



De-Centring Science

Diffractionally Mapping Ways of Understanding the World

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Abstract

Scientism is very popular today, which is problematic, as Kuhn's theory of paradigms and Nietzsche's perspectivism show that science gives a limited perspective on the world. To counter scientism and de-centre science, I will be mapping the different ways of understanding the world which are dominant in scientific, indigenous, East Asian and feminist traditions. I will be diffractively reading how people from the latter three groups have criticized science, mapping how the differences between the ways of understanding the world they plead for and those they plead against matter. I am contributing to a new big picture in which different ways of understanding the world are situated and can be responsibly used, because we are aware of their benefits and disadvantages.

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Scientism

Western society today is very much shaped by science. Obviously technology plays a large role in people's lives, but science also affects people's way of understanding the world and way of thinking. In the past decades, scientism has become very prevalent in popular science writings. Scientism is roughly the view that (natural) science is the only, or the most trustworthy source of any knowledge, about any part of life or the world.¹ Also, it is usually assumed that only that which can (also) be discovered through science is real, as science is in principle able to explain all that there is.² For example, neuroscientist Sam Harris holds this view, as he writes that it seems inevitable that "science will gradually encompass life's deepest questions."³ As Jeroen De Ridder explains, the consequence of this scientism is this:

If one is to believe recent popular scientific accounts of developments in physics, biology, neuroscience, and cognitive science, most of the perennial philosophical questions have been wrested from the hands of philosophers by now, only to be resolved (or sometimes dissolved) by contemporary science. To mention but a few examples of issues that science has now allegedly dealt with: the origin and destiny of the universe, the origin of human life, the soul, free will, morality, and religion."⁴

The answers to these perennial questions often involve the conclusion that things we thought were real are actually illusions, or are something very different than we thought they were. For example, molecular biologist Francis Crick writes: "You, your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules."⁵ The experience of having an emotion, for example, can't be scientifically measured, but nerve cells and associated molecules can be. Since, in scientism, it is assumed that science can tell us all there is to know about the world, it is concluded that the measurable cells and molecules are all there is to a memory. As Michael Loughlin et al. phrase it: "the exercise of giving a scientific explanation of a thing, property or process is treated as synonymous with giving an account of what that thing, property or process 'really is'. An account of the neurological processes underlying our ability to feel certain emotions is an account of 'what [those] emotions really are'."⁶

Many people who read popular science can't tell where science ends and scientism begins and believe that science can tell us all we need to know about the world. If Crick writes

¹ Jeroen de Ridder, "Science and Scientism in Popular Science Writing," *Social Epistemology Review and Reply Collective* 3, no. 12 (2014): 23-24; Mikael Stenmark, "What Is Scientism?" *Religious Studies* 33, no. 1 (March 1997): 15.

² Michael Laughlin, George Lewith and Torkel Falkenberg, "Science, Practice and Mythology: A Definition and Examination of the Implications of Scientism in Medicine," *Health Care Anal* 21 (2013): 130.

³ Sam Harris, *The Moral Landscape: How Science Can Determine Human Values* (New York: Free Press, 2010), 7.

⁴ De Ridder, "Science and Scientism in Popular Science Writing," 23.

⁵ Francis Crick, *The Astonishing Hypothesis: The Scientific Search for the Soul* (London: Touchstone Books, 1994), 3.

⁶ Laughlin, "Science, Practice and Mythology," 132.

that all there is to a person is their nerve cells and associated molecules, that's what they believe science has shown a person to be. The way the world is conceptualized in science, strongly influences the way many people understand the world. As Andrew Cunningham and Perry Williams argue, the concept 'science' is relatively new. The type of practice we are referring to when we use the term 'science' is essentially what is usually described as 'modern science' – which is also how I will be using the term 'science' from now on.⁷ In other times, practices which we now label 'scientific' can be detected, but these were not as influential for society as science is now. Many people may not explicitly believe in the claims of scientism, but science, has strongly shaped the way western society looks at the world today.

Situated science

It's not surprising that people have so much faith in science. Science has made the development of all kinds of technology possible, which has helped us in many ways (although there are also many detrimental effects). De Ridder calls this the 'halo effect' of science: since science makes things happen which people never knew were even possible, it's easy to believe that science can do anything.⁸ However, as I will argue below, scientism is problematic.

In 1962, in *The Structure of Scientific Revolutions*, Thomas Kuhn writes:

Observation and experience can and must drastically restrict the range of admissible scientific belief; else there would be no science. But they cannot alone determine a particular body of such belief. An apparently arbitrary element, compounded of personal and historical accident, is always a formative ingredient of the beliefs espoused by a given scientific community at a given time.⁹

This 'apparently arbitrary element' is the paradigm. Kuhn has shown that, throughout western history, different paradigms have succeeded each other. Kuhn describes 'paradigm' in different ways: as a set of metaphysical commitments, as a set of scientific habits, and as a 'way of seeing'.¹⁰ What these three have in common is the effect they have: they create a "strong network of commitments - conceptual, theoretical, instrumental, and methodological," which guides scientists.¹¹ Kuhn compares different paradigms with different ways of looking at the well-known rabbit-duck illusion. Looking at the same thing, "[p]racticing in different worlds, the two groups of scientists see different things."¹² A paradigm doesn't flow from scientific discoveries, but precedes them; it determines (partly) how scientists interpret the empirical evidence they encounter.

⁷ Andrew Cunningham and Perry Williams, "De-Centring the 'Big Picture': 'The Origins of Modern Science' and the Modern Origins of Science," *The British Journal for the History of Science* 26, no. 4 (December 1993): 409.

⁸ De Ridder, "Science and Scientism in Popular Science Writing," 26.

⁹ Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago, 1970), 4.

¹⁰ Margaret Masterman, "The Nature of a Paradigm," in *Criticism and the Growth of Knowledge*, ed. Imre Lakatos and Alan Musgrave (London: Cambridge University press, 1970), 76-77.

¹¹ Kuhn, *The Structure of Scientific Revolutions*, 42.

¹² *Ibid.*, 150.

Before Kuhn wrote about paradigms, Friedrich Nietzsche had already come up with a similar theory of ‘perspectivism’, arguing that certain presuppositions are necessary for science.¹³ He wrote: “The only seeing we have is seeing from a perspective; the only knowledge we have is knowledge from a perspective.”¹⁴ Just as there is always a point of view in visual perception, ideas are shaped by our cultural and personal background. Haraway uses the term ‘situated knowledges’ to describe the way knowledge is always gained from a limited position.¹⁵

While what Nietzsche calls ‘perspective’ and what Kuhn calls ‘paradigm’ are not identical, what they both show is that there is no such thing as a ‘neutral’ way of looking at the world. As feminist professor Donna J. Haraway has described it, there is no ‘view from nowhere’, or in Nietzsche’s words, there is no ‘eye without direction’.¹⁶ As Pierre Duhem has argued, our observations are always ‘theory-laden’, which means they are informed by certain background ideas about what the world is like.¹⁷ However, these observations, to us, seem unmediated. We feel as though we can look directly at the world, without any presuppositions. They are like glasses we see the world through; we don’t see the glasses themselves.

From our limited perspective, our background ideas, our way(s) of seeing, flows a specific *worldview*. As Sander Griffioen explains, the term *worldview* is used in many different ways, often without a clear definition.¹⁸ German differentiates between *weltbild* and *weltanschauung*, which are both translated with *worldview* in English. When I use the term *worldview*, I mean *weltbild*. The term *weltbild* is used to describe a conception of the basic structure of the world, including basic differences and similarities between things and the place of humanity in the world. It is usually used to describe the outlook of a society, which is to a certain extent unconsciously held.¹⁹ A worldview is an important part of a paradigm and is for a large part determined by one’s situated perspective. Our worldview doesn’t just influence how we see the world, but also what we can and want to know about the world, what counts as knowledge and how what we know is contextualized and given meaning. Our situated perspective doesn’t just give us a static image of what the world is like, it also makes us *act* in a certain way and *interact* with the rest of the world in a certain way. Our situated knowledge is the result of our active ways of trying to *make sense of* the world, of *understanding* the world. A worldview comes with *ways of understanding (the world)*. This is the term I will be using in this thesis to talk about how different (groups of) people, with different worldviews, when looking at the same (parts of) the world, *understand* it in different ways. Any specific worldview is accompanied by a set of *ways of understanding*. A set of *ways of understanding* constitutes, among other things, a worldview.

¹³ Friedrich Nietzsche, *On the Genealogy of Morals: A Polemical Tract*, trans. Ian Johnston (Arlington: Richer Resources Publications, 2009), 126.

¹⁴ *Ibid.*, 98.

¹⁵ Donna Haraway, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,” *Feminist Studies* 14, no. 3 (Fall 1988), 583.

¹⁶ Haraway, “Situated Knowledges,” 589; Nietzsche, *On the Genealogy of Morals*, 98.

¹⁷ Pierre Duhem, *The Aim and Structure of Physical Theory*, trans. Philip P. Wiener (Princeton: Princeton University Press, 1991).

¹⁸ Sander Griffioen, “The Approach to Social Theory: Hazards and Benefits,” in *Stained Glass; Worldviews and Social Science*, ed. Paul A. Marshall, Sander Griffioen and Richard J. Mouw (Lanham: University Press of America, 1989), 83.

¹⁹ *Ibid.*, 84.

Many feminists, postcolonial theorists and historians have shown how the historical context of science has shaped science.²⁰ Science has mainly been developed in the western world, by men, so science is shaped primarily by white, male ways of understanding the world. There are many other people on the Earth who are not white men, with fundamentally different ways of understanding it. Knowledge is always situated and so is science. Contemporary science is not neutral or universal, but starts from a limited perspective. So it seems absurd to have ultimate faith in science alone for helping us understand the world. Scientism is problematic, because it takes the scientific ways of understanding the world (by this I mean the ways of understanding the world which are dominant in science) to be the only right ways of understanding it.

Attacking scientism

There are people who have attempted to fight scientism, by showing how science is limited by its situatedness. A problem they have encountered while doing this, is that science often appears to be neutral or self-evident. As I discussed earlier, our own presuppositions are always hard to know, because they are like glasses through which we see the world. People who have scientific ideas, like all people, find it difficult to see their glasses. However, in the case of science this is even more so because science has status. It is a white, male tradition, which means that it is strongly connected with the most dominant group in the world. As feminist philosopher Simone de Beauvoir wrote:

I used to get annoyed in abstract discussions to hear men tell me: “You think such and such a thing because you’re a woman.” But I know my only defense is to answer, “I think it because it is true,” thereby eliminating my subjectivity; it was out of the question to answer, “And you think the contrary because you are a man,” because it is understood that being a man is not a particularity.²¹

Stefan Dudink has also written about the problem that masculinity is so self-evident and omnipresent, that it is hard to make it a particularity.²² As Jet Bussemaker et al. phrase it, masculinity is like a sun that shines too brightly to look into it. It illuminates everything around it, is always present, but it’s hard to see it as something with particular characteristics itself.²³ That is why, Dudink argues, a circumferential movement is needed to attack it. To write its history, it has to become part of other histories.²⁴ The same way masculinity and also whiteness are not seen as particularities, but as standard, the scientific tradition which is connected to them is not seen as particular. As Dudink suggests, a way in which it can be made particular, is by placing it in the context of other traditions.

