (Savage-Rumbaugh 1986; Segerdahl, Fields, and Savage-Rumbaugh 2005), that Grey parrots can demonstrate some aspects of referential vocalizations (Pepperberg 2007, 2010), and that dogs can respond to semantic information (Taylor et al. 2014). However, as various commentators have pointed out, these lines of enquiry tend towards the anthropocentric, in the sense that their 'pivot' is the human norm, against which the capacities and practices of other species are measured. "If semiosis is admitted to take place in the animal world at all," maintains Hoffmeyer (2010, 387n), "it is seen as a degenerate version of human semiosis," with the differences between the two "typically emphasized over and over" (de Waal 2012, 191). The fact that properties of human languages such as abstraction and recursion set them apart from the communicative resources of other species can be used to make a circular argument. Approaching the latter from the perspective of the former – that is, "using constructs developed for one recently evolved and possibly highly derived system of communication (language)" (Rendall, Owren, and Ryan 2009, 238) to seek to understand the communicative practices of very different kinds of creatures – risks closing off our ability to perceive their diverse, unfamiliar properties. Again, there are parallels here with people who are "considered diverse with regard to language, culture, ethnicity, and class [who] are particularly vulnerable to representations grounded in a deficit discourse" (Whitehouse and Colvin 2001, 212). As long as animal communication is compared and contrasted with human language, humans – and particularly the most advantaged humans – will continue to come out 'on top'. Alternative perspectives include the suggestion that language constrains human perception (e.g., Derrida 2003) and an interest, on the part of some disability scholars, in both human and non-human "forms of subjectivity that are not language-based" (Weil 2006, 87; see also Grandin and Johnson 2009).

## 4. Semiosis and signs

Challenges are emerging to the dualisms that separate human language from all other forms of semiosis, and the semiotic from the non-semiotic world. A more inclusive concept is found in the theory developed by Peirce (c. 1897), where a sign "is something which stands to somebody for something in some respect or capacity" (CP 2.228). Processes of interpretation and translation are integral to Peirce's theory of the sign, in the 'intralingual' sense of translation (Jakobson [1959] 2000), while some

attention has also been drawn to the relevance of his work for translation studies more generally (e.g., Gorlée 1994, 2004; Queiroz and Aguiar 2015; Stecconi 2007).

However, it is important to note that the 'somebody' in the above quotation from Peirce need not necessarily be human. Recognition of the need to comprehend the crucial role of signs in communication beyond the human gave rise to 'zoösemiotics', the term that denotes "the scientific study of signalling behavior in and across animal species" (Sebeok 1968, 142), and later 'ecosemiotics', defined by Kull (1998, 350) as "the semiotics of relationships between nature and culture," but slightly differently by Nöth (1998, 333) as "the study of the semiotic interrelations between organisms and their environment." The latter definition encompasses non-intentional signs that are nevertheless interpretable by living organisms; for example, one animal may involuntarily give off a scent which alerts another animal to its presence as potential prey (Brier 2008). Human beings too communicate not only via lexis and grammar, facial expressions and gesture, but also by emitting involuntary signals generated by biologically regulated systems such as hormones and reflexes. Notwithstanding debates about terminology (e.g., Kull 1998; Maran 2007; Maran and Kull 2014), the most relevant term in the present context for this rapidly developing field of study is 'biosemiotics', defined as "the study of the myriad forms of communication and signification observable both within and between living systems" (Favareau 2010, v), or "the study of signs and signification of cognition and communication – also in the form of language – in all living systems" (Brier 2008, 48). From this perspective, living creatures are not so much passive entities, whose behaviour is determined by their genes and the immutable 'laws of nature', as "active systems of sign production, sign mediation and sign interpretation, that harness the physical laws in order to live and sometimes make a more complex living" (Kull, Emmeche, and Hoffmeyer 2011, 1).

In contrast to a "crude ontology of genes with deterministic developmental capacities, and isolated, self-interested individuals" (Dupré 2012, 99), biosemiotics is consistent with an ontology that can accommodate living entities as emergent, dynamic and inter-connected, including through symbiotic processes. This puts it at odds with the conventional hierarchy of communication, where humans with their complex, symbolic language are at the apex, primates on the rung below – but above all other 'macro' life forms (mammals, birds, fish) – and from which microorganisms are typically absent. Against this, contemporary work in biology reveals how even 'primitive' organisms interact semiotically with their environment as they identify and select or avoid components within it in order to survive (Nöth 2001, 75; see also Hird 2009, 53), a notion that is gradually being taken up in dialogue between biosemiotics and translation studies (Marais and Kull 2016).

Although as humans we may be used to thinking of ourselves as discrete, unitary entities, we too actually exist in a symbiotic relationship with myriad microorganisms, and could not survive without continual access to other entities, including the substances we ingest for sustenance, not to mention all the other entities with which we are enmeshed in assemblages of many kinds. Living organisms, then,

which are necessarily adaptable rather than fixed, may better be understood as 'processes' rather than 'things' – processes that both respond to, and contribute to the construction of, their environments or niches (Dupré 2012, 99). A typical example is the way some moths emit ultrasonic clicks in response to bat echolocation calls, thus indirectly modifying evolutionary developments both in kinds of species (Waters 2003). Into this context fits the Peircean concept of the sign as itself processual (e.g., Merrell 2001), as "neither a thing nor a concept [but rather] a pure relation whereby a receptive system orders its world" (Hoffmeyer 2010, 373), a relation whose meaning lies in its "practical effects" (Nöth 2012, 296).

An obvious implication of this more inclusive, 'open' view of representation is that it is "something both more general and more widely distributed than human language" (Kohn 2013, 38), and, although the symbolic modalities of human language are emergent from the indexical, and the indexical from the iconic, these other modalities have properties of their own. Moreover, the affordances of the perceiver and of that which is perceived, as well as the relation between them, affects them both. That relationship-network of organisms with their capacities, needs, and environment constitutes their experiential world, or *umwelt* (von Uexküll 1982), and involves the interpretation of meaningful signs. Yet, our own primary mode of communicating about other-than-human modes of communication is the symbolic mode of human language, and it has been claimed that "extending linguistic relationality to nonhumans narcissistically projects the human onto that which lies beyond it" (Kohn 2013, 84). This brings me to my empirical example.

