The Missing Link:
Scientific Sexism, Racism and Speciesism

By

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Abstract

In this paper I am undertaking a multidisciplinary investigation of causes, conditions and connections of discriminatory practices in the domain of science which are based on sexist, racist and speciesist assumptions. Pessimistic meta-induction and analogy are used as methods. The practice of racism and sexism in science are recognized as analogous forms of dehumanization, a process of denial of essentialized human identity. Further analogous analysis of the historically and morally grounded concept of anthropocentrism, a form of speciesism, with the practices of scientific sexism and racism reveals a connection between those elements - unquestioned anthropocentrism as entailed by, and necessary condition of, animalistic dehumanization. Both dehumanization and anthropocentrism in science are analogously operating on essentialism, hierarchy, dichotomy and exclusion which leads to the conclusion that we have some reason to believe that at least some currently successful scientific theories which in some way include reference to other species, or our relation with other species, might be false due the speciesism.

Keywords: analogy, animal, anthropocentrism, dehumanization, dichotomy, discrimination, human, non-human animal, pessimistic meta-induction, race, racism, simianization, sex, sexism science, speciesism,

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Introduction

In this thesis my first and main claim will be that we have good reasons to believe that there is analogy between scientific failures in the cases of scientific sexism and scientific racism, and that it can be found in the phenomenon of dehumanization. My second claim is that similarly there is sufficient evidence to assume that scientific theories which in some way include reference to other species might not be true due the speciesism. To prove my claims the thesis will be discussed in three chapters:

I) We have good reasons to believe that in general currently successful scientific theories might be false;

II) We have good reason to believe that there is an analogy between the causes of scientific sexism and scientific racism as false scientific theories, which can be found in the phenomenon of dehumanization;

III) In analogy with II) we have some reasons to believe that at least some currently successful scientific theories which in some way include reference to other species might be false due speciesism;

In the first chapter I will present Laudan's idea of pessimistic meta-induction which will give us grounding. In the second chapter I will present an analogy as a method, and then I will try to apply it in the case of comparison of scientific sexism, racism and speciesism. There I will also introduce concept of dehumanization to show how causes of scientific failures due to sexism and racism can be jointly placed under conceptual frame of dehumanization. In the third chapter I will present the idea of anthropocentrism and apply again analogy to find connections between racism, sexism and anthropocentrism in science. I will conclude upon presentation of these chapters.

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Chapter I

I) We have good reasons to believe that currently successful scientific theories might not be true.

I accept here the notion of "successful" offered by Brown, who says that "successful" scientific theories are the ones which are "able to organize and unify a great variety of known phenomena" (J. R. Brown 1998, 1136), and that "this ability to systematize the empirical data is more extensive now than it was for previous theories" (p 1137) and that "[a] statistically significant number of novel predictions pan out; that is, our theories get more predictions right than mere guessing would allow" (p 1137).

I rely on Laudan's idea of pessimistic meta-induction which says that most of our successful scientific theories believed to be true showed up as false. I will briefly explain the idea and the context in which it appears. Namely, to explain why science is successful epistemic or scientific realist "divers in orientation as Popper, Grunbaum, McMullin, Sellars, Reichenbach and Putnam" (Laudan 1984a, 84), claim that it is simply because it is true or nearly true, it represent reality as it is, or nearly as it is. If it would not be true, then the fact that it is so successful would be simply a "miracle" which is not something we want to believe in (J. R. Brown 1982). On the other hand epistemic relativists of whom Laudan mentions Fayerabend, the later Wittgenstein, Hesse, Rorty, and as the most prominent sociologists of knowledge - Mannheim, Durkheim and Kuhn (84), disagree on this idea. For them "success has nothing to do with truth" (Barker and Kitcher 2013a, 97), because they believe that "there are no universal epistemic facts, that facts about what belief is justified by a given item of evidence can vary from community to community" (Boghossian 2011, 38). They rely on different empirical evidence from history of science pushing against the idea that success renders the scientific theories true. For example, in the sixteenth century the dominant geocentric model and new heliocentric model gave approximately similar and

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successful calculations of the movements of planets. However, the geocentric model which was at the moment accepted as true turned out to be false.

This is one of the reasons which motivated Laudan's idea about "historical gambit", pessimistic meta-induction (Laudan 1984b, 157). In addition to theoretical reasons, Lauden provided the list of numerous examples of theories which were successful, seen as true, that is, referring to the real things in the world, and were proven later as false (Laudan 1981, 33). Some of them are: "the crystalline spheres of ancient and medieval astronomy; the humoral theory of medicine; the effluvial theory of static electricity; catastrophist' geology, with its commitment to a universal (Noachian) deluge; the phlogiston theory of chemistry; the caloric theory of heat; the vibratory theory of heat; the vital force theories of physiology; the electromagnetic aether; the optical aether; the theory of circular inertia; theories of spontaneous generation" (Laudan 1981, 33). While Laudan claims that *"[n]othing* I have said here refutes the possibility in principle of a realistic epistemology of science" (p 48, italics in original), he believes we should be pessimistic about our ability to use inductive reasoning to gain what is true knowledge and I will have in mind this conclusion in further discussion.

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Chapter II

II) We have good reason to believe that there is analogy between the cases of scientific sexism and scientific racism which can be found in the phenomenon of dehumanization

While pessimistic meta-induction does not categorically negate the possibility of epistemic realism, in general we should expect our successful theories to be proven false. As we can see, Laudan provides a list of examples of failed theories in the past (Laudan 1981, 33). Since eventually these false theories were proven wrong at some point, it must have been that there was a process during which some scientists realized that there might be a possibility of falsehood. Accordingly, we might want to be aware of the possibilities of falsehood in the future also, and in this case we would find useful some markers which might warn us that we find ourselves at risk of making false theories. Among the factors which affected knowledge production in the past and on which my focus will be are biases and expectations connected to categories of sex/gender and race.

If we look at the first case we can see that, for example, theories of conception were influenced by biased gender related expectations which lead to the so called "sperm sagas" instead of valid scientific theories. These are stories in which "the valiant sperm hero fights inhospitable conditions, overcomes his competition and finally wins the patiently waiting damsel" (Haely 2008, 69). Regarding the issue Martin claims that "while the 'facts'of biology may not *always* be constructed in cultural terms, I would argue that in this case they are. The degree of metaphorical content in these descriptions, the extent to which differences between egg and sperm are emphasized, and the parallels between cultural stereotypes of male and female behavior and the character of egg and sperm all point to this conclusion" (Martin 1991, 492 italics in original). The product of these biases and expectation was false theorizing about the role of the reproductive cells. We can see that a preconception about gender roles have influence until today (Ress-Turyn et al. 2008; Saul 2013).This is why it would be plausible to say that *sex/gender related biased expectations contributed to the*

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falsehood of scientific theories in the past, and we have some reasons to believe that currently successful scientific theories might also be in danger to be false due to these expectations.

The same empirical fact stands related to the category of race. Craniology was once seen as true scientific theory proving that people categorized as black belong to the "degenerated" and inferior variation within human species – black race (Stepan 1985). Actually the invention of race as scientific category is something which is contested: "[w]e suggest that without consideration of these historical influences of racial reasoning in social statistics—the flawed notion that race is an individual and genetic characteristic instead of a social process—social scientists will tend to repeat the mistakes of the past" (Zuberi, Patterson, and Stewart 2015, 113). Our cognitive biases towards women, but also members of other social groups like black people tend to be resistant and manifold in their manifestation even today (Del Pinal and Spaulding 2018; Dovidio et al. 2016; Saul 2013). In line with this, I would claim that *race related biased expectations contributed to the falsehood of scientific theories in the past, and we have some reasons to believe that currently successful scientific theories might also be in danger to be false due to these expectations.* It might be that these reasons are less present today than in the past though since we became aware that these are the markers which we should take into account of knowledge production.

There are certain indicators which show that sex/gender, race and species related conceptions might be deeply connected. For example, if we take the craniology case we can see that

> it was claimed that women's low brain weights and deficient brain structures were analogous to those of lower races, and their inferior intellectualities explained on this basis.[12] Woman, it was observed, shared with Negroes a narrow, childlike, and delicate skull, so different from the more robust and rounded heads characteristic of males of "superior" races. Similarly, women of higher races tended to have slightly protruding jaws, analogous to, if not as exaggerated as, the apelike, jutting jaws of lower races.'[3] Women and lower races were called innately impulsive, emotional,

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> imitative rather than original, and incapable of the abstract reasoning found in white men (Stepan 1986, 263).

The phenomenon of dehumanization, which is a certain kind of denial of humanity on different levels, can be according to Haslam animalistic and objectifying (Haslam and Loughnan 2014). In the first form features which are taken to be essential for humanity, and actually vary on different axes of time and space, but some like intelligence, language capacity or capacity for higher emotions are often mentioned, are decreased or striped fully from the subject, and the person is often likened to an animal. In the second case the person is striped from the human features completely and likened to an object (ibid.). This is why my claim is that *we have good reason to believe that there is an analogy between the causes of scientific sexism and scientific racism, which can be found in the phenomenon of dehumanization.*

Furthermore, as Stepan stresses "[i]t was measurements of the skull, brain weights, and brain convolutions that gave apparent precision to the analogies between anthropoid apes, lower races, women, criminal types, lower classes, and the child" (p 266). For dehumanization, particularly animalistic dehumanization to be possible, it seems that it is a necessary assumption that non-human animals are lower kind of creatures, which can serve as a benchmark on the "Great Chain of Being" to measure humanness or animality in humans. This presumption about non-human animals might be even older than specific forms of dehumanization like sexism and racism, and while these two are largely addressed and subjected to scientific scrutiny, to be eventually rejected, it might be that we are still faced with the challenge regarding our preconceived and motivated beliefs about other species. I find the analogy between beliefs and treatment of humans based on false assumptions regarding sex and race in the past, and the beliefs and treatment of non-humans in the past and today to be informative. Therefore, my hypothesis is that there are good reasons to believe that species should also be seen as one of the suspect markers in the production of

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successful scientific knowledge, in the past and today, that is, *that in analogy with scientific sexism and racism, we have at least some reasons to believe that at least some currently successful scientific theories which is some way include reference to other species might be false due speciesism*;

I will base my claim on the historical evidence of the analogy between sex/gender, race, and species related stereotypes which influenced science on different levels, and which, I will attempt to show, are grounded in dualistic thinking as a technology of existence (Ferrando 2016).

1. First, I will provide some background for the arguments based on analogy;
2. Second, I will define scientific sexism and racism and provide basic elements to ground the analogy between them in dehumanization;

This would give us a complete image which would show that racism and sexism as forms of dehumanization are analogues, and further that since dehumanization is based on anthropocentric, essentialist and dualist assumption, some scientific theories which include reference to other species might be false. Scientific racism and sexism had their major influence in particular scientific fields like anthropology, anatomy, neurology, brain science, physiology, gynecology, medicine, pharmacy, physiology, psychiatry, law, education etc. (Stepan 1982b; Belkhir 1994; Schiebinger 1989; Briggs 2000; Trimble and Reynolds 2016; Foucault 1995; Staples 1984). In analogy with this, I will take as reasonable to define the scope of my theses on certain sciences which might be vulnerable to falsehood due to speciesism. These are primarily sciences concerned with non-human species including biology, zoology, primatology, veterinary, marine sciences, animal welfare and behavior, animal reproduction, but also the ones which closely relate us with animals like animal agribusiness, animal management, animal breeding, food and fiber production, of course ecology and environmental sciences, and the ones which are dealing with humans, but

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extensively use animals in their practice like medicine, pharmacy, microbiology and genetics which will become more contentious in time when data becomes ultimate currency, and with human enhancement, even techno-sciences.

