Humaniora

RIIN MAGNUS

The Semiotic Grounds of Animal
Assistance: Sign Use of Guide Dogs
and Their Visually Impaired Handlers

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INTRODUCTION

If we have never been modern, as Bruno Latour suggests, neither have we (or the other traces we leave behind) been human, if 'human' is meant to indicate a class of beings separated from all other living beings by an unbridgeable ontological or ethical abyss.

(Benson 2011: 4)

The co-inhabitance and shared activities of humans and other species have taken very different forms in history. Wild animals have helped humans to hunt and fish (Brandt 1972: 14–20; Gudger 1927; Jackson 1997), to control parasites and pests (Ståhlberg, Svanberg 2011: 368–370) and search for food (Isack, Reyer 1989), to name a couple of such cooperative activities. By and large, domestication brought along a diminishing in the number of species with whom humans have direct contact, as well as a decrease in the meanings these species carry. Yet, the domestication of the dog is an example of how domestication and the contingent socialisation opened up a manifold of possibilities to relate to one and the same animal species. The perception, behaviour and certain ecological relations of an animal are all important in any forms of cooperation between humans and domesticated or wild animal species. Still, it is possible to delimit a group of animals whose function for humans has primarily been related to perception. This function is fulfilled, for example, by detection dogs, military dolphines and rats who search for mines, honey guides who indicate the locations of beehives, but also animals who help people with perceptual disabilities. The focus of this thesis lies on the interactions of one type of such assistance animals – guide dogs – and their visually impaired handlers.

In previous studies, the topic of cooperation between guide dogs and their handlers has been approached from the perspective of the visually impaired handler (Sanders 2000; Deshen, Deshen 1989; Nicholson *et al.* 1995), the dog (Ittyerah, Gaunet 2009; Fallani *et al.* 2007; Yamamoto *et al.* 2011; Valsecchi *et al.* 2010), the trainer (Mizukoshi *et al.* 2008) as well as the human raisers (Koda, Minami 2000, Koda 2001). Research on guide dog teams covers topics such as the physical and mental well-being of the guide dog handlers (Sanders 2000), guide dog genetics (Takeuchi *et al.* 2009; Goddard, Beilharz 1985), the selection of guide dogs based on their behavioural and psychological characteristics (Arata *et al.* 2010; Gaunet 2008, 2010; Murphy 1995, 1998), and the comparisons of different vision and mobility aids (Deshen, Deshen 1989). Furthermore, the cooperation of the guide dog team offers rich material for research on the role of different senses in interspecific communication (Ittyerah, Gaunet 2009; Gaunet 2008; Scandurra *et al.* 2015); as well as the synchronisation of actions between the individuals of different species (Naderi *et al.* 2001) and it also points to the role of other species in the development of the values, attitudes and self-image of society. Although the latter three topics all fall within the research scope of semiotics, save for the very early years of biosemiotic research (Uexküll, Sarris 1931; Sarris 1935), assistance animals

have later escaped semiotic scrutiny. Yet, the rise of the field of zoosemiotics in the 1960s and 1970s (Sebeok 1965, 1972), the integration of Jakob von Uexküll's works to semiotic studies (Uexküll 1982; Sebeok 1979) and also attention to umwelt transitions as crucial for the study of human-animal interactions (Tønnessen 2011) have opened up an inviting platform to take up the topic anew. In order to analyse the sign usage of guide dog teams, the analysis that is provided in this thesis combines cultural and zoosemiotic tools. Such a combination allows for discussing the sign processes on different levels of organisation (organism, intersubjective, social) by highlighting the specifics of each individual level, while also seeing different levels of interaction as contexts of each other. More specifically, the thesis falls in the research field of anthropological zoosemiotics, "that studies the semiotic interaction between human beings and other animals, including those of cultural and/or sociological type" (Martinelli 2010: 180).

Although each paper of the thesis targets a slightly different set of questions, some of the central questions of the thesis can be summed up as follows: Why is the umwelt change of the guide dog team members important for their successful cooperation? What kind of signs are involved in guide dog assistance and what function do they serve? What does the maintenance of sign relations specific to guide dog work depend on? What are the semiotic challenges that the team members face? As reflected in these research questions, the whole thesis keeps its focus on the specifics of human-animal semiotic interactions in guide dog work, and the questions pertaining to disability as such or the status of an animal in human society serve only as a background to that.

The biosemiotic premise that all living beings need to use signs for their existence and orientation in the environment (Uexküll 1940) serves as an ontological ground of the thesis. The individuals of a species are endowed with an innate or acquired repertoire of signs, the formation of which has been influenced by the sign systems of other species. This influence is exerted either directly — by perceiving one another and communicating with each other — or indirectly — by shaping the environment through processing and cultivating the objects that are important and meaningful for one's existence. Different sign systems are often hierarchically organised in a human society, with normality, efficacy and ability serving as the criteria of building the hierarchies. In the worst case, semiotic hegemony and the domination-submission relations which go along with that may induce a situation, which the Estonian paleontologist Ivar Puura has called a semiocide (Puura 2002), whereby a dominant sign system destroys out of negligence the meanings that are important for the other. The more so it is important and interesting to pay attention to beings and phenomena which untie such hierarchies and thereby undermine their validity. The guide dog team does not correspond to the conditions of normality imposed by the society and human environment, which is evinced by their definition in terms of negation (as non-seer and non-human respectively). But the different grounds of these negations result in a short circuit when brought together. When together, the two subjects cannot so easily be classified under the pre-existing

categories of difference or 'the other'. Hence, the activities of a guide dog team carry a much more extensive meaning than animal aided movement. The co-presence of those two subjects initiates a positive semiotic force, which contrary to semiocide, results in something that could be tentatively called a 'semiolution'. This neologism should on the one hand refer to the need for a dissolution of the monosemiotic conditions of normality. On the other hand, the concept should present a resolution of the mutually enforcing existence of beings with multiple systems of signs as the ultimate origin of semiotic diversity.

1. ANIMAL ASSISTANCE: CONCEPTUAL SCOPE AND IDEOLOGICAL IMPLICATIONS

Guide dogs are assistance animals in the strict sense of the term, i.e. they assist people with physical disabilities (DeMello 2012: 201). Along with therapy animals, assistance animals form the other major group of animals whose function has been explicitly defined in terms of help (Phillips 2015: 295). However, the term 'assistance animal' is defined differently in different legislative documents, by the assistance animals organisations and researchers (see Parenti *et al.* 2013). Most commonly the term is used as a synonym to 'service animals' to denote animals who are trained to assist disabled people. The other animals (besides guide dogs) who are trained for assistance purposes include signal dogs, who assist people with hearing disabilities; mobility dogs, who help people with impairments that effect mobility; and seizure alert dogs, who predict or respond to seizures. Dogs are the number one assistance animal species and although different species have occasionally been trained or used for different assistance purposes, even in legislative terms dogs account for the only acknowledged species of assistance animals (see e.g. Americans with Disabilities Act). The other use of the term 'assistance animal' also encompasses working animals who assist humans in their work tasks (police dogs, rescue dogs) (Coppinger, Coppinger 2002: 253–270). The term acquires an even wider scope if sports and recreational purposes of animals are included, as in the following functional categorisation listing the animals under the assistance function (Parenti *et al.* 2013): (1) service animal; (2) public service animal; (3) therapy animal; (4) visitation animal; (5) sporting, recreational, or agricultural animal; and (6) support animal. In an even more general sense, animals have assisted humans by expanding and transforming their scope of sensory and motoric outreach for several purposes from the onset of human history.

The widening of the scope of animal services and animal assistance has been criticised in relation to its specific ideological bias – as another instance of human dominionism and exploitative endeavors (Malamud 2013). A parallel could be drawn with the shallow ecological principles in environmental debates (*sensu* Naess 2003) expressed in concepts such as 'ecosystem services', 'natural capital', and 'ecological goods'. According to Alf Hornborg, those conceptualisations of nature by modern scholars "reveal the […] basic modes of relating to the world that characterise the social contexts to which they are respectively accustomed" (Hornborg 2003: 106). When observing the ecosystems as well as animals in market economic terms, the benefit that humans are to receive either from living and/or non-living entities is stressed while other meanings or values of their existence, either for themselves or for other beings, are downplayed. The parallel can be fetched even further, as just like the services of ecosystems for humans can be enhanced via a combination of scientific and technological interventions, so can the potential of animals as service providers for humans be raised through taming, breeding and training. Although the ideas of 'ecosystem services' are attached to the striving for sustainable resource use, the value of

ecosystems in economic terms is related to the impression that they, in and of themselves, without any human input in the form of labor or capital, offer a whole array of benefits, and thus appear to be free of charge or low-cost services. In a similar vein, the beneficial effects of animals on human physical and mental health have been discussed in the framework of low-cost approaches to human health (L'Abate 2007).

The instrumentalist connotation that the wide application of the idea of animal assistance brings along acquires an even stronger emphasis if animals are seen not only as beings who provide humans with the benefits they desire, but also as means to access other resources. In that light, animal assistance is as if incorporated to an expansionist technological endeavor, even though the resource acquiring capacities of animals remain far behind those of fuel-driven machines. If taken as an instance of 'zootechnology', assistance animals acquire the role of a human 'extrasomatic mechanism' (*sensu* White 1959)[1] and become another instance of the specifically human exteriorisation of the functions of organs through technology (*sensu* Leroi-Gourhan 1993).[2] Although the term 'assistance' should ennoble the animal as a subject of generous deeds, it in fact glorifies only the human subject him/herself. Humans maintain their dignity while using animals for non-trivial purposes, i.e. not just as resources that satisfy their primary needs. A naturalisation of the animals' volition to serve humans is behind such an image of the 'noble animal'.

However, the previous lines of thought are built on a very specific image of man, who sees any natural object or entity as a raw material which needs to be shaped after his/her own face. If the idea of animal assistance was related to the ideological biases brought above, then there would be no justification for making qualitative differences between the kinds of relationships humans are having with the animals. What the possibility of interpreting animals as human extrasomatic mechanisms helps to highlight, however, is that the difference between the kinds of human-animal relations runs not necessarily along the lines of functions (food vs. assistance), but along the mode of including or excluding certain animals in the (human) semiotic realm. If seen as extensions of the human body and mere mediums of resource acquisition, assistance animals would have to be silenced and placed at the low end of semiotic abilities, while seeing them as partners of communication would place them at the other end of the scale. This observation is confirmed by Thomas Sebeok's stress on the difference between two kinds of training, initially made by Heini

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[1] The American anthropologist Leslie White defined culture "as an extrasomatic mechanism employed by a particular animal species in order to make its life secure and continuous" (White 1959: 8).

[2] The French anthropologist André Leroi-Gourhan has drawn a parallel between the separation of a word and object in human language and the separation of the tool and hand as crucial for the development of human technology. Leroi-Gourhan hence concludes: "The whole of our evolution has been oriented toward placing outside ourselves what in the rest of the animal world is achieved *inside* by species adaptation" (Leroi-Gourhan 1993: 235).

