

Justifying Moral Standing by Biosemiotic Particularism*

Jonathan Beever, University of Central Florida
Morten Tønnessen, University of Stavanger

Summary. In this essay we examine a fundamental question in biosemiotic ethics: why think that semiosis is a morally relevant property, or a property that supports the moral value of living beings or systems that possess it? We argue that biosemiotic particularism, the view that normative assessment should be based on the particular fulfillment of an organism's or other biological entity's specific semiotic capacity, offers a justifiable normative position for the biosemiotic ethicist. If what justifies offering moral standing to all living beings and systems is that these entities are semiotic, then there must be something ethically motivating about semiosis. We examine several arguments in answer to this question. These include arguments for semiotic agency, the claim that all living entities are agential as a result of their semiotic capacities; arguments for subjective or quasi-subjective experience, that all living beings have it and that it matters morally; and arguments for the moral relevance of meaning-making as sufficient for moral considerability. We also address the negative argument that semiosis is at least as defensible as sentience, an alternative candidate capacity for grounding moral relevance, and other cognition-related capacities. Finally, we push further to ask: even if semiosis is a morally relevant capacity of living organisms, is it the morally relevant property? That is, is semiosis the least common denominator for attribution of moral worth, to the effect that sentience-based approaches, among others, could build on biosemiotic ethics as a foundational meta-ethical theory?

Zusammenfassung. In diesem Essay untersuchen wir eine fundamentale Frage der Biosemiotik: Warum sollte Semiose eine moralisch relevante Fähigkeit sein, oder eine Fähigkeit, die den moralischen Wert lebender Wesen oder Systeme, die über sie verfügen, steigert? Wir argumentieren, dass biosemiotischer Partikularismus, also die Ansicht, dass normative Bewertung auf der jeweiligen Erfüllung der semiotischen Kapazität eines Organismus oder einer anderen biologischen Entität fußen sollte, eine gerechtfertigte normative Position für den biosemiotischen Ethiker bereithält. Wenn das, was es rechtfertigt, allen lebenden Wesen und Systemen moralischen Stellenwert beizumessen, ihr semiotischer Charakter ist, dann muss Semiose etwas ethisch Motivierendes beinhalten. Wir untersu-

chen verschiedene Argumente, um diese Frage zu beantworten: Argumente für semiotische Handlungsfähigkeit, also die Behauptung, dass alle lebenden Entitäten als Ergebnis ihrer semiotischen Kapazitäten Handlungsträger sind; Argumente dafür, dass alle lebenden Wesen subjektive oder quasi-subjektive Erfahrungen haben und dass sie moralisch relevant sind; und Argumente dafür, dass die Erzeugung von Bedeutung moralische Relevanz hat und ausreicht, um moralische Bedeutsamkeit zu begründen. Wir gehen auch auf das Negativargument ein, dass Semiose mindestens so vertretbar ist wie das Empfindungsvermögen, das eine alternative Kapazität zur Begründung moralischer Relevanz darstellt, wie auch andere wahrnehmungsverwandte Kapazitäten. Schließlich fragen wir noch weiter: Selbst wenn Semiose eine moralisch relevante Fähigkeit lebender Organismen darstellt, ist sie die moralisch relevante Fähigkeit? Das heißt, ist Semiose der kleinste gemeinsame Nenner für die Zuschreibung moralischen Werts, mit dem Ergebnis, dass empfindungsbasierte Konzepte, unter anderen, auf biosemiotischer Ethik als einer begründenden meta-ethischen Theorie aufbauen könnten?

1. Introduction

There is no singular biosemiotic thesis. In its relatively short existence dating to only the end of the 20th century the contemporary research area of biosemiotics has become defined by a cluster of concepts and theses related to signification and sign relations. Yet central to this cluster is at least one fundamental belief; namely, that all living systems are semiotic; that is, all living systems contribute meaningfully to dynamic systems of signification within their environments. This fundamental belief is regularly voiced in a stronger form; specifically, that all and only living systems are semiotic. From this fundamental belief, some biosemioticians have taken an ethical turn, arguing that biosemiotics can ground moral concern. Biosemiotic ethicists interested in a capacities-based account of moral standing draw on this fundamental belief and a related cluster of concepts toward that end. They argue that the biosemiotic belief supports the claim that signification is sufficient for moral standing.

In this essay, we return to fundamental questions in biosemiotic ethics, demarcating arguments about justification, exclusivity, and scope related to the concepts and claims of the approach. We argue that *biosemiotic particularism*, the view that normative assessment should be based on the particular fulfillment of an organism's or other biological entity's specific semiotic capacity, offers a logically and ethically justifiable normative position for the biosemiotic ethicist that can resolve much of the conceptual tension related to those fundamental questions and offer a vantage point from which to apply biosemiotic ethics to real-world value conflicts.

We first offer evidence of that key claim (of biosemiotics and biosemiotics ethics) and articulate its importance in the complex and dynamic landscape of human, animal, and environmental ethics. We then offer an outline of the various justificatory strategies employed in support of that key

claim, and analyze the extent to which those strategies can support the weaker or stronger version of the claim of biosemiotics. If what justifies offering moral standing to all living beings and systems is that these entities are semiotic, then there must be something ethically motivating about semiosis. We examine several arguments in answer to this question. These include arguments for semiotic agency, the claim that all living entities are agential as a result of their semiotic capacities; arguments for subjective or quasi-subjective experience, that all living beings have it and that it matters morally; and arguments for the moral relevance of meaning-making as sufficient for moral considerability. We also address the negative argument that semiosis is at least as defensible as sentience, a strong and widely accepted alternative candidate capacity for grounding moral relevance.

In the next section of this essay, we turn to questions about exclusivity of semiosis as a morally relevant capacity: even if semiosis is a morally relevant capacity of living organisms, is it the morally relevant property? That is, is semiosis the least common denominator for attribution of moral worth, such that sentience-based approaches, among others, could build on biosemiotic ethics as a foundational meta-ethical theory? We compare semiosis to other capacities conceived of as morally relevant, including cognition and sentience. We then ask to what scope does the best-justified form of biosemiotic ethics apply? Does the appropriate scope entail that all life, or all and only life is morally relevant? The weaker claim, that all living organisms and systems are morally relevant, is still a bold one, extending moral concern for individuals and living systems well beyond traditional scopes of higher-order mammals or even sentient life. The stronger claim is radically ambitious, not only offering moral standing to all living systems, but also denying moral standing to anything other than those systems.

In the final section of this essay we offer three illustrative examples of how biosemiotic ethics can help resolve value conflicts. Through a biosemiotic framework, we examine the moral status of a human fetus, animal welfare, and conservation ethics and wildlife management. We assert that biosemiotic ethics offers a richer and more dynamic normative evaluative framework than its peer normative theories, and conclude that, despite potential concerns about scope, justification, and exclusivity (from which no useful theory is wholly absolved), biosemiotic particularism has great potential to help us understand and value ecological relations and the value of the living beings that constitute those relations.