Consequently, the route that many people have taken when trying to turn science into a particularity, is by approaching science via alternative traditions, such as feminist and non-

²⁰ Sandra G. Harding, *Is Science Multicultural? Postcolonialisms, Feminisms, and Epistemologies* (Bloomington: Indiana University Press, 1998), 55.

²¹ Simone de Beauvoir, *The Second Sex*, trans. Constance Borde and Sheila Malovany-Chevallier (New York: Vintage Books, 2010), 25.

²² Stefan Dudink, “De vanzelfsprekende mannelijkheid,” *Tijdschrift voor Vrouwenstudies* 16, no. 2 (1995).

²³ Jet Bussemaker, Joke Hermes and Evelien Tonkens, “Het doorbreken van mannelijkheid als stilzwijgende norm. Inleiding op het thema,” *Ibid.*, 129.

²⁴ Dudink, “De vanzelfsprekende mannelijkheid,” 216.

Western ones, by comparing them and showing what the disadvantages are of science in comparison with these alternatives. However, this means that these traditions have mostly been used in an aggressive way, for critiquing science. As philosopher Meera Nanda describes it, “In recent years, social constructivist critics of science, along with their feminist and postcolonial allies, have [...] discoursed about science with a passion that belongs more appropriately to a war.”²⁵

This is not very surprising. As Physicist Ian Hutchinson argues, “scientism provokes a defensive, immunological, aggressive response from other intellectual communities, in return for its own arrogance and intellectual bullyism.”²⁶ Scientism has made people (among whom scientists) devalue other traditions (such as religion and philosophy) and ‘encroach’ on their domains.²⁷ Both the people who believe in the claims of scientism and those who see it as a problem have wanted to show why their opponents are wrong, therefore focussing on what their opponents’ ways of understanding the world lack. This is understandable. However, it is questionable whether critique is still the right tool for fighting scientism. In *Why has critique run out of steam? From Matters of Fact to Matters of Concern*, Bruno Latour shares his worries about the effect of critique:

Wars. So many wars. Wars outside and wars inside. Cultural wars, science wars, and wars against terrorism. Wars against poverty and wars against the poor. Wars against ignorance and wars out of ignorance. My question is simple: Should we be at war, too, we, the scholars, the intellectuals?²⁸

Latour argues that, though critique has been very useful for a long time, it is now becoming a problem. Scholars have, for example, often emphasized that there is never ‘scientific certainty’ about facts. However, this tactic is now used by opponents of global warming, who use the lack of scientific certainty about global warming to argue against taking measures against global warming.²⁹ Labour argues that, whereas there used to be excessive confidence in what scientists presented as ‘facts’, today there is too much distrust of facts. Along with ‘facts’ we are losing “hard-won evidence that could save our lives.”³⁰ The ‘critical spirit’ is fighting the wrong enemies, Latour argues.³¹ What we should do, instead of focusing on matters of fact, which can always be criticized because they are never certain, is focus on what Latour calls ‘matters of concern’.³² While there may be no certainty about whether a ‘matter of fact’ is really true or not, there are matters of concern which undoubtedly deserve our attention. Science is limited and does not give us complete or universal knowledge of the world, but that does not mean that the scientific ways of understanding the world are never useful. Science should not be

²⁵ Meera Nanda, “A ‘Broken People’ defend science: Reconstructing the Deweyan Buddha of India’s dalits,” *Social Epistemology* 14, no. 4 (2001): 335.

²⁶ Ian Hutchinson, *Monopolizing Knowledge: a scientist refutes religion-denying, reason-destroying scientism* (Belmont: Fias Publishing, 2011), 143.

²⁷ Ibid.

²⁸ Bruno Latour, “Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern,” *Critical Inquiry* 30 (2004): 225.

²⁹ Ibid., 226.

³⁰ Ibid., 227.

³¹ Ibid., 231.

³² Ibid.

seen as superior to all other traditions of understanding the world, but the value it does have should be embraced.

Nanda also argues that it is problematic how much scholars are at war with science. She writes that “they have tended to reduce the worldview, the methods and content of modern science to a sword that the powerful wield against the powerless.”³³ Science is often seen as something that oppresses, which means that it should be fought and that the ways of knowing, grounded in the culture of the oppressed, should be preferred. Sometimes it is even assumed that oppressed groups are opposed to science.³⁴ However, Nanda argues, many of the people who argue this, don’t take into account the location of science in different societies. In fact, there are many places (outside the West) where the most oppressed people are oppressed by ‘their own’ cultural values.³⁵ For example, in India, the Dalits, who are in the bottom of the hierarchical caste order, have embraced science and use this to fight their oppression, to fight against traditional Hindu values which harm them. Nanda argues that in postcolonial science studies, for example, it is often assumed that challenging science is in the interest of the oppressed, while that is often not the case.³⁶

What those at the bottom of non-Western societies are searching for is not an affirmation of their cultural values, just because they are ‘their own’. What they seek is an affirmation of those aspects of their inherited cultural values that help them gain some critical distance – which is another name for value freedom – from the values that have kept them in bondage.³⁷

Nanda argues that there are Indian values, such as the non-separation between subject and object, which many western people have seen as better values than those of modern science. However, it is these values which have been used to legitimize the oppression of many people.³⁸ The scientific ways of understanding the world are not inherently better or worse than alternatives. It depends very much on the context how beneficial each way of understanding the world. Science is sometimes simply seen as a failed attempt at understanding the world, because of the way it is culturally and historically constructed, limited and biased. However, as Haraway argues, an account of the “radical historical contingency for all knowledge claims and knowing subjects” should not exclude a “no-nonsense commitment to faithful accounts of a ‘real’ world.”³⁹ Otherwise, as Latour argues, all ways of gaining knowledge will eventually be ‘eaten up’ by the same tools which were excellent for critiquing science.⁴⁰ It must be accepted that ways of knowing are always limited, which means the scientism found in science should be challenged, but not the usefulness of all scientific ways of understanding the world.

As Nietzsche argued, knowing that there are other perspectives from which to look at the world, we should try to see the world from multiple different perspectives: “the more eyes,

³³ Nanda, “A ‘Broken People’ defend science,” 335.

³⁴ Ibid.

³⁵ Ibid., 336.

³⁶ Ibid., 343.

³⁷ Ibid., 358.

³⁸ Ibid., 359.

³⁹ Haraway, “Situated Knowledges,” 579.

⁴⁰ Latour, “Why Has Critique Run out of Steam?” 232.

different eyes, we know how to train on the same thing, the more complete our 'idea' of this thing, our 'objectivity,' will be."⁴¹ Each historically contingent way of understanding the world may have certain benefits, but also certain disadvantages. That's why we shouldn't constrict ourselves to one way of seeing.

However, we should not resort to relativism. As Haraway argues, the problem with relativism is that implies that it doesn't matter in which way we understand the world, as all ways of understanding the world are equally justified. These differences do matter.⁴² After all, the way we view the world strongly influences society. In different contexts, different ways of understanding the world are beneficial.

According to Nietzsche, we should have "the capability of having power over one's positive and negative arguments and of raising them and disposing of them so that one knows how to make the very variety of perspectives [...] useful for knowledge."⁴³ Knowing a variety of ways of understanding the world is especially useful if we know about their benefits and disadvantages. Only then can we deliberately choose from which perspective(s) to look in specific contexts.

We should not be putting different ways of understanding the world opposite each other and try to decide which is the best and should be adopted, while the rest is discarded. As Cunningham and Williams argue, rather than critiquing science, we should be de-centring it.⁴⁴ We need to treat it as one limited tradition of understanding the world. As Haraway writes: "I am arguing for politics and epistemologies of location, positioning, and situating, where partiality and not universality is the condition of being heard to make rational knowledge claims."⁴⁵ Different ways of understanding the world should be approached as legitimate but not universal, as situated knowledges.

My thesis

We need a mapping of different ways of understanding the world, in which it is made clear how and why the differences between them matter. That will give us a way of making the variety of perspectives useful, as Nietzsche argued. Since so many people have critiqued science by comparing it to other traditions, a lot is already known about the benefits of ways of understanding the world which are not dominant in science. What I will be doing is focus on three of these groups of traditions: indigenous, East-Asian and feminist traditions, and map what their critique of science can tell us about what different ways there are of understanding the world and how it matters which ways we choose.

The concept of diffraction is useful in further defining my project. Haraway has proposed diffraction as an alternative for the metaphor of reflection. The term diffraction (from the Latin verb *diffringere*: 'breaking-apart') is used in physics to describe how waves move outward in different directions, after encountering an obstacle.⁴⁶ Figuratively, diffraction

⁴¹ Nietzsche, *On the Genealogy of Morals*, 98.

⁴² Haraway, "Situated Knowledges," 584.

⁴³ Nietzsche, *On the Genealogy of Morals*, 98.

⁴⁴ Cunningham and Williams, "De-Centring the 'Big Picture'," 429.

⁴⁵ Haraway, "Situated Knowledges," 589.

⁴⁶ Karen Barad, "Diffracting Diffraction: Cutting Together-Apart," *Parallax* 20, no. 3 (2014): 171.

is used to describe a way of reading and thinking.⁴⁷ As American feminist professor Karen Barad, who has further developed Haraway's concept, writes: "unlike methods of reading one text or set of ideas against another where one set serves as a fixed frame of reference, diffraction involves reading insights through one another in ways that help illuminate differences as they emerge."⁴⁸ Whereas ideas or texts are often used to reflect on other ideas or texts, placing them opposite each other doesn't create any new ideas. Whereas reflection only gives us more of what there already is, in diffraction something more is seen.⁴⁹ When one approaches ideas with a diffractive method, the different ideas are used to illuminate each other, to interact. It's not so much about comparing two things and seeing how they differ, but rather about looking at what happens when they come in contact and what this tells us about differences within the new whole. "A diffraction pattern does not map where differences appear, but rather maps where the effects of difference appear."⁵⁰ Or in other words, in a diffraction pattern, we find the 'differences that matter'.⁵¹

Feminists are mainly criticizing what they consider male bias in science, whereas East-Asians and indigenous people compare their own ways of understanding the world with what they consider typically western characteristics of science. These people seem to be criticizing different things. However, as Barad argues, when one reads diffractively, "insights from different sources, which may seem to be separate sets of concerns, sharply demarcated," can be read through each other and illuminate each other.⁵² This is especially useful in my project, because, as historian Elizabeth Fee argues, Western feminist epistemologies and many non-Western epistemologies "appear to embody very similar ideas: conceptions of nature that in one context are denounced as masculine are in another denounced as European, colonial [or white]."⁵³ All groups are comparing their own ways of understanding the world to the dominant way of understanding the world, which is both western and male, but approach it from a different perspective. I follow Nietzsche in taking a perspectivist approach, which means that I will try to get the best understanding of the different ways of understanding the world I can, by looking at them from different perspectives. So I will read the insights of these different groups diffractively, letting them interact and illuminate each other.