Hediger — apprentisage and dressage — which exhibit very different kinds of human-animal relations. Depending on whether the animals are subjected to an apprentisage type of training, where the human-animal bond is insignificant, or whether they are engaged in dressage, which presumes intense emotional involvement from both sides (Sebeok 1994: 71), the animals' semiotic abilities can be expressed and brought out very differently in the two training procedures.

As shown in paper IV, when guide dogs move from one physical and social space to another, their position in this semiotic scale is also shifted. They enter contexts in which the border between inclusion/exclusion is drawn in different places, indicated by a change in the characteristics that are highlighted by the same animal (e.g. as a potential inducer of allergic reaction or as an intelligent mammal). As is demonstrated in the thesis, this is not a simple matter of epistemological shifts, but bears relevance for the very ontology of the team — to their identity, action and position in society.

While the previous paragraphs pertained to the ideological framing of assistance and assistance animals, then a different context is needed to delimit 'animal assistance' from the guide dog handler's own perspective. Such a context is provided by the alternative and contingent mobility aids – either other human beings and/or various technological and mechanical devices. Different mobility aids are often employed simultaneously as complements to one another by the visually impaired persons (e.g. obstacle detectors identifying obstacles above the chest of the person and beyond the perceptual field of the dog; tactile maps allowing to plan the route; and GPS devices telling the turns that the person should take). Thus, there is a whole nexus of technological devices, humans and animals that can extend and modify the sensory field of the visually impaired person.

The devices also exhibit significant differences in their meanings, which extend far beyond their primary functions. Animal assistants allow their handlers to gain independence from other humans when carrying out their daily activities, contributing to the attainment and maintenance of human autonomy. In this sense, they come close to the technical vision aids that allow humans to gain access and process the resources they need, or to simply expand their perception of environment without dependence on the presence of other human beings. Viewing animal assistants and human helpers as part of the same category reveals their differences from technical devices. Like humans, animal assistants are not simply passive channels of resource acquisition, but interactive subjects who are addressed on their own accounts as well. The guide dog and the technical vision aid are also different in terms of their effect on the cognition of the blind person. Guide dogs can be considered as being part of the extended cognition for the blind — they can offload some of the cognitive tasks to the dogs and save their attention for other things besides movement. In contrast, the technical aids place additional cognitive load on the person. The devices lack the cognitive filtering ability characteristic to the dogs and therefore transmit redundant and unnecessary signals to the human. The combination

of the two meanings of a guide dog — as a communication partner and as an extender of human cognition and perception — makes them a unique instance of sensory and mobility aids, through which the human perceives not just via the animal, but together with the animal.

2. THE HISTORY AND BASIC PRINCIPLES OF GUIDE DOG TRAINING AND WORK

The first documented reports on assistance animals concern guide dogs, followed by those on hearing dogs and psychiatric service dogs (Parenti *et al.* 2013: 746). Since the history of guide dogs has been covered by several authors, both on national as well as international scale (see Hännestrand 1995; Calabrò 1999: 3–75; Stork 1988; Fishman 2003; Haupt 1958; Ostermeier 2010; Steinbach 1988; Baár 2015), and is also briefly handled in the articles of this thesis, only the major courses of development and turning points will be outlined in the following paragraphs.

The history of guide dog training dates back to the times of WW I, when the first dogs were trained in 1916 in Germany at a guide dog school in Oldenburg to assist visually impaired soldiers (Haupt 1958: 13; Stork 1988: 51; Baár 2015: 87). The first attempts of guide dog training in France were also related to military institutions, where in 1917 training was undertaken with the support of War ministry (Hännestrand 1995: 133). In Germany, the first guide dogs became available for civil blind people in 1922 (Hännestrand 1995: 123). After the establishment of guide dog training in Germany, the training and use of guide dogs as seeing aids spread all over the world. Although in Germany, the Oldenburg School yielded several branch schools, it was the opening of a school in Potsdam in 1923 that was to become a new milestone in guide dog training in Germany (Hännestrand 1995: 125–128; Stork 1988: 53) and an inspiration for the introduction of guide dogs to the USA (Ostermeier 2010: 588; Fishman 2003: 454). The use of guide dogs as mobility aids became more widespread among laypeople in the USA as well as Western Europe in the late 1920s and early 1930s. In the USA, The Seeing Eye Inc. started in 1929 in Nashville (Fishman 2003) and it can now proudly state that, with more than 75 years of existence, it is the oldest guide dog organisation today.[3] In the 1930s, guide dog schools were established in several European countries — UK, Belgium, the Netherlands, and Poland (Hännestrand 1995: 149–153). The duration of training a guide dog at that time was significantly shorter compared to modern standards. At the guide dog school in Oldenburg, the dogs were trained for only 1.5 months, with 4–6 weeks of training given to the handlers and some co-training in the handler's home place, while the Seeing Eye Inc. provided three months of training for the dog and two months for the handler at the end of 1930s (Hännestrand 1995: 156–157; Stork 1988: 52).

The onset of WW II led to an increase in the number of guide dog schools in the USA (Ostermeier 2010: 589). The first guide dog training facilities were also opened in the Nordic countries in the late 1930s and early 1940s (Stork 1988: 74), with Australia following in the 1950s. The post-war time brought along the spread of guide dog training in many industrially developed countries

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[3] Prior to the Seeing Eye, a few guide dogs were still trained already in the USA in the 1920s (Stork 1988: 55; Hännestrand 1995: 135–136).

(Hännestrand 1995: 177), but unlike the post WW I establishments, guide dog training itself was becoming unbound from the military institutions. Instead, the organisations of the blind themselves got more involved with the training (Hännestrand 1995: 177–178).

These days, the International Guide Dog Federation has 88 member organisations from 28 countries and European Guide Dog Federation has 36 members from 20 countries.[4] By no means do these figures feature the real number of guide dog schools and organisations in the world or in Europe, and such data is also not available anywhere. However, most European countries these days do offer guide dogs as mobility aids for the blind, although the training quality as well as the social acceptance and legislative protection of the teams varies considerably from country to country. Although the major stages of guide dog training are the same in most countries (the guide dog puppy spending his/her first year with the puppy walkers, training of the dogs at a guide dog school by the trainer, and training with the handler by the training facility and home place), the selection, training and examination of the dogs and the overall conditions and regulations under which the training takes place may vary. This is not just due to the preferences and schooling of the trainers, but also to the requirements of the organisations of the blind as well as governmental institutions (healthcare, social units) or insurance companies. That might concern e.g. the time of training or the inclusion or exclusion of the trainer from the introduction of the dog and the handler.

To illustrate the divergence in the organisation of training in different countries, I will use as an example the guide dog training in three countries covered in paper IV — Estonia, Germany, and Sweden. The phases that a future guide dog passes through before he/she is handed over to the handler are, in broad terms, the same in all three countries. How long each phase lasts varies slightly from country to country, but as the schools have to consider the needs of each individual dog that enters training, the training times of different dogs may vary significantly within one school. At the age of 2–3 months, the puppies are sent to the so called foster families or puppy walkers, who socialise them and who might also do some basic obedience training with the dogs. At the age of 12–15 months in Germany (in Estonia 14–18 months), they are taken to training at the guide dog school, which in Estonia lasts for 5–7 months on average[5], in Germany 6–9 months, and in Sweden a minimum of 6 months from the day it enters training to the day it is ready for the final test (Der Blindenführhund 2006; Hundgöra 2005). When the dog has acquired all the necessary skills of a guide dog, the co-training of the visually impaired person and the dog begins. In Estonia and Germany, the same trainer or school who trained the dog will also instruct the training of the team. In Sweden, the national organisation of the visually impaired (Synskadades Riksförbund, SRF) takes over all the

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[4] European Guide Dog Federation: http://www.egdfed.org/about (retrieved at 14.10.2015); e-mail communication with International Guide Dog Federation.

[5] SA Juht-ja Abikoerte Kool. *Juhtkoera kasvatus*: http://www.juhtkoer.ee/koerad/juhtkoer/ kasvatus/.

responsibilities from there on, including the training of the team. However, several Swedish informants of the current study had still been instructed by the same trainer who had trained their dogs. Several tests have been implemented in order to check whether the dog is ready to enter the next phase in his/her career as a guide dog. Guide dog schools in Germany and Estonia are allowed to train both mixed and pure bred dogs as guide dogs, but SRF in Sweden accepts only purebreds as guide dogs.[6]

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[6]   Interview with the head of guide dogs section by the Swedish National Association of the Visually Impaired Ulrika Norelius Centervik, 5.06.2013, Stockholm.

3. THE SEMIOTIC COMPONENTS OF GUIDE DOG ASSISTANCE

In the current thesis, the delimitation of the semiotic components of the guide dog work largely coincides with the research objects of zoosemiotics as "the study of signification, communication and representation within and across animal species" (Maran *et al.* 2011: 1). In order to be able to move as a team, the individuals of the guide dog team have to transmit perceptual information to each other through communication. Not all of the information perceived by a subject is transmitted to the other, but only the part that is important for the particular situation. Therefore, the sensory data pass through a functional filter before they are imparted. At the same time, perception itself is guided and directed by communication — i.e. one pays attention to those cues that are important to be transmitted to the other and which the former intersubjective interactions have directed one to detect. The transfer from one mode of semiosis to another is therefore not unidirectional — just as much as the perceptual signs are coded into communicative signs, so do the communicative signs direct one's attention to certain cues and meanings. Relying on that, it is important to observe the transitions of those two semiotic processes (perception and communication) and their influences on one another.

Although in strict terms the guide dog team consists of two individuals, their sign use and meanings depend on how they are encompassed into the social network of relations and values. In paper III of the thesis, a closer look is taken at how the sign use depends on different social contexts and also on the other beings to who the team relates. In paper IV, the social challenges of the team are analysed in more detail and various institutions and their norms that also pertain to guide dog teams are discussed. The architectural composition of urban space presents, in a material form, the same images of normal bodies and suitable bodyplans as the conscious or unconscious norms and prescriptions that regulate behaviour. The designed environment can hence be treated as an environment of expectations, which defines the systems of signs that correspond to its affordances. From this background, the example of the guide dog team demonstrates that the interests of beings with different sign systems meet on the same material objects. From there stems the need to pay attention to the question of how to produce such affordances in urban space that would allow for access with different systems of signs.