1.1 From Biosemiotics to Biosemiotic Particularism

Central to the cluster of concepts and theses that make up contemporary biosemiotics is one fundamental belief: all living systems are semiotic. Whether one takes a historical medievalist perspective following John Deely (2001), a biological natural science approach following Jesper Hoffmeyer (1996) and Kalevi Kull (2009), a cybernetic view following Søren Brier (2005),

or an anti-humanist view following Paul Copley (2016), this fundamental belief holds true. Each position within biosemiotics can possibly be taken to have its own ethical implications, as evidenced by the proponents of each approach (see Deely 2008; Hoffmeyer 1995; Brier 2013; Copley 2016). For instance, Deely has emphasized making a distinction between moral patients (those with moral standing) and moral agents (those capable of moral evaluation). His view of *semioethics* entails that the conversation about biosemiotic ethics shifts from moral rights to moral responsibilities: that what matters, ethically, is ethical obligations. Semioethics is the importantly unique domain of the human animal. “Human animals not only are unique in having responsibilities, but also in the extent of those responsibilities: for we have learned through and on the basis of semiosis become “metasemiosis” or semiotics that our interactions involve us in the whole of Gaia, not just in the human socio-cultural sphere” (Deely in this volume: 21). The semioethical focus on moral responsibility, while important, overlooks the question of to whom one is morally responsible. These discussions are complementary and demand to continue to develop in parallel.

The differences between various positions within biosemiotic ethics hinge on three main assumptions: what justification biosemiotics can offer for claims about the nature of moral standing, whether semiosis is one of or the exclusive morally relevant capacity of individuals or living systems, and how far the scope of moral standing extends out into the world. In working out the differences among positions, we argue that biosemiotic particularism offers the strongest justification for a biosemiotic ethic. It also, we argue, supports claims about exclusivity and scope that are both internally consistent and consistent with other commonly held or intuitive normative commitments.

Biosemiotic particularism, as we have argued elsewhere (Tønnessen and Beever 2015), suggests that normative evaluation is not analogical or hierarchical but, rather, to be based on the organism’s fulfillment of their needs, which are generally related to their semiotic capacity.

Particularism, on our view, claims that normative assessment should be based on a living being’s own merit, or its particular fulfillment of its semiotic capacity (again, a morally relevant capacity of which sentience is a particular case). Such capacity-fulfillment varies so much that it neither makes sense to value all living beings evenly nor to rank them hierarchically. Proper treatment of different living beings has to be case-specific and take species-specific and other needs into consideration. Facilitating the fulfillment of the needs of the living to the greatest extent possible is a core normative component of ethics (Tønnessen and Beever 2015: 53).

Biosemiotic particularism is not to be confused with the strict versions of moral particularism, a term originally coined by R.M. Hare (1963). Generally, moral particularism is the metaethical view that correct moral judgments can only be about particular cases (Hooker and Little 2000). In its more stringent forms, it denies that there is any normative principle or prin-

principles that is superior to others, except in the context of particular cases (see Dancy 2004). Biosemiotic particularism adheres to the general claim, but denies the latter: while normative evaluation must be about particular cases, the same normative principle (namely, that semiosis is the fundamental morally relevant capacity; cf. section 2) applies to all cases.

1.2 Biosemiotic Particularism in Terms of Ethology

Peter Singer and other proponents of the moral standing of animals have often been accused of compromising the moral standing of marginal cases of humans with regard to cognitive capacities. In contrast with Singer's utilitarian approach based on the capacity of sentience, Alice Crary (2016) argues that "human beings with intellectual disabilities have undiminished claims to respect and attention" because "the sheer fact of being human is morally salient" (Crary 2016: 5). Moreover, she claims that "merely being an animal of some kind" also matters enough to make this in itself morally salient, and that in consequence "all human beings and all animals are inside ethics" (Crary 2016: 121). "A good case can be made", Crary writes (2016: 134), "for affirming, with moral individualists' detractors, that merely being human or merely being an animal of some kind (i.e., apart from the possession of any particular individual characteristics) is morally important." It is noteworthy that Crary supports her claims with the view that "we need to see human beings and animals in the light of conceptions of what matters in their lives" (Crary 2016: 134). Specifically, she claims that "grasping a human or non-human creature's expressions is impossible apart from reference to a conception of what is important in the life of creatures of its kind" (Crary 2016: 68).

This resonates well with our perspective of biosemiotic particularism. In Crary's perspective, "humans with significant intellectual disabilities" are "morally speaking, full-fledged human beings" (Crary 2016: 136), because the measure of what is good for them is what is important in the lives of human beings. In a somewhat similar manner, the measure of what is good for animals in captivity (be it in agriculture, zoos, or animal companionship) can be marked as what matters in the lives of its fellow specimen, generally speaking. In the case of captive animals, it is reasonable to state that the variation of natural, species-specific or species-typical behaviour in wild specimens is a relevant measure (at least to the extent that the captive animals have retained that behaviour, or the inclination for it).

This view is consistent with the category of being a member of cognitively sophisticated species as ground of moral status as presented in Jaworska and Tannenbaum (2013). And the same view is likewise consistent with membership in a species with merely rudimentary cognitive capacities; and, further, in a species with semiotic capacities. Furthermore, besides being consistent with a contemporary understanding of grounds of moral status, this view also has specific implications of practical use. Name-

ly, if what matters in a typical, representative or species-specific (or population-specific) life is the measure of a good life for all individuals belonging to e.g. a species, then the quality of life of any given individual of that species, from a moral point of view, can be assessed in considerable detail. Here we see how fruitful biosemiotic ethics, with its links to empirical, ethological studies, can be in an applied setting.

Of course, this ethological perspective evidences the same tension as biosemiotic particularism; namely, the tension between the moral worth of the individual based on its species-membership, and the moral worth of the individual based on its unique world of experience. Before addressing this ethical tension, we first address why semiosis might be considered morally relevant in the first place.

2. Justification

In this section we address the question of justification for claims about the moral relevance of semiosis. We articulate several strategies that have been used to establish that biosemiosis can ground moral standing. We will soon discuss what exact aspect of biosemiosis is taken to ground moral status – subjective experience, semiotic agency, or meaning-making. We start out, however, by arguing the claim that biosemiosis is the underlying ground of all cognition-related grounds of moral status. This claim is related to a biosemiotic view of cognition/consciousness and its relation to biosemiosis, which we will treat in section 3.1. If it is true, as we will argue, that all cognition is semiosis, and that biosemiosis is the broader ground of all cognition, then it also follows, within a cognition-related approach in ethics, to hold that biosemiosis is the underlying ground of all possible grounds of moral status.