1. Arguments based on analogy

The term analogy comes from the Greek language and refers to the proportion which directs to a relation between things and their structure. This is why one-to-one correspondence between elements is a crucial part of an analogy (Juthe 2005, 5). Analogy is the *"*process of understanding a novel situation in terms of one that is already familiar [….] In the course of reasoning by analogy, the novel target comes to be seen as another example of "the same kind of thing" as the familiar analog." (Holyoak and Gentner 1997, 32).While registering of similarities in cognition is a constant in human history, the way how it is introduced, dealt with, and evaluated in scientific discovery and reasoning has historical perspective. For example, from an early age the Alchemist relied heavily on the analogy between symbols, what they saw are primary elements like fire, air, water, earth, heavenly bodies, or mythological figures and chemical elements, but their work was criticized by scientists like Kepler who thought that "analogies should be based on physical, measurable quantities, and not on the symbols that represent them" (Jeziorski and Gentner 1993, 463, 473). Kepler believed in the separation of the context in which scientists get their ideas, the context of discovery, and the one in which they test them, the context of justification, and argued for the usage of analogy only in the context of the former, simply as a tool for generating hypothesis, not in the context of the later (474). The late sixteenth and the beginning of the seventeenth century are seen as a period of debate about the proper usage of similarity in reasoning and the transition from the understanding of analogy as identity, towards a more rigorous usage of this argumentative form in science (475). To have sound reasoning from analogy means that there are certain kinds of selected relevant similarities in

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the argumentation with something in a standpoint which allows the standpoint to be accepted, and that the cases which are compared are really comparable in a sense that there are no significant differences (Van Eemeren and Henkemans 2017, 87). According to the Gentner and Jeziorinski "the strength of an analogy in licensing scientific prediction rests on the degree of systematic structural match between the two domains" (Jeziorski and Gentner 1993, 453). Here it might be good to distinguish a same-domain-analogy, where relations and the elements belong to the same domain, and a different-domain-analogy, where relations are the same, but elements belong to the different domain (Juthe 2005, 5). This might be important when we compare racism, sexism and speciesism since the first and the second refer to the human animal, while the third one refers to the non-human animal, and the difference is often taken as significant, even though I will argue that in some relevant sense, there is no significant difference, but similarity. Another relevant issue about arguments based on analogy is that "two objects can be analogous in one regard and disanalogous in another regard. It depends on the perspective from which, or the level of abstraction at which the objects are compared" (Juthe 2005, 9), and this defines the range of the conclusion, but analogy does not come in degrees according to Juthe, and "if an inference from an analogy is probably true, then the analogy is probably correct, not partially correct" (10).

2. The analogy between sexism and racism as forms of dehumanization

In this section I will conceptualize sexism and racism and then show that there are relevant similarities which make these phenomena comparable. I am interested in the falsehood of scientific theories due to specific markers as sex/gender and race. Therefore, after I provide general conceptual explanation, I will focus on the examples of sexist and racist scientific practices. Sexism and racism will be shown as belonging to the same domain. I will categorize them as analogous types of dehumanization – phenomenon of denial or

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diminishing of human identity, often related to the idea of human essence, and exclusion from the human community (communities) in various ways.

Sexism

Here I provide a basic definition of sexism, introduce some elementary typology and character of the phenomena captured by different scales, and point to sexism as institutional practice, a form of structural violence, the latter being briefly explained, which will lead us to the institutional practice of scientific sexism.

Accounts of sexism

Definitions of sexism refer to the prejudice or discrimination based on sex, and while it can affect people who are assigned male sex, it has the most sever effects on the one who have assigned female sex (O'Brien 2009). Some authors give more detailed description and next to "comments or behaviors that reflected or enforced traditional gender role prejudice and stereotyping" (Swim Janet K. et al. 2002, 36), they consider as sexism demeaning and derogatory comments and behaviors, like assigning labels to women "(such as "bitch" or "chick"), making sexist jokes, exclusion in conversations, exclusion through the use of sexist language, violence toward women, and negative attitudes toward equality" (37). Often a separate category of sexism is mentioned, the practice of sexual objectification, that is, "comments and behaviors of a sexual nature" (37).

Sexism is a social phenomenon which changes with time. While old-fashioned racism and sexism allow blacks or women to be discriminated against simply because of their skin color or sex, people are today inhibited by the atmosphere of political correctness and now "I am not a racist, but…" racism is globally present phenomenon (Bonilla-Silva and Forman 2000). In this atmosphere "unfavorable attitudes toward minorities surface in areas in which the attitudes could be interpreted in nonprejudiced terms" (Swim and Cohen 1997, 105; Bonilla-Silva and Forman 2000; Swim et al. 1995). In accord, we can see that sexism as

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unequal treatment can be overt, easily recognized and documented, but more often today it is covert, hidden from the public, and that it can also be very subtle (Swim and Cohen 1997, 104) This last form of subtle sexism is defined as "openly unequal and harmful treatment of women that goes unnoticed because it is perceived to be customary or normal behavior" (Swim and Cohen 1997, 104). This means that sometimes people might officially be proponents of equality, but not realize that they are actually being sexists, because sexism became a social norm.

The Attitudes Towards Women scale was invented in the 70s, and it measures more open and direct old-fashioned sexism (McHugh and Frieze 1997). But, due to the change of manifested forms of sexism, and in analogy to the Modern Racism scale (Kim 2006; Sue 2010b, 142; Romm 2010), during the 80s and the 90s, researchers had to develop the Modern sexism scale and the Neosexism scale (Glick and Fiske 1997; Swim and Cohen 1997; McHugh and Frieze 1997). These are meant to deal with hidden sexism and both of these scales "are indicated by (a) beliefs in the rarity of discrimination against women, (b) antagonism toward women's demands [for equal treatment], and (c) resentment of efforts to address gender inequality [like affirmative action] "(Becker and Swim 2011, 227).

Racist and sexist beliefs and behavior became today not only less open, but they are now also more ambivalent. Glick and Fiske developed another instrument to capture this dimension of sexism, the Ambivalent Sexist Inventory, which follows two types of sexism, so called benevolent and hostile sexism (Glick and Fiske 2011). Benevolent sexism contrary to the old-fashioned sexism which usually denigrated women in their traditional roles supports the idea that "women are wonderful", but it does not liberate them, it actually celebrates women in stereotypical romantic and nurturing roles (ibid.). This type of sexism portrays them as " 'pure', the 'better' sex, and as idealized caregivers" (Becker and Swim 2011, 228). It has three components: Heterosexual intimacy, complementary gender differentiation, and

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protective paternalism (Glick et al., 2000). Heterosexual intimacy consists of the view of women as necessary romantic partners for men, whilst complementary gender differentiation emphasizes the belief that women have unique desirable traits such as purity and enhanced moral sensibility. In turn, protective paternalism consists of the belief that, as superior and more powerful beings, men have the responsibility to provide for and to protect women" (Ramos et al. 2018). Benevolent sexism is often socially accepted by women as flattery, but it essentializes them, presents women as weak, incompetent, cognitively inferior, and in general reinforces paternalism and power difference (Glick and Fiske 2011; Becker and Swim 2011; Skinner, Stevenson, and Camillus 2015; Garaigordobil and Aliri 2011). It is simply on the other side of the hostile sexism which serves to punish women for stepping out of the stereotypical roles (Glick and Fiske 2011).

In addition to historical and individual perspective, sexism should be seen also as a widely present and structural phenomenon, since women all over the world face sexism on everyday basis (Swim Janet K. et al. 2002), and inequalities are also engraved into the institutional practices in different fields like politics, economy, art, education etc. (Lovenduski 2014; Lansky et al. 2017; Branisa et al. 2014). It is a form of structural violence. Galtung defines structural violence in opposition to the personal violence as the one which does not have a perpetrator "There may not be any person who directly harms another person in the structure. The violence is built into the structure and shows up as unequal power and consequently as unequal life chances" (Galtung 1969, 171). The author connects structural violence with uneven distribution of resources, and power to decide about distribution. This power is convertible from one social field to another, for example, power to decide about education might convert to financial domain, housing, health, etc (171). Galtung gives importance to education by saying that "when one husband beats his wife there is a clear case

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of personal violence, but when one million husbands keep one million wives in ignorance there is structural violence" (171).

On this track Ahmed claims that "sexism is a set of attitudes that are institutionalized, a pattern that is established through use, such that it can be reproduced *almost* independently of individual will. Archiving sexism - showing that pattern made out of the fabric of our lives - is thus a crucial form of feminist activism (Ahmed 2015, 10 italics in original). Sue thinks that "patriarchal policies, practices, and structures have granted men power over women, and provided men with a convenient justification for the subjugation of women" (Sue 2010a, 166). The author also gives a comprehensive definition of sexism which reflects on this side of the phenomenon: "[s]exism is any attitude or behavior of individuals, institutions, or societal norms based on the belief that men are naturally superior to women and should dominate them in all spheres of life: political, economic, and social" (Sue 2010a, 166).

Scientific sexism: conception theories

Sexism is a pervasive phenomenon and it did not leave out science as institutional practice. Actually, science had a prominent role in establishing a sexist worldview. As old fashioned sexism bases the superiority of men on natural differences, the scientific practice of the Enlightenment period might be said to contribute to the naturalization and essentialization of both racial and sexual differences, with significant effects for both social categories (Schiebinger 1989, 2006).

It is interesting to see how biological sexual difference was present even on the level of a single cell. One of the already mentioned examples are theories of conception. In early embryology "[s]ome of the first scientific ideas about the form and function of sperm were developed in the seventeenth century. This theory of preformation asserts that within each primordial organism resides a miniature, but fully developed, organism of the same species" (Moore 2002, 96). The Russian doll model and the Hartsoeker's drawing of a "little infant"

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how he calls it, curled up in the spermatozoa head in his "*Essaide dioptrigue"* from 1694 are probably the most emblematic representations of this theory (Pinto-Correia 1997a, 212). Scientists tried to prove that the embryo, which is in the spermatozoa head, actually has developed organs, for example, blood and digestive system (ibid.).

The Preformation theory stuck in science even until nineteenth century and in expectation of androcentrism we would assume that, of course that embryo was in the spermatozoa, and that man was imagined as a bearer of life. But an interesting caveat is that scientists of that time were actually separated in two camps, the ovists and the spermists, debating where the preformed embryo is actually located. Spermatozoa is firstly observed in 1677 with the microscope, however, it took time for it to be infused with culturally biased superior features. It is interesting to see how animality stood in the way. Spermatozoa was first treated as some form of animal, and called "animalcules". In the context of speciesism, the idea that lesser creatures like "worms", in similarity also with frogs, have anything to do with conception was at the beginning fiercely rejected, not just by religious, but also scientist establishment (Pinto-Correia 1997b).

However, it did not take long for scientists to follow sexist European historical narratives going back to Aristotle. Aristotle took females as incomplete males, repositories of life matter, and males as originators of life, the ones who give life, which was adopted by the theologians in the Middle Ages, and taken into the centuries to come right to the twentieth century (The Biology and Gender Study Group et al. 1988, 61; Pinto-Correia 1997b; Haely 2008; Stepan 1985; Moore 2002; Martin 1991). Harvey had conceptualized the epigenetic theory of embryonic development on the example of animals (Pinto-Correia 1997c, 2). The theory claims that embryos develop gradually from a mass of material and from an egg, but it comes at the time of repudiation of Aristolian ideas of spontaneous, gradual becoming in favor of more direct causation in accordance with the new mechanical worldview (ibid.).

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Also, the preformation theory was fitting for the religious and higher classes since it naturalized all inequalities professing clear cut between social categories (Pinto-Correia 1997c, 4).

One more interesting example of the false and sexist practice in science relates to the time when it was discovered that both the sperm and the egg are needed, the attempts to explain the role of each in conception similarly fall into the background of philosophical and scientific sexism (ibid.). Even the ovists who favored the egg, considered it to be a passive recipient of God's influence and/or simply natural principle of formation of life in the egg form (Pinto-Correia 1997d). "Sperm sagas" , that is theories which tried to account for the available data, presenting the spermatozoa on their "heroic journey" could begin (Haely 2008, 69), and it seems that the story of a sperm, "the valiant hero" on his way to conquer a damsel, that is the egg, still did not reach its happy end, since this partial and incorrect account of conception is widely present in textbooks and in public in general (Nettleton 2015). What happened is that it was subsequently discovered that the process of conception is much more complex, and that the egg does not simply perform passive role in this process, that on contrary, it produces enzymes together with the spermatozoa which allow them to stay glued together and for the conception to happen. However, according to Martin many scientists still continued to think of the egg, and present it, as a passive actor, not acknowledging new data. Another strategy was to reconceptualize the new data by vilifying egg, which is in this case "trapping" the spermatozoa, calling its cover, zona "aggressive sperm catcher" (Martin 1991, 493).