The concept of diffraction is also useful for me in another way. The texts I will be investigating are more than just critiques. They often show why certain differences between ways of understanding the world matter. We can see them as part of a diffractive process. We can see science and the other traditions as waves, which touch and create a diffractive pattern, in which "the effects of difference appear."⁵⁴ The critiques of science written by people attacking science and/or defending their own traditions are 'effects of difference'. There are differences between different ways of understanding the world which have urged people to

⁴⁷ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham: Duke University Press, 2007), 30.

⁴⁸ Ibid.

⁴⁹ Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," *Signs* 28, no. 3 (Spring 2003): 802-803.

⁵⁰ Haraway, *The Haraway reader* (New York: Routledge, 2004), 70.

⁵¹ Barad, *Meeting the Universe Halfway*, 72.

⁵² Barad, "Posthumanist Performativity," 803.

⁵³ Elizabeth Fee, "Critiques of modern science: The relationship of feminism to other radical epistemologies," in *Feminist Approaches to Science*, ed. Ruth Bleier (Oxford: Pergamon Press, 1986), 50.

⁵⁴ Haraway, *The Haraway reader*, 70.

write these critiques: these are differences that matter. In Latour's words: they are also about matters of concern, not (merely) about matters of fact. So they are a great source if I am looking for which differences in looking at the world matter and why they matter.

So, my project is the following:

I will be looking at part of the diffraction pattern that is the product of the interaction of science and other traditions: indigenous, East-Asian and feminist traditions. I will investigate what people who critique science, write about their benefits of their ways of understanding the world, in comparison with (what they believe are) dominant ways of understanding the world in science. Reading their work diffractively, I will map the many different ways of understanding the world in different ways, which they write about. Any way of understanding the world has advantages and disadvantages. Because the ways of understanding the world which are dominant in science are taken for granted and the advantages of other ways of understanding the world are not well known (in the western world), I will focus on the disadvantages of the former and the advantages of the latter.

It should be kept in mind that many ways of understanding the world which are dominant in science are also present in other traditions, and vice-versa. For example, while holistic ways of understanding the world are more dominant in other traditions than in science (as I will discuss later), they do play an important role within botany (though they may still be undervalued by science in general).⁵⁵ So, in my thesis I do not want to put science and other traditions opposite each other. I don't want to draw strict lines between them, because new understanding is so often the result of different traditions exchanging ideas. Some ways of understanding the world which I describe as dominant in other traditions than science, are actually gaining support within science. Science does not stand still. Yet I do keep mentioning which ways of understanding the world are dominant in science, because these are generally overrepresented and given too much weight.

The other traditions

I have chosen to focus on three alternative (groups of) traditions: East-Asian, indigenous and feminist traditions. In describing their ways of understanding the world, I will only use the writing of East-Asians, indigenous peoples and (feminist) non-men themselves, because I want to know how they, not how other people see their ways of understanding the world. I have chosen to focus on these three groups, because all of them have written a lot about how their ways of understanding the world differ from those dominant in science, what they believe are the benefits of the former and why they see the latter as problematic. Of course there are many different traditions within each of these groups and many different understandings of each of these traditions. So, I want to stress that I am not at all attempting to create a complete or consistent account of any of these (groups of) traditions.

⁵⁵ Mary Midgley, *The Myths We Live By*, (London: Routledge, 2004), Taylor and Francis e-Library, 29.

Indigenous traditions

The word 'indigenous' means 'native', but there is no consensus about what exactly it means for a culture or group of people to be indigenous. As Adivasi (South-Asian indigenous) professor Dip Kapoor and indigenous African sociologist Edward Shizha argue,

“[m]any would prefer not to define indigenous peoples at all because, after all, definition/taxonomies (and their rigidities) are a product/instrument of colonial administration and control, as outsiders continue the offensive practice of bounding the indigenous while identities themselves tend to be more fluid. In fact, the UN Working Group on the Declaration on the Rights of Indigenous Peoples expressed concerns and stated that a ‘definition of indigenous peoples was unnecessary and that to deny indigenous peoples the right to define themselves was to delimit their right to self-determination.’”⁵⁶

Sometimes people call themselves 'indigenous' to emphasize that they are the prior inhabitants of a place, positioning themselves in opposition to (the descendants of) colonialists. However, the word 'indigenous' is also often used to describe small scale societies, without advanced technology and written language, with strong ties to the land. Many peoples, considered indigenous by others, might not identify with such characterizations. For example, many native Africans, despite experience with colonization, don't call themselves 'indigenous'.⁵⁷ Whereas most peoples who call themselves 'indigenous' live in small scale societies and see themselves as independent from other indigenous peoples, there are currently African scholars who are focussing on the shared history of many African peoples, developing an 'Afrocentric' worldview, as an answer to a Eurocentric one. African-American professor of Africana studies Maulana Karenga, for example, takes the ancient Egypt concept 'Maat' as the basis of African philosophy.⁵⁸ This is a recent development, which means that there are not as many extensive accounts on, for example, Afrocentric epistemology, as there are on indigenous epistemology. That is why, for now, I will be focusing on the ways of understanding the world of indigenous peoples who identify as 'indigenous' and not on Afrocentric ways of understanding the world (which does not mean that I will exclude African indigenous peoples).

There is no such thing as one 'indigenous worldview' one type of 'indigenous knowledge' or one 'indigenous epistemology'. However, such general terms are used by indigenous peoples themselves, because focussing on their shared ideas helps emancipating them. As native Kwara'ae, David Welchman Gegeo and Karen Ann Watson-Gegeo write: “Around the world today indigenous ethnic groups are asserting the validity of their own ways of knowing and being, in resistance to the intensifying hegemony of mainstream epistemology from the metropolitan powers.”⁵⁹ They have written to emancipate themselves, to show that

⁵⁶ Dip Kapoor and Edward Shizha, introduction to *Indigenous Knowledge and Learning in Asia/Pacific and Africa: Perspectives on Development, Education and Culture*, ed. Dip Kapoor and Edward Shizha (New York: Palgrave Macmillan, 2010), 2.

⁵⁷ Kapoor and Shizha, “Introduction,” 2-3.

⁵⁸ Maulana Karenga, *Maat, the Moral Ideal in Ancient Egypt: A Study in Classical African Ethics*, ed. Molefi Kete Asante (London: Taylor & Francis Group, 2003), ProQuest Ebook Central.

⁵⁹ David Welchman Gegeo and Karen Ann Waston-Gegeo, “‘How we Know’: Kwara'ae Rural Villagers Doing Indigenous Epistemology,” *The Contemporary Pacific* 13, no. 1 (Spring 2001), 55.

their ways of understanding the world are as valid as (or even more valid than) those of science. Since many indigenous peoples have developed their ways of understanding the world independently from science, live in very different ways than western people do and have recently written a lot about the common characteristics of their ways of understanding the world, their work is very useful in my research.

East-Asian traditions

In East-Asia many different traditions have developed. I will mostly be reading about ways of understanding the world which are dominant in the largest of these traditions, such as Confucianism, Hinduism and Daoism. There are big differences between these traditions, but also many similarities.

When describing their own ways of understanding the world to those dominant in science, East-Asians are usually less critical of science than indigenous people and feminists. Their historical situation is shaped less by oppression from western men. Also, there are many people from the West who are interested in East-Asian traditions, since traditional religion is weakening in the West and people are looking for other traditions for finding meaning and spirituality. Western people usually consider East-Asian traditions religions. However, the concepts 'science' and 'religion' are relatively new for East-Asians, as they have only been introduced in the second half of the nineteenth century.⁶⁰ Most East-Asians wouldn't categorize their traditions in the same way western people do. Since, in the West, what is characterized as 'religion' has less status than what is considered 'science', this is a label many East-Asians want to escape.

Feminist traditions

In *Uncovering Gynocentric Science*, feminist scholar Ruth Ginzberg argues that, while the science of men has dominated for a long time, there has been a 'gynocentric science' existing alongside it for a long time. She argues that American scientist Barbara McClintock is an example of a scientist from this tradition. Although she did work within the natural sciences, "[she] was often seen as a bit 'odd' or 'incomprehensible.' These are hallmarks of the sort of paradigmatic incommensurability described by Kuhn."⁶¹ Many feminists argue that there is such a thing as a feminist alternative to masculine science, sometimes called 'feminist science'. Many have argued that science is a biased, masculine practice. As Fee argues, "whether consciously articulated or not, women carry the seeds of an alternative ontology, epistemology, and ethics."⁶² Feminist ways of understanding the world, however, are not simply a 'feminine' or 'female' ways of understanding the world. Feminists criticize science for its male bias, and argue for ways of understanding the world which are not male, partly by emphasizing the values typically seen as feminine and therefore thought of as inferior, but also partly by breaking through this dualism and finding ways of understanding the world which are less binary.

⁶⁰ Shin Jaeshik, "Mapping One World: Religion and Science from an East Asian Perspective," *Zygon* 51, no. 1. (March 2016), 205.

⁶¹ Ruth Ginzberg, "Uncovering Gynocentric Science," in *Feminism & Science*, ed. Nancy Tuana (Bloomington: Indiana University Press, 1989), 70.

⁶² Fee, "Critiques of modern science," 47.

Of course, western women (who are the most dominant among feminists) are strongly influenced by science themselves. However, they still look at it from a different perspective than western men do and are not connected to science in the same way men are. To be sure, I am not assuming that feminists or women in general have different ways of understanding the world because women have a different biology. As Fee writes, “women have some kind of privileged access to the new epistemology, not because of a biological difference but because of their different experience. Women’s social experience leads to (or makes possible) an alternative view of the world and of nature.”⁶³

Big pictures

One might wonder whether this kind of subject isn’t too big for a thesis of about 30.000 words, or even too big to be addressed at all. I want to map all the different ways of understanding the world which matter in the writing of many different people who are part of many different traditions. Even within each of these specific traditions there is enormous variation. It is impossible to really do justice to the diversity of ways of understanding the world.

However, I do think it is important to investigate large questions. As British feminist philosopher Mary Midgley argues, there is a tendency toward specialization in the academic world:

all intellectual disciplines have been gradually splitting up and becoming more specialized, so that they often cannot accommodate these big topics and drop the concepts that would be appropriate for them. Yet the big topics still need to be discussed; indeed, if anything, they get more urgent and more difficult from being neglected. Philosophy, which used to take responsibility for these interdisciplinary matters, has unfortunately chosen to regard itself as just one more limited discipline and has largely followed the academic fashion of becoming increasingly technical and preferring smaller questions.⁶⁴

Native American writer Vine Victor Deloria Jr. writes something very similar:

The gradual fragmentation of the old categories of natural history and theology into the isolated sciences and disciplines of today has produced a myriad of separate bodies of knowledge complete with their professional priesthoods and has allowed considerable slippage in the ability of the Western scientific paradigm to generate adequate explanations for the multitude of problems we face as a society.⁶⁵

Obviously, small questions have to be answered as well. However, as Midgley and Deloria argue, big questions are currently often ignored and are important to answer, because they concern big topics which are very relevant for society. Though it may be impossible to give a complete answer to many big questions, we should at least try to begin to answer them. It is

⁶³ Ibid., 48.

⁶⁴ Midgley, *Are You an Illusion?* (Abingdon: Routledge, 2014), 17.