2.1 *What Exact Aspect of Biosemiosis Grounds Moral Status?*

Our first candidate is subjective experience, which is intuitively held to be intrinsically related to having moral standing. The disagreements often center on deciding what exact kind of beings have proper subjective experience. In this context, biosemiotics tends to suggest that all living beings have subjective or at least quasi-subjective experience. Strictly speaking, however, subjective experience refers only to one side of the perception-and-action cycle that is fundamental to all living beings capable of perceiving their surroundings. In Uexküllian (see e.g. Uexküll 1957, 1982) and Gibsonian thinking, it is essential to realize that perception and action is interrelated. It is in their *a c t i o n s* that living beings are shown to be *a c t o r s*, i.e. agents in charge, as it were, of their own lives. An emphasis on subjective experience is consistent with ethical approaches based on the capacity of sentience, which are likewise essentially focused on aspects

of subjective experience – but does not go beyond them. Only by relating to semiotic agency or meaning-making – the active, agent-driven aspects of living beings' perception-and-action cycles – can biosemiotic ethics go beyond sentience-based approaches in ethics not only concerning the scope of subjective experience, but also in terms of its understanding of the plasticity of subjective experience as linked with action. A strictly experience-focused ethical approach risks reducing living beings to merely passive entities in a world of wrongdoers and good-doers. More suitable for biosemiotic ethics is an understanding of experience that underlines the active nature of experience, which can only come to light by emphasizing the interrelatedness of action and perception.

Our second candidate is semiotic agency. As described in Tønnessen (2015),

There is no consensus in the biosemiotic community on whether or not agency is co-extensive with the living realm. While practically all biosemioticians appear to think that living organisms and/or systems are agents and thus endowed with agency, the dividing issue is whether or not there are agents beyond living agents. [...] While there is no consensus on the terms 'agent' and 'agency', most biosemioticians appear to agree that core attributes of an agent include goal-directedness, self-governed activity, processing of semiosis and choice of action, with these features being vital for the functioning of the living system in question (Tønnessen 2015: 139–140).

These four features can be taken to be constitutive of biosemiotic agents. Now, does semiotic agency ground moral standing? As already indicated above, acknowledgement of the occurrence of perception-and-action cycles in the life of animals implies that subjective experience and action – and thus agency, the capacity for action – is seen in connection with each other. Semiotic agency can be regarded as a valid ground for moral standing because it is through semiotic agency that living agents act in the world, and thus are subjects in the first place.

A third strategy one might employ for justifying the normative claims of biosemiotic ethics focuses on meaning-making. There is intuitive appeal to leaning on this concept of meaning. As David Chandler wrote, "We seem as a species to be driven by a desire to make meanings: above all, we are surely *homo significans* – meaning-makers" (Chandler 2002: 13). Yet this approach faces at least two problems. First, philosophy has traditionally taken meaning to be a semantic concept, relevant to the language production that human beings are capable of enacting through internal rational processes. However, some contemporary philosophical approaches have reconsidered the nature of meaning and written critically of the linguocentric trend of analysis (Merrell 1997). From the perspective of semiotics, this linguocentric trend tracks along semiological lines, supported by the dyadic understanding of signs developed by Ferdinand de Saussure at the turn of the 20th century. The work of Ruth Millikan on biosemantics is one clear example (Millikan 1984, 2005). The problem with this approach, for biose-

miotics, is that it is unable to explain non-linguistic sign use by nonhuman animals and, following, unable to justify any claims of moral relevance based thereon. Second, some semioticians have thought that meaning was too nebulous a concept to usefully employ in the conceptual work of semiotics. For example, American semiotician Charles Morris saw meaning as too fragmented a concept to be rigorously applied within the science of semiotics. Writing in 1946, Morris argued, “accounts of ‘meaning’ usually throw a handful of putty at the target of sign phenomena, while a technical semiotic must provide us with words which are sharpened arrows” (Morris 1946: 162). His advocacy of a technical approach to the study of signs turned his attention to more specific terms to describe the process of signification. Meaning was a confusing and nebulous term and even on “the most charitable interpretation of such confusions” (Morris 1938: 44) that referred to the process of signification, meaning was to be abandoned as a functional concept in semiotic analysis. Morris claimed that meaning could not help us better understand semiotics; rather, semiotics should be employed to critique and clarify what was meant by the term (Morris 1938: 44). The disconnect between semiotics and meaning, following the semiological linguistic trend set by Saussure and followed by Morris, values linguistic ability as the baseline of evaluation: all life is then measured against human life. By fiat, then, the normative measure of living organisms is the rational, linguistically-capable, human individual. Such a view does indeed enable moral evaluation, based on the maintenance of a modernist view of human exceptionalism. If linguistic meaning is morally relevant, justifying the attribution of moral standing, those living individuals who have merely an analogies to linguistic capabilities have mere analogies of moral standing. If the biosemiotic ethicist is after more than mere analogy – if she wishes to attribute moral standing as such to all living organisms – such a view of meaning is insufficient.

Yet the linguistic conception of meaning is not the conception held by the semiotician. Instead, following C.S. Peirce’s triadic account of signification, meaning just is the interpretation of signs in the process of signification: the relation between signs. For Peirce, and the biosemioticians who draw on his semiotics, meaning comes in grades, from the linguistic meaning of words to the interpretation of signs in any environment (Peirce 1903: 256). On a biosemiotic view, all living organisms are meaning-makers. Similar views of living organisms as meaning-makers is prominent within some traditions within enactivism (e.g. Di Paolo and Thompson (2013), particularly the autopoietic enactivism of Maturana and Varela (1992) (see also De Jesus 2016), as well as in cognitive semiotics (see Zlatev 2009).

Further, this meaning-making is morally relevant. Indeed, Peirce himself recognized a complex relationship between signification and value, writing in a 1902 manuscript that

Meaning is something allied in its nature to value. I do not know whether we ought rather to say that meaning is the value of a word – a phrase often used – or whe-

ther we ought to say that the value of anything to us is what it means for us – which we also sometimes hear said. Suffice it to say that the two ideas are near together (Peirce 1902: MS 599).

Any meaningful sign relations, the biosemiotic ethicist wishes to maintain, can justify not only the moral standing of linguistically-capable human individuals, but also all semiotic individuals – that is, all living individuals. From this Peircean perspective, biosemiotics maintains both that meaning is the result of all signification by semiotic (i.e., living) individuals and that meaning is importantly linked to value.

Any of the candidates we have outlined so far in this section — semiotic agency, subjective experience, or meaning-making – offer candidates for morally relevant criteria by which to justify claims of moral standing. Biosemiotic ethics purports that semiotic capacity (in terms of the meaning-making resulting from the activity of experiencing semiotic agents) is the strongest candidate and, perhaps, the exclusive candidate for moral relevance. In the next section we evaluate this claim.

3. Exclusivity

If questions about justification pose one challenge for biosemiotic ethics, questions about the exclusivity of semiosis as the ground of moral standing pose another. Is semiosis the only morally relevant criterion? If not, how does it stack up against other such criteria? Our proposal is that semiosis is the least common denominator for criteria of moral relevance.

The logic of this claim proposes that semiosis is both the necessary foundation of the conditions of moral standing and is itself morally relevant: it encompasses all other criteria otherwise conceived. To formulate this general argument in its strongest terms: any criterion X taken to be morally relevant relies, at its root, on an account of actual experience. Capacities such as rationality, consciousness, sentience, intentionality, cognition, *et cetera* that have been argued by one or another theorist to be morally relevant all rely on such subjective accounts. Each of those criteria in turn relies on the processes of signification. Thus semiosis is the common ground of moral relevance.