3.1. The transitions between perception and communication

In order to differentiate between human interactions with the environment as mediated by an animal and by a technical device, a distinction should be made between the semiotic processes that take place between subjects and between subjects and objects. In the first case, the semiotic activity is twosided, whereas

in the second case the whole semiotic activity departs from one organism only. This difference can be partly explained with the distinction between the semiosis of communication and perception. In the classification of the types of semiosis provided by Thure von Uexküll, the communicative signs are intentional and addressed, unlike the informational and symptomatic signs (Uexküll 1997: 449–450; cf. paper III of the thesis). In the current thesis, communication is understood as an addressed use of signs that is also recognised as such and that initiates a cognitive and behavioural intersubjective feedback chain. Thure von Uexküll distinguishes between the non-communicative signs — informational and symptomatic signs — depending on whether the source of sign or the object of perception is alive or not. However, he does not explain more specifically the difference between the two as the sources of signs. The signs that have their origin in a living being (e.g. symptoms) are the outcomes of biosemiotic activity, although they lack a direction and an addressee in a strict sense. Nevertheless, relying on Adolf Portmann's idea that the meaning of the outward appearance of an organism is its self-manifestation or self-presentation (Portmann 1990)[7], a conclusion could be drawn that the biological forms are addressed to oneself — as the primary forms of self-expression, they give shape to the self and at the same time make oneself accessible for the others. According to Portmann, the self-presentation of an organism takes place via its sense-perceptible structures. Although Portmann talks about the forms in which life presents itself already in the more simple animals such as transparent jellyfish (Portmann 1990: 21–23), he considers the development of an opaque surface of an organism as an origin of the further emergence of various perceptible forms (from various kinds of body coverages to all the colors and transformations of skin colors), which all could disclose the complex inner structures of the animal (Portmann 1960: 102–118). In this connection, Portmann writes: "This self-manifestation is in the service of the self-description of an animal type; furthermore, this self-manifestation conveys announcements concerning the change of the entire state through its changing appearance [...]" (Portmann 1990: 27). The self-presentation of an organism is of a (proto)semiotic character as far as it mediates the inside of the organism via its outward appearance, opening up a whole array of relationship possibilities. Accordingly, the difference between receiving non-intentional signs from living beings and from non-living objects could be expressed as a difference between semiotic processes which entail self-presentation (i.e. telling something about the state of the self-determining unit) and those that do not.

Recognition of the self-presentational component in the intersubjective interactions appears to be crucial for the assistance animals' work and intrateam communication. As demonstrated in paper III, the behavioural clues that signify

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[7]   Gregroy Bateson has pointed to a specific case of such non-intentional signals when discussing how sense organs themselves serve as the primary means of signalling or more specifically, as transmitters of messages about relationships (Bateson 2000: 370). The receptor function is thereby merged with the function of self-presentation (*sensu* Portmann).

the organism's aptness to respond to communicative signs is of utmost importance when designing the particular acts of communication. Moreover, ignoring the other's sign-relations which extend the particular task and opting for a strictly functional communication might lead to forms of self-presentation (protest) that will inhibit communication and correspondingly, the functioning of the informational semiosis with the environment.

Therefore, informational and symptomatic semiosis both belong to perception, but when it comes to the source of signs, the latter carries a potential for communication, which the first lacks. From the side of the receiver, the symptomatic semiosis serves as an indicator of the source's sign-relations, which are absent in the informational semiosis. Despite the apparently simple criteria offered by Thure von Uexküll for the delimitation of symptomatic and communicative semiosis, in real-life interactions, the border is much more fuzzy. However, probably uniquely among non-human species, dogs have learned to employ signs that signal the intent of communication (Kaminski *et al.* 2012; Téglás *et al.* 2012; cf. Prato-Previde 2014: 109–110). The use of the so called ostensive cues (eye-gazing, facing the addressee, etc.) affords confirmation of the addressedness and intentionality of the semiotic act and the classification of it as a communicative one.

Given the initial observation that the guiding of perception via communication and the dependence of communication on perception is constitutive of guide dog work, a question may be raised as to why and how are such links established. One of the roles of communication is considered by both ethologists and semioticians to be the regulation of social behaviour and the enhancement of the predictability of social situations. Communication provides the opportunity to specify what kind of relations the other has with some objects of the environment, to direct the other's behaviour in respect to those objects and also to regulate one's own behaviour according to the identified addressee and object relation. Charles Morris, for example, has described signs as means of behaviour control: "Signs in general serve to control behavior in the way something else would exercise control if it were present" (Morris 1946: 95).[8] The potential behavioural outcome predicated in different kinds of signification may or may not be realised, depending on other conditions. In turn, Morris has provided a classification of sign behaviour, depending on what is being controlled (the properties of the environment, the subject's needs or behaviour), which is in effect a typology of ways in which communication can guide the perception of another subject. Morris distinguishes between the identifying, designative, appraisive, formative and prescriptive components of signifying (Morris 1946: 60–91). As essential components in any sign-behaviour, they provide a sort of a semiotic algorithm of behaviour for the responsive organism, which contains a semantic, axiological and pragmatic component. These com-

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[8]   In ethological literature, for example, W. John Smith has turned attention to a specific type of signs that can raise the predictability of the addresser's behavior: "Most display messages make the behavior of the communicator to some degree more predictable by the recipient of the message […]" (Smith 1977: 145).

ponents form a basis for the classification of the modes of signification due to the fact that their presence varies to a certain degree in different acts of signification (Morris 1946: 63).

The claim of Morris that such a differentiation in the functions of signification is missing from the pre-linguistic signs of humans and other animals is confirmed by Jakob von Uexküll's treatment of animal umwelten. According to his umwelt theory, the meaning of an object is presented to an animal as a tone of the object, which is tied to the activity that the animal is to carry out in respect to it (e.g. eating, flight, attack). The tone of the object, in turn, is tied to the disposition (*Stimmung)* of the particular animal (e.g. is the animal hungry or saturated) (Uexküll, Kriszat 1934: 56–63). That the uncoupling of the 'perception' and 'action' component of signs is specific to human sign practice is demonstrated in the studies with dogs E. Sarris conducted at the Institute of Umwelt research (Sarris 1931; 1934). A 'chair' as a merely perceptual category or a neutral object *(Gegenstand)* (Uexküll, Kriszat 1956: 106) is something specific to humans, whereas it serves as an indication of action possibilities for the dog (and mostly also for humans). As the recent studies on canine cognition have demonstrated, dogs are indeed capable of memorizing a remarkable number of word-object associations (Fischer *et al.* 2004; Pilley, Reid 2011), but that takes place only after being within the human set frame of training and even here, retrieving or pointing might be the activities that subsume the objects into one activity-based category. In their daily actions, such a need to remember things 'for their own sake' is simply absent from the umwelt of the dog. This does not mean that only one kind of activity would be attached to the same sign-vehicle. The meaning of the word is not contained only in the form of the word itself, but in the whole expressive behaviour of the human as well as in the situation in which communication takes place. As indicated in paper III, the guide dog users have often developed special extralinguistic means of communication that should signify the urgency of certain behaviour as well as specify its form. Hence, as demonstrated in paper III, the classification provided by Morris can be applied when the human addressing behaviour is observed (e.g. prescription addressing directly the dog's behaviour, whereas designation refering to the object of behaviour), but it is hard to discern those different types of signification by the response of the animal or also in cases when the animal addresses the human.

Charles Morris' typology of significations was thus built around the ways in which communication can be used to guide the organism's relations with some objects. In contrast, Gregory Bateson proposes that the relation with some objects external to both interlocutors is secondary in comparison with the function of communication to keep up the relationship itself: "What I am trying to say about wolves in particular, and about preverbal mammals in general, is that their discourse is primarily about the rules and the contingencies of relationship" (Bateson 2000: 366–367). In this sense, the mediation of perceptual information can be engaged in the service of the specification of the state of the relationship of the interactors and whichever form of communication is primari-

ly used as a constant update about the mutual social positioning. The feedback to the other counterpart's activities is hence not necessarily utilised for the enhancement of the referential function, but for the upholding of the relation between the two subjects beyond the specific tasks of assistance.

3.2. The functions of animal communication
in guide dog work: from contact to reference

The major zoosemiotic classifications of the functions of animal communication take models of human linguistic communication as their departure points. Roman Jakobson's and Karl Bühler's models of language functions and speech acts have served as the major grounds for further elaborations (see Sebeok 1972: 13–17; 63–83; Martinelli 2010: 77–81). Jakobson's classical functions of language encompass the following functions: expressive (directed to the sender), conative (directed to the receiver), referential (directed to the context), phatic (directed to contact), metalinguistic (directed to the code of the message) and poetic (directed to the form of the message) (Jakobson 1960: 353–357). Which of these are only proper to humans and which are shared by other species has been a matter of debate in zoosemiotic discussions. Dario Martinelli, for example, has described all of those functions of communication by animals, adding to them a cognitive function (relying on Felice Cimatti), i.e. refering to the fact that communication and the ability to communicate influences the cognition of animals (Martinelli 2010: 77–81). Thomas Sebeok, on the other hand, has claimed that the poetic and metalinguistic functions are present only in human communication (Sebeok 1972: 17). The ethological debates about animal communication and its message have for decades centered around two of those functions — expressive/emotive and referential — and their presence or proportion in the communication of different animal species. Unlike the zoosemiotic treatments, the ethological debates have often seen the two functions as exclusive of one another.

In this thesis I have analysed which functions of communication are highlighted in the work of the guide dog (paper III) and how those functions influence one another (papers III, IV). According to the findings of paper III, the two principal functions of signs that appear to be central for the guide team's work are the maintenance of the communicative situation itself and the mediation of significant objects and their meanings to the other counterpart. The latter is called referential communication in zoosemiotic as well as ethological literature. Usually referents are taken to be the objects which are outside of the addresser, but some authors treat as referents also the physical characteristics, internal states and behaviour of the addresser (e.g. Smith 1981). The definition of the referential dimension of the message, as used by zoosemioticians, rather coincides with the narrower definition of reference: "The referential dimension of message can be formulated as the link between the message and something in

the environment that is external to the message and that the message stands for" (Maran *et al.* 2011: 105).

Some ethologists have argued that animals cannot refer to something outside of themselves and in the seemingly referential communication, they express simply their motivational or affective state (pain, aggression, hunger) (Smith 1969; Marshall 1970). However, more studies confirm that animal communication contains an affective as well as a referential component (Kroeber 1952; Marler *et al.* 1992; Hauser 1996: 473–522; Manser *et al.* 2002). In the ethological literature, the term 'functionally referential communication' is used to denote the latter (Marler *et al.* 1992: 68; Macedonia, Evans 1993: 180; Miklósi, Polgardi 2000). The term is used in order to point to the functional similarity of the referential communication of animals and human referential communication, as in both cases, it is possible to determine the original context on the basis of the structure of the signal (Hauser 1996: 509). By refering to the animal communication as 'functionally referential', a possibility is preserved that the referent in human and in animal communication is different. Tim Ingold, for example, has stated that if for animals, the objects of the outer world are the referents, then for the humans this is constituted by the internal world of concepts (Ingold 1994: 94). Another reason why animal communication has been cautiously named 'functionally referential' is that only the behaviour of the addressee is taken into account by the definition (Seyfarth, Cheney 2011). Dorothy Cheney and Robert Seyfarth, who studied the communication of vervet monkeys, have concluded that these animals act as if the acoustic warning calls that their conspecifics produced would signify different predators, but there is no proof that they would thereby understand the referential connection between the calls and the characteristics of the objects or would interpret the sounds of the source as the representation of the emitter's knowledge about something (Seyfarth, Cheney 2011: 161). By defining the functionally referential communication through the addressee, one does not have to assume that the sender wanted to inform the other about something (Manser *et al.* 2002).