## 5. A meta-semiotic lexeme: HEAR

### 5.1 Linguistic commentary on HEAR

Consistently with the ideas presented above, I illustrate the challenge of 'translating' across *umwelten* by starting not with nouns denoting species, and contrasts among them, but instead with a verb that represents a relational, communicative process – HEAR. HEAR is a very frequent verb in English; it occurs 367 times per million words in the British National Corpus (BNC) (Leech, Rayson, and Wilson 2001), although this is less frequent than SEE at 1920 occurrences per million words. This reflects the 'perception verb hierarchy' (Viberg 1983), which privileges the sense of sight above hearing because – for human beings – sight is the primary mode of direct perception, so that "it makes sense that certain sensory modalities enjoy greater prominence and frequency in linguistic representation" (Whitt 2009, 1084). Nevertheless, hearing is a core perceptual sense, and one shared among many kinds of animals (though see below). Its primary definition in the OED is intransitive: "to perceive, or have the sensation of, sound; to possess or exercise the faculty of audition." In its transitive sense, the objects of HEAR, according to the OED, are "sound, or something that emits or causes sound." However, corpus evidence demonstrates that what humans are

reported to hear is very frequently linguistic communication. For example, studies comparing English HEAR with French ENTENDRE (Lacassain-Lagoin 2015), German HÖREN and Spanish OÍR demonstrate that, when the range of syntactic constructions around any of these verbs is examined, the most prominent objects 'heard' are linguistic. Lacassain-Lagoin (2011, 59) reports how HEAR functions to embed "the Other's *discourse* in one's own auditory perception" (emphasis added), whether reporting in a neutral way or implicitly adding the hearer's interpretation of what was said. Similarly, Whitt (2009, 1095) demonstrates how HEAR and HÖREN both serve to express linguistically the ways in which "auditory perception can shape our epistemology," while López and Valenzuela (2004, 15) discuss how 'hearing' is used in the metaphorical sense of 'knowing'. A small study using the British National Corpus confirms the prominence given to language and culture in what it is that human beings are reported to 'hear'.

Following the Corpus Pattern Analysis developed by Hanks (2004), a graduate student[2] classified the patterns found with HEAR in the BNC. She established that the single most frequent pattern is transitive, with a human or animal as subject and a sound or activity the most frequent object. An example sentence from the BNC illustrates how inferences are drawn from sounds about what they may signify:

> *From what we understand she **heard** a pop and that is when she noticed the pain in her back.*

Such inferences are not confined to human modes of perception. For example, in his thesis arguing for 'an anthropology beyond the human', Kohn (2013) recounts how the sound of a tree trunk being chopped by a hunter "stands for something" to a monkey in a nearby tree (31), who has learned "to interpret a crashing palm as a sign of danger" (52).

What humans are reported to 'hear', however, often includes no actual sounds at all, as in the idiom 'to have one's voice heard', which may denote 'having one's views recognised' via a written medium. For instance:

> *such tactics risked reducing the range of titles and thus of voices **heard** in the national press*[3]

The corpus pattern analysis (consistent with the studies cited above) also identified non-literal senses in various patterns involving 'that' clauses and prepositional constructions with 'about', 'from' and 'of'. For instance:

> *I had **heard that** sight is often impaired by poor health*

[2] I am grateful to Emma Franklin for providing this analysis.
[3] All examples in this section are taken from the BNC; underlining highlights references to written language.

*I saw two notices calling public meetings to discuss pollution – the first I and many others had* ***heard about*** *this problem*

*At the time there was a postal strike and I didn't* ***hear from*** *David for about 3 or 4 weeks*
*Councillor Gene Fitzgerald TD complained that the first council members* ***heard of*** *the planning decision was when they read of it in the morning paper*

There is also the institutional sense of HEAR where a legal body officially listens to and considers information, in order to make a decision. For instance:

*The* ***court heard*** *he was hooked on tranquillisers after splitting from his wife*

Semantically, the meaning of HEAR extends to include 'know' (as discussed above), 'understand' and 'obey'. For instance:

*going down there is a foolish risk – didn't you* ***hear*** *what he said?*

***Hear*** *the word of the Lord!*

Thus, although the core definition concerns 'the faculty of audition', in actual usage HEAR covers a wide range of symbolic, linguistic communication among human beings.

**5.2** The meaning of HEAR beyond the human

That which is registered as sound is emergent from the relation between changes in physical matter (particles), a medium (air, water, solids), and a perceiving subject who 'hears' it. The dictionary definition of 'hear' alludes to the 'specific organ' of the ear, which seems straightforward enough. However, researchers into the evolution of hearing have identified the anthropocentrism evident in conventional approaches (Fay and Popper 2000): the physiological affordances, environments and behaviours of non-human animals accommodate a much more diverse range of vibration and sound than is perceptible to human hearing. The organs classified as 'ears', which are acoustic sensors that have evolved from vibration sensors (Gibson and Windmill 2017), have characteristics that contrast across different species, including the medium through which vibrations travel within different kinds of living organism. For example, "many insects produce and detect vibrations that are propagated through the substrate that supports them, such as a branch or leaf of a bush or tree" (Hoy 2012, 2). Whereas vertebrates tend to have pairs of ears located on the cranium, an insect's ears can be located virtually anywhere on its body (Hoy 2012). In contrast to the 'perception verb hierarchy' of humans (Viberg 1983, cited above), for cetaceans sound is more critical than sight (or smell), yet a visual metaphor is used to convey

the way many species use echolocation to "'image' their environment by analysing echoes from a self-generated ultrasonic signal" (Ketten 1992, 718). Whales "hear as well as land mammals but in a different medium," while cetacean ears may be "more acoustically and physically diverse than any related land mammal group" (Ketten 2000, 43, 44), and whales receive most of their sound signals via the jawbones (Webster 2017). Furthermore, since sound travels much more slowly through air than water, the sonar systems of bats and dolphins, for example, are quite different from each other (Au 2004).