⁶⁵ Vine Deloria Jr. and David E. Wilkins, “Racial and Ethnic Studies, Political Science, and Midwifery,” *Wicazo Sa Review* 14, no. 2 (Autumn 1999): 67.

not my goal to present a complete picture of all the different ways of understanding the world there are and all their benefits and disadvantages. However, if we ultimately want to see the scientific ways of understanding the world as a few among many ways, some kind of mapping of all these differences is necessary. As Cunningham and Williams argue, “Big pictures are, of course, thoroughly out of fashion at the moment; those committed to specialist research find them simplistic and insufficiently complex and nuanced, while postmodernists regard them as simply impossible.”⁶⁶ However, even specialist research is always defined as part of some bigger picture. When we learn something specific, it is always fit into some larger picture. Big pictures are necessary, no matter how problematic they may be. So I will be mapping different ways of understanding the world, focusing on those which have already been written about and argued for, proposing a framework for what a big picture in which science is de-centred could look like.

On the other hand, I should stress that my project is not as enormous as it may seem. There are a lot of things I will not be doing. For example, I will not evaluate whether the descriptions and critique of science in the texts I read are correct or not (although I will include the reasoning behind them). The point of my mapping is not to describe the different traditions I discuss, but describe the different ways of understanding the world I encounter in these texts. I will also not be creating a picture which is complete in any way. It only contains what I learn from the specific texts I have selected, from the specific traditions I have selected. Of course I have tried to select representative texts, but that means I have (mostly) restricted myself to dominant ideas within these traditions. I have also restricted my project by discussing mainly the disadvantages of ways of scientific ways of understanding the world and the benefits of other ways, while ultimately a mapping of these differences should contain the benefits and disadvantages of all of them.

Also, like anyone’s, my perspective on this subject is limited. Although I try to use the different perspectives I read about to see it in different ways, obviously I don’t have a ‘view from everywhere’, as I don’t know all possible perspectives.⁶⁷ Also, while I have described the way science and other traditions have formed a diffraction pattern, and I am diffractively reading what others have written, it is also important that everything I discuss, has been diffracted *by me*. What I mean by this is that I am not a distant observer, but an active participant in these diffractive processes. What I write about different ways of understanding the world is ultimately my interpretation of them. I am most familiar with feminist thought, which shapes the way I approach other traditions. In the reading guide I will get further into how my project is shaped by my position.

Motivation

There are multiple reasons why this (type of) research is important. I have already explained that with this mapping I want to contribute to the de-centring of science, in which science is perceived as a situated tradition of understanding the world, among many other situated traditions, all with their own benefits and disadvantages within specific contexts. The diversity of ways of understanding the world should be embraced, because knowing about all these different ways of understanding creates a more comprehensive understanding of the world. I

⁶⁶ Cunningham and Williams, “De-Centring the ‘Big Picture’,” 407.

⁶⁷ Haraway, “Situated Knowledges,” 590.

have also explained why it is important that people in academia concern themselves with big topics like this one.

As Kapoor and Shizha argue, it is problematic to use the work of, in their example, indigenous people “for mere descriptive ethnography with no apparent purpose but to mine or engage in academic voyeurism.”⁶⁸ Especially indigenous peoples and feminists write about their ways of understanding the world from non-dominant positions to emancipate themselves and their ways of understanding. Their project is political, and it would be wrong for me to use it, especially to use the work of indigenous people as a privileged western person, without contributing to their cause. I will contribute to the work of indigenous people and feminists, by showing how their ways of understanding the world are beneficial and why they matter.

This thesis is also meant to contribute to science. I will show how ways of understanding the world which are not dominant within science, are sometimes very helpful for scientists for seeing the world in a different way. Great discoveries are often made when people shift their perspective. I will be mapping different ways of understanding the world in different ways and such a mapping can be useful for scientists who want to look at what they are researching in another way.

The undervalued ways of understanding the world that I directly investigate are non-western and/or non-male, but people who are part of different traditions can benefit from this as well. In contemporary western society, many people have a blind faith in science and will discard any idea that does not fit in their conception of the scientific worldview, believing that science can in principle answer all questions and solve all problems. Showing that there are contexts in which ways of understanding the world which are not dominant in science are more useful, can help non-scientific knowledge and ways of understanding the world to be taken more seriously in general. This includes religious ways of understanding the world, which are often seen as unjustified, because they aren't based on empirical facts.

⁶⁸ Kapoor and Shizha, “Introduction,” 1.

Reading guide

I am most familiar with feminist thought and ways of understanding the world myself, which is why the time I spend discussing the different ways of understanding the world is not completely equal. In the first parts of my mapping, the feminist way of understanding the world will especially be more dominant. I have started with describing the ways of understanding the world I am most familiar with. That is because, as we will see, the different way of understanding the world I will discuss are very much connected. Many ways of understanding are easiest to describe when referring to other ways of understanding. The ways of understanding I am less familiar with, which I find more in indigenous and East-Asian thinking, are easiest to describe when I can refer to feminist ways of understanding I have already discussed. The structure of this mapping is determined simply by what is the most practical way to explain the different ways of understanding the world. Those I discuss first are easiest to understand by themselves, while those I discuss later are easiest to understand when one already has an understanding of those I discussed first. There is not really a beginning point and an ending point in my story, because my mapping is essentially a listing of ways of understanding the world, which are described by reference to each other.

However, to still provide the reader with some structure. I have also cut up my story into eleven short sections and I have listed their central topics below.

1. Humanity in the world: I discuss the concept 'nature' and different ways of understanding the place of humanity in the world. I will also introduce some dichotomies which are dominant in science.
2. Passivity and activity: I discuss different ways of locating activity and passivity in the world, why this matters and how this shapes our understanding of the world.
3. Relating to the world: I discuss different way of understanding our relationship with the rest of the world and what their consequences are.
4. Systems: I discuss different ways of understanding systems: as adversarial, hierarchical or reciprocal.
5. Difference: I discuss different ways of understanding difference. One of these ways is the dichotomical way, which I will discuss criticism of.
6. Basic character: I discuss different ways of understanding the basic character of the world, such as atomism and holism.
7. Complexity: I discuss different understandings of how comprehensible and complex the world is. This shapes which ways of understanding the world are seen as legitimate.
8. Knowing: I discuss many different ways of trying to gain knowledge which are seen as legitimate within different traditions, as well as different ways of understanding what learning is.
9. One with the world: I will go further into the subject/object dichotomy, and discuss what it means for what we can know if subject and object aren't separated.
10. Human knowledge: I will discuss the differences between ways of understanding knowledge as 'objective' and ways of understanding knowledge as 'human'.
11. Truth: I will discuss different ways of thinking about 'truth' and go into what the purpose of our ways of understanding the world may be.

Ways of understanding the world

1. Humanity in the world

One of the first things that comes to mind when thinking about how scientists (try to) understand the world, are the laws of nature. Scientists study nature and formulate laws of nature. In this section, I will discuss what the conceptualization of nature can tell us about the different ways in which the place of humanity in the world is understood.

The concept of nature catches the attention of many non-Western people, because it is alien to them. Enrique Salmón, Native American Rarámuri anthropologist, calls the worldview of his people a *kincentric ecology*.⁶⁹ This means that the Rarámuri see themselves as part of a family which also includes parts of the world which in the West would be called 'nature', such as animals, plants and stones. Many indigenous people see themselves as one form of life among many other forms of life (life is in their understanding usually not restricted to organisms which scientists would call 'alive').⁷⁰

East-Asian traditions are often described as *anthropocosmic*.⁷¹ Humanity is embedded in and inseparable from the cosmos as a whole ('nature' in the broad sense of the word). The Confucian concept of the "unity of Heaven and Humanity" (*tianrenheyi*) is an expression of this anthropocosmic way of understanding the world.⁷² An influential basic concept in Chinese thinking is *qi*: the basic energy in the cosmos which "connects all people and existence in a web of relationship."⁷³ Since *qi* forms the basis of everything that exists, human beings are not separated from the rest of the universe.

Indigenous and East-Asian writers stress this connection between human beings and the world they live in, because in the West, 'nature' is defined as opposite to 'culture', the human world. Humans are by definition absent from the natural world and the opposition implies a certain separation between humanity and nature. Rather than seen as a whole, the world is cut up into two parts. As Chinese historian Yue Zhuang explains, in Chinese tradition "this anthropocentric concept of nature as an alienated natural world did not exist." The traditional Chinese word *ziran* is now used as translation of the word 'nature', but it refers to a spontaneous self-regenerating process, rather than an object, which makes it a very different type of concept than 'nature'.⁷⁴

Midgley cites Nobel Prize winning biochemist Jacques Monod and astrophysicist Steven Weinberg as examples of how scientists relate to nature. Monod writes that man "must realise that, like a gypsy, he lives on the boundary of an alien world."⁷⁵ He understands

⁶⁹ Enrique Salmón, "Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship," *Ecological Applications* 10, no. 5 (October 2000), 1327.

⁷⁰ *Ibid.*, 1331-1332.

⁷¹ Jaeshik, "Mapping One World," 207-208; Tu. Weiming, "The Ecological Turn in New Confucian Humanism: Implications for China and the World," *Daedalus* 130, no. 4 (Fall 2001), 244.

⁷² Weiming, "The Ecological Turn," 243.

⁷³ Jing Lin, Tom Culham and Rebecca Oxford, "Developing a Spiritual Research Paradigm: A Confucian Perspective," in *Toward a Spiritual Research Paradigm: Exploring New Ways of Knowing, Researching and Being*, ed. Jing Lin, Rebecca Oxford and Tom Culham (Charlotte: Information Age Publishing, 2016), 144.

⁷⁴ Yue Zhuang, "Confucian ecological vision and the Chinese eco-city," *Cities* 45 (June 2015), 144.

⁷⁵ Midgley, *Evolution as a Religion: Strange hopes and stranger fears* (London: Methuen, 2003), Taylor and Francis e-Library, 76.

humanity as separated from nature, even to the extent that we are considered fundamentally different from it. Weinberg explains that the universe has existed long before and will exist long after us and that we won't survive when the conditions in the universe change (which they will) - concluding that we are living in an "overwhelmingly hostile universe."⁷⁶ In this way of understanding the world, the universe we are living in is not just different from us, but even hostile to us. We are in an adversarial relationship with it.

Feminists have argued that within science, culture and nature are often characterized as a dichotomy, which is related to many other dichotomies. Many have argued that scientists approach nature, the object of their science, as a passive woman, who has to be controlled or even, as Fee phrases it, 'unclothed' by the scientist.⁷⁷ Australian Feminist philosopher Genevieve Lloyd takes renaissance philosopher Francis Bacon as exemplary of this view, as he wrote: "Let us establish a chaste and lawful marriage between Mind and Nature."⁷⁸ In this marriage mind and nature aren't equal: "nature betrays her secrets more fully when in the grip and under the pressure of art than when in enjoyment of her natural liberty."⁷⁹ Humanity is male and nature female. Nature, as the object of science, is passive. As Māori professor of indigenous education Linda Tuhiwai Smith writes: "objects of research do not have a voice and do not contribute to research or science. [...] An object has no life force, no humanity, no spirit of its own, so therefore 'it' cannot make an active contribution."⁸⁰ Humanity and nature are in a hierarchical relationship, as culture/subject/male dominates and controls nature/object/female. Smith argues that the split between culture and nature stems from classical Greek philosophy, in which the two were already in a hierarchical relationship, as humanity was placed on a higher plane than the rest of the world, because of characteristics such as language and reason.⁸¹

One could also argue that, within science, culture and nature are not understood as separated opposites, since the science often studies human beings the same way it studies nature. Midgley argues that some scientific theories, such as evolution theory, actually imply that humanity is part of nature.⁸² Millions of years of evolution have created us to fit into it perfectly. Evolution theory can be understood as support for the kincentric idea that humanity is part of nature, with the different species as our family – in this context it makes sense to see nature not as alien but as our home. Yet again, on the other hand, that world may still be seen as very hostile.