Now, one may question the sufficiency of this argument. Are we not begging the question by merely dropping down a layer of explanation and failing to answer the fundamental question of justification? Why think that moral relevance extends down layers of complexity to basic semiosis? Our proposal is to suggest that the best explanation for the variety of capacities considered morally relevant is that they each point to instances of something more fundamental: some capacity shared by beings with moral standing. That capacity, on this reading of biosemiotic ethics, is semiosis.¹

3.1 *On Biosemiosis and Its Relation to Consciousness*

As an example of how this argument for the exclusivity of semiosis works, consider claims of the moral relevance of consciousness. In animal and environmental ethics, many scholars assume that conscious animals constitute the proper society of moral subjects, since, they claim, only conscious animals have subjective experience (see Degrazia 1996 for a discussion of this claim). In their view, consciousness therefore marks the demarcation line between those living beings that have moral standing, and those living beings that do not have moral standing. The biosemiotic belief, however, implies that absolutely all living beings have something akin to subjective (or quasi-subjective) experience. In the perspective of biosemiotic ethics, consciousness gives rise to a demarcation line between living beings with specific cognitive needs and behaviours, and living beings without such needs and behaviours. But it does not justify a demarcation line between those living beings that have moral standing, and those that do not.

As we see in Jaworska and Tannenbaum's (2013) encyclopedia entry "The Grounds of Moral Status", it is common, in contemporary ethics, to refer to the capacity for cognition, directly or indirectly, as the ground of being attributed moral status, i.e. moral standing. They refer to four variations of cognition as ground for moral status: 1) sophisticated cognitive capacities, 2) capacity to develop sophisticated cognitive capacities, 3) rudimentary cognitive capacities, and 4) (being a) member of cognitively sophisticated species. If biosemiotic ethics is taken to be a capacity-based approach, it could be understood to fall under 1) (sophisticated cognitive capacities) combined with 3) (rudimentary cognitive capacities).² However, it is also possible to interpret biosemiotic ethics as based not strictly on the specific cognitive capacities of an organism, but rather on 2) the capacity to develop sophisticated cognitive capacities or 4) being a member of a cognitively sophisticated species. While biosemiotic ethics is still capacities-based, given such interpretation, it would not be based on *immediate* but rather *prospective* or *associated* capacities.

It is not the case that biosemiosis is always cognitive, for cognition properly speaking is related to consciousness and associated physiological features. Some but not all biosemiosis is cognitive – but all cognition is semiosis. In this sense, biosemiosis is the broader ground of all cognition. In conscious animals, simpler, non-cognitive semiosis (most of it so-called endosemiosis, or somatic semiosis) underpins and supports cognitive semiosis. Were it not for this underpinning of more basal biosemiosis, cognition would not occur. A logical consequence is that in order to really value cognition, in both a somatic and an ecological perspective, you have to value biosemiosis at somatic and ecological levels as well as on the cognitive, conscious level.

3.2 *Competing Perspectives on Biosemiosis as Ground of Moral Status*

Consciousness is just one candidate for morally relevant capacity. Even if we accept that consciousness can be understood in terms of a complexity gradient of semiosis, other candidates for morally relevant capacities might still pose a problem for biosemiotic ethics. Sentience is a key example of one such capacity. Sentience, taken to mean the capacity to experience pleasures and pains, has historically been taken as a key marker of moral standing.

There are currently developments in the natural scientific understanding of sentience and relatedly of subjective experience and consciousness. Among other issues, it is now being discussed what role ganglions – nerve cell clusters – play, in the peripheral nervous system, which supplements the central nervous system in conscious animals. Traditionally, the physiological basis of conscious experience has been taken to be the occurrence of a central nervous system, consisting of the brain and spinal cord. However, in a recent paper, Barron and Klein (2015) claim that even insects have a capacity for conscious subjective experience. “The brain structures that support subjective experience in vertebrates and insects are very different from each other,” the authors state (Barron and Klein 2015: 4900), “but in both cases they are basal to each clade.” Insects do not have a brain of the sort that e.g. mammals do, including a midbrain that processes sensory information. But they do have a central ganglion which appears to perform similar functions. Singer (2016) refers to some of these developments, but does not make any explicit statements with regard to implications for our reasoning about moral standing.

Three phases of argument support the semiotic view of sentience presented above. The first argument is that biosemiosis is at least as good a criterion of moral relevance as is sentience. Arguments from intuition can be powerful tools to support the uptake of a philosophical ethical position. Intuitively, experiencing pleasures is a desirable and therefore morally good thing and experiencing pains is not desirable and therefore a bad thing. Analytically, moral relevance is seen by many theorists as just the sort of capacity that sentience entails. Sentience theorists have likewise argued from analogy in support of their claim to moral relevance: the experience of pain and pleasure matter to me; by biological, evolutionary, or behavioural analogy they probably matter to you as well. If they matter to all us humans, they likely matter to those nonhuman animals biologically, evolutionarily, or behaviourally proximal to human animals, *et cetera*. Sentience is also supported by analogical arguments from subjective experience, given that it is the experience of pleasure and pain that is morally meaningful to us and, we argue by analogy, other relevantly similar organisms.

As stated earlier in this section, the capacity for sentience relies on the processes of signification, i.e. semiosis. This is in line with what we have claimed in earlier work – namely, that sentience is, at its heart, a semiotic

capacity (Tønnessen and Beever 2015). Sentience demands an account of subjective experience, and that experience is explainable in terms of interpretation of signs in environments. In a biosemiotic perspective, sentience, involving a form of perception (the experience of pleasure and pain), is not only underpinned by somatic semiosis, moreover, it itself represents a special case of particularly complex biosemiosis. So if we value biosemiosis, we implicitly value sentience as well, as one segment of semiosis. It follows that biosemiotic ethics covers all cases of sentience – of suffering, pain, pleasure and feelings of wellbeing – and more. Therefore, biosemiosis is at least as good a criterion of moral relevance as is sentience.

A second argument is that biosemiosis is the ultimate ground of moral status. This argument overlaps with our first argument. Sentience is, in some interpretations, merely analogical shorthand to the moral relevance of our own human experiences of pleasures and pains – it neglects the more fundamental morally relevant capacity of biosemiosis on which it necessarily relies as its ultimate ground. By considering biosemiosis rather than sentience as ground for moral standing, we attain a more accurate and empirically verifiable understanding, without losing any of the intuitive appeal of the sentience argument.

The third argument that supports the semiotic view of sentience is that biosemiosis does not replace but supplements other valid arguments for grounds of moral status. As we argued above, biosemiotic ethics can, depending on its exact theoretical formulation, be placed within any of the four variations of cognition or within a sentience-based account as ground for moral status. And it entails both the scope and intuition of sentience-based approaches.