If referential communication is, per definition, important for the guide dog team's movement —one needs to inform the other about the objects on the path and about their meaning — then the significance of phatic communication is less obvious and a question may be raised: why does the team need to pay special attention to this function? In terms of the reasons of the use of phatic communication, this is related to the specifics of guide dog work (the need for concentration, special tasks), but in terms of the origins of the function, this stems from the ability of dogs to make use of human like social skills. In principle, this is an instance of the partial adoption of an intraspecific communication system for the purpose of interspecific communication. In the past decades, several ethological studies have focused on the ability of dogs to attend to the communicative behaviour of humans (e.g. Hare, Tomasello 2005; Cooper *et al.* 2003). The human like social skills distinguish dog's cognition from that of the primate's, who are otherwise more advanced in several tasks, which demand higher cognitive skills (Hare, Tomasello 2005). Human behaviour, in-

cluding the facial expressions, gestures and speech offer for the dog important cues to reach significant objects. It has been demonstrated that dogs find food that has been hidden from them, relying on the gaze of the human (Téglás *et al.* 2012; Soproni *et al.* 2001), on pointing (Soproni *et al.* 2001; Scheider *et al.* 2013), on head orientation towards the object (McKinley 2000) (for a review see Kaminski, Nitzschner 2013). Many of those communicative skills are related to the dog's attendance to human visual cues. As such skills are of little or no use for the communication of the guide dog and visually impaired handler, alternative means and channels are needed for the establishment and maintenance of communication.

Roman Jakobson, who delineated the functions of language, already claimed that the accessory participation of other functions, besides the predominant one, should always be accounted for by the observer of communication (Jakobson 1960: 353). Bearing this in mind, paper III of the thesis sheds light on how one function of communication can become a frame of meaning for another. Expressive function is often necessary in order to adequately understand the referential plane of meaning (the dog's body language indicating whether she/he is currently relying on sign relations specific to his/her work or not). Phatic communication appears to be important to make the other responsive to referential communication in the first place. Conative function provides the ability to delimit the message as directed to this particular subject and highlight its relevance on the background of other potential sources of information. Such a mutual framing of the different functions of communication in real-time interactions of the subjects indicates that the former separation of the functions of communication can be done only as a result of abstraction from the situation to which they are essentially tied. As indicated in paper III, in real-time communication, the gathering and transmission of information is centered around specific situation-task complexes (e.g. whether one wants to go to a familiar shop, to a cafe in a foreign town or simply take a walk in a park) that specify the following: the additional sources of signs needed to reach the target; the application of the previous knowledge about the situation; the expectations about each other's behaviour; and the place-specific norms delimiting the accepted forms of interactions. This is better captured by Gregory Bateson's delimitation of communicative situations via a reference to the circuits of information flow (Bateson 1973: 434). The Jakobsonian and Batesonian segmentations of communication are conducted along different lines — one draws the lines of distinction within an act of communication, whereas the other places the communicative situation within a larger whole of an informational setting. However, they are not just different levels of a unified hierarcy, and a simple transition from one to another is not possible without additional modifications. As suggested above, one amendment that would ease the transition concerns defining different functions of communication, not only through the components of the communication act, but also through their contextualising role for one another. This opens up the opportunity to describe the constellation of com-

munication functions that is formed to extend from one state of organism-environment complex to another.

3.3. Spatial and social aspects of guide dog assistance

Jakob von Uexküll has treated the material environment or medium as one out of four spheres of meaning that all animals share (the other three are partner, enemy and food) (Uexküll, Kriszat 1956: 110). The objects that carry the meaning of a medium are a part of the animal's umwelt and depend on the specific spatial and temporal categories of the subject. According to umwelt theory, the perceived characteristics of the medium and the responses to them depend primarily on the organism's own biological characteristics. The physical properties of the environment, which initiate certain perceptions and actions, along with the possibilities of meaning that have been inserted into the environment from the activities of the other beings, are not refered to by the concept of umwelt.[9] In order to turn attention to the role of the properties of the environment as the shapers of the organism's activities, the umwelt concept of Uexküll has been occasionally supplemented with James Gibson's concept of affordances denoting the features of environmental objects that offer certain activities for the organism (see e.g. Barrett 2011: 98; Dawson *et al.* 2010: 6; Rosa 2007: 220). Given that affordances point to individual actions, and umwelt in Uexküll's works mostly refers to the whole set of cues that the organism attends to, it would be more sound to set Uexküll's functional cycles on a comparative ground with Gibson's affordances. It is Gibson's definition of a niche as a set of affordances (Gibson 1979: 128) that rather evokes associations with umwelt if the latter is defined "as *a set of relations an organism has in an ecosystem*" (Kull 2010: 353). In this sense, the ideas of Uexküll and Gibson appear as two-sided descriptions of the environment-organism coin.[10]

An implementation of the ideas of both authors has been later suggested for design and architecture (for Gibson see e.g. Maier *et al.* 2009; for Uexküll see

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[9]   However, Uexküll's reflections on the composition of nature and the meaningful relations of various organisms as points and counterpoints gives a clue to how different organism and their products can be subjected to the same meaning rules (Uexküll 1940).

[10]   However, the transition between the concepts cannot be done without theoretical concessions, as Tim Ingold has pointed out. Whereas organisms take up the meaningful properties of objects in Gibson's rendition, they bestow the meanings upon the objects departing from their needs according to Uexküll (Ingold 2011: 79). A specification should be made to Ingold's claim, though, as affordances are not simply "inherent potentials of environmental objects" (Ingold 2011: 79), but despite their indifference to the actual attendance of organisms, they are still defined in respect with certain body plans and hence their potential is in the end also revealed only through relations with the organism. As Gibson himself has emphasized: "[...] an affordance is neither an objective property nor a subjective property; or it is both if you like. […] It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither" (Gibson 1979: 129).

e.g. Charrington 2012). The application of the concepts to architectural solutions would create the possibility to elicit certain activities in particular places; to take into account the simultaneous presence of different body plans and activities in the same place or their concentration in different places, and accordingly construct buildings or infrastructure that are open or specialised in terms of their functions and forms. Together with the question of physical accessibility to created environments, the question of social affordances and accessibility is raised. This concerns a further semiotic delimitation of the space of movement, which extends its primary 'use value'. The task of the guide dog is to guarantee to the visually impaired person physical access to certain places, but the significance of the latter is determined through their relevance to the human being's social existence. As George Canguilhem has pointed out in his treatment of normality, human norms are primarily "determined as an organism's possibilities for action in a social situation rather than as an organism's functions envisaged as a mechanism coupled with a physical environment" (Canguilhem 1991: 269). Hence the material constraints cannot be fully untied from their social embedding, which defines their meaning for the particular subjects.

It has been proposed that the built environment should ease the coordination of people's behaviour and reduce its unpredictability (Rapoport 1990: 61). Even if perception and movement in their physical form procede without problems, the adaptation to the dominant schemes of interpretation may remain problematic for the guide dog team. The contact with the social schemes of behaviour that have been inserted into the built environment can result in different outcomes. The legislative grounds as well as people's awareness about the specifics of guide dog assistance may guarantee that the presence of the team is inscribed into different places. In some cases, this means that the team is allowed to divert from the social prescriptions of the places (e.g. an animal in a food store). The presence of a guide animal can also induce the relaxation of the social frames of interpretation *in situ* (the dog as a pretext for foreigners to start a conversation with the visually impaired person). On the other hand, the regulations of behaviour in certain places can be so rigid that they close off exceptions of interpretation (one does not enter a food store with a muddy animal). Furthermore, the specifics of an animal umwelt and the differences of meaning in comparison with humans can cause a clash with the scheme of interpretation that has been inserted into that particular environment (the dog reacting actively to the attractive smells of a restaurant or rubbish bin). Which of those potential scenarios is realised often depends on whether the dog is seen primarily through his/her function as an assistant of a disabled person, through his/her role as the closest non-human companion to humans or as an animal that embodies nature, which is opposed to humans and culture.

Depending on the social situation, the dog is not only a helper of a visually impaired person, but also a potential danger to human health, a dirty animal, etc. These meanings do not necessarily, but may obstruct the dog in carrying out his/her work if expressed in people's behaviour. The guide dog team is in many

senses, a phenomenon that crosses the borders of different social categories and through the team, several values and rights that have so far been taken as complimentary may be revealed to be on conflicting terms. As pointed out in paper IV, the major contexts that determine the reception of guide dog teams are pet culture, healthcare, the rights of disabled people and religious taboos. The diversity of meanings in these contexts in turn stems from different understandings of human-animal relations, through which the spatial, breeding historical and ontological reasons might be distinguished. Different (institutional) spaces contain different rules about the coexistence of humans and animals (a hospital vs. a city street). By marking and materialising different rules of behaviour and criteria of belonging, they signal to the guide dog team their inclusion or exclusion from the set of meanings that have been inserted into the environment. The diversity of meanings that is related to the breeding history of the dog stems from the fact that humans have used the same species, breed and sometimes even individual for different purposes. Although labrador retrievers, the most popular guide dog breed these days, are bred in special kennels, their former function as bird dogs is still present in their behaviour. On the one hand, the earlier breeding history of the animal has given them the psychological and physical characteristics that make this breed suitable for the function of guiding (through a sort of an artificial exaptation), but on the other hand, such characteristics may inhibit the carrying out of the current task (the heightened interest of labradors towards water fowl). The ontological reason of the plurality of meanings is related to the understanding of the ontological status of the other as an animal. The interpretation of the guide dog work in terms of serfdom, or vice versa, of liberation, stems from the tying loose of the animals from human culture and the attribution of some independent animal essence to them, the expression of which the guide dog's worktasks either inhibit or bring forth.

The fluency of the guide dog team's movement depends not only on their ability to perceive the spatial cues of the environment, but also on whether and how their perception and interpretation of space matches with the interpretations of the other beings. Since the dog mediates to the handler only some of the environmental cues that are accessible to a human who can see, these may not be enough to catch the constellations, arrangements of objects, expected modes of behaviour and frames of meaning that are captured in them (e.g. the placement of chairs in a room and the expectations for social roles expressed in such a simple phenomenon). The dog cannot supply the human companion with the additional information that would help to specify the conventions of behaviour proper to the situation (e.g. where someone in the room is sitting or what is he/she doing) (cf. Windsor 2004: 195). In order to understand the social situation that is mediated by the space and the material objects, additional communication with the other humans is necessary. This helps to shape ideas and expectations about the spatial and social whole where one is staying. At the same time, the entrance of a guide dog team into certain places may initiate a change in the schemes of interpretation by the other humans (e.g. the social hierarchies expressed in the spatial placement of objects are put aside and the

arrangement of objects is seen in terms of accessibility as such). A change may also be brought about by a spatial rearrangement itself (things are placed so that the team could pass them; the chairs are brought into one place so that they can be easily found).