⁷⁶ Ibid.

⁷⁷ Fee, "Critiques of modern science," 44.

⁷⁸ Genevieve Lloyd, "Reason, Science and the Domination of Matter," in *Feminism and Science: Oxford Readings in Feminism*, ed. Evelyn Fox Keller and Helen E. Longino (Oxford: Oxford University Press, 1999), 47.

⁷⁹ Ibid.

⁸⁰ Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples* (Dunedin: University of Otago Press, 2008), 61.

⁸¹ Smith, *Decolonizing Methodologies*, 47.

⁸² Midgley, *Evolution as a Religion*, 76.

2. Passivity and activity

I have described the place of humanity in the world and how the world around humanity is perceived, which has to do with what is considered active and passive. In this section I will go further into how it matters what is considered active and passive for how we understand the world.

American physicist and feminist Evelyn Fox Keller argues that the use of the term 'law of nature' also says a lot about how nature is conceptualized in science. When the term was first used, it referred to the commands of deities upon matter.⁸³ As American feminist physicist and philosopher Evelyn Fox Keller writes, "laws of nature, like laws of the state, are historically imposed from above and obeyed from below."⁸⁴ In science, nature is conceptualized as subservient to laws, as obedient. So nature is passive and obedient, both to the scientist and to the laws of nature.

In ways of understanding the world in which there is no strict distinction between humanity and nature, in which humanity is often seen as related to or one with the rest of nature, humans and the world around them are seen as very much alike. Therefore, 'nature' is seen as equally active as humanity. For example, Native American writer Leslie Marmon Silko expresses her kincentric relationship to nature with these words: "I carried with me the feeling I'd acquired from listening to the old stories, that the land all around me was teeming with creatures that were related to human beings and to me."⁸⁵ Nature is not passive, dead matter, but very much alive.⁸⁶ Deloria argues that, whereas, in science, the cosmos is usually seen as "devoid of personality, and operating as a relentless machine," Native Americans have approached natural processes as active and full of energy.⁸⁷ The North American indigenous Blackfoot, like many indigenous peoples, even consider everything in the world to be conscious.⁸⁸ Jing Lin et al. describe *qi* in a similar way, as "the concept of the primordial energy [...] which is the physical informational, bio-energy, and spiritual element."⁸⁹

Feminists have criticized the concept of the laws of nature and Keller has argued for an alternative to describe the regularities in nature: order. "Order is a category comprising patterns of organization that can be spontaneous, self-generated."⁹⁰ As I wrote earlier, in Chinese the word 'nature' is translated with a word which describes it as spontaneously self-regenerating. Keller has argued for this alternative, because when one views nature as active, it is approached in a different way than when it is viewed as passive, which has certain benefits.⁹¹ She has written about McClintock, who argued that she was able to discover transposition (for which she received the Nobel Prize in Physiology or Medicine) because she approached her

⁸³ Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven: Yale University Press, 1995), 131.

⁸⁴ Ibid.

⁸⁵ Salmón, "Kincentric Ecology," 1327. Silko more precisely identifies as being one quarter Native American, also being Anglo American and Mexican American.

⁸⁶ See also, for example, Joseph Couture, "Native Studies and the Academy," in *Indigenous Knowledges in Global Contexts: Multiple Readings of Our World*, ed. George J. Sefa Dei, Budd L. Hall and Dorothy Goldin Rosenberg (Toronto: University of Toronto Press, 2000), 160.

⁸⁷ Vine Deloria Jr., *The Metaphysics of Modern Existence* (Golden: Fulcrum Publishing, 2012), 49.

⁸⁸ Betty Bastien, *Blackfoot Ways of Knowing: The Worldview of the Siksikaitstapi*, ed. Jürgen W. Kremer (Alberta: University of Calgary Press, 2004), 80.

⁸⁹ Lin, Culham and Oxford, "Developing a Spiritual Research Paradigm," 144.

⁹⁰ Keller, *Reflections on Gender and Science*, 132.

⁹¹ Ibid.

object of research as active, stressing that one must “hear what the material has to say to you,” “let it come to you,” rather than try to pull it out aggressively.⁹² She insisted that plants, which her research focussed on, were strongly underestimated and too often considered passive, though they constantly interact with their environment.⁹³ Clearly there is a difference between approaching the object as passive or active in relation to the scientist. But McClintock’s case was not just about the difference between approaching the object as passive or active, but also about different ways of attributing activity and passivity in specific contexts.

Let me explain how these differences mattered for McClintock’s discovery. In 1953 Crick and biologist James Watson discovered the structure of DNA and came up with the idea that information which is coded in the DNA passes via RNA to protein, which they called the ‘central dogma’.⁹⁴ As Crick described it: “once ‘information’ has passed into protein it cannot get out again.”⁹⁵ DNA used to be and is often still called the ‘master molecule’.⁹⁶ In this view, DNA solely determines how an organism is going to turn out, giving orders to the rest of the cell. “As the king to his subjects, as the architect to his builders, as upper management to lower labor, so stands the collectivity of the organism’s genes (the genome) to the cell in which it resides,” American feminist scholar Marion Nemenwirth writes.⁹⁷ The DNA is seen as active and the rest of the cell as passive. McClintock found out that, in maize, DNA could actually rearrange itself, reacting to its environment: transposition.⁹⁸ This meant that information flowed ‘backward’, from protein to DNA. The DNA affects the rest of the cell, but the rest of the cell affects the DNA as well; they function as a whole. Nemenwirth explains that the master molecule is a ‘conceptual simplification’ has been useful in science, but became problematic when it was mistaken for reality.⁹⁹ She argues that scientists have realized this very late, as they were long ‘mesmerized’ by the master molecule, which ultimately slowed down the development of biology by making it unlikely to conceive of other parts of the cell as active.¹⁰⁰ I will discuss this example further in.

It seems that even though scientists may regard the object of science or nature as a whole passive, they still locate active parts within specific systems in the object or nature. Also, it must be noted that, sometimes when scientists draw an especially thick line between humanity and nature, as we have seen earlier, this comes with the idea that nature is hostile. If nature is hostile, that means that nature is actively working against us. In different contexts, different parts of the worlds may be considered active and passive.

⁹² Keller, *A Feeling for the Organism: The Life and Work of Barbara McClintock* (San Francisco: W.H. Freeman, 1983), 198.

⁹³ *Ibid.*, 200.

⁹⁴ *Ibid.*, 5-6.

⁹⁵ *Ibid.*, 6.

⁹⁶ Marion Nemenwirth, “Science Seen Through a Feminist Prism,” in *Feminist Approaches to Science*, 26.

⁹⁷ *Ibid.*, 27.

⁹⁸ Keller, *A Feeling for the Organism*, 9.

⁹⁹ Nemenwirth, “Science Seen Through a Feminist Prism,” 27.

¹⁰⁰ *Ibid.*, 28.

3. Relating to the world

It has become clear that our understanding of the world around us strongly influences how we approach it. In this section I will go further into what the consequences are of different approaches to nature.

McClintock saw knowledge as something that shouldn't be dragged out of a passive object, but which appears by itself. Native Vietnamese filmmaker, feminist and postcolonial theorist Trinh T. Minh-ha describes, in a similar way, how knowledge is created in her culture:

“Never does one open the discussion by coming right to the heart of the matter. For the heart of the matter is always somewhere else than where it is supposed to be. To allow it to emerge, people approach it indirectly by postponing until it matures, by letting it come when it is ready to come. There is no catching, no pushing, no directing.”¹⁰¹

Many have criticized scientists for doing the opposite. As Deloria describes it, “[s]cience forces secrets from nature by experimentation,” whereas “traditional peoples accepted secrets from the rest of creation.”¹⁰² Native American Kevin Gover criticizes the western world for thinking that “the land is a passive commodity, a thing that gives only if we conquer it, a thing we can own and exploit for fullest advantage.”¹⁰³ He argues for a conception of nature as giving, rather than as something to exploit.

When one approaches nature as passive, it is not something that gives knowledge or anything else, but something that can only be actively taken from. Also, when one affects something which is passive, it does not react. As Midgley argues, this way of thinking about nature has been common in the West since at least the industrial revolution: “Natural resources were assumed to be inexhaustible,” and only recently is there real fear of natural disaster.¹⁰⁴ We have affected nature, through the technology produced by science, and nature has reacted, for example in the form of climate change. However, as Midgley argues, “today, when news continually comes in that these resources are actually failing, we find it simply impossible to take that information seriously. [...] The way in which we have been accustomed to think of ourselves as isolated, cerebral units standing above the natural world blocks our understanding of how deeply and directly what goes wrong with that world can concern us.”¹⁰⁵

People who see the world around them as something they control, see themselves in a hierarchical relationship with it. That creates the risk of people making bad decisions, which not only harm nature, but ultimately humanity itself. We can't control nature, Midgley argues, so we should work *with* nature.¹⁰⁶ Similarly, as Chinese philosopher Chen Xia writes, “climate change is a visceral reminder that we are in the world; that our being is part of a larger being,

¹⁰¹ Trinh T. Minh-ha, *Woman, Native, Other: Writing Postcoloniality and Feminism* (Bloomington: Indiana University Press, 1989), 1.

¹⁰² Vine Deloria Jr., *Spirit & Reason: The Vine Deloria, Jr., Reader*, ed. Barbara Deloria, Kristen Foehner and Sam Scinta (Golden: Fulcrum Publishing, 1999), 135.

¹⁰³ Kevin Gover, foreword to *The Land Has Memory: Indigenous Knowledge, Native Landscapes, and the National Museum of the American Indian*, ed. Duane Blue Spruce and Tanya Thrasher (Chapel Hill: University of North Carolina Press, 2008), xi.

¹⁰⁴ Midgley, *Science and Poetry* (London: Routledge, 2001), Taylor and Francis e-Library, 16.