It is important to stress that this imprint of the stereotypical gender roles was filling the higher levels of structural organization. Scientists did not just claim that the cell is passive and inferior, but they also tried to prove that the female reproductive organs, and the whole female body plays this submissive and passive role which lead, for example, to the idea that

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hysteria is women's disease (Chodoff 1982; Hunter 1983), linked to the old idea of Plato about "restless, wondering womb", and that "women's reproductive capacity and sexual organization, specifically the ovaries and uterus, controlled her entire nature and existence from puberty to menopause, that these organs were the seat of disease and the center of sympathies, and shape everything from social roles and characteristic to common ailments and personal, intellectual and physical abilities and disabilities" (McCrone 1988, 7)

Even though false theories about the embryo in the spermatozoa, passive egg, reproductive organs, or body of women are usually recognized as ridiculous echoes of sexism, and it is not to be expected to encounter them in serious scientific discourse today, it should be recognized that it was hardly possible to have theories of conception outside the framework of existing theories not just about the nature of men and women, but about the general principles governing the process of conception, taken to be the laws of nature, and that science of that time was taken seriously.

Further I will turn to racism to see how it was defined, what its usual form is and how it manifested in institutional, scientific practice. We will see that, even though the concept of race as a social category is relatively new, there are numerous similarities between these two phenomena which will allow us to find an analogy and ground it in the phenomenon of dehumanization further.

Racism

Before I give an account of racism, and provide one example of scientific racism which might be relevant for us later, I will go through the history of the notion of race since the practice of racism predates the theoretical and scientific conceptualization mostly placed in the period of the early Enlightenment in the seventeenth and eighteenth century.

Invention of the category of race

At the early seventeenth century with the spreading of colonialism, the diversity of newly encountered objects of nature significantly influenced and moved the thought of the

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men of science in Europe. It was not that there was no connection with non-European lands and cultures before, but economic interest urged colonial forces to provide regular, adequate and safe transfer. Slavery and exchange of goods from distant lands allowed for different species of plants, animals and, how it was often thought, different types or species of humans to cross the boarders with greater regularity. Botany at this time gain significance since knowing which plant has which characteristics, if it can be useful as a commodity that can be traded was important for financial gain on the level of the State and on individual level (Sparay 1996, 187).

In addition to economic interest, sensing the feeling of the time, in the period of liberation from the theologian doctrines, the most learned scientists are urged to follow in the direction of the early Enlightenment thought towards better understanding of nature and its hidden patterns. These patterns were taken to be discoverable by the proper scientific method. In this early age of the development of science these were observation and classification (Banton 2000, 54). While it is obvious that slavery and contempt for African blacks predates the conceptual scientific framework, it is interesting that it took time and significant effort to introduce humans close to animals into the natural order, and to subject them to similar classificatory practices which will end up in scientific racism (Cole 1972)

The start of this phenomenon usually brings up the name of Carl Linnaeus (1707-1778), Swedish botanist, zoologist and physicist, interested in variations in nature, who upgraded the old Aristotle's idea about the "Chain of Being", which had simple one line structure of distinctly separated, hierarchically ordered beings, with the human on the top, created by Good (Lovejoy 1936b). Even though Linnaeus was a scientist of the early Enlightenment period, he did not exclude God as a significant explanatory reference, as it will be the case with other scientists or natural philosophers, Leinnaeus took the classification he established as actually made by God.

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He tried to make taxonomy by selecting essential elements of every group of specimens which exhibited some form of similarity, on which he could base the classification of plants, and in 1640 published his famous "Systema Naturae" where he claimed that nature is separated into the kingdoms of minerals, plants and animals, of which each has its place into nested hierarchy according to class, order, genus, species (Ereshefsky 1994). In his book he presented around ten thousand species, plants and animals, provided descriptions of their characteristics, and introduced now standardized naming system, binomial nomenclature, containg genera and species. After this there are many different attempts to make similar kind of effort and scientifically classify things and organisms in nature (Leedale 1974). The book became very popular and in some respect controversial since it introduced sexual reproduction among plants and included humans in the animal kingdom. According to Linneaus, humans belonged to genus Homo, together with orangutans and chimps, and this genus belongs to the family of Primates, together with simians and lemurs (Schiebinger 2013). Linneaus provided one of the first classifications of humans in science; he divided human species on Europaeus, Americanus, Asiaticus, Africanus, which he did not call races, but varieties. We will see that the notions of variety, type, subspecies will be often conflated with race further on in history (Banton 2000). He also connected these observable varieties with their temperament and behavior (ibid.).

Introduction of humans into the animal kingdom was contested by different authors, including Buffon (1707-1788), for example, who clearly noticed the similarities, but did not appreciate human separateness and uniqueness violation, considering it simply false (Schiebinger 2013, 13). However, Buffon did agree with classification of humans, although he found Linneaus' classification to be very static and inappropriate for capturing "changing nature of human difference"(Hudson 1996, 254).He also did not want to base classification on the single criteria of skin color, or too detailed measurements which Linneaus applied

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(ibid.). He claimed that differences can be determined on more obvious terms and that "we must take into account the whole 'ensemble' of traits.[54] In classifying humans, we should focus not just on skin-color, but also compare stature, physiognomy, hair-type, intelligence, and the whole configuration of physical and mental features" (ibid.).

Buffon is famously known for his definition of species as interbreedable groups of individuals, he claimed that "those animals who by way of copulation can perpetuate themselves and conserve the character of the species, and as belonging to different species those who by the same means can not produce anything" (Farber 1972, 262, 263). He was using also the notion of degeneration and accepting the influence of the external factors on the change of the species, he considered "Lapps or Negroes as having "degenerated" as the result of harsh climates, poor diet, and brutal customs"(253, 254).While he considered some form of essentialism which allows continuation of the species, Buffon rejected static notion of species and emphasized variability due to external conditions, which is why he is seen as predecessor of Cuvier and Darwin who introduce us to the new elements of race and racism.

Actually, Cuvier (1773-1838) was the one who used classification to specify details in animal kingdom and relied on what we might call today a type. Nevertheless, he "divided man into three main subspecies (which he called races): Caucasian, Mongolian, and Ethiopian, which were further subdivided. He stated that they were all one species but they had been separated by some great natural catastrophe" (Banton 2000, 55). His account is next to Buffon's one of the first which allows geographical location and climate to become entangled with race.

One of the naturalists who was interested in taxonomies, and one of the founding fathers of anatomy and craniometry was Blumenbach (1752–1840). He was not satisfied just with skin color as criteria for classification. As Brown says

> He looked at skin color and rejected it as the basis for racial types, noting that greater color variability existed within types than among them—an observation that turned

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> out to be quite prophetic. Instead of looking at externals, such as skin color or hair texture, Blumenbach focused his work on the many characteristics and landmarks of the skull, taking dozens of measurements and observations. These data led him to create five racial types. While still essentialist in character, his work was less subjective than his contemporaries. In fact, some of the measurements Blumenbach developed are still used by forensic anthropologists today in order to establish the biological affinity of human remain" (P. F. Brown 2010, 67).

What is a common line during the eighteenth century is that scientific racism was still monoegenist, claiming that while there are certain varieties, which they called with different names, humans all originate from the same source. Only later in the nineteenth century there are polygenic theories of race, when race becomes something not affected by climate or other external factors, but on contrary, pregiven, essential feature separating humanity into sections and further determining cultural differences. Scientific racism also becomes more focused on the differences which are "more than skin deep" (Schiebinger 1989; Gordon 1992), which are "in the blood", trying to figure out in addition which measures of internal body features can substantiate this idea, and anatomy and physiology acquire their significance. What happened is the "change from an emphasis on the fundamental physical and moral homogeneity of man, despite superficial differences, to an emphasis on the essential heterogeneity of mankind, despite superficial similarities" (Stepan 1982a, 4). It was the time of resurrection of the Anicent Greek idea of the "Chain of Being" which appears in some form in Plato and Aristotle, and which was distinctively separating beings on the hierarchical ladder. As Lovejoy claims, "[i]n spite of Aristotle's recognition of the multiplicity of possible systems of natural classification, it was he who chiefly suggested to naturalists and philosophers of later times the idea of arranging (at least) all animals in a single graded *scala naturae* according to their degree of "perfection" (Lovejoy 1936a, 58 italics in original). The most referred criteria was the quality of their soul, their essence, with human animal having the most perfect soul, based on reason, and in connection with God (ibid.). We see here that as in many other cases,

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the idea of some kind of continuity between animals and humans appears very early in the Western thought, even though it fades to the back in certain historical periods.

Darwin (1809-1882) publishes his book "On the Origin of Species" in 1859 establishing the connection between animals and humans and challenging the prevalent essentialist idea of natural categories. Unfortunately, he did not challenge the idea about essentialism of racial types, which according to Brown lead to social Darwinism, for example Nazi eugenics, and racial hygiene, the idea that humanity needs to be "cleaned out" of the "weak ones" on the way of progress of superior Arian race. It also lead to other types of racism we are more familiar with, like forced control of birth in forms of sterilizations, different forms of criminalization and pathologization of the difference among humans which in some form stay with us even today. One of the forms simianization, likening of humans with apes, but certain groups of people, seen as race, most often black race, as lower races closer to primates on the "Chain of Being" (Hund, Mills, and Sebastiani 2015). It should be noticed that colonial practices gave strong push to these kinds of scientific justifications, even thought they were certainly not the only cause of them, and that they were eager to exploit results of it. Colonial forces had immense use of scientific justification of exploitative paternalism as Enlightenment brought the idea of the scientific means to deal with the moral issue of the "white man's burden" to civilize "brutes" and "barbarians" by enslavement and expropriation of their resources, for their own good (O'Brien 2014).

As Ereshefsky points out "For Linnaeus the major ontological divide in his hierarchy was between genera and the other higher taxa. The members of each genus had a genus specific essential property, and the members of each species had a species specific essential trait (Cain 1962, 2-3). Those essential properties could be used to construct classifications of species and genera. According to Linnaeus, because such essences were not mind-dependent but real properties created by God, classifications of species and genera reflected real groups

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in the world (Mayr 1982, 176; Cain 1958, 148, 152-153) (Ereshefsky 1994, 197). While later other authors might renounce God, or find other ways to classify humans, they all have in common desire to establish clear categories, establish a hierarchy between categories of humans, and to connect in some way biology with culture. I will turn not to the concept of racism which appears as a reaction to theory and practice of unequal treatment of people assigned to different races.

Accounts of racism

Although distinguishing people according to their physiognomy is probably as old as humanity, the concept of racism is of a relatively new origin and appears to be a combination of a desire to refute racist science of the nineteenth century, and warn about eugenics used by the rising Nazi regime in Europe (Miles 1999). As Miles reminds us, "[i]n *We Europeans: A Survey of 'Racial' Problems*, Huxley and Haddon (1935) argued that there was no scientific evidence to sustain the idea of distinct and discrete 'races' and that 'racial biology' was a pseudoscience" (345). As Bonilla-Silva states, "Benedict (1945) was one of the first scholars to use the notion of racism in her book, Race and Racism. She defined racism as "the dogma that one ethnic group is condemned by nature to congenital inferiority and another group is destined to congenital superiority", and ideas are based on physical differences (Bonilla-Silva 1997, 465). We see that the "SAGE dictionary of sociology" recognizes several grounds for racism except physical differences and the authors claim that racism "signifies beliefs, ideologies or behaviour that distinguishes people on the basis of their supposed membership of some putative racial group (in practice usually defined by culture or land of origin or skin colour)" (Bruce and Yearley 2006, 252).

Today we can see that similarly to sexism, there are different types of racism seen as prejudice which are recognized and measured in some way. There are "old-time" and "modern" racism, differing in the fact that the old-time racism was more direct,

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unsophisticated and visible, while the modern one is more hidden and symbolic (Romm 2010). Some authors name the same thing how it seems, but with other names, for example there are for Roy "blatant" racism, which we can identify also as "old-time" racism, and "subtle" racism - where preference is masked by socially acceptable ideals, similar to "modern" racism (Roy 2006). Roy however, adds "aversive" racism-which is unconsciously present and manifested among people who believe they are free from racism, and separates "subtle" from "symbolic" racism-where culture is the object of racial evaluation (Roy 2006), some authors also recognize racist micro-aggressions (Kim 2006; Sue 2010b, 142), which Sue and others define as "commonplace verbal or behavioral indignities, whether intentional or unintentional, which communicate hostile, derogatory, or negative racial slights and insults" (Sue 2010b, 278). There is also color-blind racism, which might be seen as a form of modern and aversive racism, where there is negation of the racism as such (Roberts 2015). Again, as in the case of sexism, there are more or less adequate instruments for measuring racism, like Modern Racism Scale (Roy 2006; Kim 2006).