Although human attention is drawn most readily to the sounds within the range we can readily hear, this is only a subset of what can be perceived across the full range of living organisms, which encompasses wide variations in frequency, volume, pitch and timbre (e.g., Manoussaki et al. 2008; Fay 2012; Heffner and Heffner 2007; Webster 2017). Many animals also process sounds differently from the way humans do. Very small animals, such as those few orders of insects that have tympanic membranes, have different ways of identifying the direction of sound sources and perceiving frequencies than larger organisms, whose paired ears afford more space to enable the detection of the direction of sounds (Gibson and Windmill 2017), while the asymmetrically placed ears of night-hunting owls enable them to calculate vertical and horizontal angles between them and their prey (Webster 2017).

Linguists are familiar with the way different languages exploit the contrasts between vocal sounds in different ways. For example, the sounds represented by [t] and [d] in English are distinct from each other. Hence, the words 'toe' and 'doe' denote different things, whereas in Korean there is no meaningful distinction between those two sounds. Conversely, English speakers often struggle to hear the variations that carry meaning in tonal languages. In comparison to the acoustic contrasts that register with humans, there are much greater contrasts between aspects of the sounds produced by animals that may be meaningful for them. So, for example, the sound produced by dolphins that humans may hear as a 'squawking' with tonal qualities "is actually a set of rapid echolocation clicks" (Kershenbaum et al. 2014). Birds in different habitats vary their songs in different ways, with semiotic significance potentially attaching to variations in volume, frequency, sequence of units, repetition and so on (ibid.).

Varied means of producing, as well as perceiving, sound are deployed by different animals. These include rubbing parts of the body against other parts or against something in the environment (insects), moving two bones together or contracting muscles that are connected to the swim bladder (fish) (Popper et al. 2003), and detecting seismic vibrations through the foot (elephants) (O'Connell-Rodwell 2007). Yet, despite this huge range of sound semiosis in living creatures, its representations in (English) language seem to gravitate towards a linguistic model. Thus, although animals such as crickets, cicadas and grasshoppers do not produce sounds by expelling air through a vocal tract, as humans do, their signals are nevertheless termed 'chirps', 'calls' and 'song-patterns' (Ragge and Reynolds 1988; Gerhardt and Huber 2002). Sounds made by fish may be labelled by terms that

suggest the passage of air through a vocal tract, such as 'whistles' and 'grunts' (Zelick, Mann, and Popper 1999). The components of birdsong are known as 'syllables' and 'phrases' (Catchpole and Slater 2003), despite the OED definition of a syllable as "forming a *word* or an element of a *word* […] an element of spoken *language*" and 'phrase' as "a small group […] of *words*" (emphasis added).

These observations point to two slightly different senses in which discourse about animals' aural communication may be termed 'linguo/lingua/linguicentric'. Variants of this term have been used to refer to the centrality of language in thought and culture (e.g., Enfield 2000), the privileging of one human language over others (e.g., Dervin 2013), or of language over other human cultural forms such as music (e.g., Tomlinson 2015). However, the linguicentrism I intend here is the (tacit) acceptance of the primacy of words, summarized provocatively as the idea that language is "tantamount to the whole of culture and communication," and

> possessed solely by we overconfident human knowers who think we possess genuine knowledge by the mere fact that we are loquacious animals, unlike other creatures, who presumably must limp along with those supposedly lesser and impoverished modes of communication. (Merrell 2003, 154)

Thus, one kind of linguicentrism in discourse about animals is the way in which human language is taken as almost synonymous with all communication, where whatever sounds animals make must be (imperfect) approximations of human, symbolic language. The second sense in which a language metaphor appropriates biosemiosis is the way labels for describing human language are imported into accounts of other-than-human communication. To explore this further, in the next section of the paper, I present in more detail the findings from an analysis of a topic-specific corpus on the subject of animals, with specific reference to how HEAR is used when animals are either the hearers or the heard.

## 6. Animals hearing and heard

The data used here derives from a three-year project researching the discursive representation of animals.[4] The corpus, comprising just under 9 million words of running text in contemporary British English, includes a wide range of discourse types, excluding imaginative discourse such as fiction and poetry, but including scientific journal articles, legislation, newspaper articles, transcripts of wildlife broadcasts, as well as elicited data from interviews and focus groups. For full details see Sealey and Pak (2018).

[4] 'People', 'products', 'pests' and 'pets' – the discursive representation of animals. Funded by the Leverhulme Trust (RPG 2013–063).

One set of words for the animal sounds that humans hear occurs in the transcripts of wildlife broadcasts, which were obtained by downloading the subtitles from the television broadcasts, as these routinely include indications of sounds that are important for the film and would be missed by hearing-impaired viewers. Examples include: 'sheep bleat', 'cub growling', 'goats bleat', 'chirping', 'croaking', 'buzzing', etc. Many people believe that such words are onomatopoeic, and indeed the definition of onomatopoeia on Wikipedia[5] uses "animal noises such as 'oink', 'miaow' […], 'roar' and 'chirp'" to exemplify the phenomenon. A spokesperson for the company responsible for producing these subtitles explained that, while there are no prescriptions on which words should be used to represent animal sounds, most staff "would pick the same word" since "a lot of it is simply down to inherited cultural wisdom – so cats will 'meow', dogs will 'bark', mice will 'squeak' etc." (Russell, personal communication). However, it has been shown that the way people perceive animal sounds is influenced by the language they speak, so that although some terms show little variation across languages, others are rendered in the contrasting ways illustrated in Table 1. These examples are drawn from the list compiled by Derek Abbott and collaborators[6] (words originally in a language that uses a different alphabet are transliterated into the English alphabet).

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TABLE 1 ABOUT HERE

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**Table 1.** Examples of contrasting words for animal sounds in different languages

| Animal sound | Dutch | English | French | Greek | Hungarian | Japanese | Russian | Spanish | Swedish | Turkish |
|---|---|---|---|---|---|---|---|---|---|---|
| **bird (small)** | tjiep | cheep/chirp/ chirrup/peep | | tsiou tsiou | csip-csirip | pee pee/ pii pii | fiyt-fiyt | | pip-pip | jiyk jiyk |
| **cat purring** | prrr | purr | ronron | | doromb | goro goro | mrrr | rrr | | |
| **dog barking (medium dog)** | woef woef | woof woof/ ruff ruff | ouah ouah | gav gav | vau vau | wan wan | hav-hav/ gav-gav | guav | vov-vov/voff | hauv hauv |
| **horse neighing** | | neigh | | | | hi-hiin | i-go-go | | iihaha | |
| **pig grunting** | knor knor | oink | groin groin | | röf-röf (pron.: reuf-reuf) | boo boo | hrgu-hrgu | oink/oinc | nöff-nöff | |

In addition to the evidence of linguistic influence on human perception of animal sounds, the types of animals found in such a list are consistent with the prevalence of a relatively narrow range in human discourse – namely, those which feature most extensively in human experience (see Sealey and Charles 2013; Sealey and Pak 2018).