¹⁰⁵ *Ibid.*

¹⁰⁶ *Ibid.*

and that going against the flow of nature means to run counter our collective self-interest.”¹⁰⁷ She argues for a Daoist way of understanding the world instead. In Daoism, ‘non-action’ (*wuwei*) is prescribed, which can be understood as ‘effortless action’ or ‘non-calculating action’.¹⁰⁸ People should interfere with the world around them minimally and follow the ‘flow of nature’. In Daoism, the world is seen as self-organizing, creating what we need, so it is better to contribute to the processes already unfolding around us, rather than working against them.¹⁰⁹

Another negative consequence of approaching nature as passive and something to control can be found in medical science. Indian feminist philosopher Vrinda Dalmiya and American feminist philosopher Linda Alcoff have argued that the focus on control in masculine science leads to a very different approach of childbearing than the traditional approach of midwives. They explain that male physicians have used unnecessarily violent techniques, such as “squeezing and trampling on the abdomen to force the baby’s descent in a difficult birth or hanging the woman from a tree” and have invented the ‘twilight sleep’, “which rendered the woman semiconscious, unable to remember the experience afterward, and completely inactive and vulnerable to the doctor’s decisions.”¹¹⁰ They approached the process of childbearing as something to be controlled and the woman as passive. Midwives tended not to use such invasive techniques. Instead, they approached the labouring woman as holding power. As midwife Raven Lang wrote: “You should be able to listen closely to everything your body is telling you about what’s happening within, how your body feels about what goes into it, what comes out, and just how it feels organically.”¹¹¹ The woman has to be “in harmony with the forces within [her].”¹¹²

It is often thought that the invasive techniques of physicians are simply necessary to avoid complications. However, as Ginzberg argues, the vast majority of pregnancies outside of western hospitals, with adequate attention to health and social support, result in a healthy child and mother. In fact, “many of Western women’s difficulties in giving birth are the result of the conditions imposed upon them by Western hospitals,” for example the lithotomy position (the woman lying flat on her back with her legs up in the air), which causes many health risks.¹¹³ The traditional squatting position, used by many midwives (in many non-Western cultures), which is almost never allowed in hospitals, eliminates or reduces these risks and “enables labouring woman to use her expulsive forces to the greatest advantage.”¹¹⁴ The lithotomy position is preferred because it allows the doctor to have more control (monitoring the child’s heartbeat, administering drugs, etc.), even though it increases the risk of complications.¹¹⁵ The goal is to control nature, at the expense of health, rather than work with nature.

¹⁰⁷ Chen Xia and Martin Schönfeld, “A Daoist response to climate change,” *Journal of Global Ethics* 7, no. 2 (August 2011), 202.

¹⁰⁸ *Ibid.*, 200.

¹⁰⁹ *Ibid.*, 199.

¹¹⁰ Vrinda Dalmiya and Linda Alcoff, “Are ‘Old Wives’ Tales’ Justified?” in *Feminist Epistemologies*, ed. Linda Alcoff and Elizabeth Potter (New York: Routledge, 1993), 222.

¹¹¹ Ginzberg, “Uncovering Gynocentric Science,” 80.

¹¹² *Ibid.*

¹¹³ *Ibid.*, 77-78.

¹¹⁴ *Ibid.*, 78.

¹¹⁵ *Ibid.*

In science the world around us is often seen as something we are in an adversarial or hierarchical relationship with. For example, for a long time, evolution theory has been interpreted as meaning that individuals and species are in a constant fight with each other, in an adversarial relationship. The strongest, most egoistic and most aggressive wins, which means there is no room for genuine altruism or compassion. (This is not how Darwin thought about evolution theory, but how many of his followers interpreted it.” Lynn Margulis, an American biologist who many feminists argue did science in a feminine or feminist way, criticized this understanding the world. She argued that, in fact, symbiosis is omnipresent in nature:

“Not only are our guts and eyelashes festooned with bacterial and animal symbionts, but if you look at your backyard or community park, symbionts are not obvious but they are omnipresent. Then take the trees, the maple, oak, and hickory. As many as three hundred different fungal symbionts, the mycorrhizae we notice as mushrooms, are entwined in their roots.”¹¹⁶

Margulis argues that symbiosis is crucial for understanding evolution. Her revolutionary theory of endosymbiosis showed that the cells which are the ancestors of plants and animals today, originated from different bacteria which, through symbiosis, evolved into one organism.¹¹⁷ The idea of symbiosis in nature, is also central in East-Asian and indigenous ways of understanding the world. Korean scholar Yongbum Park argues that the western world “has dichotomized all living beings and understood them to be in conflictive and competitive relationships.”¹¹⁸ He argues for the traditional Korean concept *Chin-Ji-In*: “an integral, circular interrelationship among God, human beings, and Nature.”¹¹⁹ Deloria writes: “Human beings are incomplete without the rest of the world. Every species needs to give to every other species in order to make up a universe.”¹²⁰ In nature, as it has evolved, each organism’s waste is another organism’s food.¹²¹ In this way of viewing the world, we are in a reciprocal relationship with nature or the world around us. When our relationship with the rest of the world is viewed in this way, there may be less danger of people unknowingly putting themselves in danger by the way they affect the world around them, because they are aware that careless behaviour might badly influence the whole on which they rely.

¹¹⁶ Lynn Margulis, *The Symbiotic Planet: A New Look at Evolution* (London: Phoenix, 1999), 7.

¹¹⁷ *Ibid.*, 8.

¹¹⁸ Yongbum Park, “*Chondogyo* and a Sacramental Commons: Korean Indigenous Religion and Christianity on Common Ground,” in *The Wiley Blackwell Companion to Religion and Ecology*, ed. John Hart (Hoboken: John Wiley & Sons, 2017), 332.

¹¹⁹ *Ibid.*, 334.

¹²⁰ Deloria, *Spirit & Reason*, 226.

¹²¹ Margulis, *The Symbiotic Planet*, 148.

4. Systems

In science the world around us is often seen as something we are in an adversarial or hierarchical relationship with. Many people with different ways of understanding the world have argued that there is a more general tendency in science to see systems as adversarial or hierarchical rather than reciprocal. A reciprocal model consists of parts which are all equally active and are dependent on each other, rather than dominating (hierarchical) or fighting (adversarial) each other. In this section I will discuss these different ways of conceptualizing systems. (I use 'system' in the broad sense of the word, not to specifically refer to man-made systems, for instance.)

As I explained earlier, the 'central dogma' involved a hierarchical way of understanding how DNA works, where an active part dominates a passive part. In the end, scientists found that reciprocal models were more useful for understanding the relationship between the DNA and the rest of the cell than hierarchical models, since DNA and the rest of the cell are constantly actively interacting and need each other to function. There are more cases of hierarchical and adversarial models in biology that have been standard for a long time, after ultimately being replaced by reciprocal models which turned out to be more useful. See, for example *Body, Bias, Behaviour* by Helen Longino and Ruth Doell, in which they describe how a hierarchical description of how egg and sperm cells come together and fuse has dominated for a long time.¹²²

American feminist philosopher Elizabeth V. Spelman argues that the tendency towards hierarchical thinking is already visible in Aristotle's work.¹²³ Aristotle wrote that "in all things which form a composite whole and which are made up of parts, whether continuous or discrete, a distinction between ruling and subject element comes to light."¹²⁴ These hierarchical structures are also present within the structure of the academia. As American feminist philosopher Kathryn Pyne Addelson describes, leading scientists of academia are living in a world in which they have to compete for positions at the top. Authority is very valuable, which makes it unsurprising that the world is often described using concepts like competition and hierarchy.¹²⁵ Within this hierarchical system, people are also in adversarial systems. As indigenous Hawaiian philosopher Manu Aluli Meyer argues, scholars are expected to argue with others, to always critique others and to put themselves above others, taking their own views and arguments to be better than those of others.¹²⁶ American philosopher Janice Moulton calls this the 'adversary paradigm' of academia:

Under the Adversary Paradigm it is assumed that the only, or at any rate, the best, way of evaluating work in philosophy is to subject it to the strongest or most extreme

¹²² Helen E. Longino and Ruth Doell, "Body, Bias, and Behaviour: A Comparative Analysis of Reasoning in Two Areas of Biological Science," in *Feminism and Science*.

¹²³ Elizabeth V. Spelman, "Aristotle and the Politicization of the Soul," in *Discovering Reality: Feminist Perspectives on Epistemology, Metaphysics, Methodology, and Philosophy of Science*, ed. Sandra Harding and Merrill B. Hintikka (Dordrecht: Kluwer Academic Publishers, 1983), 25.

¹²⁴ Ibid.

¹²⁵ Kathryn Pyne Addelson, "The Man of Professional Wisdom," in *Discovering Reality*, 181-182.

¹²⁶ Shawn Wilson, "Progressing Toward an Indigenous Research Paradigm in Canada and Australia," *Canadian Journal of Native Education* 27, no. 2 (2003), 172.

opposition. And it is assumed that the best way of presenting work in philosophy is to address it to an imagined opponent and muster all the evidence one can to support it.¹²⁷

This line of thinking is very similar to that of Barad and Haraway, which I wrote about in the introduction. Barad argues:

Critique is all too often not a deconstructive practice, that is, a practice of reading for the constitutive exclusions of those ideas we can not do without, but a destructive practice meant to dismiss, to turn aside, to put someone or something down— another scholar, another feminist, a discipline, an approach, et cetera.¹²⁸

Moulton argues that there are different types of reasoning that can be used, dependent on what the goal of this reasoning is. Many academics use reasoning which is meant to convince a strong opponent, in which everything that is argued needs proof, or to attack an opponent, in which everything that is not proven is questioned.¹²⁹ Both Moulton and Barad argue that other, non-adversary types of reasoning could also be used. For example, Moulton writes:

The relations of ideas used to arrive at a conclusion might very well be different from the relations of ideas needed to defend it to an adversary. And it is not just less reasoning, or fewer steps in the argument that distinguishes the relations of ideas, but that they must be, in some cases, quite different lines of thought.¹³⁰

This reasoning is used in science, but is not regarded equally valuable as adversary reasoning, since it can easily be attacked with adversarial reasoning. So, Moulton also argues for less adversarial ways of relating to ideas of others, for example by considering how they relate to larger systems of ideas and how, even if they are not perfect, they can be built on, considering which value they add to what we know.¹³¹ Reading diffractively is also an example of a way of relating to the work of others in a non-adversarial way. The focus is on using what has been written to create new ideas, instead of criticizing old ideas.

Hierarchical and adversarial models are inextricably linked with dichotomies. The culture/nature dichotomy is connected to the subject/object, the active/passive, and the male/female dichotomies. Feminists have written about more connected dichotomies such as the mind/body and reason/emotion dichotomies. These are deeply entrenched in male, western thought.¹³² All these dichotomies have a hierarchical as well as an adversarial structure. I have already discussed how the active, male subject dominates the passive, female object. We have also seen in how humanity and nature are sometimes seen as in conflict with

¹²⁷ Janice Moulton, "A Paradigm of Philosophy: The Adversary Method," in *Discovering Reality*, 153.

¹²⁸ Barad, "Matter Feels, Converses, Suffers, Desires, Yearns and Remembers: Interview with Karen Barad," in *New Materialism: Interviews & Cartographers*, ed. Rick Dolphijn and Iris van der Tuin (Ann Arbor: University of Michigan, 2012), 49.

¹²⁹ Moulton, "A Paradigm of Philosophy," 153.

¹³⁰ *Ibid.*, 159.

¹³¹ *Ibid.*, 161.

¹³² Val Plumwood, *Feminism and the Mastery of Nature* (London: Routledge, 2003), Taylor & Francis e-Library, 43; Freya Mathews, "The dilemma of dualism," in *Routledge Handbook of Gender and Environment*, ed. Sherilyn MacGregor (London: Routledge, 2017), ProQuest Ebook Central, 57.

each other. The adversarial character of dichotomies is also clearly visible in the reason/emotion and mind/body dichotomies: reason and the mind are often pictured as wanting different things than emotion and body, as if they are continuously in conflict.¹³³

¹³³ Midgley, *The Myths We Live By*, 89-90.