Further, looking at racism as ideology present on different levels, I take Benoist's analysis to be informative. The author offers five core elements of racism which I believe give substantive description of the phenomena as a belief system:

> 1) A belief in the superiority of one race, and more rarely of several races, over others. This belief is usually accompanied by a hierarchical classification of racial groups; 2) The idea that this superiority and inferiority are of a biological or bio-anthropological nature. The conclusion drawn from this belief is that superiority and inferiority are ineradicable and could not, for example, be modified by social milieu or education; 3) the idea that collective biological inequalities are reflected in social and cultural orders, and that biological superiority translates into a "superior civilization," which itself indicates biological superiority. This implies a continuity between biology and social conditions; 4) A belief in the legitimacy of the domination of "inferior" races by "superior" ones; 5) A belief that there are "pure" races and that miscegenation has an inevitably negative effect on them ("decline,""degeneration," etc.) (Benoist 1999, 14)

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Schmid separates behavioral from motivational and cognitive approach to racism as unequal considerations. In the first case the focus is simply on behavior, in the second on motivation to dominate, and in the third case on the belief of inferiority of other races. The author argues for the second approach as it accounts better for colonialism and slavery (Schmid 1996)

Since modern racism today changed in different ways, in that it is not simply individual prejudice, Bowser insists that we look at the racism from different levels, so there are individual, institutional and cultural level which are to be seen actually as three integral components of the theory of racism which are supporting each other (Bowser 2017). Further, Bonilla-Silva specifically argues against an individualistic and psychologistic notion of the idea, which the author sees as an idealistic view of racism which he describes like this: "[f]irst, racism is defined as a set of ideas or beliefs. Second, those beliefs are regarded as having the potential to lead individuals to develop prejudice, defined as "negative attitudes towards an entire group of people" (Schaefer 1990:53). Finally, these prejudicial attitudes may induce individuals to real actions or discrimination against racial minorities. This conceptual framework, with minor modifications, prevails in the social sciences" (Bonilla-Silva 1997, 466). Since it is historically linked with power structures, the author argues for a structural approach. He cites Fanon, one of the famous anit-colonial writers from Martinique, long time French colony, who as a practicing psychiatrist and philosopher claimed that "[t]he habit of considering racism as a mental quirk, as a psychological flaw, must be abandoned" (Bonilla-Silva 1997, 465). This is why the definition which Grosfoguel provides might be the most comprehensive and might serve us further. Grosfoguel claims that "[r]acism is a global hierarchy of superiority and inferiority along the line of the human that have been politically, culturally and economically produced and reproduced for centuries by the institutions of the

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"capitalist/patriarchal western-centric/Christian-centric modern/colonial world-system" (Grosfoguel 2016, 10)

Scientific racism: simianization

As it is one of the most common types of racism, and it relates to my further investigation, I will here present the case of simianization through scientific practice. Simianization is one common example of racism. Scientists did not stay immune to it, indeed it might be said that they gave it enough legitimacy to occupy the domain of science and pseudo-science until late nineteenth century. The seventeenth and eighteenth century brought Europeans into the distant foreign colonies where they witnessed very different cultures and, obviously, encountered people with different physiognomy. Eslaved black people were also brought to Europe and their presence became prevalent in everyday life of the European higher circles, where they were mostly used as servants. Through these phenomena the question of their place in the "Great Chain of Being" inevitably arose (Lovejoy 1936b; Stepan 1985).

On the other hand, apes have a special place in the history of Western culture as they are often seen as "unpleasantly similar", undeveloped and incomplete humans, projections of uncanny, often subjected to monsterification themselves for defying the idea of human uniqueness, and essentialization of biological natural kind in the hierarchical order of natural kinds without overlaps (Smith and Panaitiu 2015, 19,20). They are, as black people and their distant cultures, known in Western philosophy and science from early ancient times, but since their actual presence in Europe mainly coincide with colonialism, in their resemblance to humans, they become of particular importance in the scientific community from the seventeenth century onward, serving mostly as a reverse mirror of projected metaphysical notion of humanity, and, as it will be shown, an instrument of scientific racism and sexism (Hund 2015; Schiebinger 2006).

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At the time of birth of the concept of race, and categorizations of humans, with the rising idea of different origin of races and the hierarchical ontology with the white, Western men on its top, physiology, anatomy, and what was understood as typical behavior of apes are used as a benchmark against which the level of the absence of humanity, and the "degree of animality" can be measured, and it was used to answer the question of "races and proper places" (Stepan 1985). In the eighteenth century, Camper, who it seems was not in favor of scientific racism himself, comes up with the well-known measure of the "facial angle", showing how extension of a jaw changes craniofacial morphology (Meijer and Camper 1997). Mayer describes Camper's method "involved the transference of the cranial form onto paper (in the manner of an architect), and tracing a line from the front of the incisor teeth to the prominent part of the forehead. This *linea facialis* intersected a horizontal line, drawn from the nose base to the earhole, thereby producing the 'facial angle,' later termed 'prognathism'" (Meijer and Camper 1997, 3 italics in original). In its simplicity, contrary to his apparent intention to deal with the assumption that nature does not produce "ugly creatures like that" and to show that common elements of the physiognomy of some people like wider nose and fuller lips, are not a matter of post birth intervention, but are actually naturally occurring, served against them, for the production of scientific racism and sexism, since women of all races were also subjected to this measurement (ibid.). Jahoda claims that Cuvier played significant role in translating prognathism into the tool of "savaging" and dehumanization by developing the "index of animality", claiming that "the larger the facial area with a low forehead and protruding snout (corresponding to a low facial angle), the more the organism remains tied to mere sensory functioning governed by external sensations" (Jahoda 1999, 78). According to Cuvier, a small facial area, indicated in high facial angle, assigned fully to the antic ideal of Western white men, was an indicator of lesser dependency of the organism from its physical surrounding, higher level of organization of the nervous

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system, and higher faculties, which was all in favor of the biologized, racial hierarchy and polygenism, the belief that not all people have the same unique origin (Jahoda 1999, 78). Scientific racism explained physiology less in terms of climate and external factors, and became focused on using elements of phenotype as indicator of exclusively genetic, hereditary, and not changeable, essential difference, which would lead further away from variation to the idea of speciation of human races. Of course, the ontological difference was further categorized hierarchically on the orderly and eternal, unchanging "ladder of beings". In this practice we can already recognize the mechanism of dehumanization to which I will turn now.

Dehumanization

There are several approaches to the phenomenon of dehumanization and they seem to be complementary. Dehumanization was first researched during the seventies and the eighties as a severe form of denial of human identity and exclusion from human community which made easier the exclusion from moral community, and allowed its manifestations in mass atrocities and genocides towards different social groups during history (Haslam and Loughnan 2014). However, more subtle forms of dehumanization are detected in the next decades in the form of so called infra-humanization (Leyens et al. 2007). It is discovered that there is a wide spread tendency to perceive members of out-groups as less human and more animal like (ibid.). As Leyens says "[p]eople are experts at breaking down humanity into social categories, which helps them feel that they understand their environment" (Leyens et al. 2007, 141). While these boundaries between social categories are usually arbitrary, and change on different axes through time and space, humans tend to essentialize them (ibid.). It is important to understand essentialism for this reason.

Essentialism is often mentioned in connection to Aristotle's work since essence plays very significant role for Aristotle. For him substance, which is one of the categories of being, does not come in degrees, and it always has an essence with the functional property, and as

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such it is the cause of a being, determines belonging to a natural kind (Loux 2006a). As Layens and others further claim, "[e]ssentialism is the belief that people are what they are by substance as opposed by contingencies, which implies the conviction that there are discontinuities in humanity. To believe that essences explain differences between groups is therefore completely opposite to the idea of groups as social constructions" (142) Essentialist claims postulate social categories as expressions of discrete, fixed, natural, uniform, and defining characteristics that are shared by all members, and are informative about them (Yalcinkaya, Estrada-Villalta, and Adams 2017). While the first that comes to mind are old-fashioned racism and sexism, essentialism does not have to be grounded on strictly biological terms. Sexism and racism are also perceived through different cultural phenomena (Morning 2009; Worrell 2015), and by itself, cultural essentialism served similar purpose of essentialization of the difference, including different elements of ethnicity, language, religion, geographical positioning, etc., and their manifold combinations (Yalcinkaya, Estrada-Villalta, and Adams 2017; Narayan 1998; Kinnvall 2004; Bugarski 2007). Layens and others conceptualize the "human essence" as "the *uniquely* human essence, that is, an essence possessing characteristics not shared with other species or other animals" (Leyens et al. 2007, 142), and they find that intelligence, language capacity and capacity for complex, that is secondary emotions are some features which are most commonly defined as uniquely human, in opposition to the features of non-human animals. Haslam and Loughnan accept this oppositonality to non-human animals as the crucial element of essentialization and dehumanization (Haslam and Loughnan 2014). But, going further into the analysis, they claim that this is only one dualistic form of dehumanization, and that yet another dualistic form should be acknowledged (ibid.). According to the authors, indeed, "humans are distinguished from animals on attributes involving cognitive capacity, civility, and refinement" (Haslam and Loughnan 2014, 403), but they also recognize essence in human

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features which distinguish us from objects, like emotions, vitality and warmth (Haslam and Loughnan 2014, 403). So, there are actually two forms of dehumanization, animalistic and objectifying, mechanistic dehumanization (ibid.). In the first case dehumanized subjects are usually still considered as humans, or some kind of humans, but they are lower kind, striped of uniquely human features like "refinement, self-control, intelligence, and rationality" (401), completely or in some degree, and often being likened to animals (Haslam and Loughnan 2014). In the other case they are not seen as humans at all, and they are likened to inanimate objects (ibid.). Combination of two types of dehumanization is possible, and often happens in reality, and, as mentioned, these two forms can manifest on a continuum from very severe to very mild form (ibid.).

It might be useful at the end to provide a short summary of the dehumanizing mechanism, and for this I find appropriate Godwyn's five core components of dehumanization which Smith and Panaitiu present:

> First, when we dehumanize people we grant that they appear human but deny that they are human. Dehumanized people are ›humanoid‹. They are simulacra of humans rather than genuine human beings. Second, this peculiar metaphysical status is explained by the fact that these individuals lack whatever it is that only and all human beings share. In 17th century European thought this factor was identified with the human soul (more explicitly, the rational soul). However, we should conceive of it more generally as the idea of a human essence.[15] Third, nature is arranged hierarchically and humans occupy a higher rank in the hierarchy than those that are occupied by nonhuman animals. Nonhuman animals are therefore ›sub‹human. Fourth, in virtue of being identified with animals, dehumanized people are not merely non-human, they are subhuman. They do not merely lack a human essence; they possess a subhuman one. And fifth, dehumanized people are ›beneath‹ human beings in a specifically moral sense, thus rendering them less morally considerable than humans are. It is therefore morally permissible to treat them in ways that are regarded as appropriate for nonhuman animals but inappropriate (and ethically impermissible) for human beings (Smith and Panaitiu 2015, 7,8).

Further in the text I will clarify some common assumption underlying the practices of scientific sexism and racism based on the presented theory about dehumanizing practices.

Common ground for scientific sexism and racism

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It seems that subtle forms of dehumanization, infrahumanization are potentially part of our cognitive apparatus. As Leyens and others notice, there is a general and strong tendency to assign humanity to in-groups which is often recognized in higher degree of self-assigned complex emotions, and also noticeable in group accepted antroponyms “the Humans”, “the People”, “the Men” in self-naming of the older societies, tribes or clans as it is noticed by anthropologists (Leyens et al. 2007, 141). We can see that this practice is present among different ethnic groups, for example, Roma in Europe today (Rom means a human). At the same time, while full humanness is self-ascribed, less degree of complex, secondary emotions is assigned to the members of the out-groups, and being the case that this is also often designated as a unique feature of humanity, it is a form of dehumanization, or infrahumanization, as Leyens and others call it (Leyens et al. 2007, 141).