In order to identify patterns in references to animals in the corpus, we tagged every instance of an animal-naming term with a symbol, and for the present investigation I retrieved occurrences of the lemma HEAR that are found in proximity to

[5] https: //en.wikipedia.org/wiki/Onomatopoeia

[6] School of Electrical & Electronic Engineering, University of Adelaide, http: //www.eleceng.adelaide.edu.au/personal/dabbott/animal.html

these terms. These are grouped semantically, illustrating several aspects of the discourse. Table 2 contains examples of the way that qualities of animals' hearing capacities are routinely contrasted with those of humans, while the knowledge reported about those abilities, in science publications and in the more informal 'edutainment' of television broadcasts, is available to us only vicariously, via technological devices.

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TABLE 2 ABOUT HERE
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**Table 2.** Animals' hearing contrasted with that of humans[7]

| | |
|---|---|
| **we only HEAR part** of the call. [*capercaillie*] One component is so low-pitched **we can't HEAR** it at all | brdcst |
| the *sea-lions* also have superb **HEARING** | news |
| A *dog*'s **HEARING** frequency range is **between 47 and 44, 000Hz**, and they are very sensitive to **high frequencies** | jrnl |
| *cetaceans* predominantly perceive their world using sound and remarkable **HEARING** abilities; a distinction that makes **comparison with primates** difficult | jrnl |
| **you can't HEAR** it, **but** he [*dog*] can | intrvwD |

A similar set of examples illustrates the kinds of things that animals are reported as hearing; see Table 3.

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TABLE 3 ABOUT HERE
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**Table 3.** Targets of animals' hearing

| | | |
|---|---|---|
| The *tawny owl* has such good **HEARING**, it can pick up the **slightest rustle** and home in on its **target** | prey | brdcst |
| *Bat-eared foxes* can **HEAR grubs and termites** moving **nearly a foot below the ground** | prey | brdcst |
| Even while the **eggs** are still within the nest, their mother [*caiman crocodile*] can **HEAR them** [*hatchlings*] from **some way away** | young | brdcst |
| they [*huskies*] can **HEAR** an **avalanche** coming **critical seconds before their human companions** | danger | news |
| the *howler monkey* whose **territorial** calls reach **90dB** and can be **HEARD three miles away** | con-specifics, 'rivals' | news |

[7] The form of the lemma is in small capitals; animal-naming terms are in italics; quantitative and contrastive items are in bold; descriptive terms are underlined.
Key: brdcst = transcript of wildlife broadcast; jrnl = academic journal article; intrvwD = transcript of interview with keepers of dogs.

The sets of concordance lines in Tables 2 and 3 include both explicit and implicit comparisons between sounds made and heard by humans and other species (huskies hear an avalanche critical seconds *before* humans; capercaillie call is *so low-pitched we can't* hear it) and these abilities often evoke admiration. This illustrates the tendency for human beings to act as an implicit benchmark for what it means to 'hear'. And the sounds made by animals are also part of humans' aesthetic environment – see Table 4.

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TABLE 4 ABOUT HERE

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**Table 4.** Appreciative reports of animal sounds[8]

| | |
|---|---|
| The *robin. Blackbird. Song thrush*. That's always nice to **HEAR** | brdcst |
| What you'll **HEAR** is **a lot of echolocation clicks**, but then you'll **HEAR** something special | brdcst |
| I like to **HEAR** the **cry** of a *fox* at night, or the **hoot** of an *owl*. | Mass Obs |
| The **song** of the *humpback*, it's something really beautiful. The most beautiful **sound** you can **HEAR** in the sea | brdcst |

The final set of examples reveals the closest links between humans and what other animals are reported to hear, as human-produced sounds stimulate behaviour in the animal(s).

[8] Key: as before; MassObs = submissions to a Mass Observation Directive (see Sealey and Charles 2013).

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TABLE 5 ABOUT HERE
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**Table 5.** Animals' responses to sounds heard[9]

| | |
|---|---|
| because he [*dog*] could **HEAR the car**, his whining would grow in pitch | Mass Obs |
| they [*rabbits, guinea-pigs*] squeak and whistle cutely when they **HEAR you chopping vegetables** for them | news |
| he's [*dog*] the other side of the door waiting for us because he's **HEARD us get up** | intrvwD |
| as soon as they [*whales*] **HEAR** the **boat noise** or **HEAR splashing**, they're just going to be gone | brdcst |
| I remember going to fetch him [*cat*] and him miaowing as he **HEARD our voices** | Mass Obs |
| Harding et al. (2004) trained *rats* to press a lever for food reward on **HEARING a positive 2Hz tone** | jrnl |
| he [*dog*] knows because he **HEARS the dish** | intrvwD |
| They [*horses*] looked at the bowl or placed their muzzle in the bowl after **HEARING the "click"** | jrnl |
| whenever he [*dog*] **HEARS children** in any of the gardens out the back or playing he cries | intrvwD |

The data examples above are consistent with a perception of the animals featured as individual exemplars of their species, who exhibit a limited array of traits and capacities. These include hearing, which is discursively linked with navigation, locating food, avoiding danger (including humans and other predators), and communicating with (potential) mates, with their young and, in the case of pets, with their 'owners'.

## 7. Discussion and implications

These examples bring me back to my opening question, about the tension between, on the one hand, making the experience of 'the other' accessible by likening it to the familiar and, on the other, remaining faithful to its distinctiveness. As Cronin (2017, 79) puts it, the challenge is to respond to the need for "any post-anthropocentric ethics of translation to engage properly with difference."