5. Difference

I have already described how one may think about these specific pairs of concepts in different ways, but we can also consider how this 'dualizing scheme' itself is a specific way of understanding difference in the world.¹³⁴ In this section, I will discuss different ways of thinking about differences.

Dichotomies are not just pairs of opposites, but mutually exclusive pairs: something is always either cultural or natural and never something in between. There are other ways of thinking about difference in the world. For example, Native American Blackfoot Leroy Little Bear explains that in North American indigenous languages, many dichotomies which are central in western thinking don't exist: "The languages of Aboriginal peoples allow for the transcendence of boundaries. For example, the categorizing process in many Aboriginal languages does not make use of the dichotomies either/or, black/white, saint/sinner. There is no animate/inanimate dichotomy. Everything is more or less animate."¹³⁵ Instead of categorizing everything as either cultural or natural, for example, one can see different degrees of both culture and nature in everything. Feminists have also used this way of thinking to counter sexist ways of understanding the world. When women are associated with nature and nature is considered subordinate to men, this association is used to justify the domination of women. Many feminists have protested against this reasoning, by arguing that women should not be associated with nature, or by embracing their association with nature, but arguing that nature should not be dominated.¹³⁶ In both these ways of reasoning, the dichotomies are accepted. Today most feminists reject these dichotomies altogether, and follow Australian philosopher and ecofeminist Val Plumwood, who argued that women (as well as men) are both human and part of nature and that humanity is continuous with nature.¹³⁷

Minh-ha calls this type of difference, 'difference within'.¹³⁸ She argues that 'difference' is often understood as 'division', as it is in dichotomies, where difference is always 'difference between' two distinct identities.¹³⁹ "This means that at heart, X must be X, Y must be Y, and X cannot be Y."¹⁴⁰ However, one may also see every individual (thing) as containing so much difference that it does not have one fixed identity which distinguishes it from other identities. Difference understood as 'difference between' has often been used to separate groups of people and ultimately facilitates, for example, racism and sexism. So which way one understands what difference is matters.

In yin-yang thinking we can also find another way of conceptualizing difference than in the form of dichotomies. Korean theologian Shin Jaeshik calls Western (Aristotelian) logic a 'logic of negation' and contrasts it with a yin-yang 'logic of polarity'.¹⁴¹ Western logic is based on dichotomies. The rule of the excluded middle is central: everything is always either 'A' or

¹³⁴ Mathews, "The dilemma of dualism," 54.

¹³⁵ Leroy Little Bear, "Jagged Worldviews Colliding," in *Reclaiming Indigenous Voice and Vision*, ed. Marie Battiste (Vancouver: UBC Press, 2000), 78.

¹³⁶ Mathews, "The dilemma of dualism," 56.

¹³⁷ Plumwood, *Feminism and the Mastery of Nature*, 36.

¹³⁸ Trinh T. Min-ha, "Difference: 'A Special Third World Women Issue,'" *Feminist Review* 25 (Spring 1987): 15.

¹³⁹ *Ibid.*, 7.

¹⁴⁰ *Ibid.*, 15.

¹⁴¹ Jaeshik, "Mapping One World," 209.

'-A'. Dichotomies have this shape: culture is defined as the opposite of nature and nature as the opposite of culture. In Chinese thinking, there is a dialectic of "reconciling, transcending, or even accepting apparent contradictions."¹⁴² More than Western people, generally the Chinese believe in a 'middle way': two (seemingly) opposing propositions can both contain truth. For example, in Daoism, paradoxes and contradictions are central. "The sage acts without action; and the ruler rules without governing. The intelligent person is like a little child. [...]Being and nonbeing produce each other."¹⁴³ Psychologist David Y. F. Ho argues that Derrida's critique of logocentrism in 1978 is preceded by centuries in Daoism.¹⁴⁴

In yin-yang thinking, objects are not defined by intrinsic properties, but by their relationship with their environment. For example, something that is dark in comparison with the one thing can be light in comparison with another thing.¹⁴⁵ This means that things are never simply 'A' or '-A' (yin or yang), but always both to a certain degree, as they can be yin when seen in relationship with one thing and yang when seen in relationship with another thing. In this logic, dichotomies don't exist. This is a way of thinking about difference as 'difference within' rather than 'difference between'. However, it does resemble dichotomical thinking in the sense that difference always depends on two opposites. It is also possible to think about difference in yet another way. As Belgian feminist philosopher Irigaray argues, in the logic of negation, propositions and their negations are always on the same scale.¹⁴⁶ When something is not A, one can immediately conclude that it is -A. The two are very similar, in a way, because they are each other's mirror image. A and -A are the same type of thing. As Irigaray argues, sameness can be expressed in this logic, as well as the dichotomical type of 'difference', but not other types of difference, differences which cannot be explained merely in terms of negation, differences which create a larger variety than two opposites.¹⁴⁷

¹⁴² Richard E. Nisbett et al., "Culture and Systems of Thought: Holistic Versus Analytic Cognition," *Psychological Review* 108, no. 2 (2001), 294.

¹⁴³ David Y. F. Ho, "Selfhood and Identity in Confucianism, Taoism, Buddhism, and Hinduism: Contrasts With the West," *Journal for the Theory of Social Behaviour* 25, no. 2. (June 1995), 119.

¹⁴⁴ Ibid.

¹⁴⁵ Robin R. Wang, *Yinyang: The Way of Heaven and Earth in Chinese Thought and Culture* (Cambridge: Cambridge University Press, 2012), 7.

¹⁴⁶ Luce Irigaray, "Is the Subject of Science Sexed?" trans. Carol Mastrangelo Bové, in *Feminism & Science*, 62.

¹⁴⁷ Ibid.

6. Basic character

One may see difference as involving drawing strict boundaries between different things. One may also see difference as something which does not separate, or even, as in the logic of polarity, flows from the relationships between things. In this section, I will show how these differences are connected to different ways of understanding the basic character of the world.

Many people have criticized the scientific understanding of the world by calling it 'atomist'. In an atomist worldview, the whole (world) is approached as consisting of distinct parts and is understood through its parts. An alternative way of understanding the whole (world) is called 'holistic', which means that the whole (world) is approached as primarily a whole, rather than a sum of parts. Every part of the world is understood through its connections within the whole. Jaeshik, for example, writes: "In the East Asian worldview, the universe is an organic whole in which all of the parts of the entire cosmos belong to one organic whole."¹⁴⁸ Native American Blackfoot Betty Bastien gives an example of these different ways of thinking:

"One example of the denial and sacrifice that results from Eurocentred logic is one that my friend, colleague, and ceremonialist, Duane Mistaken Chief shared with me regarding the use of plants and herbs (personal communication, December 1998). He said, "Eurocentred scientists dissect the herb and extract the elements of the herb that they have found to have medicinal properties. However, what they don't understand is that the plant functions as a whole - other properties of the plant may be important because of their cleansing functions." It is the nature of the universe to function as an interdependent whole."¹⁴⁹

An important difference between an atomist and a holistic thinker is that the former thinks a whole can be reduced to its parts, while the latter thinks a whole is more than just its parts. I have already discussed some ways in which one can understand the whole as atomist, for example by thinking of the world in terms of dichotomies, which is a way of trying to understand it by splitting it up into different parts and separating these. I have also discussed how, in evolutionary theory, individuals may be approached as independently fighting each other rather than being dependent on each other. Smith argues that the idea of "the individual, as the basic social unit from which other social organizations and social relations form," is typically western.¹⁵⁰ In social sciences, the individual is (often) seen as a basic building block, which determines what groups of people are like, much more than the other way around. Midgley calls this 'social atomism': we divide the social world up into atoms and try to explain the whole through its parts.¹⁵¹

In a holistic way of understanding the world, the dependence of the individual on the collective is stressed. From an ecological feminist perspective, Warren rejects individualism: "Relationships are not something extrinsic to who we are, not an 'add on' feature of human

¹⁴⁸ Jaeshik, "Mapping One World," 207.

¹⁴⁹ Bastien, *Blackfoot Ways of Knowing*, 105.

¹⁵⁰ Smith, *Decolonizing Methodologies*, 49.

¹⁵¹ Midgley, *Science and Poetry*, 7.

nature; they play an essential role in shaping what it is to be human.”¹⁵² Sami professor Rauna Kuokkanen explains that, in holistic indigenous paradigms, individual human beings are not separated from what is around them: nature, ancestry and community.¹⁵³ In many indigenous communities this connection with people of the past is emphasized. In Confucian societies, people are also very community minded. People base their actions more on what other people expect from them, than on their personal volitions. Ho calls the Confucian identity a ‘relational identity’ and a ‘collective identity’, as the identity of a person is determined by their social relationships and the group to which they belong.¹⁵⁴ “In the extreme, the individual is not regarded as a separate being, but as a member of the larger whole.”¹⁵⁵

Unlike in Confucianism, in Taoism the individual is not seen as defined by the group, but as an extension of the cosmos. There is no distinction between the self and the other.¹⁵⁶ The concept of *qi* also implies that the self disappears. As Lin et al. write: “we are not single, independent entities, but are perpetually in interrelations and interconnections.”¹⁵⁷ In many East-Asian traditions, the concept of the self is denied. In Buddhism, the self is seen as an illusion, which we should let go of.¹⁵⁸ Whether the individual is seen as an extension of the group or the whole cosmos, the individual is not primary. In the West, however, the self is at the centre and sharply demarcated from the rest of the world. Ho describes the core of the Western conception of the self as “an individualistic self that is intensely aware of itself”.¹⁵⁹

As I described before, in science, the human subject is usually clearly demarcated from the nature which it investigates. However, while the individual may be understood as primary when compared with the world around it, it is also often cut up into separate pieces. As I discussed before, mind and body, as well as reason and emotion are often placed opposite each other. Smith argues that this split was already visible in Greek philosophy, as well as in Cartesian dualism.¹⁶⁰ Nisbett et. al. (a team of psychologists from different backgrounds) argue that the fact that surgery was common in the West long before it was common in East-Asia, was because the Westerners thought of the body as a collection of parts which could be malfunctioning and be treated individually, while the Chinese saw the body as something that was healthy or unhealthy as a whole, which meant that the whole had to be treated.¹⁶¹ These days, often the (metaphorical) cutting up into parts of the body goes a lot further. For example, in the academic discussion about free will, the belief that parts are more primary than wholes is prevalent. Arguments about the (non)existence of free will are often based on the idea that, when someone makes a choice, this choice is determined by the way neurons move. This means that it’s ‘really’ the neurons making the choice, rather than the person. As Midgley writes, “[t]he suggestion is that only these special parts are causally active. They are

¹⁵² Karen J. Warren, “The Power and Promise of Ecological Feminism,” in *Environmental Ethics*, 2nd ed., ed. Michael Boylan (Hoboken: John Wiley & Sons, 2014), 68.

¹⁵³ Rauna Kuokkanen, “Towards an ‘Indigenous Paradigm’ from a Sami Perspective,” *The Canadian Journal of Native Studies* 20, no. 2. (2000), 417.

¹⁵⁴ Ho, “Selfhood and Identity,” 116.

¹⁵⁵ Ibid.