Still, even though this seems to be a global and universal tendency, there are specific social groups which are more often dehumanized than others, and this is contingent on existing social status (some indexed criteria are ethnicity, race, sex, sexuality, class, occupation, criminality, mental health), also historical, political and sometimes simple geographical closeness or distance between groups (Leyens et al. 2007; Haslam and Laughnan 2012; Narayan 1998). Dehumanization based on sex or race is very old and common. Women are dehumanized both in animalistic and mechanistic ways (Tipler and Ruscher 2017; Rudman and Mescher 2012). Different groups are more likely to be likened to certain animals. Simianization is one very old animalistic dehumanizing practice which likens people to apes (Smith and Panaitiu 2015) and was, for example, globally visible in 2008 when Barack Obama was presented as a chimpanzee during the presidential campaign (Smith and Panaitiu 2015). It should be noticed that this form of dehumanization is not strictly reserved for the people of color since Jews, Italians and some other social groups are also subjected to this kind of dehumanization (Hund, Mills, and Sebastiani 2015).

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If we analyze the most paradigmatic cases of false scientific theories, scientific sexism and racism, for example, the idea that women and black people have smaller volume of their skull, and consequently lower intellectual capacities, which makes them closer to apes (Schiebinger 1993), we can see that the metaphysical order was in line with the concept of the "Great Chain of Being" (Lovejoy 1936b). It allowed nature to be separated in distinct ontological compartments with specific necessary and sufficient essential, inherent, and unchangeable features. There was a selection of features which were deemed essential, meaning unique for humans, which are supposed to be possessed by all members of a group, and also visible and comprehensible to humans, more than others to scientists. Compartments were presumed to be ordered hierarchically in nature. So it was possible for "the facial line to become the most frequent means of explaining the gradation of species" (Schiebinger 1993, 150), determining the relation between apes, black people from colonies and Europeans, males and females, or to determine woman's beauty and her femininity by the size of her pelvis (156). As Schibinger says "[w]hen anthropologists did compare women across cultures, their interest centered on sexual traits—feminine beauty, redness, of lips, length and style of hair, size and shape of breasts or clitorises, degree of sexual desire, fertility, and above all the size, shape and position of the pelvis. For anatomists among them, it was the pelvis (and its procreative virtues) that ultimately emerged as the universal measure of womenlines" (ibid.). The position on the ladder is not neutral, but hierarchy is always dichotomy, so some skulls closer to the top of the scale are beautiful, and show higher intelligence, and the opposite, or in another example, female egg is simply passive, which is negative, while the spermatozoa is active, and brings life, so the position bares the sign either of superiority, or inferiority. Schiebinger notices how "[w]omen and Africans were seen as sharing similar deficiencies when measured against constant norm-the elite European man. Women and black males had narrow, childlike skulls; both were innately impulsive,

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emotional, and imitative. European women shared the apelike jutting jaw of the lower races, while males of the lower races had prominent bellies similar to those of Caucasian women who had borne many children" (Schiebinger 1993, 158).

The superior anthropocentric position is always presumed, on the top of hierarchy was always human, and even though scientific studies to support this regarding any criteria, even the anthropocentric ones, were rarely done (mostly scientists just started to use animals for vivisection, and it was done with the same unquestionable presumption of human superiority). But, it was, of course, not any human. Categorization on the biases of possession of presumably essential features is done by the measurement and comparison with the distinguishing, particular features of the Western, white, male as a universal standard, so in science "[i]n the eighteenth-century Europe, the male body remained the touchstone of human anatomy" (Schiebinger 1993, 160). Of course, these classifications which were "found" in nature further legitimized the status of "not real humans", but more of a "humanoids", and social classifications and hierarchies, particularly exclusion from the moral realm of these "sub-humans". As feminists will recognize from the early nineteenth century suffrage movement and later in the twentieth century, biology becomes destiny (de Beauvoir 1956).

Based on this I take that all core elements of dehumanization set by Godwyn (Smith and Panaitiu 2015, 7,8) are present in both cases, in scientific sexism and racism, and that it is safe to conclude that there is analogy among them, and that they can be put under the category of dehumanization. In the next section I will deal with anthropocentrism and examine if there is a reason to believe that it might lead to the false scientific theories in analogy to sexism and racism.

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Chapter III

III) In analogy with II) we have some reasons to believe that at least some currently successful scientific theories which is some way include reference to other species might be false due the speciesism

In the last section I showed how scientific sexism and scientific racism appeared as a product of certain kind of historically grounded assumptions and practices of scientists from the early Enlightenment period. I presented the phenomenon of dehumanization, and I showed how scientific sexism and scientific racism are analogous to each other in certain respects, as forms of dehumanization, the practice of denial of humanity. This denial of humanity in one case of dehumanization, animalistic dehumanization, happen to be so structured to entail the concept of human essence, and dichotomized hierarchical scale on which humanity can be measured against animality. This presumed also that there is a definite and scientific answer to the question what it means to be an animal, as much as there is the answer to the question of humanity. If our conceptions of what it means to be human and how to measure humanness appeared to be in some way false, which scientific sexism and racism show, it might be a logical question if we got it wrong, in some way at least, in the case of animals. In this section I would like to propose that it is possible that today we are operating in science on the ground of unquestioned assumption of our own superiority over non-human animals, and that there is possible analogy in the source of our falsity to scientific sexism and racism.

First I will present the idea of anthropocentrism as a form of speciesism. Here I mostly rely on the conceptual framework offered by Horta (Horta 2010). I will delineate these two ideas, present some forms of speciesism, and provide some elementary overview of the current debate in environmental philosophy on this topic. I will offer what I see is an example of scientific speciesism through history, vivisection, and at the end try to find an analogy between racism, sexism and anthropocentrism.

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Anthropocentrism

Accounts of anthropocentrism

Horta defines anthropocentrism as “disadvantageous treatment or consideration of those who are not members (or who are not considered members) of the human species (Horta 2010, 258). Disadvantageous treatment here designates differential and discriminatory

treatment. Horta thinks that anthropocentrism should not be equated with speciesism; rather he thinks that the former is a form of the later. The author gives a definition of speciesism as "the inclusion of all human animals within, and the exclusion of all other animals from, the moral circle" (ibid.), but then he criticizes it by saying that "[t]here is no reason, however, to restrict the meaning of 'speciesism' in this way. In line with what I have pointed out above regarding discrimination and oppression, it is possible [for humans] to discriminate against those who do not belong to species other than the human one [humans]. Certainly, in the world in which we are living most instances of speciesism are ones that favor humans over nonhumans. But other discriminations are possible that may favor the members of other species or both the members of human species and of other species as well (Dunayer 2004, pp. 2–4)"(ibid.). I agree with Horta that anthropocentrism is one form of speciesism, and that hypothetically one can be a speciesist, but not biased in favor of human species - as antropocentrists are - but in favor of some other species, that is non-anthropocentric specisist, or in favor of human and some other non-human species together (Horta 2010, 258).

Horta restrains from classifying the anthropocentric treatment by default as unjustified, even though he thinks that it is (ibid.). The author claims that "for a moral exclusion to be fully justified, all the premises prescribing moral exclusions in which it is based must be justified themselves, with no exception. Hence, every speciesist position is unjustified (since so it is at least one of the prescriptions it consists of), even if those who are discriminated against by it are not completely deprived of consideration as a result. Speciesism does not become justifiable by being combined with other criteria that are" (256). This comes from his classification of the speciesist position on simple and combined speciesism. The first one encompasses moral exclusion simply on the ground of not belonging to a certain species which can be followed either by complete negation of the capacity to have any experience (Descartian position), or by acknowledgment of this, but its

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moral disregard (Kantian position) (257). The second one is combined from the membership exclusivity and some additional criteria, for example, sentience, which is acknowledged, but in the case of conflict of interest it is overridden by the interest of the members of the belonging species (ibid.). Combined anthropocentrism is the one which is practiced by most of the people who care for the interest of nonhuman animals, but in the case of conflict would favor human interest, which is actually, how Horta recognizes, the animal welfare position (264).

Horta thinks that these are speciesist positions, and not two different types of speciesism. So there are simple and combined speciesist positions. The second type, combined speciesist position is overruled by two arguments. The first argument is the argument from species overlap, and the second one is the argument from relevance. The argument from speciesist overlap is that the additional criteria which we add in the combined version of speciesist position to the fact of membership to certain species, does not allow us to pick exclusively humans. The criteria which is selected appears in at least two species, and in that sense, it is not good for demarcation of the species. The second argument is that even if we could do that, if we could find a feature which uniquely belongs only to the all members of one species, the relevance of this criterion is in question (263).

Historical account

I will turn now to an historical overview of anthropocentrism and speciesism where I will follow status of non-human animals from the status of Gods to the status of property and the gradual rise from the objectification which started only recently during the seventies in Western Europe.

The fall of the non-human

How to establish an ontological break, the clear line between species? And further, what moral order should it bring, when this constructed break changed with time and

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location? I will give a short historical overview of the problem. Antropocentric treatment of non-human probably existed from the dawn of civilization when our ancestors learned how to hunt, but different cultures have different approach to speciation, non-human animals and nature in general (Kalof 2007a). Some cultures did not recognize clearly the separation between human and non-human animals as different species (DeMello 2012a, 34), and in some cultures it was believed that humans can transform into animals and vice versa (Lindstrøm 2012). When hierarchical order existed, it did not always put humans above animals (Alves, Rilke, and Barboza 2018). Non-human animals were as part of nature seen as having special, magical powers, even though this often lead to their sacrificing (ibid.). Many cultures had animals, or antropomorphic animals as their supreme deities, some believed they have descendants in animals, and we see that in some form animalistic totems find their place designating family lineage until today (Alves, Rilke, and Barboza 2018, 278).

The relationship between humans and non-humans is very rich and filled with exploitative, but also caring and even adoration sentiments. Yet, it seems that as humans became less dependent on nature, especially when it become possible to produce more than for simple sustenance with agricultural way of life, they treated nature and non-human creatures as less sacred and more instrumentally (Kalof 2007b, 10). Cristianity in Europe with its rejection of the spirituality of the Earthly life (Kalof 2007d, 44), and the famous idea that God gave to humanity nature at its disposal, contributed to the idea of the separateness and to the loss of reverence towards nature. As Kalof says, by the late Middle Ages animals were already been instrumentalized and exploited in great extent (ibid.). Hierarchical order from the religious texts, should not, or not fully and necessarily be equated with disadvantageous treatment since the idea of human as a "shepherd" often implied caring relation with non-human animals (Szűcs et al. 2012). Actually as Maehle claims,

> Robert Boyle (1627–91) and Sir Matthew Hale (1609–76) have recently been quoted as prominent advocates of this concept of stewardship before 1700 (Passmore 1974;

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> Oster 1989). It was still popular in the following century, and towards the time of the French Revolution it was combined with the ideal of brotherhood among all creatures (Thomas 1983). As the Mainz philosopher Wilhelm Dietler (d. 1797) put it: Man is the more clever brother on earth, therefore God has made him His steward here, so that he should rule over the other animals not like a tyrant, who believes that everything has been created for himself, but like a brotherly guardian, who guides his less intelligent brothers, so that they love him and will be happy with him. (Dietler 1787:36–7) (Maehle 2002, 85).

One of the major influences on the construction of a brake between human and non-human species is probably presented best in the work of Descartes (1596-1650) who believed in separation of body and mind, and in reason as a defining feature of humans. In accord with the mechanical world-view, he accepted the idea that all internal processes happen as in mechanical apparatuses, and that non-human animals, which cannot reason, do not have a soul, and are more like machines, mindless automatons (P. Harrison 1992). It is sometimes claimed that Descartes believed that animals do not feel, even though they appear to be feeling, since according to the Enlightenment's tradition of being biased towards the grand idea of Reason he subsumed emotions under thinking. Other authors disagree with this conclusion (Maehle 2002, 87; P. Harrison 1992). In any case, here Descartes draws from Aristotle in more than one sense, so I will present shortly some of Aristotle's ideas which can give better understanding of the following work of Descartes, as of the other scientists and philosophers of that time.