So how, then, does it differ from other approaches in contemporary ethics? One reasonable interpretation of the adaptable appearance of biosemiotic ethics when compared with other contemporary approaches, is that it does not introduce to ethics entirely novel perspectives concerning the nature of the ground of moral status. Rather, it grounds existing beliefs about various cognition-related grounds of moral status in the shared and empirically rich context of semiotics. Phrased in a different way, biosemiotic ethics is not so much of an incompatible, “take it or leave it” kind of alternative to competing approaches to grounds of moral status as it is a supplement that can strengthen and deepen existing approaches. By acknowledging and incorporating biosemiotic ethics, several sentience-based or cognition-related contemporary approaches to grounds of moral status can find themselves more accurate and argumentatively more solid.

Yet the argument for biosemiotic ethics as a supplement to sentience-based or cognition-based approaches might also have negative results: biosemiotic ethics also challenges contemporary approaches to moral standing like those based on cognition or sentience. For example, Jaworska and Tennenbaum suggest that cognitive approaches cannot extend the scope of moral standing very far.

Notice that an even more rudimentary feature, which is not cognitive, would have to be considered if one were to accord any moral status to all living beings. For example, one can appeal to having a good or wellbeing of one's own that can be enhanced or damaged as a ground of moral status (Taylor 1986, p. 75, and Næss 1986, p. 14) (Jaworska and Tannenbaum 2013).

On their view, we can safely assume, while semiosis can help better justify cognitive approaches to moral standing, it also poses a significant challenge in that capacity for cognition or sentience can no longer hold as the exclusive category of moral relevance: moral standing extends beyond the cognitive or the sentient. These questions of scope and extension are the targets of the next section of this essay.

4. Scope

Another fundamental question for biosemiotic ethics is the question of scope or moral standing. What exactly has moral standing, on the biosemiotic account? Within this question is another question about class: is moral standing the sort of thing that applies to individuals or organisms³, or to living systems? This class question has framed conflicts between animal and environmental ethics, for instance with the animal ethicist claiming that only the individual matters morally and the environmental ethicist claiming that such a view leaves out morally-considerable systems like mountains, forests, and other ecosystems. For the biosemiotic ethicist, this question of class concerns to what semiosis applies: can an ecosystem be semiotic, or is semiosis the sort of capacity that only applies to individuals or organisms?

Also within the question of moral standing lies a second question about the family of individuals/organisms or systems that have moral standing. This question returns us to the fundamental thesis of biosemiotics with which this essay begins; namely, that living systems or organisms are semiotic. The two variants of this claim, the weaker and the stronger, frame differently the scope of biosemiosis and, so, the scope of biosemiotic ethics. The stronger claim is that all and only living systems or individuals/organisms are semiotic. The weaker claim is non-exhaustive: all living systems and organisms are semiotic but there are, perhaps, nonliving systems or entities that are semiotic, too.

4.1 *Individuals vs. Systems: the Consortia View*

As Kull (2010) describes, Reinke's consortium view and Uexküll's Umwelt view both support the idea that living beings are connected via sign relations in and through ecological systems. A consortium, in Kull's words (2010: 347), "can be defined as a group of organisms connected via (sign) rela-

tions, or groups of interspecific semiotic links in biocoenosis”, i.e. in a community of naturally occurring organisms occupying and interacting within a specific biotope. These semiotic webs (Sebeok and Umiker-Sebeok 1989) are ecologies of relations built on the processes of signification, meaningfully co-constituting the individual organism as system. While biological entities such as e.g. organisms, individuals, species or ecosystems have often been considered the appropriate subjects of moral standing, what is considered to have value is not necessarily those various entities themselves, but rather their interrelations. Arne Næss was among the first to develop this ecological view, arguing by way of the platform of deep ecology that what has intrinsic value is the flourishing of life (Sessions and Næss 1986). In a similar vein one could make the claim that what has value, in the perspective of biosemiotic ethics, is not various biological entities ranging from organisms to living systems, but rather the relations in which they partake.

This view of individuals/organisms and systems as co-constituted is the view from ecology that drives contemporary animal and environmental ethics, overcoming some of the problems of scope identified above. Here, biosemiotic particularism follows, denying the binary view of either individual or system and paying attention to the important ways in which individuals and other organisms are embedded within ecological relationships. To focus on the particulars of an ethical case is to focus on the ways those relations are shaped by and shape the individual. To uphold these values is of critical importance for actually safeguarding the biological entities they are engaged with. These relations have vital importance for upholding the intrinsic value of the individual, by enabling some morally attractive states of affairs, including, for example, individual welfare based on fulfillment of species-specific and individual needs.

4.2 All and Only Biosemiosis? Shades of Semiosis

So if an ecological perspective can overcome the problem of class, can it also overcome the problem of family? Some biosemioticians have argued the strong thesis that semiosis is a capacity of all and only (embedded, ecological) living beings. For example, Kalevi Kull, following Thomas Sebeok’s work, has argued that “there are sign processes in all living processes, and therefore, the semiotic threshold is placed at the boundary of life” (2003: 596). In this view, life is both necessary and sufficient for semiosis. Thus, on the view of biosemiotic ethics, all and only living beings and systems are morally considerable. There is some intuitive appeal to this position in that it supports the traditional biological view that there is some special quality to life. Birds and bees have it, but rocks and debris do not. In this way, biosemiotic ethics works to extend the scope of moral standing beyond traditional positions (of cognition and sentience, for example) but bind its limit to a scope with some intuitive appeal.

The weaker claim is that all but not all and only living systems are semiotic: life is sufficient for semiosis but not necessary. Scholars like John Deely, with his idea of physiosemiosis (Deely 2001), or Winfried Nöth, with his work on defining ecosemiotics (2001) beyond the living realm, have followed this logic through to its counter-intuitive ends. They both conclude that there might be some abiotic entities or phenomena which enter into processes of signification in meaningful ways (autocells are one example; cf. Doyle 2013).

The growing literature around the semiotic processes of computation, information, and machine learning (see e.g., Nadin 2010) points in this direction too: if information and meaning are linked by semiosis, then the door is open to understand complex computational systems – from human minds to artificial intelligence systems – as semiotic and, in consequence (on some interpretations), morally considerable. This weaker claim seems, to many, counter-intuitive. At least two options have been proposed to avoid it. First, one could argue that the capacity for meaning-making alone is not sufficient for being granted moral standing, while semiosis is a fundamental capacity of morally-relevant individuals, perhaps some higher order capacity like subjective experience (see section 3 above) in combination with meaning-making is required. This seems to be the direction pushed by many zoosemioticians. Second, one could argue for a scale of semiotic ability that privileges freedom as a means of keeping in life and keeping out artifice.