The patterns illustrated in the empirical examples presented above are perhaps largely unremarkable. If so, I believe this may be attributable to a kind of 'triple hegemony'. The pervasive belief in human exceptionalism – the idea that human beings are both distinct from and superior to all other life forms – has taken different forms over the centuries (Thomas 1991), and critics point to its role in current crises facing the planet (loss of biodiversity, climate collapse etc.). Yet numerous human

[9] Note: Underlining indicates animals' actions.

practices predicated on the conviction that we as a species have 'dominion' over all other living things continue unchallenged. Such practices rely on various norms and assumptions being deeply embedded in discourse, as indeed they are, to the extent that their identification can amount to statements of the apparently obvious. This, indeed, is one way in which hegemony operates, as "a particular social structuring of semiotic difference [becomes] hegemonic, become[s] part of the legitimizing common sense which sustains relations of domination" (Fairclough 2001, 124).

Entwined with these assumptions is a second set of presuppositions, and these concern the role of semiosis itself in inter- and intra-species interactions. The words available to name, describe and interpret signs caused by vibrations are often inadequate, so that routine discursive formulations inevitably lead speakers and writers towards anthropocentrism, anthropomorphism, or both. My formulation 'signs caused by vibrations' is periphrastic, but necessarily so since the much more common term, 'sounds', along with 'hear', 'ears', etc., fail to include many other ways in which animals cause and respond to this range of 'signs'. Similarly, as Narins, Stoeger, and O'Connell-Rodwell (2016, 192) point out, even "the definition of infrasound is clearly anthropocentric," based as it is on the "nominal lower frequency limit of *human* hearing" (emphasis added). In other words, the (English) language itself, as a human construct, encodes the experience of 'hearing' in human terms. This may limit not only our means of representing the myriad sensory experiences of other species, but also the potential for understanding and empathy, for example with oceanic creatures whose lives are devastated by human-caused marine noise pollution (Simmonds et al. 2014).

And what of my choice of the word 'signs'? This too is a contested term, with researchers holding various positions on the extent of similarities between animal communication and human language, and on the appropriateness of linguistic terminology, including 'sign' as well as 'reference', 'meaning', 'interpretation', etc. (e.g., Rendall, Owren, and Ryan 2009; Scott-Phillips 2010; Font and Carazo 2010). Particularly in some scientific writing, such a stigma is attached to anthropomorphism that descriptions of animal behaviour are often required to be restricted to "the physical, the visible, the objective" (Carbone 2004, 209; Sealey and Oakley 2013). Therefore, communication among animals may be reported in quasi-mechanistic terms, allowing for the involvement of 'senders', 'receivers' and 'signals', and perhaps 'negative emotional arousal', but not for less directly observable processes such as 'thinking', much less those that imply complex, interactional experiences such as 'grief', 'jealousy' (Tudge 2013) – or indeed other ways of being-in-the-world of which we humans may be unaware.

The third taken-for-granted set of assumptions that restricts the options for reporting animals' experiences is the way animals' modes of hearing are represented as 'adaptations', in the Darwinian sense of having evolved to contribute to their survival and reproduction. Again, this seems an unexceptionable position, but it is framed within a discourse which, while superficially neutral as to ethics and values, is profoundly political. It is the discourse of the 'selfishness' of the gene (Dawkins

[1976] 2006), of competition between discrete individuals, where "communication is the result of a coevolutionary arms race between senders playing the role of manipulators and receivers playing the role of mind readers" (Font and Carazo 2010, e3, summarising Dawkins 1984). This remains an influential paradigm, despite challenges from philosophers (e.g., Midgley 1979), ethologists (e.g., Bekoff and Pierce 2010) and some science writers, including Colin Tudge (2013, online, no page), who maintains that "the essence of life is cooperation. Life is not a punch-up. It is a dialogue – and a constructive dialogue at that."

## 8. Conclusion

The metaphor of life as 'constructive dialogue' is consistent with ideas developed in biosemiotics, which conceptualises "meaning-making as a general phenomenon in the communication processes at all levels of life" (Marais and Kull 2016, 171), and which extends the concept of 'translation' to mean "that some signs in one umwelt are put into a correspondence with some signs in another umwelt" (Kull and Torop 2011, 414). As noted in section 2 above, relations of power infuse processes of translation, and this applies not only to the ways in which different social groups are represented, but to the representation of non-humans too. There is growing recognition of the political implications of insights from biosemiotics (see, for example Cannizzaro and Cobley 2015), while in translation studies, Cronin (2017, 71) proposes the term 'tradosphere' to denote "the sum of all translation systems on the planet," taking into account communication between all kinds of organism, and entailing "not anthropomorphic projection but communication across and in the full knowledge of radical difference."

I see here a potential convergence between the skills, experience and awareness of contributors to biosemiotics, translation studies and human-animal studies. My brief empirical investigations of HEAR in a corpus of general English and a more specialized corpus of discourse about animals illustrate the limitations of current metasemiotic resources. Perhaps dialogue between biosemiotics, translation studies and human-animal studies could be the start of developing new ways of hearing and being heard.

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**References**


Ackerman, Jennifer. 2016. *The Genius of Birds*. Kindle edition. London: Corsair.

Adams, Carol J. 1990. *The Sexual Politics of Meat*. New York: Continuum.

Ahuja, Neel. 2009. "Postcolonial Critique in a Multispecies World." *PMLA* 124 (2): 556-563.

Appiah, Kwame Anthony. (1993) 2000. "Thick Translation." In *The Translation Studies Reader*, edited by Lawrence Venuti, 417-429. London: Routledge.

Au, Whitlow W. L. 2004. "A Comparison of the Sonar Capabilities of Bats and Dolphins." In *Echolocation in Bats and Dolphins*, edited by Jeanette A. Thomas, Cynthia F. Moss, and Marianne Vater, xiii-xxvii. Chicago, IL: University of Chicago Press.

Bekoff, Marc, and Jessica Pierce. 2010. *Wild Justice: The Moral Lives of Animals*. Chicago, IL: University of Chicago Press.

Bourke, Joanna. 2011. *What It Means to Be Human: Reflections from 1791 to the Present*. Berkeley, CA: Counterpoint Press.

Brier, Søren. 2008. "The Paradigm of Peircean Biosemiotics." *Signs – International Journal of Semiotics* 2: 30-81.