Aristotle's endeavor is directed towards identification of the most general kinds of things existing and the structure of their relations (Loux 2006b, 5). These things he calls categories, and there are ten of them, substance being the only independent category of being on which the existence of all other categories depends on (Politis 2004b). While Aristotle was influenced by Plato's teachings, he develops his ideas on categories of beings in opposition to Plato, and so they are not as in Plato in otherworldly form, they have high, foundational ontological status, but they are close to our experience as "familiar objects of common sense"

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(Loux 2006b, 5). So, for Aristotle, acquirement of knowledge, what we can call science, begins with the observation of the familiar, perceptible objects, particular things (Miller 2013, 293). To know things is for Aristotle not simply to know that they exist, but to know why they exist, to know their essence (Miller 2013). Essence plays significant role in Aristotle's work, as mentioned. For him substance, which is one of the categories of being, does not come in degrees, and it always has an essence with the functional property, and as such it is the cause of a being, determines belonging to a natural kind (Loux 2006a). Primary substances are always particulars, and secondary ones, universals always depend on them, and can further be separated into species and genus, what is sometimes also called genera (Boyle 2012). So individual men like Socrates is a primary substance, he belongs to the species of men, which belongs to the genus of animal. Although it can be arguable, Aristotle claims that the differentia specifica of the species of human is that they are rational animals (Boyle 2012, 400). Humans have the capacity for reasoning, for knowledge. However, for Aristotle plants, animals and humans are capable of acquiring some kind of knowledge (Politis 2004c, 31, 32). Plants have perceptual capacity to acquire particular knowledge, animals have it too, and they also have the capacity to generalize and acquire particular non-explanatory knowledge, while only humans have the capacity for particular form of knowledge - explanatory knowledge, that is, science (ibid). This is all possible due to the soul as a principle of life, as a form of a natural body, and as causal source of the movement, the end, and the essence (Frede 1992). This means first that soul is "unmoved mover", providing structure for the elemental bodies from which everything is made: earth, water, fire, air. Second, it is a source of the final cause of things, which explains its purpose. And third, it is the source of the unique properties which define identity. While plants have nutritive soul, animals have sensitive, perceptive soul, and humans have intellectual soul (ibid). One more reason why Aristotelian metaphysics together with his epistemology was seen in a bad light

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by some scientists of the seventeenth and eighteenth century, and further feminists, critical and the authors of posthuman is that Aristotle's postulate scientific realism as one of the requirements for explanations (Politis 2004a, 48). All scientific, explanatory general knowledge, is actually presenting elements of reality as it is, natural kinds, and reality is in that sense independent of our thought or language (ibid). Since essences inevitably form natural kinds, and they cannot avoid but express them, in that sense, nature is not changing. Aristotle for this reason imposes observation as the most useful scientific method. Even though it is said that Aristotle was the first who systematically applied and analyzed induction (Galik 2006), we can see how the development of the interventionist experimental scientific setup, forwarded by the philosophers of the seventeenth century, and which in advance form we know today, was hindered in this constellation, since any "unnatural setting" would simply interfere with the operation, natural movements of the elemental bodies of which natural things are made, imposing artificial conditions upon them (Losee 1972a, 1972b). In its very limited form, Aristotelian thought served to medieval philosophy from the thirteenth century mostly for theologian purposes, for example, Lahor claims that Thomas Aquinas found "the principles for the demonstration of truths such as the existence, infinity, and omnipotence of God" (Lahor 1982, 93). But, from the fifteenth century, it gets more liberated from this interpretation, and Aristotle's work in physics serves as a teaching ground even until the seventeenth century, when it will be gradually replaced, and eventually rejected by the new, Cartesian mechanical philosophy (Brockliss 1981). It should be noticed that during that time scientists like Galileo, Copernicus and Beacon and other challenge Aristotelian ideas, embrace experimental method which yields significant scientific discoveries, leading to the new worldview, and from the sixteenth century we can see that not just physics, but also the notion of metaphysics changes, and rationalists like Descartes,

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Spinoza and Leibnitz create “abstract speculative systems far removed from any recognizably commonsense picture of the world” (Loux 2006b, 5).

The Cartesian system has its origin in the scholastic readings, deeply affected by the work of Aristotle and Thomas Aquinas. Descartes was a student of the college of La fleche, Jesuit Dutch university in Anjou for good number of years, learning classical literature, history, rhetoric, mathematics, moral philosophy, theology, natural philosophy (Ariew 1992). While Descartes was unsatisfied with the traditional aversion of the Jesuits to novelty, and with the lack of criticism there, he considered these teachings to be the best in Europe, and also introductory for his work (Ariew 1992). It is no surprise that Descartes developed his theories in dialogue with Aristotle. Descartes rejects Aristotle’s idea about the final causes, the ten categories; he also rejects the idea of primary substances, and the doctrine of substantial form, essences which inform substance, and according to Chappell, there are several different meanings of substance Descartes uses, but the one with which he refers to individual substance existing per se is the one mostly considered by his commentators (Chappell 2008, 251). There we see that Descartes idea about the human distinctiveness and grounding in reason actually predates him. Similarly, the idea that animals are machines, no matter how strange it might seem today, was not new, and it has an intellectual background, even though it did not always have the same negative inferences (Maehle 2002). As Maehle writes

> [i]n his *Summa theologiae* Thomas Aquinas had already attempted to explain apparent animal sagacity as God-given instinct, and he had compared their faculties with those of watches made by man (Rosenfield 1940). Moreover, in the middle of the sixteenth century the concept of animals as machines had been propagated by the Spanish physician Gómez Pereira (Pereira 1749, I). To some extent Descartes’s mechanistic view of animals can be seen as an extension of the mathematics and physics of Galileo and Kepler to the field of physiology (Rothschuh 1966). It has also been interpreted as a literary response to the way in which the sceptic philosophers Michel Eyquem de Montaigne (1533–92) and Pierre Charron (1541–1603) had seen animals (Boas 1933). Unlike Descartes, they had attributed the perfection of particular animal actions (for example, the construction of the swallow’s nest or the organization of the ‘bee-government’) to animal intelligence, which might even

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> exceed that of human beings. Accordingly these 'Theriophiles' (Boas) had been ready to ascribe a rational, though mortal, soul to animals (Maehle 2002).

The idea that we should question if animals have souls, that is that the existence of animal cognition and sentience should be a controversial issues, may see odd today. However, as we will see, this idea has been reflected in the long lasting practice of disregard for non-human animals' pain until today (Guichet and Latouche 2014). We can recognize these two criteria, lack of reason and capacity to feel pain as additional factors for the combined speciesist position Horta offered (Horta 2010).

As gradually the construed ontological break became established, and non-human animals were put in a hierarchy below human animals, their interests became disregarded to the level where they were objectified completely. Since they had the status of property, there was no protection of their interest whatsoever for a long time. Even the first act which was made in favor of non-human animals was motivated exactly by the protection of property. Starting from the early seventeenth century which demanded movement not just of human and goods, but also animals over longer distances in poor conditions, ended up with loss of goods, deaths of slaves, but non-human animals, "[l]ivestock mortality during sea shipment would frequently approach 50% or more, which was attributed to inadequate feed supply, overcrowding, and rough seas (Skaggs, 1986). As colonial expansion headed west, livestock and the meat trade expanded" (Swanson and Morrow-Tesch 2001, E102, E103). This is why the Twenty-Eight Hour Law, one of the first laws to protect animals, prescribing rest after period of twenty eight hours was introduced in 1873, even though it was nothing more than a symbolic act, rarely used, and with modest financial punishment (ibid.).

What is noticeable in this case is that there is a gradual decrease in the status of non-human animals starting from a blurred boundary between them and humans, their status of Gods, deities or descendants, then being regarded as objects of shepherdship, and finally to

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the position of objects without reason and feelings, a status of mere property. It is tempting to detect an analogy with sexist and racist dehumanization and exploitation, and I believe we could recognize here an analogy with the objectifying dehumanization. In above mentioned cases I would say that there are several stages towards speciesist position of humans towards non-humans. First there was something which looks like favorable treatment of non-human animals. Gradually disadvantageous treatment, which Horta uses in his definition, appears in a complex form, so simple difference in species still was not sufficient for speciesism, but humans needed to find some additional reason to treat non-humans unequally. Reason and lack of capacity to feel were these additional elements needed for disadvantageous treatment. But, the status of non-humans is to be degraded further, and in this case simple speciesists form became sufficient for justification of unequal and disadvantageous treatment. This speciesist position became prevalent and widespread, and for a long time in the Western states, there was no regulation to protect non-human animals, and it was legitimate to treat them badly simply because they are non-humans.

The rise of the non-human

Gradual change of the status of non-humans for the better starts again from the nineteenth century. There was no mentioning of cruelty in the law before 1822 when the Parliament of the United Kingdom introduced "An Act to prevent the cruel and improper Treatment of Cattle" or famously called the "Martin's act" (Traïni 2013). Politician Richard Martin who proposed it seemed to be genuinely concerned for the non-instrumental benefit of the domestic animals, arguing for example, for horses not to be left to starve to death at the end of their lives, and he was also one of the founders of the Royal Society for the Prevention of Cruelty to Animals (RSPCA) appearing in 1824 (Traïni 2013; B. Harrison 1973, 788). In 1835 this act is extended to protect domestic and wild animals from "wanton" cruelty (B. Harrison 1973).

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There is a long history of the rise of the animal protection movement and their activities during the nineteenth century. The situation, however, did not change much by the twentieth century, until the essentialist ideas started to lose their grip, and a more Darwinian perspective began to influence academic and wider public circles. In 1964, Ruth Harrison wrote extensively on the worst conditions of factory farming in her book "Animal Machines" which did not argue for total abolition of animal use by humans, but lead to the questioning of the accepted welfare standards and change of regulations (R. Harrison 1964). Relevant for us, rather late, in 1970 and 1978, Oxford-based academics Richard Ryder, Peter Singer and Tom Regan started philosophical debates about treatment of animals (Traïni 2013, 3). Richard Ryder, motivated by the usage of experimental animals, and inspired by Darwin's idea of a biological continuum came up with the term "anti-speciesisim", "that is, the desire to challenge discrimination against members of different species" (Traïni 2013, 3). From that time approaches to the ethical status of animals developed. There are utilitarian anthropocentric approaches (Passmore 1974; Norton 1984), the ones arguing for abolition of all use of animals, intrinsic value and equal animal rights (Regan 2001; M. A. Warren 2017; Callicott 1980), deep and social ecologists, ecosocialists (Löwy 2005), feminist approaches (Plumwood 1991; K. J. Warren 1990; Shiva and Mies 2014), and also generational theories of justice related to the environmental issues (Partridge 1981) etc.

Contemporary philosophical debate

The contemporary philosophical debate about anthropocentrism as a form of speciesism is, as we can see, is traditionally located in the domain of ethics. Even though this is not my main concern, I will for this reason approach to this section from this angle, giving some comparison with the cases of scientific sexism and racism. In these discussions regarding anthropocentrism, we will recognize the argument from species overlap and the argument from marginal cases as commonly used. I will also give an example of what I see as

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scientific anthropocentrism and which from the first place motivated Ryder's coinage of the concept of anti-speciesism, and is in general one of the main reasons for the rise of the animal protection movement (Traïni 2013; Guerrini 2008). This example does not regard the production of false theories as we know until now though, but I believe it is important since it will show us the investment of science in holding anthropocentric views.

With the twentieth century there was recognition in the scientific community of the failure of essentialist accounts and the attempt to establish race as a category, or its moral significance, to treat race as a species, to speciate on the basis of sex or race**.** As mentioned, these unsuccessful attempts can be seen as types of dehumanization, which had two major forms, objectification and animalization. It seems that science recognized failure in these cases, and that scientists now faced another, new and at the same time old, challenge of sorting out non-human animals. I will turn now to the discussion about species, and the established differences between human and non-human animals and their significance.