Jesper Hoffmeyer, starting from the claim that “living systems are basically engaged in semiotic interactions” (Hoffmeyer 2010: 367), has articulated such a scalar view of semiosis that allows for some individuals to have a greater degree of semiotic freedom (Hoffmeyer 1992) than others. Semiotic freedom is expressed in a hierarchical evolutionary way. “Organic evolution exhibits an inherent tendency toward an increase in semiotic freedom. Mammals generally are equipped with more semiotic freedom than are their reptilian ancestor species, and fishes are more semiotically sophisticated than are invertebrates” (Hoffmeyer 2010: 367). This view develops a semiotic account of the great chain of being, thinking of evolutionary development as a series of developing semiotic complexity (Hoffmeyer and Stjernfelt 2016). Hoffmeyer’s own analysis focuses on living biological systems and itself takes the strong view of biosemiotics, following Kull in claiming that “life and semiosis are coextensive” (Hoffmeyer and Stjernfelt 2015: 9). Some scholars, however, take this graded, evolutionary perspective on semiosis to imply that there was never a point in time when semiosis came to be, but that semiosis has always been around, even before life emerged.

Some biosemioticians address the challenge of describing where semiosis starts, as it were, through a differentiation between *semiosis* and *proto-semiosis*. Sharov and Vahkavaara (2014), too, argue that simple semiosis preceded more complex semiosis in evolutionary history. They further claim that semiosis and proto-semiosis have co-existed ever since proper semiosis emerged, with proto-semiosis being characteristic e.g. for bacteria. In their view, only proper semiosis is truly Peircean, whereas proto-

semiosis is not, in that it is bereft of an object in Peirce's sense (and thus does not involve triadic relations).

Biosemiotic particularism offers a means by which to step beyond both a gradualistic and a hierarchical understanding of semiosis, and focus instead on an individual semiotic web of meaningful relations. It is thus compatible with different ways of understanding biosemiosis. In the view of biosemiotic particularism, moral evaluation is not offered in comparison to other "more" or "less" semiotic beings, but instead on the being's specific semiotic capacity *vis-à-vis* its relations.

One final remark: in Tønnessen and Beever (2015), we make a distinction between proper subjects and quasi-subjects, which we relate to semiotic capacity and organization. This constitutes yet another "shade of semiosis".

Proper subjects stand out with regard to moral concern because their lives have another dimension, namely unified, cohesive experience of their surroundings, which quasi-subjects lack. Quasi-subjects such as plants, fungi and animals with decentralized bodies also have semiotic experience, but only proper subjects have cohesive, integrated experience. These differences are clearly morally relevant, since they are very much telling of how different beings are affected by the way we treat them. This is not to say that quasi-subjects do not have moral status, but their experience and "subjectivity" is different, and thus their needs (Tønnessen and Beever 2015: 85).

5. Biosemiotic Particularism in Application to Ethical Dilemmas

In this section we provide a few examples of application of biosemiotic ethics to ethical dilemmas from the perspective of biosemiotic particularism. A basic challenge for biosemiotic ethics (as well as for other ethical approaches with a wide scope) is a practical one: if all living systems have moral standing, then how can the ethical theory provide guidance in practical ethical dilemmas? Will not all living systems matter equally – and if they do, how can any ethical conflicts possibly be resolved?

In the following, we will look into three cases, involving the moral status of a human fetus, animal welfare, and conservation ethics and wildlife management respectively. In line with what we have argued thus far in this paper, an approach starting with biosemiotic ethics will emphasize subjective experience, living beings' agentive capacities, and their particular needs and behaviours. An animal's particular needs include both species-specific and individual needs. Another way of looking at fulfillment of needs is to map the relations of a living being and identify those that are vital relations (cf. Næss 1986). This in effect involves placing the living being in question in its ecological setting. Typically, species-specific as well as individual needs can only be fulfilled if certain relations are maintained.

Our first case involves the moral status of a human fetus. “While the human umwelt arguably emerges already at the embryonic stage,” Tønnessen (2014: 281) writes, “the sense-saturated umwelt emerges at the fetal stage.” The emergence of the sense-saturated Umwelt implies that “the developing organism is not only *physically* one but furthermore *experientially* one” (Tønnessen 2014: 281), and capable of acting. It is the transition from simple to sense-saturated Umwelt that marks the emergence of a human being as a proper subject in our terms. With the sense-saturated Umwelt, perception, and sentience, emerge too. This biosemiotic understanding of the development of the human embryo and fetus has moral consequences.

According to biosemiotic ethics, all living beings have moral standing. But when does life start? In the human case, some argue at conception: when the egg is fertilized and the resulting zygote starts transitioning to an embryo. From then on the organism *in spe* passes through various developmental stages. Whereas biosemiotic ethics asserts that absolutely all living beings have moral standing, application of biosemiotic particularism implies that these different developmental stages are associated with different needs and, eventually, behaviours. Furthermore, in light of a consortia perspective, a living being – such as a human embryo becoming fetus becoming infant becoming toddler, and so on – is also the center of a growing web of relations. And the nature of these relations is telling of the needs and requirements of the organism in question. A crucial event in early human development, as well as in the early development of any sentient organism, is the abovementioned transition from simple Umwelt to sense-saturated Umwelt, as the senses develop, one by one. In humans, the first sense to develop might be the tactile sense. The first experienced relation to another organism – the mother – is formed when the fetus develops a sense-saturated Umwelt. As the senses develop and mature, new vistas of experiences open up for the fetus, and further relations are established in the womb and after birth. To value a living being such as a human fetus involves valuing these relations, and meeting the various needs of the developing fetus. This view is consistent with holding that even human embryos have moral standing, in line with their more limited semiotic capacities and merely quasi-subjective experience. Moreover, it is consistent with the view that the exact commitments that we have with regard to human fetuses, infants, children and adults develop in line with their physiological, experiential and agential development.

Our second case involves animal welfare. Based on the idea that the good life for any nonhuman animal is defined by what matters to it in natural circumstances (cf. Cray’s argumentation and outlook in section 1.2), one can set standards for allowable vs. non-allowable levels of welfare in different captive settings. Exactly where the limit for what is allowable will go in each case will ultimately depend on subjective, socially based evaluations. However, assuming that captivity is defensible in a specific case, it follows from what has been said above that biosemiotic ethics is normatively biased towards captive settings that facilitate expression of natural

behaviour (and the animal's subjective experience of expressing that behaviour). This points towards measures such as socialization, varied or complex con-specific (and perhaps inter-specific) social milieus, captive environments with sufficient space and with the ingredients/elements that are natural to the animal in question, and environmental enrichment tailor-made to the animal's behavioural repertoire. It also points toward facilitation of animals' need for play, exploration and self-initiated activities, as subjective beings whose independent agency should be acknowledged and welcomed. Also, individual differences in animals belonging to the same species should be acknowledged and their expression facilitated.

As Mellor (2016) argues, captive animals should be provided with "a life worth living". A tricky issue is whether this should involve a full life. After all, wild animals do not necessarily live full lives – a majority in several species never get a chance to die of old age. However, when we take an animal in our custody, we are responsible for their wellbeing, and some would say that we owe them not only an acceptable life, but the best life that we can possibly facilitate. This could be interpreted to include letting the animal live through all life stages. While this view makes good sense on ethical grounds, it fundamentally challenges the way we currently keep animals in agriculture, with juveniles of several species (broiler, lamb, calf etc.) being routinely sent to slaughter.