Cannizzaro, Sara, and Paul Cobley. 2015. "Biosemiotics, Politics and Th. A. Sebeok's Move from Linguistics to Semiotics." In *Biosemiotic Perspectives on Language and Linguistics*, edited by Ekaterina Velmezova, Kalevi Kull, and Stephen J. Cowley, 207-222. Heidelberg: Springer.

Carbone, Larry. 2004. *What Animals Want: Expertise and Advocacy in Laboratory Animal Welfare Policy*. Oxford: Oxford University Press.

Catchpole, Clive K, and Peter J. B. Slater. 2003. *Bird Song: Biological Themes and Variations*. Cambridge: Cambridge University Press.

Cronin, Michael. 2017. *Eco-translation: Translation and Ecology in the Age of the Anthropocene*. London: Routledge.

Dawkins, Richard (1984). "Animal Signals: Mind-Reading and Manipulation." In *Behavioural Ecology: An Evolutionary Approach*, edited by John R. Krebs and Nicholas B. Davies, 380 - 402. Oxford: Blackwell.

Dawkins, Richard. (1976) 2006. *The Selfish Gene*. 30th anniversary edition. Oxford: Oxford University Press.

de Waal, Frans. 2012. "Addendum to Down with Dualism! Two Millennia of Debate about Human Goodness (2010)." In *Species Matters: Humane Advocacy and Cultural Theory*, edited by Marianne DeKoven and Michael Lundblad, 190-194. New York: Columbia University Press.

Derrida, Jacques. 2003. "And Say the Animal Responded." In *Zoontologies: The Question of the Animal*, edited by Cary Wolfe, 121–145. Minneapolis, MN: University of Minnesota Press.

Dervin, Fred. 2013. “Politics of Identification in the Use of Lingua Francas in Student Mobility to Finland and France.” In *Social and Cultural Aspects of Language Learning in Study Abroad*, edited by Celeste Kinginger, 101-125. Amsterdam: John Benjamins.

Dupré, John. 2012. *Processes of Life*. Oxford: Oxford University Press.

Enfield, Nick J. 2000. “On Linguocentrism.” In *Explorations in Linguistic Relativity*, edited by Martin Pütz and Marjolyn Verspoor, 125-158. Amsterdam: John Benjamins.

Fairclough, Norman. 2001. “Critical Discourse Analysis as a Method in Social Scientific Research.” In *Methods of Critical Discourse Analysis*, edited by Ruth Wodak and Michael Meyer, 121-138. London: Sage.

Favareau, Donald. 2010. “Preface.” In *Essential Readings in Biosemiotics: Anthology and Commentary*, edited by Donald Favareau, i-xii. Dordrecht: Springer.

Fay, Richard R., and Arthur N. Popper, eds. 2012. *Comparative Hearing: Mammals.* Springer Handbook of Auditory Research 4. New York: Springer.

Fay, Richard R. 2012. *Comparative Hearing: Mammals*. Vol. 4: Springer Science & Business Media.

Fay, Richard R., and Arthur N. Popper. 2000. “Evolution of Hearing in Vertebrates: The Inner Ears and Processing.” *Hearing Research* 149 (1): 1-10.

Font, Enrique, and Pau Carazo. 2010. “Animals in Translation: Why There Is Meaning (But Probably No Message) in Animal Communication.” *Animal Behaviour* 80 (2): e1-e6.

Gal, Susan. 2015. “ Politics of Translation.” *Annual Review of Anthropology* 44 (1): 225-240.

Gerhardt, H. Carl, and Franz Huber. 2002. *Acoustic Communication in Insects and Anurans: Common Problems and Diverse Solutions*. Chicago, IL: University of Chicago Press.

Gibson, Jeremy S., and James F.C. Windmill. 2017. “Engineering Novel Hearing Systems Inspired by Nature.” *The 10th Anniversary Meeting of the British Animal Studies Network: ‘Hearing’* (University of Strathclyde, Glasgow, 19-20 May 2017).

Goatly, Andrew. 2006. “Humans, Animals, and Metaphors.” *Society and Animals* 14 (1): 15-37.

Gorlée, Dinda L. 1994. *Semiotics and the Problem of Translation: with Special Reference to the Semiotics of Charles S. Peirce*. Amsterdam: Rodopi.

Gorlée, Dinda L. 2004. *On Translating Signs: Exploring Text and Semio-Translation*. Amsterdam: Rodopi.

Grandin, Temple, and Catherine Johnson. 2009. *Animals in Translation: Using the Mysteries of Autism to Decode Animal Behavior*: SUNY Press.

Hanks, Patrick 2004. "Corpus pattern analysis." In *Euralex Conference Proceedings*, edited by Geoffrey Williams, 87-98. Lorient, France: Université de Bretagne-Sud, Faculté des lettres et des sciences humaines.

Heffner, Henry E., and Rickye S. Heffner. 2007. “Hearing Ranges of Laboratory Animals.” *Journal of the American Association for Laboratory Animal Science* 46 (1): 20-22.

Hird, Myra J. 2009. *The Origins of Sociable Life: Evolution after Science Studies*. New York: Palgrave Macmillan.

Hoffmeyer, Jesper. 2010. “A Biosemiotic Approach to the Question of Meaning.” *Zygon: Journal of Religion and Science* 45 (2): 367-390.

Hoy, Ronald R. 2012. “Acute as a Bug’s Ear: An Informal Discussion of Hearing in Insects.” In *Comparative Hearing: Insects*, edited by Ronald R. Hoy and Richard R. Fay, 1-17. New York: Springer.

Jakobson, Roman. (1959) 2000. “On Linguistic Aspects of Translation.” In *The Translation Studies Reader*, edited by Lawrence Venuti, 113-118. London: Routledge.

Kershenbaum, Arik, Daniel T. Blumstein, Marie A. Roch, Çağlar Akçay, Gregory Backus, Mark A. Bee, Kirsten Bohn, Yan Cao, Gerald Carter, and Cristiane Cäsar. 2014. “Acoustic Sequences in Non□human Animals: A Tutorial Review and Prospectus.” *Biological Reviews* 91 (1): 13-52.