When discussing sexism and racism Fray claims that " the problem is that such systems rely on shifting, socio-politically generated, and scientifically unsupportable assignments to particular racial groups and that they pick out characteristics of human beings that have no genuine moral significance" (Moddy-Adams 2003). So, in another words, we can agree that in many cases the significant biological difference does not even exist, or that even if it exists, it is not morally significant, and that racism and sexism are forms of discrimination, ''disadvantageous consideration or treatment" (Horta 2010, 248) which are unjustified and morally unacceptable. However, it might not be wrong to argue for biological and morally significant differences among human and non-human species. After all, the physiology of a mouse and a human are very different, and, for example, a mouse's cognitive skills which we find as morally relevant are largely inferior to those of humans', so anthropocentrism as "disadvantageous treatment or consideration of those who are not

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members (or who are not considered members) of the human species" (Horta 2010, 258) might not be morally unjustified.

In the case of non-human species it seems that we have much clearer case of a difference and speciation. In addition to physiological difference, the traits which humans usually find morally relevant are missing completely or partially in other species. For example, animals' ability to speak, or communicate, their intellectual abilities, their ability to reason or have ethical judgment are questionable at best, or clearly missing, so it seems that it is not unjustified if the treatment of animals is different, and disadvantageous. In the moral sphere, according to some authors like Passmor or Norton (Passmore 1974; Norton 1984), it allows us not to have obligation, or no direct obligation to animals, even though most of the authors tackling this issue would argue against brutality towards animals. Passmore, for example, offers among others "reverence" for life as an argument grounded in the concept of vandalism, which would save those species from "wanton" suffering and pain (Sylivan and Bennett 1994). Nevertheless, human interest stays a priority every time humans inflict pain to animals not "wantonly", but in a careful and planned way, as it is the case with the usage of animals for scientific purposes, for example, for which humanity is highly motivated in their striving for scientific advances. Passmore, who according to me neglects this highly biased charge, claims that there is actually logical impossibility to hold to such high standards of granting other species the same moral standing since "we kill by remaining alive" (Passmore 1974, 123), and if we would "treat plants, animals, landscapes precisely as if they are persons" it would be impossible to act or stay alive (126). Similarly, accepting the anthropocentric view, Norton makes the distinction between felt, more temporary and deliberated considered preferences which include the "judgment that the desire or need is consistent with a rationally adopted world view – a world view which included fully supported scientific theories and a metaphysical framework interpreting those theories, as

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well as a set of rationally supported aesthetic and moral ideals" (134). Based on this, the author differentiate between strong and weak anthropocentrism since "weak antropocentrism […] recognizes that felt preferences can be either rational or not (in the sense that they can be judged not consonant with a rational world view). Hence, weak anthropocentrism is in this way nonindividualistic and provides a basis for criticism of value systems which are purely exploitative of nature" (135), and makes a solid ground for environmental ethics according to him. But, in this case also nothing obliges humans to ascribe equal moral value to the other species and their needs, and in some cases inflict them pain for certain *not purely exploitative purposes*, that is, in science.

However, this relationship can be seen from a different perspective. The concept of species is historical and the concept of biological species is only one of the possible ways to define a species (Mayr 1992), and it can be contested in different ways. To define species as "groups of interbreeding natural populations that are reproductively isolated from other such groups" (Mayr 1992), is one of the options, but we know that historically different features were used to define categories of beings. How we define a species in this case has important repercussions for the status of the individuals seen as belonging to the species. In moral sense if nonhuman animals are animals "like us", and we take that we owe to each other equal moral respect as "one of us", it might be we owe them also more than we think we do now. So, for example, the genetic differences between humans and other species are sometimes very small. While among humans the similarity of genetic structure seems to be 99.5% (Levy et al. 2007) or some claim even 99.9% (Collins and Mansoura 2001), we share 95% of our genes with chimpanzees (Britten 2002). Second, some of the animals, as Regan argues, possess in some degree features we take to be of moral significance and according to which we would treat human with due moral consideration (Regan 2001). As we know, apes can reach certain level of cognitive abilities as much as small children (Ladygina-Kohts 2002;

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Kellogg and Kellogg 1967). While some authors might say that nevertheless they would never accomplish the degree of humans, it is also true what Regan claims that neither every human would (Regan 2001, 2003).

And even if we take the ideal cases, again, why should we focus on the difference? Singer, for example, acknowledges the fact that most of non-human animals are conscious, and have a capacity to feel pleasure and pain, as humans do, and applies the principle of equality among the species in the utilitarian tradition, relying on the maximization of pleasure and minimization of pain for all (Singer 1993). In addition, Singer argues that even if one species does not have a certain trait considered as morally relevant, for example, intelligence, up to the level of humans, it is still not the reason to disregard their interest and/or exploit them. Regan goes even further and he rejects the utilitarian principle due to its aggregative nature and inability to consider individual good, and claims that we can assign to animals equal moral rights not because they feel pain, but simply because they are conscious and self-aware "subjects-of-a-life" (Regan 2001). They have certain experiences and as for humans, life can go better or worse for them. However, this account is also not without problems since it seems that on this account also we would have to draw a line somewhere since at some point some species, maybe bacteria, might not be aware of themselves (M. A. Warren 2017). There are others like Naess who argue for the "deep ecology", claiming that we should extend our subjectivity to nature and in this way grant it full moral status (Naess 2016), but there are issues with this account, one of them is that the difference of interests of human and non-human animals and nature in general is then collapsed (Mathews 2001).

While Passmor and Warren seem to offer protection form "wanton" destruction, planned killing of animals is not prohibited, and Singer's account also might not protect them if it is done without pain, or if it brought more aggregate happiness. Protection from "unnecessary" pain is also questionable since it is up to humans to decide what is necessary.

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As we can see now, it is "necessary" to kill animals for the pure preference of taste of animal's meat, or for the preference in fashion for their fur and skin, or simply for our amusement and gambling (DeMello 2012b).

Some authors actually want to abandon the whole idea of moral status. Horta claims that it leads us inevitably to the problem of the "status monsters", even the minor need of the species with the moral status is more important than the crucial, existential need of the species without it (Horta 2017). And if we assign to humans full moral status the way we do it now, based on certain characteristics, we encounter problems with some potential superior post-human beings, or even machines which might have this capacity in much higher degree.

Since I want to show that humans are motivated to specieate in a certain way which is unfavorable for non-human animals in the domain of science in analogy to sexism and racism, in the next section I will give some overview of how much we owe to the usage, or better to say exploitation of animals in this domain. The scientists cited in the story acted in accord with their time, and might not be morally judged at this point, and also had different metaphysics and ontologies, and in general different understating of the concept of human and non-human animal, and hold different speciesist position, but I take that the historical data can serve as a sobering reminder of our investment in scientific and anthropocentric availability of the lives and bodies of animals.

Scientific anthropocentrism: vivisection

As early as Western philosophy, anatomy, medicine and in general science began to develop, animals were used in experimental purposes and testing (Franco 2013). One of the reasons for this was the taboo of violating human body with dissection (von Staden 1992). Known records show that animals and probably condemned felons were cut alive for vivisection as early as in the sixth century BCE by Greeks, and again with the rise of scientific methods in the sixteenth and seventeenth century (Franco 2013). As mentioned,

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Descartes personally did vivisection, taking in his mechanical account animals to be spiritless creatures, "nonsentient automata" (P. Harrison 1992, 219; Guerrini 1989) so called "animal-machines" (Franco 2013, 241), in all these cases animals were seen as different in kind and subordinated to the will of humans. When they were perceived as worthy of care or at least as creatures to be saved from suffering in the eighteenth and nineteenth century, as in the case of Locke or Kant, it was due to human benefit. Locke thought that hurting animals would lead to hurting humans, and Kant held that since animals have no self-consciousness, the only harm to them is harm to their owner, and therefore should not be inflicted if it has no worthy cause (Broadie and Pybus 1974; Franco 2013, 241). For him, as for the scientists of the seventeenth century, the human desire to experiment was enough to do vivisection and inflict other kinds of suffering and bring death upon animals. Harvey, Hooke, Boyle and others promoted the idea that we should learn not from contemplation but from experimentation, and we have to be grateful to many animals in their experiments who were killed for learning about the vascular system, transfusion, and the heart function, air pump, toxicity of certain materials etc. (Harvey 1889; Guerrini 1989). Even though Boyle is mentioned as a proponent of stewardship, as Guerrini says "Boyle sacrificed a virtual hecatomb of animals—from cheese mites to ducks and cats—to the rigors of the vacuum" (Guerrini 1989, 396), while direct benefits to human health based on such a mass of experiments were in fact questionable[1] . Only later in the seventeenth century some criticism was raised, but the human purpose mostly overruled them, for example, while Hooke was uncomfortable with the suffering of the dogs and was considering drugs to desensitize them, he still claimed that "certainly the enquiry would be very noble" (Kalof 2007c, 124) contributing to human purposes, which was the utilitarian attitude spread into the eighteenth century. With the French revolution in 1789 there came the discourse of the human and patient rights in medicine, and the final turn of

[1] as they are in many cases questionable today, see Knight, Andrew. 2011. *The Costs and Benefits of Animal Experiments*. London: Palgrave Macmillan

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society towards state regulated, institutionalized, more standardized laboratory science to ensure public safety of human health and with it animal testing and experimentation get fully and systematically incorporated into medicine, cemented into the idea of scientific progress in general ("The French Revolution: A Revolution in Medicine, Too" 1977; Franco 2013, 247). Even in the late nineteenth century Magendie, celebrated as the "father of experimental physiology" (Stahnisch 2009, 1950) - who researched, among other things, spinal nerve functions - was well known for his particularly cruel vivisection of animals. His experiments, for example, included breaking the spine of puppies to examine spinal cord nerves, leaving them conscious and injured to suffer in pain for hours, even days, at the time when anesthetics became available also. One more gruesome experimentation was done by famous scientist, Bernard, "the father of modern medicine" (Bates 1988, 28), who was "cutting open conscious animals under the paralyzing effects of *curare*, or slowly "cooking" animals in ovens for his studies on thermoregulation" (Franco 2013, 250 italics in original). Pasteur and Koch "fathers of microbiology" developed their work on animals, routinely inflicting them wounds and infecting them to come up with the germ theory of infectious diseases and identifying connection between specific germs and diseases. "[P]ost-1871 Pasteur went further. He inoculated animals in his laboratory with the microbe that had been made visible by means of his cultures. He made them ill. He in effect simulated the epidemic. With laboratory-made statistics he counted the sick and the dead and those that underwent spontaneous cure. He performed on dogs, chickens, sheep, what the hygienists did with the help of nationally made statistics on real populations" (Latour 1993, 63). Koch who indisputably contributed to the well-being of humanity by discovering the causes of choler, anthrax, and the causes of tuberculosis, which eventually got him the Nobel prize in1905, "designed elaborate inoculation studies using mice, guinea pigs, rabbits, dogs, frogs, and birds. He discovered that inoculating a mouse with blood from a sheep that had died of

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anthrax caused the mouse to die the following day" (Blevins and Bronze 2010, e745). Since it became possible to grow and develop specific bacteria in laboratory conditions, to match them with specific diseases and the way of infecting became known, preconditions for the vaccination were met and modern immunology was born. In the nineteenth and into the twentieth century with the development of vaccines and antitoxins, the usage of animals which served as containers and as testing organisms grew rapidly (Plotkin 2014). "For example, in the first half of the twentieth century monkeys were integral to the research that resulted in the development of a vaccine against poliomyelitis. Polio is an infectious viral disease that causes paralysis and muscle wastage in children. In 1909, scientists had discovered that the polio virus was transferable to some species of monkeys (Flexner and Lewis 1909). This meant that many investigations which, for contemporary ethical reasons, could not be conducted using human subjects, could now proceed with monkeys" (Monamy 2017, 59). As from the seventeenths and eighteenth century the organization of science became more complex, whole communities of scientists became involved in the process of the production of scientific results. There was a tendency to "standardize the form of scientific publications and professional accreditation of practitioners, creating conditions in which researchers can trust the reports of others beyond their social circle – a process which eventually lead to the institutional structure so crucial to the functioning of professional science today" (Barker and Kitcher 2013b, 7,8). With this also came the separation of labor, but scientific management of work which Taylor developed in the production line and which had strong influence on scientific work affected not just the relations of production, but also technology and the material of production (Alder 1998), in this case live animals. While already objectified and instrumentalized animals become artifacts which had to become something like interchangeable mass produced standardized parts of scientific work. Scientists became committed to "furnish perfect animals" (Clause 1993, 346) fully suitable

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to their own experimental purposes. By the 1906 biological organisms were already named as standardized, and Wistar Rat, massively used even today, gets the status of a good, first class "fresh material" (336) produced, licensed, advertised, distributed, sold over the world, setting the norm in experimental scientific work. While Clause mentions that scientists involved in the Wister Rat project showed concern for the well-being of the animal while considering its laboratory habitat (347), in her short piece Dunayer portrays what is today simply ordinary treatment of these animals (Dunayer 2000) who in such a massive number "provided service to science" (Clause 1993, 349) on anthropocentric language, as if it was their will:

> I heard rats scream as their ears were hole-punched for identification. I saw them flung by the tail into metal boxes that fit them like coffins. There they stayed 23 hours a day, unable to look out. So that they would work for food, some rats were kept half starved. Others received electric shocks. Still others were subjected to painful injury such as stomach puncture. Termed "procedures" and "methods," all forms of torture escaped moral judgment. Initially, like the department's other vivisectors, I viewed rats as mine to use. My experiments (which my advisor called "the world's most benign") didn't cause pain, but they did entail deprivation. By nature, rats are social, lively, and curious. They eat a wide variety of foods. Individually confined to small wire cages, "my rats" endured isolation, inaction, and an unchanging environment. Two hours a day, they had access to one type of food pellet, always the same […].When the experiments ended, the rats had no more use as "tools," so my advisor instructed me to have them killed (429).