Cultural knowledge about the meaning of certain places itself forms a context of communication, contributing to the generation of messages. In other words, the general meaning of a place eases the formation of guesses and expectations about the particularities of the place and makes it possible to specify which messages can be meaningful in this particular instance. Hence, places allow one to predict the presence of certain items and configurations of objects even if perception is not involved (e.g. benches, patches of lawn, criss-crossing sidewalks in a park). This is related to the fact that spatial meanings are defined through certain activities and accordingly, one can expect to find certain objects and placement of objects which support the activities. Such reliance on spatial meanings when formulating messages for the other counterpart is also of importance for the guide dog teams — the handler can give certain commands or ask the dog to carry out some tasks even if she/he does not exactly know if the element that she/he mentions is present. The dog, in turn, can answer by specifying the spatial situation with his/her behaviour.

Finally, a question is to be raised as to the significance of the artistic meanings of urban environment for the guide dog team's movement. The characteristics of architecture and urban design as instances of art is the dislocation of habitual affordances, or a play with the habitual ties between form and content. In his ecological semiotics, Luke Windsor has brought out how the essence of art lies in the play with the different affordances of the same object and the replacement of the habitual affordances with the affordances of art (Windsor 2004: 195). Artistic affordances, which claim to transcend ordinary perception, may turn out to be forms that carry primary perceptual-motoric meanings if a being with a different perceptual apparatus gets into contact with them. The elements of design, which do not follow the dictate of function from the position of one body, may be subjected to the functional constraints from the position of another. Therefore, there are no universally function-neutral forms just as there are no universally aesthetic forms.

4. A RECONSIDERATION OF THE UEXKÜLLIAN APPROACH TO GUIDE DOG ASSISTANCE

According to a core assumption of the thesis, a change in the individual usage of signs or semiotic activity of the two members of the guide dog team is necessary for their successful and smooth cooperation and movement. This is an insight stemming from Jakob von Uexküll's umwelt theory and Uexküll's and Emanuel Sarris' work on the methodology of guide dog training. Despite the foundational meaning of this claim for the current thesis, it soon became clear that its underpinnings need to be expanded, reconsidered and elaborated beyond what Uexküll proposed in order to understand the semiotic grounds of the guide dog team's activity. It followed that the theoretical premises of the thesis keep an Uexküllian twist, but aim at developing a framework that would encompass distinctions between different semiotic processes, highlight the contribution of different subjects to the semiotic composition of the guide dog work and describe the subdivisions of umwelten that are brought forth in such a form of assistance. In order to proceed with the elaborations, Uexküllian ideas about the functioning of the assistance animal and human team are first placed within a wider context of extensionalist interpretations of organism-environment relations. Although the latter has so far largely laid its focus on the ontology of organismic existence, the particular human-animal relations can be seen as a special case within it.

While denouncing the exhaustiveness of extensionalist explanations of umwelt change, it is argued below that the mechanism of reaching a partly shared and partly novel set of signs and meanings is a result of an intricate entanglement of communication and perception processes originating equally from both subjects involved in the cooperative movement. It is further stressed that the umwelt change cannot entail the total replacement of the repertoire of signs of one species with that of another, but instead, the guide dog and human interactions are founded upon a multi-layered set of meanings.

4.1. An extensionalist approach to guide dog and human interactions

One way to interpret the mutual relations of the guide dog team members is to see one counterpart as a sensory and motoric extension of the other. The extension can be the dog as well as the person. An image of the guide dog as a replacement of the visually impaired person's seeing organ reaches back to the times after WWI. At that time, guide dogs were sometimes considered as a type of prosthesis, which, while included in the rehabilitation plan of the injured soldiers, had to contribute to the return of those people to the social daily life (Baár 2015: 87–88). An animal as a living being with his/her own umwelt is set to the background in these treatments.

At the same time, the primary agent of the team can also be the dog, in which case the human becomes a passive attribute of the animal. This image has stemmed from social, political as well as organism philosophical grounds. According to Bo Hännestrand, in the early years of guide dog training in England, the guide dogs were represented as car drivers who are driving around their employers — the latter could concentrate on other things as a result (Hännestrand 1995: 121). The incentive of such an image was the wish to get rid of the stigmatised relation between the blind person and the dog (which originated in the image of the beggars and beggar dogs) and instead, implement an image of a blind man and his/her guide. Hännestrand notes that a similar image was cultivated by the U.S. guide dog organisation Seeing Eye in its early days, which enforced the myth of a guide dog as a super animal with the aim of raising the financial basis of the organisation through voluntary donations (Hännestrand 1995: 369).

A biosemiotic explanation to the 'active animal-passive human' image was given in the 1920s and 1930s by E. Sarris and J. v. Uexküll. According to Sarris and Uexküll, dogs can best take into account the properties of the environment that are important for the blind when they tie the persons with their own body plans (Sarris 1935; Uexküll, Sarris 1931; cf. paper I of the thesis). However, the attribution of meanings to the environment must have still taken place from the standpoint of the human, leading to a paradoxical solution, as in order to bring the meanings of the blind person to the dog, the human him/herself was turned into a mechanical and passive supplement of the dog.

The guide dog training methods that Uexküll, Sarris and their colleagues developed were based on Uexküll's umwelt theory and on the possibilities of umwelt change as presented in this theory (cf. Linask, Magnus, Kull 2014). According to umwelt theory, the acquisition of novel perceptual and motoric cues should go hand in hand with the bodily changes of the organism. In their articles about guide dogs, Uexküll and Sarris do not talk so much about the learning of guide dogs, but about the changes and changing of umwelten. The transformation of an umwelt may be related to the development of the organism or to the shifts in its physiological states, but it is also possible to bring about an umwelt change through an artificial modification of the body and a cognition of the body (see also paper I). Hence a cart, which was to imitate the body of a blind person, was constructed and attached to the dog in order to bring about such a change in the body plan of the dog (Sarris 1935; Kiep-Altenloh 1944). While moving with the cart, the dog had to learn to attend to new meanings and turn attention to new properties of objects. When the training with the cart was finished, the 'phantom man' was replaced by the visually impaired person and the dog had to continue carrying around the person just like he/she had done with the cart. Thus, the dog had as if adopted the umwelt objects of the blind person and, as an independent being, did not need feedback from the person but got it directly from the environment. The handler was of course still giving the commands and instructions, but the dog was independent in establishing a connection between the representamen and the object. In one stroke, the

incorporation of one organism to another's body plan extinguished a possibility of twoway communication between them.

Taking the guide dog as an extension of his/her handler assigns the dog a similar function to the white canes, electronic sensory devices and other sensory aids, although the objects that are detected by the dog may be different. The contact with the environment that would take place via the mediation of the animal would, in this case, be an instance of the informational semiosis (*sensu* Thure von Uexküll) and not communicative semiosis. The commands that are given to the dog would then function as the on and off switchers for the fulfilling of some task. The dog would serve as a transducer, attending to some environmental cues and transposing them into another form. A communication that is through and through prescriptive and does not contain two-sided feedback ceases to be a communication. Furthermore, the studies that compare the benefits and drawbacks of moving with a white cane vs. a guide dog often bring forth the social functions of the guide dog, but the fact that they are semiotically very different phenomena is not highlighted enough.

According to the extensionalist approach, the ultimate aim of guide dog aid is the expansion of the sphere of activity of one counterpart of the team with the help of the other (in a more widespread version, it's the dog which expands the human side). In a more general sense, such an understanding is an instance of the 'extended organism' idea, which also treats the activity of organisms as an accommodation of the environment to the needs of self. The origins of the extended organism concept are related to the works of 19th century philosophers William James and Ernst Mach, although the question about the borders of an organism is handled in this regard at the beginning of the 20th century (cf. Rattasepp 2010). Among others, the mid-20th century works of the American psychiatrist Andras Angyal have also been expanded upon as instances of the extended organism paradigm (Rattasepp 2010: 33–34). Angyal distinguished between the heteronomic and autonomic processes of organisms, refering thereby to the different sources of governance of those processes. Autonomic processes are based on 'self-governance', while heteronomic processes are subjected to government from the outside (Angyal 1941: 37–39). Therefore, heteronomic processes (e.g. gravitation) function as the limits of the autonomic processes (e.g. of movement). If heteronomy is the external obstruction to actions, then an extended organism expands the borders of autonomous activity. By adapting the environment to oneself, a stability in the environmental parameters is created (e.g. by creating a microclimate, which suits the needs of the organism, by concentrating the resources) and the need for the constant and abrupt change of the self is reduced. The process of self-expansion, which Angyal has described as unique to life, takes place in two directions — the organisms incorporate something from the environment (assimilation) or they turn some objects in the environment into tools, which fulfill some of the functions necessary for the functioning of the whole organism (Angyal 1941: 27–29).

The idea of the extended organism has been developed in different directions: J. Scott Turner has discussed it on an energetic note (Turner 2002) and Richard Dawkins has done the same in an evolutionary frame (Dawkins 1982). The Gaia hypothesis, as presented in the works of Lynn Margulis and James Lovelock, and Vladimir Verndaski's concept of biosphere, which explains the functioning of the global biochemical and ecological networks, can also be taken as instances of an extended organism approach (Vernadski 1998; Lovelock, Margulis 1974). In both cases, the living beings create through their life activities the environmental conditions that are suitable for persistence, guaranteeing at the same time the functioning of the organic world in its dependence on the diveristy of life forms. Specific interspecific relations have also been handled within the framework of extended organism (e.g. the termites and the endosymbiotic bacteria in their guts) (Turner 2004: 58). In these cases, one organism helps the other in its acquisition of the resources that it needs.

Within an extensionalist frame, the guide animal aid is in effect a restoration of a regime of autonomy, which is based on certain relations. The need of help of the organism is, in this case, defined through its separation from some interactions that should be restored for the sake of normal functioning. In order to achieve this target, a new subject has been involved in the network of relations, who should contribute to the restoration of the functions that are considered to be normal. This also means that the person has entered a novel state of autonomy, which contains the relations with a new subject. The fact that this is not a technical device created by humans, but another organism who implicates new meanings and values, brings along a need to rethink the prior values and meanings with his/her existence in mind. This reveals the other side of extensionalism, which was left untouched by the phantom man method — the extension of the self also means a limitation of the self, i.e. the delimitation of one's own meanings by departing from the needs of the other being on whom one depends.

4.2. Paired perspectives and multi-layered umwelten

In different papers of the thesis, slightly different terms are used to indicate the changes in the umwelten of the guide dog team members. Paper I discusses the possibility of one organism to have multiple umwelten. Relying on Uexküll's own statement that in the guide dog work, "*a new self steps into a new Umwelt, which encompasses new obstructions*" (Uexküll, Sarris 1931: 1016, my translation and emphasis) — the fact is stressed that in such a case, not simply individual signs, but the whole system of signs of the organism is transformed, ensued by a new coherence of the organism-environment complex. However, if sticking to Uexküll's own contention that umwelt encompasses all the signs used by the organism, it would make more sense to make the differentiations within one umwelt. Hence, in paper IV, I discuss different phases of umwelten

(a work-time phase and an off-work phase) between which the team members switch.