Ketten, Darlene R. 1992. “The Marine Mammal Ear: Specializations for Aquatic Audition and Echolocation.” In *The Evolutionary Biology of Hearing*, edited by Douglas B. Webster, Arthur N. Popper and Richard R. Fay, 717-750. New York: Springer.

Ketten, Darlene R. 2000. “Cetacean Ears.” In *Hearing by Whales and Dolphins*, edited by Whitlow W. L. Au, Richard R. Fay, and Arthur N. Popper, 43-108. New York: Springer.

Kohn, Eduardo. 2013. *How Forests Think: Toward an Anthropology beyond the Human.* Berkeley, CA: University of California Press.

Kull, Kalevi. 1998. “Semiotic Ecology: Different Natures in the Semiosphere.” *Sign Systems Studies* (1): 344-371.

Kull, Kalevi, Claus Emmeche, and Jesper Hoffmeyer. 2011. “Why Biosemiotics? An Introduction to Our View on the Biology of Life Itself.” In *Towards a Semiotic Biology: Life is the Action of Signs*, edited by Claus Emmeche and Kalevi Kull, 1-22. London: Imperial College Press.

Kull, Kalevi, and Peeter Torop. 2011. “Biotranslation: Translation between Umwelten.” In *Readings in Zoosemiotics*, edited by Timo Maran, Dario Martinelli, and Aleksei Turovski, 411- 425. Berlin: Walter de Gruyter.

Lacassain-Lagoin, Christelle. 2011. “Le verbe *hear* et ses différentes constructions: intégration et résonance du discours de l’autre.” In *Formes allogènes dans le discours: imbrication et résonance* (Rives – Cahiers de l’Arc Atlantique 6), edited by Fabienne Gaspari and Catherine Mari, 59-82. Paris: L’Harmattan.

Lacassain-Lagoin, Christelle. 2015. “De la perception auditive à la cognition.” *L’Information grammaticale* 146: 19-26.

Leech, Geoffrey, Paul Rayson, and Andrew Wilson. 2001. *Word Frequencies in Written and Spoken English, Based on the British National Corpus*. London: Longman.

López, Ana María Rojo, and Javier Valenzuela. 2004. "Verbs of Sensory Perception: An English-Spanish Comparison." *Languages in Contrast* 5 (2): 219-243.

Lundblad, Michael. 2012. "Archaeology of a Humane Society: Animality, Savagery, Blackness." In *Species Matters: Humane Advocacy and Cultural Theory*, edited by Marianne DeKoven and Michael Lundblad, 75-102. New York: Columbia University Press.

Manoussaki, Daphne, Richard S. Chadwick, Darlene R. Ketten, Julie Arruda, Emilios K. Dimitriadis, and Jen T. O'Malley. 2008. "The Influence of Cochlear Shape on Low-Frequency Hearing." *Proceedings of the National Academy of Sciences* 105 (16): 6162-6166.

Marais, Kobus, and Kalevi Kull. 2016. "Biosemiotics and Translation Studies." In *Border Crossings. Translation Studies and Other Disciplines*, edited by Yves Gambier and Luc van Doorslaer, 169-188. Amsterdam: John Benjamins.

Maran, Timo. 2007. "Towards an Integrated Methodology of Ecosemiotics: The Concept of Nature-Text." *Sign Systems Studies* 35 (1/2): 269-294.

Maran, Timo, and Kalevi Kull. 2014. "Ecosemiotics: Main Principles and Current Developments." *Geografiska Annaler: Series B, Human Geography* 96 (1): 41-50.

Merrell, Floyd. 2001. "Charles Sanders Peirce's Concept of the Sign." In *The Routledge Companion to Semiotics and Linguistics*, edited by Paul Cobley, 28-39. London: Routledge.

Merrell, Floyd. 2003. *Sensing Corporeally: Toward a Posthuman Understanding*. Toronto: University of Toronto Press.

Midgley, Mary. 1979. "Gene-Juggling." *Philosophy of Science* 54 (210): 439-458.

Mooney, Richard. 2014. "Translating Birdsong Research." *Birdsong: Rhythm and Clues from Neurons to Behavior* (Georgetown University, Washington DC, 14-15 November 2014).

Narins, Peter M., Angela S. Stoeger, and Caitlin O'Connell-Rodwell. 2016. "Infrasonic and Seismic Communication in the Vertebrates with Special Emphasis on the Afrotheria: An Update and Future Directions." In *Vertebrate Sound Production and Acoustic Communication*, edited by Roderick A. Suthers, W. Tecumseh Fitch, Richard R. Fay, and Arthur N. Popper, 191-227. Cham: Springer.

Nöth, Winfried. 1998. "Ecosemiotics." *Sign Systems Studies* 26: 332-343.

Nöth, Winfried. 2001. "Ecosemiotics and the Semiotics of Nature." *Sign Systems Studies* 29 (1): 71-81.

Nöth, Winfried. 2012. "Translation and Semiotic Mediation." *Sign Systems Studies* 40 (3/4): 279-298.

O'Connell-Rodwell, Caitlin E. 2007. "Keeping an 'Ear' to the Ground: Seismic Communication in Elephants." *Physiology* 22 (4): 287-294.

Peirce, Charles Sanders. c. 1897. In *Collected Papers of C. S. Peirce 1931-1958*, edited by Charles Hartshorne, Paul Weiss, and Arthur W. Burks. Cambridge, MA: Harvard University Press.

Pepperberg, Irene M. 2007. "Grey Parrots Do Not Always 'Parrot': The Roles of Imitation and Phonological Awareness in the Creation of New Labels from Existing Vocalizations." *Language Sciences* 29 (1): 1-13.

Pepperberg, Irene M. 2010. "Vocal Learning in Grey Parrots: A Brief Review of Perception, Production, and Cross-species Comparisons." *Brain and Language* 115 (1): 81-91.

Popper, Arthur N., Richard R. Fay, Christopher Platt, and Olav Sand. 2003. "Sound Detection Mechanisms and Capabilities of Teleost Fishes." In *Sensory Processing in Aquatic Environments*, edited by Shaun P. Collin and N. Justin Marshall, 3-38. New York: Springer.

Queiroz, João, and Daniella Aguiar. 2015. "C.S. Peirce and Intersemiotic Translation." In *International Handbook of Semiotics*, edited by P. P. Trifonas, 201-215. Berlin: Springer.