Understanding of genetics is based on the usage of standardized lab animals, predominantly mice. Mendel who discovered heredity patterns first started working on mice before he transferred to peas (Franco 2013, 256), and later Morgan, who subsequently got the Nobel prize in 1933, and "fly boys" extensively used standardized generations of mutant fruit fly for their chromosomal theory at the beginning of the twentieth century (Rubin and Lewis 2000; Kohler 1999). Watson and Creek, also Nobel prize winners (1962) for their discovery of DNA in 1953, experimented on mice, among other animals. Mice was also the first transgenic animal, the one whose genome is altered in different ways, sometimes by elimination of genes or introduction of foreign ones by different methods, infection of

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embryos with retroviruses, microinjections of DNA in pronucleus, or introduction of DNA into embryonic stem cell injected into host blastocyst (Jaenisch 1988). And today in the era of the human enhancement, it seems that there is no end to this practice. To put this in perspective, just in USA in 2016 there were 820,812 animals reported being used in experiments and 137,444 more kept but not currently experimented on (Speaking of Research 2017) including guinea pigs, hamsters, rabbits, farm animals, dog, cats, non-human primates while statistics do not even count fishes, or massively used and expendable "standardized" types of mice and rats. But, this number rises to hundreds of millions according to the organizations for animal protection (PETA n.d.). In UK, the major user of experimental animals reported 3. 94 million experimental procedures involving animals completed in 2016 (The Office for National Statistics 2017)

I presented here the case of vivisection which actually contributed to many successful theories as we know for now, and includes in this case moral and political, but not epistemological ground for rejection of anthropocentrism. I believe that theories which are based on anthropocentric assumptions will eventually show wrong in some way. I take that science in its high complexity and dependency on human worldviews, political, consensual and sometimes arbitrary choices which are not set in stone, and which lead to ecological catastrophes, for example, might be one of the examples (Pike 2010; Clark and Majone 1985; Forsyth 2004). It seems to me as logical assuming the analogy with sexism and racism in science to assume that theories regarding other species, if they are other species at all, which are based on anthropocentric presumptions will hardly render non anthropocentric science about these other species. For now I take that the development of the anti-speciesist idea will bring about more examples of the theories regarding nature, other species, and humans in relation to other species which we took as successful and show them wrong. I will here provide by analogy with scientific sexism and racism a possible theoretical reason why

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even if we might not have currently solid examples of unsuccessful theories based on anthropocentrism, it would be justified to think that this will happen in the future.

Common ground for anthropocentrism and dehumanization

In both cases of false scientific theories, scientific sexism and racism embraced the notion of clearly separated natural kinds with essences, hierarchy of kinds and a dichotomy among them. We see that there are dyadic pairs male - female, white - black. They are oppositional and hierarchical in such a way so that the first counterpart is superior. These essences comprehensible and can be measured. They both rely on some sort of scale measuring some features taken to be essential for humans. It can be a scale measuring skull, bones, uterus, pelvis, intelligence, different mental and language capacities, emotions, beauty, morality etc. Essences are grounded in nature, even though it may be disputable what accounts for the primary origin of the essences, is it theistic primary source, so that women and men, or whites and blacks are created as essentially different by God, or culture, or nature, and what essences contain as their necessary and/or sufficient conditions, that is, what kind of features are considered essential. There are different answers to the question what it means to be a man or a woman, or white or black person. And on this scale of humanness, which is taken to simply represent what really exist in nature, the standard is set in a biased way by the ones belonging to the superior group in dichotomy. The standard is set in their favor, so that the ones belonging to the group seen as inferior actually do not have a chance not to prove expected inferiority, and consequently to be dehumanized. This further enhances and legitimizes existing categorization and hierarchy in the domain of culture. So while it is said that the scale simply represents biology which explains culture, culture is actually already present when biology is introduced. This kind of classification is done in both cases in different forms and levels, finally resulting in false scientific theories and practical benefits for the ones who are seen as superior group in social cultural, political, economic domain.

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Metaphysical order necessitates for natural kinds of female and male sex, and black and white race to be clearly separated. Any transgression is seen as deviation from nature, and it has negative connotation, degradation, dehumanization, again.

Further, what is taken as unquestionable premise in this process of dehumanization is that this scale ranges dualistically between human and non-human animal, that is, there are again two types of essences, which is to say that human and non-human animals are also treated as clearly separated natural kinds. There is "humanness", and there is "animality". So everything is measured on the maximum on the one hand with the superior "universal" human ideal of male, white, we can add Western, or other characteristic, and on the other hand on the minimum side with inferior ideal of non-human animal, and we can assume that there is gradation among them also. As in the previous case, essences are grounded in nature, and they are available to human understanding, even though, again, it may be disputable what account of the primary origin of the essences is employed, and what essences contain as their necessary and/or sufficient conditions, what kind of features are considered essential. There might be different answers to the question "What it means to be human?", and "What it means to be non-human animal?". Metaphysical order here also necessitates for natural kinds of human and non-human species to be clearly separated for dehumanization to work. And again, any transgression is seen as deviation from nature, and it has negative connotation. The standard on this scale applied in scientific racism and sexism is set in a biased way by the ones belonging to the group superior in dichotomy, in this case human animals, and in their favor so that the ones belonging to the group seen as inferior, non-human animals actually do not have a chance not to stand for inferiority. It is not even a matter of debate, it is simply presumed. The possibility of the argument of the species overlap is not considered, and actually even when inferiority is a matter of fact, there is always a problem with the argument of relevance, that is, of defining relevance of the inferiority outside of the anthropocentric

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contextualization, which is not in any way addressed. That further enhances and legitimizes existing categorization and hierarchy. Again, on this scale which allegedly simply represents biology which explains culture, that is our relation with non-humans, culture is also actually already present when biology is introduced.

With this I think I have captured the analogy between scientific sexism and racism as forms of dehumanization and scientific anthropocentric speciesism. Even if this is so, we can say that this is the case with practices which we already know are false, so is there any relevance of this today? We have made much progress since humans are actually arguing about the moral status of non-human animals. But even though scientific sexism and racism as practices of dehumanization are today recognized as false, the common anthropocentric presumption often stays unnoticed and unquestionable in the domain of science, which continues to use animals excessively and without much regulation. With this it is still possible that scientific fields which include reference to other species like biology, zoology, primatology, veterinary, marine sciences, animal welfare and behavior, animal reproduction, but also the ones which closely relate us with animals like animal agribusiness, animal management, animal breeding, food and fiber production, also ecology and environmental sciences, and the ones which are dealing with humans, but extensively use animals in their practice like medicine, pharmacy, microbiology and genetics, techno-sciences might be open to the same mistake of simply taking over the unquestioned premise based on the old legacy of anthropocentric perspective in accordance with the idea of the "Great Chain of Being", essentialization, dichotomizing and essentialization. Even if scientific theories built on the bodies of animals might be successful and true, it is not just an ethical problem with which we might be faced with regard to anthropocentrism in science, but our theories about non-humans, or us as humans in relation to non-humans might be based on anthropocentrism, and with that even though they might appear successful now, we might discover that they were

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false once we recognize the processes of essentialization, dichotomization and hierarchization and open the possibility that our worldview influences our theoretical framework. The practice which seems much easier today from the historical distance in the case of scientific sexism and racism.

It might be that we are still living Enlightenment ideals and try to find schemes which neatly order nature with our concepts and categories which we find suitable for our own purposes. In this effort we searched for the difference in the case of humans with whom we share 99.1% of our genome based on particular interest, trying to render them another species, which served as a justification for different kind of discrimination. Preconceptions determined the definition of the difference and its moral significance, and the difference was defined through dichotomy, hierarchy and violence. It is clear that the speciation as an institute of violence has its historical legacy which is to be acknowledged and taken as a political issue influencing science, and not simply as a matter of "disinterested" scientific endeavor. Borders of the community made of humans are always negotiated and questioned. They are places of political struggle and resistance. And we saw that the difference of sex and race were deemed unjustified by the political struggle of the humans on the other side of the dichotomy. In the case of our relation to animals there is no reason not to acknowledge the political aspect of the speciation, and not to assume the same particularity of interest, even in the domain of contemporary scientific practice, even while non-humans might not be able to negotiate. Analogy can be found in the treatment of women, blacks and animals (Stepan 1986; Adams 2010; Belcourt 2014). Since context of discovery and context of justification are never really separated (Harding 1993, 2015), there is a reasonable expectation that we would perceive, measure, and find morally significant differences which would always allow us to justify exercise of power over subjects which are in this justificatory context and relation made subaltern. Regarding the issue of morality which is not my main concern here,

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it can be said that it would equally demand reevaluation of the idea of what human means, our dualistic and hierarchical moral systems, or maybe, as Horta suggests abandoning the whole idea of assigning moral status to agents (Horta 2017).

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Conclusion

In this paper I showed that we have good reasons to believe that there is an analogy between scientific failures in the cases of scientific sexism and scientific racism, and that they can be located in the phenomenon of dehumanization. I believe I also showed that there is a similarity in the practice of scientific sexism and racism and anthropocentrism, and that there is sufficient evidence to assume that scientific theories which is some way include reference to other species might not be true due the speciesism. In the first section of the paper I presented pesmistic meta-induction as a framework of my work which directed the thought that that most of our successful scientific theories believed to be true showed up as false. In the second part I demonstrated that there is an analogy between the causes of scientific sexism and racism as false scientific theories and that it can be found in dehumanization. I did this by first presenting the argumentation based on analogy as method. After this I introduced the notions of sexism and racism, providing some details about the definitions, typology, different approaches to the problem and I presented in some more detail one case of scientific sexism and racism. Using analogy I found commonalities and after presenting the phenomenon of dehumanization I recognized practices of scientific sexism and racism as types of dehumanization grounded in removal of the humanity, essentialism, hierarchy, dichotomy and exclusion from the moral community.

In the third part I searched for the analogy between dehumanization and speciesism to prove that we have good reasons to believe that at least some currently successful scientific theories which in some way include reference to other species might be false due the speciesism. In this section I provided a conceptual framework for the phenomenon of speciesism, I took an historical approach to the topic and gave some more detailed insight into some basic elements of the contemporary philosophical debate on the topic. After this one example of anthropocentric practice in science was presented. At the last section possible

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line of thinking in the direction of the falsity of scientific theories due to speciesism was offered.

To conclude, I would say that we do have good reasons to believe that in general currently successful scientific theories might be false, we have good reason to believe that there is an analogy between the causes of scientific sexism and scientific racism as false scientific theories, which can be found in the phenomenon of dehumanization, and analogously, we have some reasons to believe that at least some currently successful scientific theories which in some way include reference to other species might be false due to speciesism.

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