All papers of the thesis suggest that the change of umwelt that is immanent to guide dog work cannot be based on a mere morphological or cognitive extension of two organisms. Guide dogs filter the environmental information that they deliver to their handlers and help to avoid the cognitive overload that comes along with the use of technical vision aids. However, while doing so, they maintain other sign relations that are not specifically related to their work. Hence the umwelten of guide dogs as well as humans contain different layers of meaning that can be tied to the different roles and contexts of activity. As different roles and identities tend to get blended in situations involving multiple sources of signs, also a meaning originating in one particular context can easily enter another one where it might not meet the expectations for meaning attribution that are prevalent there. The recognition that not just humans, but also animals operate with different sets of meanings in their umwelten helps to clarify the conditions of use of one or another set. It also directs attention to different functions of communication that are employed to specify the system of signs the other is using at the moment. The presence of multi-layered umwelten brings along the need for the receiver to pay attention to the signs that indicate the context of the sender's sign use. As at one and the same time different contexts can be actualised, the authority of the source of the sign can be decisive while opting for one or another meaning (hence the importance of phatic communication). Even if the 'proper' sign relations are maintained throughout the work of the guide dog team, the possibility for the rise of the non-work related signs during work-time is to be maintained. The latter is needed if the autonomy of the two subjects is to be preserved despite their supplementary functions.

The extensionalist model of guide dog aid also ignores the fact that another organism does not simply allow for an additional way to reach out to the environment, but that the dog's perspective shapes the meaning attribution of the human from the very beginning. In other words, the guide dog users do not simply react to the dog's behaviour and based on that deduce the state of affairs in the environment, but they also anticipate the potential meanings of dogs and, relying on that, proceed with instructions that would not put the animal beyond his/her limits. The perspective shifting thus appears to be crucial for the well-being of the team, but it also demonstrates how the interests of one member of the team are shaped by the presence of the other. In paper II, the possibility of seeing the team in dividual terms is considered and this adds another dimension to the multi-layered construction of the team's umwelten. If in the previous paragraph the multiple layers stemmed from the multiple contexts of activity of the individuals, then here the multiplicity is related to the incorporation of the other being's signs to one's own semiotic activity. This is not to say, however, that the other's meanings are simply taken over, but that they are adopted as the shapers of one's own sign relations.

Third, as indicated in paper IV, the guide dog team itself enters different schemes of interepretation, getting feedback about its meaning from multiple sources. Based on that, the guide dog handler can take into consideration the other meanings besides mobility aid that the team is met with and can correspondingly plan the activities of him/herself and the dog (be concerned about cleanliness in food stores, about the animal's contact with persons in muslim institutions, etc.). Yet, in some cases, the reconciliation of different meanings is impossible and that's when conflicts of meaning ensue. In those instances, an effort from both parties is needed to bring an either/or exclusive relation of different meanings into both/and relation of contingency.

5. METHODOLOGICAL CONSIDERATIONS

The empirical research of the thesis (articles III, IV) relies on the traditional research tools of humanities: interviews, fieldwork and participatory observation. Belonging to the toolbox of humanities, they are usually designed for the study of human beings. Hence those methods of data collection had to be adapted and combined in the current thesis in a way that would make it possible to encompass interspecific interactions as well. Such a challenge has already been met in the past decade by the so called animal turn in humanities. Research that has been conducted within reasearch fields such as multispecies ethnography (Kirksey, Helmreich 2010), posthumanities (Wolfe 2010), and more-than-human geography (Whatmore 2006) has looked for means and possibilities to discuss human-animal relations within humanities while not treating animals as the mere products of human representation. Within semiotics, zoo- and ecosemiotics are the fields of research where the focus is laid on the interactions of humans and other species. Even when studying the specifically human forms of representation or communication, those subfields of semiotics still consider the other species as semiotic agents (Maran 2007). The premise that all organisms share the capacity of sign use and yet they are different in how they do it is at the same time an answer to one of the greatest methodological challenges for the study of human-animal interactions: how to establish a ground of description that could encompass the common characteristics of the subjects, enabling their interactions in the first place, and yet characterise the particularities of the involved subjects.

Traditionally, human behaviour has been divided into two major types in humanities research, which can be accessed with different methodological tools. For example, observations could provide information for the 'described behaviour' of the subjects and the interviews would allow access to their 'reported behaviour'. Reported behaviour has already passed through the interpretations of the subject, and the unconscious parts of behaviour might not be reflected there. Observation should allow access to the raw data of behaviour, and the description as well as the interpretation of that would be left to the researcher. In the analysis of human-animal relations, such a division appears to be problematic, because if only humans were capable of reported behaviour, the description would be strongly tilted towards the human side.

The distinction between the reported and described behaviour of humans is partly paralleled by the differentiation of emic and etic descriptions of animal behaviour (cf. Martinelli 2010: 82–86). The emic description departs from the animal's own perspective and his/her interpretations. In a zoosemiotic description, as Thomas Sebeok saw it, any observed behaviour of another organism should be considered "as a response to *its* interpretations of *its* universe" (Sebeok 2001: 126). Umwelt theory is also a theory of animal behaviour, which departs from an assumption that it is possible to construct the perspective and sign-relations of an animal with scientific tools and, in this sense, it takes the emic perspective as its starting point. In this connection, Dario Martinelli has

pointed out that a study of an animal's umwelt can access not only the operational world *(Wirkwelt)* of an animal, but also its perceptual world *(Merkwelt)* — or to reconstruct the multisensorial world of the animal and not just his/her motoric responses in respect with some objects (Martinelli 2010: 84). The reconstruction of an umwelt presumes knowledge about the capacities of the animal to make use of certain sign vehichles and to attend to certain objects. Although such a reconstruction would solve the problem of access to the meaningful world of an animal, it still does not offer a good key for the description of intersubjective mechanisms of meaning generation.

While looking for a way to encompass such a two-sided formation of the meaningful world, Dominique Lestel has proposed a biconstructivist approach for the analysis of human-animal relations. In a biconstructivist approach, what Lestel calls marginal epistemologies (such as those of the trainers, animal breeders, etc.), that have their influence on animal behaviour, are integrated with the ethological knowledge (Lestel 2011). For domestic animals as well as other species having close ties to humans, an attempt to reach the purified animal essence that would be exempt of human influence would rather modify than represent the constitutive characteristics of behaviour. It has been pointed out that encompassing such marginal epistemologies to ethological knowlededge contains a threat of anthropomorphism, i.e. people interpret the behaviour of their animals while departing from motifs that are specific to humans (Horowitz, Hecht 2014). In the interviews that I conducted with the guide dog users, the handlers described as well as explained the dog's and their own sign usage (cf. more specificially the methodology sections of papers III and IV). However, given the research questions of the studies of the current thesis, the aim was not to set reality on either side of the human interpretative filter and draw a line of 'truth value' between the interview responses and the knowledge stemming e.g. from ethological studies. The interpretation of the guide dog handler of the activity of the dog is a part of the intrateam interactions and by omitting this or placing it into brackets, the meanings that underlie the cooperation would be concealed.

The participatory observation was encompassed in the methods of the studies in order to establish a common context for the research subjects — to study them *in situ* in an environment where both the activities as well as the interpretations are born. Hence it was important to move together with the guide dog teams of the focus groups. The observations that were made at the time helped to contextualise the answers of the interviews and raise and specify questions, which were not included in the interview forms. Participatory observation also pointed to the shortages of the biconstructivist approach when studying the interspecific relations in a shared environment. Somewhat paradoxically, Dominique Lestel has proposed that all animals use constructivist strategies, but yet "an umwelt of the animal is a realm which can become open to the umwelten of other animals" (Lestel 2011: 100). If each animal only constructs the world, then the opening of the umwelten could take place only by encompassing the others into one's constructive frame and the possibilities for a

dialogue would be closed out. While acknowledging Lestel's proposal to encompass different perspectives to ethological and zoosemiotic descriptions, other mechanisms of meaning generation besides construction should be taken into account. In this way, it is possible to investigate how the interpretations of humans change the behaviour of animals and how the behaviour in turn shapes the interpretations. The formation of the shared context of the team, which could be observed via participatory observation, directs attention to Tim Ingold's ideas about the mutual meanings of different beings that stem from dwelling in a shared world (Ingold 2002). Such a view directly opposes constructivism as an approach that stresses the impossibility of sharing subjective experiences.

In conclusion, not only different kinds of research subjects, but also different research tools can induce a need for different (and at times even contradictory) theoretical points of departure. In this thesis, the interviews and the autobiographies of the guide dog users shed light on the handler's viewpoint on the role of signs in establishing the interspecific bond and a connection with the environment; participatory observation made it possible to observe the teams' activities in a shared environment and voluntary work conducted with the teams gave insights into the sign relations that remained outside of the teams' time of movement.

CONCLUSIONS

A semiotic analysis of guide dog teams' work allows to explicate the role of compound sign systems in meeting the affordances of (urban) environment. It is argued in the thesis that the presence of certain systems of signs is implied in urban space, expressed in the rules and regulations of behaviour as well as in the material properties of the built environment. It may seem paradoxical that the two organisms, whose sign usage deviates from such expectations, should produce a 'normal' and adaptable system of signs when placed together. The efficiency of guide dog work demonstrates that such an existence of coupled sign systems indeed contributes to the coping of the two subjects, but this does not result only from an adaptation to the demands of the environment and society. The cooperation of a guide dog and a visually impaired person rather involves intricate ways of transforming the expectations, searching for novel cues, and inventing ways of gaining access to objects and places with the help of interspecific communication. A zoosemiotic account of those processes can consider the sign usage of the canine as well as the human member of the team while explicating the synthetic effect of such interactions. A semiotic analysis that investigates human and non-human interactions can further explain particularities of semiotic behaviour by taking into account not only species characteristics, but the role a species and/or individual plays in human society. Discovering the signs that both counterparts feel most comfortable with may also enhance the cooperation and wellbeing of the team.