Our third and last case concerns conservation ethics and wildlife management. Animals, plants and fungi have different semiotic capacities, and are therefore deserving of differential treatment. Animals raise questions about allowable individual treatment. As a rule, animals in the wild have good but not unrestricted opportunities to enact natural behaviours. In most parts of the world, the intensity level of public wildlife management contributes significantly to determine to what extent their behaviours are restricted anthropogenically. Here, biosemiotic ethics will tend to favour less rather than more intensive levels of management and interference. For similar reasons, it will also tend to favour non-invasive and non-lethal management measures, whenever possible. Biosemiotic ethics will generally tend to favour generously sized areas and/or wildlife corridors for protected species, especially if the protected species is an animal with a large home range or with regular migration patterns. The consortium outlook points towards prioritization of conservation of larger ecological entities than a single species. A complication in this context, due to climate change, is that place-specific conservation is becoming harder to conduct in an age of temperature changes and in consequence several migrating animal populations.

Of course, ethical dilemmas will arise in conservation ethics, even with policies as indicated above. A classical conflict is the one between the good of the individual and the good of the species. In conservation of threatened species, which are characterized by having relatively few individuals, conservation efforts often risk sacrificing the good of the individual animals in the name of safeguarding the good of the species. While that might be justifiable to some extent in some extreme cases, having biosemiotic ethics

as theoretical outlook comes with an obligation to have both the good of the individual animal and the good of the population or species in mind simultaneously (in other words, animal and environmental ethics have to be combined). In social, cognitively complex animals, respecting the needs of individual animals implies that social relations should preferably not be disturbed. For some of these animals, family relations might constitute some of their most vital relations, in their own experiential perspective. Excessive or random culling can do great damage in this respect.

6. Summary

In this essay we have articulated three central questions of biosemiotic ethics: 1) What justifies biosemiosis as a morally relevant capacity? 2) Is semiosis the exclusive category of moral relevance? And, 3) how far does semiosis extend? We've proposed that the focus on individual semiotic webs arising from biosemiotic particularism is better positioned to answer these questions than either comparative or egalitarian approaches to biosemiotic ethics.

The questions we have asked and answered in this essay have focused on questions of moral standing, or what living beings and systems matter, morally. We have not yet drawn other distinctions that might be made, including between moral patients and moral agents. Our discussion in this paper also leaves aside at least one lingering problem; namely, if there is indeed some way of differentiating between various ethical obligations towards semiotic beings and systems, then we find ourselves already in the business of making value judgments. And if we make such judgments, there must be some other, perhaps overriding, criterion of moral relevance, posing a significant challenge to the practical implications of biosemiotic ethics broadly and biosemiotic particularism specifically. This problem deserves careful consideration in future work, and is related to the fact that we have yet to develop a comprehensive value theory for biosemiotic ethics, beyond indicating that what is valuable to any given living being is relative to its species-specific and individual needs and behaviours.

Despite the achievements of analysis done in this essay and the ongoing work of biosemiotic ethics, our biosemiotic particularist approach cannot solve questions concerning allowable treatment of animals and other life once and for all. We firmly believe that no ethical theory that opens up for, or is compatible with, constant reflection can. But such an approach can contribute to making the ethical discourse more empirically-driven, and more consistently framed theoretically, both with regard to animal behaviour and with regard to the semiotics of human and nonhuman subjective experience. Biosemiotic particularism, as one approach within the landscape of biosemiotic ethics, focuses ethical discussion on the beings and systems that matter morally, taken one-by-one as members of rich semiotic communities. Since this and other approaches to biosemiotic ethics is

derived from biosemiotics and thus also draw on biological theory, it serves to bridge the epistemological worlds of natural science on one hand and of values and normative evaluations on the other.

Notes

- * Tønnessen's work with this article has been carried out thanks to the support of the research project *Animals in Changing Environments: Cultural Mediation and Semiotic Analysis* (EEA Norway Grants/Norway Financial Mechanism 2009–2014 under project contract no. EMP151).
- 1 One might also question whether a capacities-based account exhausts possibilities for moral standing. An ethic of care might propose relationships, not capacities, as the morally relevant criterion. A deontological position might propose a categorical claim such as “naturalness” as the exclusive category of moral relevance. Both of these takes on ethics could potentially, given sufficient sensitivity to the semiotic nature of living systems, resonate with the outlook of biosemiotic ethics. A deontological biosemiotic ethics would furthermore have the advantage that it would make connections with Uexküll's declared Kantian views in ethics (see Beever and Tønnessen 2013). For the sake of this essay, however, we leave aside these two alternative approaches.
- 2 Note that referring only to rudimentary cognitive capacities – say, semiotic agency – may be sufficient for the purpose of delineating the society of moral subjects (i.e. living beings with moral status), but that it is not sufficient for explaining differentiated treatment of different living beings. As Jaworska and Tannenbaum (2013) write, albeit with an overtly anthropocentric edge, “while one may grant that rudimentary capacities ground some moral status, one must look beyond such capacities to explain the difference in moral status between humans and most animals.”
- 3 We distinguish between individuals and organisms since individuation is a gradient phenomenon in nature, so that not all organisms are individuals (for instant, we can refer to plants as organisms, but not as individuals).

References

- Barron, Andrew B. and Colin Klein (2015), “What Insects can tell us about the Origins of Consciousness”. *Proceedings of the National Academy of Sciences* 113, 18: 4900–4908.
- Beever, Jonathan and Morten Tønnessen (2013), “‘Darwin und die englische Moral’: The moral Consequences of Uexküll's Umwelt Theory”. *Biosemiotics* 6, 3: 437–447.
- Brier, Søren (2005), “Third Culture: Cybersemiotic's Inclusion of a Biosemiotic Theory of Mind”. *Axiomathes* 15: 211–228.
- Brier, Søren (2013), “Cybersemiotics: A new Foundation for transdisciplinary Theory of Information, Cognition, meaningful Communication and the Interaction between Nature and Culture”. *Integral Review* 9, 2: 220–263.