Ragge, David R. and W.J. Reynolds. 1988. "The Songs and Taxonomy of the Grasshoppers of the *Chorthippus Biguttulus* Group in the Iberian Peninsula (Orthoptera: Acrididae)." *Journal of Natural History* 22 (4): 897-929.

Rendall, Drew, Michael J. Owren, and Michael J. Ryan. 2009. "What Do Animal Signals Mean?" *Animal Behaviour* 78 (2): 233–240.

Roy, Arundhati. 2004. "Peace and the New Corporate Liberation Theology." The 2004 Sydney Peace Prize Lecture. http://sydney.edu.au/news/84.html?newsstoryid=279

Savage-Rumbaugh, E. Sue. 1986. *Ape Language: From Conditioned Response to Symbol*. New York: Columbia University Press.

Scott-Phillips, Thomas C. 2010. "Animal Communication: Insights from Linguistic Pragmatics." *Animal Behaviour* 79 (1): e1-e4.

Sealey, Alison, and Nickie Charles. 2013. "'What Do Animals Mean to You?': Naming and Relating to Nonhuman Animals." *Anthrozoös* 26 (4): 485-503.

Sealey, Alison, and Lee Oakley. 2013. "Anthropomorphic Grammar? Some Linguistic Patterns in the Wildlife Documentary Series *Life*." *Text & Talk* 33 (3): 399–420.

Sealey, Alison, and Chris Pak. 2018. "First Catch Your Corpus: Methodological Challenges in Constructing a Thematic Corpus." *Corpora* 13 (2): 229-254.

Sebeok, Thomas A. 1968. "Zoosemiotics." *American Speech* 43 (2): 142-144.

Segerdahl, Par, William Fields, and Sue Savage-Rumbaugh. 2005. *Kanzi's Primal Language*. Basingstoke: Palgrave Macmillan.

Simmonds, Mark P., Sarah J. Dolman, Michael Jasny, E. C. M. Parsons, Lindy Weilgart, Andrew J. Wright, and Russell Leaper. 2014. "Marine Noise Pollution – Increasing Recognition But Need for More Practical Action." *Journal of Ocean Technology* 9 (1): 71-90.

Stecconi, Ubaldo. 2007. “Five Reasons Why Semiotics is Good for Translation Studies.” In *Doubts and Directions in Translation Studies*, edited by Yves Gambier, Miriam Shlesinger, and Radegundis Stolze, 15-26. Amsterdam: John Benjamins.

Stibbe, Arran. 2012. *Animals Erased: Discourse, Ecology, and Reconnection with the Natural World*. Middletown, CT: Wesleyan University Press.

Taylor, Anna Magdalena, Victoria Frances Ratcliffe, Karen McComb, and David Reby. 2014. “Auditory Communication in Domestic Dogs: Vocal Signalling in the Extended Social Environment of a Companion Animal.” In *The Social Dog*, edited by Juliane Kaminski and Sarah Marshall-Pescini, 131-163. Amsterdam: Elsevier.

Taylor, Sunaura 2017. *Beasts of Burden: Animal and Disability Liberation.* New York: The New Press.

Temple, Bogusia, and Alys Young. 2004. “Qualitative Research and Translation Dilemmas.” *Qualitative Research* 4 (2): 161-178.

Tharakeshwar, V. B. 2009. “Translating Tragedy into Kannada.” In *Decentering Translation Studies: India and Beyond*, edited by Judy Wakabayashi and Rita Kothari, 57-74. Amsterdam: John Benjamins.

Thomas, Keith. 1991. *Man and the Natural World: Changing Attitudes in England 1500-1800.* London: Penguin.

Tomlinson, Gary. 2015. *A Million Years of Music: The Emergence of Human Modernity.* New York: Zone Books.

Tudge, Colin. 2013. *Why Genes Are Not Selfish and People Are Nice: A Challenge to the Dangerous Ideas That Dominate Our Lives.* Edinburgh: Floris Books.

Tymoczko, Maria. 2000. “Translation and Political Engagement: Activism, Social Change and the Role of Translation in Geopolitical Shifts.” *The Translator* 6 (1): 23-47.

Tymoczko, Maria. 2014. “Western Metaphorical Discourses Implicit in Translation Studies.” In *Thinking Through Translation with Metaphors*, 115-166. London: Routledge.

Venuti, Lawrence. 2000. “Translation, Community, Utopia.” In *The Translation Studies Reader*, edited by Lawrence Venuti, 468-488. London: Routledge.

Viberg, Åke. 1983. “The Verbs of Perception: A Typological Study.” *Linguistics* 21 (1): 123-162.

von Uexküll, Jakob. 1982. “The Theory of Meaning.” *Semiotica* 42 (1): 25-79.

Waters, Dean A. 2003. “Bats and Moths: What Is There Left to Learn?” *Physiological Entomology* 28 (4): 237-250.

Webster, John. 2017. “Hearing and Listening, Survival and Satisfaction in Sentient Animals.” *The 10th Anniversary Meeting of the British Animal Studies Network: ‘Hearing’* (University of Strathclyde, Glasgow, 19-20 May 2017).

Weil, Kari. 2006. “Killing Them Softly: Animal Death, Linguistic Disability, and the Struggle for Ethics.” *Configurations* 14 (1): 87-96.

Whitehouse, Marianne, and Carolyn Colvin. 2001. "'Reading' Families: Deficit Discourse and Family Literacy." *Theory into Practice* 40 (3): 212-219.
Whitt, Richard J. 2009. "Auditory Evidentiality in English and German: The Case of Perception Verbs." *Lingua* 119 (7): 1083-1095.
Wolfe, Cary. 2003. "Introduction." In *Zoontologies: The Question of the Animal*, edited by Cary Wolfe, ix-xxiii. Minneapolis, MN: University of Minnesota Press.
Wolfe, Cary. 2009. "Human, All Too Human: 'Animal Studies' and the Humanities." *PMLA* 124 (2): 564-575.
Zelick, Randy, David A. Mann, and Arthur N. Popper. 1999. "Acoustic Communication in Fishes and Frogs." In *Comparative Hearing: Fish and Amphibians*, edited by Richard R. Fay and Arthur N. Popper, 363-411. New York: Springer.

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