The cooperation of the guide dog and the visually impaired person entails a modification of meaningful relations with the environment of the individuals. While the number of accessible objects and places is augmented and contact with redundant cues reduced, the transformation also encompasses an adoption of the other counterpart's meaning attribution as a guide to one's own behaviour. The question of how the guide dog's world could be populated by meaningful objects which are part of the blind person's world has been a leading question for guide dog training from the very early years of its institutionalisation (Uexküll, Sarris 1931; Sarris 1935, cf. paper I of the thesis). As a possible answer to the question, Jakob von Uexküll and his colleagues proposed a training method which was implicated on Uexküll's umwelt theory, its basic premise being that a change in the animal's bodily constitution and a corresponding shift in the sense of the self should motivate changes in the meaning of objects. Their method stressed the independence of assistance animals in their acquisition of novel cues from the environment; the persistent effect of such changes of meaning, which rely on the transformation of the body plan and the need to tie the guide dog loose from reliance on human visual communication in the training procedures. Such an approach to guide dog-human interactions can be placed within a larger 'extended organism' paradigm, where an organism modifies the environment in a manner that would allow it to use the environment as an extension of the body and as a medium for its needs. The shortcoming of an extensionalist approach to guide dog work is that the

incorporation of the other organism into one's body plan extinguishes the other's significance as a responsive subject. The same holds true if the dog is seen as a seeing prosthesis of the visually impaired, as has often been the case historically. Instead, guide dog work exhibits a special kind of supplementary relationship between a human and a dog, where the medium at the same time acts as a subject and whereby the agency of the medium is constitutive for its functioning.

As indicated in paper II of the thesis, the maintenance of signs specific to guide dog assistance in the umwelt of a guide dog as well as a handler depends on the establishment of particular intersubjective relations, which can be subsumed under the notion of trust. On the one hand, the formation of trust is predicated on the establishment of paired perspectives through the cooperation of the team. This means that the perspectives of the members of the guide dog team are not molded by individual meanings and perception only, but get their final form by incorporating and subsuming part of the other member's perspective. On the other hand, even though the presence of another perspective is accounted for, it can never be captured in its totality, as the possibility of unexpected and unpredictable responses is always present. The latter serves as a token of the autonomy of the other and is just as essential for the guide dog work as the partial merging of the individual perspectives.

In paper III of the thesis, I demonstrate that the mechanisms of building paired perspectives and shared meanings are based on intrateam communication and the interpretation of the perceptual cues in the environment. Although a formal description highlights the functions of referential and phatic communication as central for the functioning of guide dog work, the handlers themselves organise the acts of communication and the formation of perceptual meanings around specific tasks and situations (e.g. orientation, searching for objects and places, avoidance of obstacles). Despite the fact that perception and communication are different semiotic processes, they are integrated in real time, with the perceptual meanings being specified by intersubjective communication and the perception serving as an incentive for communication.

As in any developing system, the semiotic connections between the handler, the guide dog and the environment also undergo change as the cooperation evolves. As the interviews and participatory observation revealed, with time, the teams tend to enter a less hierarchical interaction, whereby both members have an equal say in deciding the next step in their cooperation. Although the number of communicative signs is often reduced in time, this does not mean that the overall number of signs used by the team diminishes — the communication in many instances is taken over by symptomatisation. This is also revealed in the shifts in communication channels — verbal commands can be replaced by nonconscious bodily signs. The smoother and more flexible movement of the team is partly related to the replacement of discrete signs with non-discrete ones. Knowing one another fairly well helps to build a horizon of expectations where certain environmental cues and the behaviour of the dog can be easily associated, and thus confusion in the meaning of the behaviour avoided. This

also means that situations that previously might have needed forbidding and correction can be anticipated and avoided through attention to the subtle signs.

Having established that the processes of interspecific signification, interpretation and communication are indispensable for the guide dog work, I point out in paper IV that if the functioning of these processes is impeded, the teams face semiotic challenges. The perceptual challenges stem from a mismatch between affordances of the urban environment and perceptual and motoric abilities of the team. Sociocultural challenges pertain to the conflicting meanings that are attributed to (guide) dogs in different social contexts and to incompatible social norms. Challenges related to intrateam communication and interpretation of the other counterpart's behaviour are mostly tied to the difficulties of placing the other's activities in the right context. Semiotic challenges are also related to the difficulties of making a transition from one semiotic process to another. A guide dog may help to master the difficulties that the physical environment poses for the visually impaired person, but if the team is not allowed access to places due to cultural prejudices, then the perceptual aid is in vain. On the other hand, the challenges stemming from one type of semiosis can be alleviated by the processes falling into another type. In cases where the handler is knowledgeable about objects on the path which might divert the dog's perception of work-related cues, she/he can obviate their gaining prominence through communication with the dog.

If the findings of the whole thesis and answers to the research questions were to be summed up in a few points, then the following could be brought out:
- A change in the individual umwelten of subjects is a prerequisite for a successful guide dog assistance.
- The corresponding umwelt change presumes the acceptance of another subject's meanings as factors in one's own meaning formation.
- The sign relations specific to guide dog work are maintained through the establishment of a trust relationship between the two members.
- The intrateam communication forms part of the situation specific information flow in which different functions of communication serve as contexts for one another in the specification of the meanings of messages.
- The sign complexes in guide dog work are formed around more specific subtasks of assistance (e.g. orientation; finding places, object; avoidance of obstacles).
- The intrateam cooperation evolves towards a less hierarchical, more symptomatic and less discrete modes of semiosis.
- The challenges of the team that involve sign use are related to the mismatch between environmental affordances and the characteristics of the organisms, to finding the right context for the other's sign use, and to the incompatible interpretations of the teams in different institutions and social contexts.

The semiotic knowledge and research could further specify how non-human perceptual systems that supplement human ones could be integrated into urban design; what kind of signs could be used in human-canine communication for

the mediation of movement-specific information; and how to develop social contexts that would not signify rejection for the guide dog team. It also helps to unfold the semiotic mechanisms through which different frames of meaning are tied to specific places, and thereby highlight their conventionality. In the end, a semiotic focus on guide dog work explicates how signs function not only as tools of work in the guide dog and human interactions, but also as means of play, innovation and fun — in short, they are essential for anything that makes life meaningful for a living being.

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KOKKUVÕTE

Abiloomade töö semiootilised alused: juhtkoera ja nägemispuudega inimese märgikasutus

Käesolevas doktoritöös uurin juhtkoera ning nägemispuudega inimese koostöö aluseks olevaid märgiprotsesse. Juhtkoerad on abiloomad, kes aitavad nägemispuudega inimesel sujuvalt ja takistusi vältides liikuda ning kes tagavad seega ligipääsu inimese jaoks olulistesse paikadesse. Juhtkoerte tööd on seni uuritud nii puudega inimeste heaolu kui võrdset kohtlemist silmas pidades, samuti on uuritud abiloomade aretus- ja valikupõhimõtteid. Oma doktoritöös keskendun kitsamalt juhtkoera ja nägemispuudega inimese keskkonnataju ning kommunikatsiooni eripäradele, samuti uurin nende kujutamist ühiskondlikes arusaamades ning representatsioonides. Töös otsitakse vastust järgmistele küsimustele: Miks on tandemi eduka koostöö jaoks olulised kummagi osapoole omailmamuutused? Milliseid märke juhtkoera töös kasutatakse ning mis on nende funktsioon? Kuidas tagatakse juthkoeratööks oluliste märgiprotsesside püsimine? Millised märgilisest käitumisest johtuvad probleemid tulevad ette juhtkoera töös? Teoreetilise impulsi on tööle andnud Jakob von Uexkülli omailmateooria, kuid seda rakendatakse analüüsis kriitiliselt, kasutades täienduseks inimese ja teiste liikide interaktsioonide käsitlusi zoosemiootika, antropoloogia ning etoloogia vaatevinklist. Töö empiiriliste andmete kogumiseks on kasutatud intervjuusid (fookusgruppideks saksa, rootsi ja eesti juhtkoerakasutajad), osalusvaatlust ning välitöid.

Semiootilises plaanis hõlmab juhtkoera ja inimese koostöö selliste märgisüsteemide kombineerimist ja sünteesi, mis eraldivõetuna linnakeskkonna märgilise käitumise ootustele täielikult ei vasta. Juhtkoeratöös ühendatakse kahe isendi omailmad, mis koostöö käigus üksteist kujundama hakkavad. Uued semiootilised lahendused, mille liikidevaheline märkide kombineerimine kaasa toob, hõlmavad uute märgikandjate otsimist keskkonnas, liikidevahelise kommunikatsiooni rakendamist ligipääsetavuse tagamiseks, aga ka kehtivate ühiskonnanormide ja regulatsioonide nihestamist ning uute piiride loomist. Nende protsesside zoosemiootiline analüüs võtab arvesse nii koera kui inimese märgikasutust, tuues samas välja nende koostegutsemisest tulenevad muutused kummagi omailmas. Zoosemiootilise lähenemise täiendamine kultuurisemiootilise vaatepunktiga võimaldab töös lahata inimese ja looma kommunikatsiooni mitte ainult liigispetsiifilisi tunnuseid arvestades, vaid pöörates tähelepanu ka sellele, mis roll on mingil liigil või isendil ühiskonnas ning kuidas see omakorda võimalikke inimese ja teiste liikide vahelisi kommunikatsioonivorme määrab ning piiritleb.

Juhtkoera ning inimese koostöö toob kaasa indiviidide keskkonnasuhete muutumise. Seeläbi kasvab ligipääsetavate objetkide hulk ning väheneb kokkupuude mittevajalike keskkonnatunnuste ning takistustega, kuid lisaks hõlmab muutus ka teise isendi tähenduste omandamist enda käitumise suunajatena. Doktoritöö **I artiklis** näitan, et küsimus, kuidas tuua juhtkoera omailma objekte

ning tähendusi, mis on olulised nägemispuudega inimese jaoks, oli oluline juba juhtkoerte treenimise algusaegadel. 1930. aastatel pakkusid Hamburgi Oma-ilmauuringute Instituudi teadlased Jakob von Uexküll ja Emanuel Sarris ühe võimaliku lahendusena välja juhtkoerte treenimismeetodi, mis tugines Uexkülli omailmateooriale. Lähtuti teooria põhieeldusest, mille kohaselt looma keha-plaani muutus ning sellega kaasnev enese piiride tunnetuse teisenemine peaks olema aluseks igasugusele omailmamuutusele. 'Fantoominimese meetodiks' kutsutud treenimismeetodis kinnitati tulevaste juhtkoerte külge spetsiaalsed konstruktsioonid, mis imiteerisid inimese kehakuju. Takistusaedades ning linna-keskkonnas liikudes pidid loomad selle vahendi abil omandama suhteliselt iseseisvalt uusi tähendusi (nt kraavid muutusid seeläbi hõlpsalt ületatavatest kohtadest takistusteks). Hiljem, kui konstruktsiooni asemel liikus koeraga näge-mispuudega inimene, pidi koer juba lähtuma inimesele vajalikest märkidest, ootamata pidevalt inimese suunavaid juhiseid. Fantoominimese meetod rõhutas seega loomade iseseisvust keskkonnale uue tähenduste omistamisel, keha-plaanimuutustel põhineva tähendusmuutuse püsivust ning vajadust muuta juhtkoerad sõltumatuks inimese visuaalsest kommunikatsioonist. Olulise zoo-semiootilise aspektina ilmneb selle meetodi puhul, et juhtkoerad tegutsevad vähemalt kaht tüüpi märgilises keskkonnas – esimene neist on aktualiseeritud töö ajal ning teine vabal ajal. Üleminekut ühest teise signaliseerivad omakorda kindlad märgid (nt rakmete paigaldamine). Fantoominimese meetodi puuduseks on ent tõik, et teise organismi kaasamine enda kehaplaani tühistab tolle tähtsuse subjektina, kellega on võimalik suhestuda. Sama probleem tuleb esile ka siis, kui looma nähakse inimese nägemisproteesina, mida on ajaloos korduvalt eri põhjustel tehtud. Juhtkoeratöö kujutab endast pigem eripärast inimese ja koera täiendussuhet, mille toimimise aluseks on osapoolte subjektsuse tunnustamine.