- Chandler, David (2002), *Semiotics: The Basics*. 2nd Edition. New York: Routledge.
- Cobley, Paul (2016), "Ethics cannot be voluntary". In: Paul Cobley, *Cultural Implications of Biosemiotics* (Biosemiotics 15). Springer.
- Crary, Alice (2016), *Inside Ethics: On the Demands of Moral Thought*. Cambridge, MA and London: Harvard University Press.
- Dancy, Jonathan (2004), *Ethics without Principles*. Oxford: Oxford University Press.
- Deely, John (2001), "Physiosemosis in the Semiotic Spiral: A Play of Musement". *Sign Systems Studies* 29, 1: 27–48.
- Deely, John (2008), "From Semiosis to Semioethics: the full Vista of the Action of Signs". *Sign Systems Studies* 36, 2: 438–469.
- Deely, John (in this volume), "Ethics and the Semiosis-Semiotics Distinction". *Zeitschrift für Semiotik* 37, 3–4: 13–30.
- DeGrazia, David (1996), *Taking Animals seriously: Mental Life and Moral Status*. Cambridge: Cambridge University Press.
- De Jesus, Paulo (2016), "From Enactive Phenomenology to Biosemiotic Enactivism." *Adaptive Behavior* 24, 2: 130–146.
- Di Paolo, Ezequiel and Evan Thompson (2013), "The Enactive Approach". In: Lawrence Shapiro (ed.), *The Routledge Handbook of Embodied Cognition*. New York: Routledge: 68–77.
- Doyle, Amanda (2013), "Did Autocells Lead to Life?" *Astrobiology Magazine*. URL: <http://www.astrobio.net/news-exclusive/did-autocells-lead-to-life/>.
- Hare, Richard M. (1963), *Freedom and Reason*. Oxford: Clarendon Press.
- Hoffmeyer, Jesper (1992), "Some Semiotic Aspects of the Psycho-Physical Relation: The Endo- Exosemiotic Boundary". In: Thomas A. Sebeok and Jean Umiker-Sebeok (eds.), *Biosemiotics: The Semiotic Web*. Berlin: Mouton de Gruyter: 101–123.
- Hoffmeyer, Jesper (1995), "Biosemiotics and Ethics". In: Vandana Shiva and Ingunn Moser (eds.), *Biopolitics: a Feminist and Ecological Reader on Biotechnology*. London: Zed: 141–161.
- Hoffmeyer, Jesper (1996), *Signs of Meaning in the Universe*. Indianapolis: Indiana University Press.
- Hoffmeyer, Jesper (2010), "A Biosemiotic Approach to the Question of Meaning". *Zygon – Journal of Religion & Science* 45, 2: 367–390.
- Hoffmeyer, Jesper and Frederik Stjernfelt (2016), "The Great Chain of Semiosis: Investigating the Steps in the Evolution of Semiotic competence". *Biosemiotics* 9, 1: 7–29.
- Hooker, Brad and Margaret Olivia Little (2000), *Moral Particularism*. Oxford: Clarendon Press.
- Hornborg, Alf (2016), "Artifacts have Consequences, not Agency: Toward a Critical Theory of Global Environmental History." *European Journal of Social Theory*.
- Jaworska, Agnieszka and Julie Tannenbaum (2013), "The Grounds of Moral Status". In: Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Summer 2013 Edition). URL: <http://plato.stanford.edu/archives/sum2013/entries/grounds-moral-status/>.
- Kull, Kalevi (2003), "Ladder, Tree, Web: the Ages of Biological Understanding". *Sign Systems Studies* 31, 2: 589–603.
- Kull, Kalevi (2009), "Vegetative, Animal, and Cultural Semiosis: The Semiotic Threshold Zones". *Cognitive Semiotics* 4: 8–27.

- Kull, Kalevi (2010), "Ecosystems are Made of Semiotic Bonds: Consortia, Umwelten, Biophony and Ecological Codes". *Biosemiotics* 3, 3: 347–357.
- Maturana, Humberto and Francisco Varela (1992), *The Tree of Knowledge: The Biological Roots of Human Understanding*. Boston: Shamabala.
- Mellor, David J. (2016), "Updating Animal Welfare Thinking: Moving Beyond the 'Five Freedoms' towards 'a Life worth Living'". *Animals* 6, 21.
- Merrell, Floyd (1997), *Peirce, Signs, and Meaning*. Toronto: University of Toronto Press.
- Millikan, Ruth G. (2005), *Language: A Biological Model*. Oxford: Clarendon Press, Oxford.
- Millikan, Ruth G. (1984), *Language, Thought, and Other Biological Categories: New Foundations for Realism*. MIT Press, Cambridge, Mass.
- Morris, Charles (1938), *Foundations of the Theory of Signs*. Chicago: The University of Chicago Press.
- Morris, Charles (1946), *Signs, Language and Behavior*. New York: Prentice-Hall.
- Næss, Arne (1986), "The Deep Ecological Movement: Some Philosophical Aspects". *Philosophical Inquiry* 8: 10–31.
- Nadin, Mihai (2010), "Information and Semiotic Processes: The Semiotics of Computation". *Cybernetics and Human Knowing* 18, 1–2: 153–175.
- Nöth, Winfried (2001), "Ecosemiotics and the Semiotics of Nature". *Sign Systems Studies* 29, 1: 71–81.
- Peirce, Charles S. (1902), "Reasons Rules". MS599. URL: <http://www.unav.es/gep/ReasonRules599.html>.
- Peirce, Charles S. (1998 [1903]), "What Makes a Reasoning Sound?" In: Nathan Houser and Christian Kloesel (eds.), *The Essential Peirce: Selected Philosophical Writings*, Vol 2. Bloomington: Indiana University Press: 242–257.
- Sebeok, Thomas A. and Jean Umiker-Sebeok (eds.) (1989), *The Semiotic Web 1988*. Berlin: Mouton de Gruyter.
- Sessions, George and Arne Næss (1986), "The Basic Principles of Deep Ecology". *The Trumpeter* 3, 4: 14.
- Sharov, Alexei (2010), "Functional Information: Towards Synthesis of Biosemiotics and Cybernetics". *Entropy* 12: 1050–1070.
- Sharov, Alexei and Tommi Vehkavaara (2014), "Protosemiosis: Agency with Reduced Representation Capacity". *Biosemiotics* 8, 1: 103–123.
- Singer, Peter (2016), "If Insects have Consciousness, What Then?" *The Globe and Mail* May 16th 2016.
- Taylor, Paul (1986), *Respect for Nature*. Princeton: Princeton University Press.
- Tønnessen, Morten (2014), "The Ontogeny of the Embryonic, Foetal and Infant Human Umwelt". *Sign Systems Studies* 42, 2–3: 281–307.
- Tønnessen, Morten (2015), "The Biosemiotic Glossary Project: Agent, Agency". *Biosemiotics* 8, 1: 125–143.
- Tønnessen, Morten and Jonathan Beever (2015), "Beyond Sentience: Biosemiotics as Foundation for Animal and Environmental Ethics". In: John Hadley and Elisa Aaltola (eds.), *Animal ethics and Philosophy: Questioning the Orthodoxy*. London: Rowman & Littlefield International: 47–62.
- Zlatev, Jordan (2009), "The Semiotic Hierarchy: Life, Consciousness, Signs and Language". *Cognitive Semiotics* 4: 169–200.

Uexküll, Jakob von (1957), "A Stroll Through the Worlds of Animals and Men". In: Claire H. Schiller (ed.), *Instinctive Behavior: The Development of a Modern Concept*. New York: International Universities Press: 5–80.

Uexküll, Jakob von (1982), "The Theory of Meaning". *Semiotica* 42, 1: 25–82.

Prof. Morten Tønnessen, Ph.D.
Department of Social Studies
University of Stavanger
4036 Stavanger
Norwegen
Email: morten.tonnessen@uis.no

Prof. Jonathan Beever, Ph.D.
Department of Philosophy
University of Central Florida
4111 Pictor Drive, Orlando
FL 32816, USA
Email: jonathan.beever@ucf.edu