Töö **II artiklis** on juhtkoerakasutajate autobiograafiatele ja intervjuudele tuginedes analüüsitud, kuidas abifunktsiooniga seotud märkide püsimine nii juhtkoera kui tema peremehe omailmas sõltub indiviidide vahelise usalduse tek-kest. Lähtudes Eduardo Viveiros de Castro, Rane Willerslevi, Morten Pederseni jt antropoloogide perspektivismikäsitlustest ning (zoo)semiootilistest inimeste ja teiste loomade märgikasutuse uurimustest, näidatakse artiklis, et tandemi liik-mete vaheline usaldus põhineb spetsiifilise kaksikperspektiivi moodustumisel. Perspektiivi defineeritakse töös kui vaatepunkti, mis hõlmab nii objektide tähendusi kui ka vorme, mida subjekt tajub ja millest lähtudes toimib. Kaksik-perspektiivi moodustumine tähendab, et tandemi liikmete vaatepunktid ei kujune vaid individuaalsetest tähendustest ja tajust lähtuvalt, vaid need moodu-tuvad, kaasates ning liites teise osapoole vaatepunkti. Teise osapoole pers-pektiivi pole ent kunagi võimalik täies mahus hõlmata ning see pole juhtkoera töös ka vajalik, sest nõnda säilitatakse ootamatute ning ennustamatute vastuste võimalus. Viimane on vajalik selleks, et tandemis liikumine ei tühistaks subjek-tide individuaalsust ning autonoomiat, mille säilimine on juhtkoeratöö seisu-kohast sama oluline, kui individuaalsete perspektiivide vastastikune määrat-lemine. Uurides usalduse loomise tingimusi, tõstatatakse artikli lõpus küsimus, kas selle lõplikuks aluseks saab olla jagatud kommunikatsioonisüsteem.

Töö **III artiklis** on intervjuudele ning osalusvaatlusele tuginedes analüüsitud, kuidas juhtkoera ning nägemispuudega inimese perspektiivide moodustumine sõltub kommunikatsioonist ning keskkonnatunnuste tõlgendamisest. Selles artiklis on adresseerijana vaadeldud eelkõige juhtkoerakasutajat. Formaalse kirjelduse alusel tulevad juhtkoera töös kesksetena esile referentsiaalne ning faatiline kommunikatsioonifunktsioon. Esimese kaudu vahendatakse teisele osapoolele infot keskkonnaobjektide ja nende tähenduste kohta, teise abil aga hoitakse alal kommunikatiivset olukorda ennast. Faatilises kommunikatsioonis võib omakorda eristada märke, mille abil a) valmistatakse teist osapoolt ette järgnevaks referentsiaalseks kommunikatsiooniks; b) hoitakse tähelepanu tööolukorda kuuluvatel märgisuhetel; c) antakse tagasisidet tegevuste adekvaatsuse kohta. Referentsiaalses kommunikatsioonis lähtuvad juhtkoerakasutajad oma märgikasutuses konkreetsetest ülesannetest ning situatsioonidest (nt orienteerumine, kohtade ja objektide otsimine, takistuste vältimine). Kommunikatsioonis edastatavate sõnumite adekvaatseks mõistmiseks on siiski oluline, et erinevad kommunikatsioonifunktsioonid toimiksid üksteise kontekstina. Kuigi taju ja kommunikatsioon on kaks semiootiliselt erinevat nähtust, näitab töös teostatud analüüs, kuidas neid juhtkoera töös omavahel ühendatakse — subjektidevaheline kommunikatsioon suunab tajulisi tähendusi ning tajutu annab omakorda kommunikatsioonile sisu. Seeläbi moodustuvad olukorraspetsiifilised märgikompleksid, mis vastavad informatsioonilistele vooluringidele (*circuits of information flow*) Gregory Batesoni mõistes.

Samas artiklis on ühtlasi näidatud, et arenevatele süsteemidele omaselt muutub aja jooksul ka kasutaja ja juhtkoera koostöö semiootiline baas. Koostöö edenedes muutub juhtkoera ja inimese suhtlus sageli vähem hierarhiliseks, nii et mõlemal osapoolel on võrdsem otsustusõigus liikumise kujundamisel. Kuigi referentsiaalsete märkide hulk tavaliselt ajas väheneb, ei tähenda see, et kogu märkide hulk väheneks — kommunikatiivsete märkide asemele asuvad sümptomaatilised märgid (s.t. organismist tulenevad, kuid mitteadresseeritud märgid). Sarnast muutust väljendab ka kommunikatsioonikanalite vahetus — verbaalsete käskluste asemel kasutatakse mitteteadvustatud kehalist väljendusviisi. Teineteise parem tundmine aitab luua ootushorisonti, milles keskkonnatunnused ning teise subjekti käitumine on paremini seostatavad. Seeläbi väheneb käitumise mitmetähenduslikkus. Väikeste muutuste tabamine teise osapoole käitumises aitab ühtlasi vältida ja ennetada sääraste olukordade teket, mis vajaksid keelavaid ning korrigeerivaid kommunikatsioonivorme.

Artikkel IV keskendub olukordadele, milles juhtkoeratöö signifikatsiooni-, interpretatsiooni- ja kommunikatsiooniprotsessid mingil põhjusel ei toimi — kokkuvõtvalt on sääraseid olukordi töös nimetatud semiootilisteks väljakutseteks. Nende väljakutsete valguses on töös analüüsitud saksa, rootsi ning eesti juhtkoerakasutajate kogemusi. Tajulised väljakutsed tulenevad linnakeskkonna võimalduste (*affordances*) ning tandemi sensoorsete ja motoorsete võimete mittevastavusest. Tajuga seotud väljakutsed pole seotud mitte ainult ligipääsuga keskkonnatunnustele, vaid ka neile adekvaatsete tähenduste omistamisega. Sama objekt võib juhtkoeratöö eri situatsioonides kanda eri tähendust (nt

laternapost, mida vältida, ja fooripost, millele läheneda). Treeningu käigus ei ole taolist kontekstuaalsust sageli võimalik õpetada ning nii tuleb tandemil neid seoseid omavahelise koostöö käigus õppida. Sotsiokultuurilised väljakutsed on seotud vastuoluliste tähendustega, mida juhtkoera ja inimese tandemile eri sotsiaalsetes situatsioonides ning institutsioonides omistatakse, samuti vastandlike sotsiaalsete normide ja regulatsioonidega. Töös rõhutatakse, et sotsiokultuurilised ootused võivad olla väljendatud ka füüsilisel või ruumikujunduslikul viisil. Ootused teatud kehakujule ning tajuvõimele sisalduvad vaikimisi ehitusregulatsioonides ning arhitektuursetes lahendustes, väljendudes muuhulgas nii kõnniteede laiuses kui trepiastmete kõrguses. Isenditevahelise kommunikatsiooni probleemid on sageli seotud kommunikatsioonipartneri tegevuse õigesse konteksti asetamise keerukusega. Eelkõige puudutab see arusaamist, kas teine olend lähtub parasjagu märkidest, mis tööülesande juurde kuuluvad, või kasutab ta mingil põhjusel märke, mis seotud hoopis teiste huvide ning vajadustega. Semiootilised väljakutsed ilmnevad ka siis, kui üleminek ühelt semiootiliselt protsessilt teisele on takistatud. Juhtkoer võib küll aidata inimesel ületada füüsilisi takistusi, kuid kui tandemit mingitesse paikadeste kultuuriliste ettekujutuste tõttu ei lubata, siis pole füüsiliste barjääridega hakkama saamisest abi. Samas võivad ka üht tüüpi semiootilised protsessid aidata lahendada probleeme, mis tulenevad teist tüüpi protsesside mittetoimimisest — nt kui inimene teab, et teel on objekte, mis võivad koera tähelepanu kõrvale juhtida, siis saab nende tähtsust ennetava kommunikatsiooni abil vähendada.

Doktoritöö peamised järeldused võib seega kokku võtta järgnevalt:

- Juhtkoera ja nägemispuudega inimese individuaalsete omailmade muutused on eduka juhtkoeratöö esmaseks eelduseks.
- Ühe isendi omailmamuutus eeldab muuhulgas teise subjekti tähenduste aktsepteerimist enda tähenduste kujundajana.
- Juhtkoeratöö aluseks olevaid märgisuhteid säilitatakse osapoolte vahelise usalduse tekke kaudu.
- Tandemi liikmete vaheline kommunikatsioon moodustab osa olukorraspetsiifilisest infovoost, milles erinevad kommunikatsioonifunktsioonid toimivad üksteise kontekstina, aidates seeläbi sõnumite tähendusi täpsustada.
- Juhtkoeratöö märgikompleksid koonduvad kindlate alamülesannete ümber (nt orienteerumine; kohtade ja objektide otsimine; takistuste vältimine).
- Tandemi koostöö areneb vähem hierarhiliste, sümptomaatilisemate ning mittediskreetsete semioosivormide suunas.
- Juhtkoeratöö peamiste märgikasutusega seotud probleemide põhjuseks on keskkonnavõimalduste ja organismide tajuomaduste mittevastavus, teise osapoole märgikasutuse paigutamine valesse käitumiskonteksti ning tandemile vastuoluliste tähenduste omistamine erinevates institutsioonides ning olukordades.

Abiloomade töö semiootiline analüüs võiks tulevikus aidata (1) linnaruumi planeerimisel enam arvesse võtta nii teiste linnas liikuvate liikide kui ka erinevate

tajusüsteemidega seotud märgisüsteeme; (2) lahata inimese ja abilooma töös ette tulevaid probleeme, lähtudes nende aluseks olevatest semiootilistest protsessidest; (3) osutada, kuidas saaks luua sotsiaalseid kontekste, mis oleksid avatud erinevate liikide koosesinemisele. Semiootiline lähenemine võimaldab välja tuua, mil viisil seotakse erinevaid tähendusraame kindlate paikadega ning aitab seeläbi avada sotsiaalsete ootuste konventsionaalsust. Kokkuvõttes näitab semiootiline analüüs ka seda, kuidas mitmesugused märgid ei toimi ainult töövahenditena juhtkoera ja inimese suhtluses, vaid samuti mängu-, innovatsiooni- ning mõistmisvahenditena, olles esmatähtsad kõige selle jaoks, mis teeb elu erinevate olendite jaoks tähendusrikkaks.

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