¹⁵⁶ Ibid., 120.

¹⁵⁷ Lin, Culham and Oxford, “Developing a Spiritual Research Paradigm,” 144.

¹⁵⁸ Ho, “Selfhood and Identity,” 121.

¹⁵⁹ Ibid., 127-128.

¹⁶⁰ Smith, *Decolonizing Methodologies*, 48.

¹⁶¹ Nisbett et al., “Culture and Systems of Thought,” 294.

spontaneous, self-moving movers, while the wholes that they compose are mere passive outcomes of their activity.”¹⁶² In this atomist way of understanding the world, causality is located in parts, rather than in the whole. There is not just a focus on parts, but parts are understood as more real, primary or essential than the whole. As it concerns belief about which type of things are real and the world is composed of, we could call this atomism ‘ontological atomism’.

Jaeshik describes an alternative to this ontology, that of East Asian yin-yang thinking. As I discussed before, in yin-yang thinking things are not approached as distinct objects with intrinsic properties, but as parts of a larger whole, defined by their relationship to this whole. Jaeshik explains that, whereas Western thinking relies on basic concepts such as ‘substance’, ‘essence’ and ‘being’, yin-yang thinking relies on ‘relationship’, ‘transformation’ and ‘movement’.¹⁶³ In an atomist understanding of the world, relationships only exist because distinct objects exist, which (may or may not) form relationships among each other. In yin-yang thinking, reality is fundamentally holistic and relationships are primary rather than distinct objects.¹⁶⁴

The words ‘yin’ and ‘yang’ originally referred to the shady (yin) and sunny (yang) side of a mountain.¹⁶⁵ Later they came to be used in a more abstract way, referring to the two sides of any polarity, but their original meanings are often used as an example of what this yin-yang polarity is. The shady and sunny side are opposites, but are also fundamentally connected.¹⁶⁶ If light did not exist, there would be no such thing as shadow and without darkness there would be no concept of light. The two, yin and yang, depend on each other and entail each other. It is the relationship between them that allows these seemingly distinct things to exist.

A holistic perspective is a relational perspective, as the relationships between parts and the whole are primary to the parts. Ecological feminism has also embraced this relational perspective. Australian feminist philosopher Freya Mathews gives an example of how an individual is defined differently from an atomist and a relational (and holistic) perspective. She argues that a blue whale, from an atomistic perspective, could be defined by its physical configuration. However, looking at it from a relational perspective, the physical shape of the blue whale is determined by its environment: “its huge baleen mouth, for instance, that filters seawater – is only an outward reflection of its constitutive relationship with tiny krill.”¹⁶⁷ From a relational perspective, the blue whale is defined by its relationship with the krill: “Blue Whale and krill are internally or logically related. They are related not just causally or materially but at the level of identity.”¹⁶⁸ The relationship between the blue whale and krill is primary, rather than the individual species. A blue whale is what it is because of its environment. In this holistic way of understanding the world, like a blue whale is connected to its ecosystem, our identity as human beings can also only be understood as related to our environment. As I wrote before, Deloria argues that human beings are incomplete without the rest of the world, which is how humans are viewed from a holistic point of view.¹⁶⁹ In an ontological

¹⁶² Midgley, *Science and Poetry*, 3.

¹⁶³ Jaeshik, “Mapping One World,” 208.

¹⁶⁴ *Ibid.*, 211.

¹⁶⁵ Wang, *Yinyang*, 7.

¹⁶⁶ *Ibid.*, 8.

¹⁶⁷ Mathews, “The dilemma of dualism,” 60.

¹⁶⁸ *Ibid.*

¹⁶⁹ Deloria, *Spirit & Reason*, 226.

understanding of the world, on the other hand, humanity is seen as strictly separated from nature.

In this holistic yin-yang thinking, change is also conceptualized in a different way. Without light, darkness would not exist. Similarly, without summer, winter wouldn't exist and vice-versa. The seasons are created by the relationship between them. It is the changing of the seasons that creates the seasons. Little Bear describes the native North American worldview in a similar way: as always in flux.¹⁷⁰ Little Bear explains that the idea that everything in the world is always moving and changing is deeply entrenched in this way of understanding the world. That is why native North American languages are mostly verb-rich and process- or action-oriented.¹⁷¹ They are more aimed at describing happenings than describing objects. Little Bear explains that from the understanding of the world as in flux, flows a holistic perspective. When everything is always changing, there is less focus on the particular than on the changes and wholeness is valued more.¹⁷²

The Western concept of change is fundamentally different. Change is what it is called when something first *is* a certain way and later *is* different. So, like relationships are produced by parts, change is produced by what is. The static 'being' is very primary in Western thinking, as ancient Greek philosophers already speculated about how change is (im)possible, puzzled by how something that 'is' can change into something that 'is not'. Parmenides even concluded change is impossible. In yin-yang thinking, on the other hand, change is a basic aspect of reality. This is why the yin-yang thinking can be seen as an alternative to the atomistic ontology, but not as an alternative *ontology*, since that is a theory about what *is*. Jaeshik calls this alternative a 'changeology'.¹⁷³

However, the word 'changeology' is misleading. It seems to imply that change is more primary than being. In Buddhism, this is the case: "The world is [...] devoid of independent, substantial, or enduring objects. [...] Nothing is; everything becomes."¹⁷⁴ As philosopher Bo Mou argues, this is (at least) an incomplete description of the yin-yang perspective. In yin-yang thinking, all opposites are complementarily constituted, which also means that being/unchanging and becoming/changing are connected in this way.¹⁷⁵ Neither is primary as they depend on each other. As I wrote above, in ancient Greece there already was a tendency to think of being as having priority over change, but an important exception to this was Heraclitus, who thought of change as being more fundamental than being. However, as Little Bear argues, what Heraclitus does have in common with many other Greeks, as well as with modern science, is a tendency of looking for the basic 'stuff' which reality consists of: "In science singularity manifests itself in terms of an expensive search for the ultimate truth, the ultimate particle out of which all matter is made."¹⁷⁶ In yin-yang thinking, on the other hand, being/unchanging and becoming/change are dependent on each other - in fact everything is dependent on something else and on everything depends something, which means that

¹⁷⁰ Little Bear, "Jagged Worldviews Colliding," 77.

¹⁷¹ Ibid., 78.

¹⁷² Ibid., 79.

¹⁷³ Jaeshik, "Mapping One World," 212.

¹⁷⁴ Ho, "Selfhood and Identity," 122.

¹⁷⁵ Bo Mou, "On some methodological issues concerning Chinese philosophy: an introduction," in *History of Chinese Philosophy*, ed. Bo Mou (Abingdon: Routledge, 2008), Taylor and Francis e-Library, 12.

¹⁷⁶ Little Bear, "Jagged Worldviews Colliding," 82.

nothing is the most primary.¹⁷⁷ However, in this way, the dependency of polar opposites on each other is still a description of the basic character of the world.

¹⁷⁷ Mou, "One some methodological issues," 12.

7. Complexity

There is still more to be said about different ways of understanding the basic character of the world. In this part, I will discuss how the understanding of the level of comprehensibility and complexity of the world determines which ways of knowing are seen as legitimate.

As I have written earlier, in East-Asian thinking there is a dialectic of reconciling (seemingly) contradictory things. The world may be seen as both changing and unchanging. Describing the world in different, sometimes opposite ways is characteristic for East-Asian thinking. Indian philosopher Sangeetha Menon explains that *ashima* is an important concept in Hinduism. Literally it means ‘non-injury to living beings’, but it’s interpreted in many ways: “‘respect for difference’, ‘coexistence’, ‘peaceful resolution of conflicts’, ‘multidimensional perspectives’, ‘learning from each other’s experiences’, ‘humility’, or ‘ecological harmony of all life forms’.”¹⁷⁸ While in modern science it is generally assumed that there is one truth about how the world is, Hinduism is pluralist, which means that different conceptions about how the world is can be accepted as true at the same time, because the world is multidimensional. One of the consequences of this is that Hinduism has absorbed many deities over the years.¹⁷⁹ Indian poet and professor Makarand Paranjape argues that this pluralism is also clearly visible today in Indian society, as western science has been incorporated just like different (religious) practices have been incorporated in the past:

“It is not that Indians in the nineteenth century dispensed with traditional medicine in favor of Western medicine. Both systems coexisted, but it was thought that when the disease worsened, the patients turned to Western (modern) medicine, [...] The coexistence of multiple, incommensurable systems of medicine persist even today in India, though the dominance of Western (modern) medicine is far greater. But this plurality of knowledge systems is also characteristic of the metaphysical and epistemological multiplicity of modern India, a location in which we see the unresolved coexistence of contending systems of signification and meaning.”¹⁸⁰

Rather than pluralist, scientific ways of understanding the world could be called ‘singular’. There is a preference, within science, for one explanation, one method, one truth, or one map of the world. Kuhn wrote: “No part of the aim of normal science is to call forth new sorts of phenomena,” and “those that will not fit the box are often not seen at all”.¹⁸¹ As Deloria argues, in science, discoveries which don’t “fit the preconceived results in our experiments,” which don’t fit in the scheme of the world which is assumed to be correct, are discarded.¹⁸² Certain propositions are not questioned. As Keller explains, McClintock’s contemporaries could not see what she saw, because her understanding of the genome did not fit with the central dogma.

¹⁷⁸ Sangeetha Menon, “Hinduism and Science,” in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton (Oxford: Oxford University Press, 2008), 9.

¹⁷⁹ *Ibid.*, 8.

¹⁸⁰ Makarand Paranjape, “Science and Spirituality in Modern India,” in *Global Perspectives on Science and Spirituality*, ed. Pranab K. Das (West Conshohocken: Templeton Press, 2009), 43.

¹⁸¹ Kuhn, *The Structure of Scientific Revolutions*, 24.

¹⁸² Deloria, *Spirit & Reason*, 4.

Transposition meant that the genome changed, which “made her phenomenon a more complex one, and, in the minds of her contemporaries, less acceptable.”¹⁸³

Feminists have argued for another view of the world, in which the world is understood as inherently complex. We may look at the world as something which is so complex that no model can do justice to it, which is exactly how McClintock looked at her plants.¹⁸⁴ From this perspective, one would usually reject simple explanations of the world. In science, the opposite is the case: parsimony is preferred, which means that, when different explanations can explain a phenomenon, the explanation in which the least assumptions are made should be chosen.¹⁸⁵ Yet parsimony does not by definition imply that scientists assume that the world is simple. However, Midgley argues that there is also a tendency in science to choose for explanations with few assumptions, even when this explanation fails to explain the whole phenomenon and more assumptions seem to be needed. She gives the example of how scientists have tried to explain how it can be that there are “birds which lead predators away from their broods by distraction behaviour, acting as if they could not fly properly until they have moved the threat well away from the nest, and then flying back in a normal manner.”¹⁸⁶ In the eighties, scientists have tried to explain this, while avoiding assuming that birds make conscious efforts and know what they are doing, in the name of parsimony. Rather than concluding that the bird is aware that it can lead away the predator by acting in this way, they have argued that it may be that inborn drives, such as fear and parental concern, have created contradictory behaviour, which by chance is misinterpreted by predators.¹⁸⁷ There have also been scientists who have argued for the consciousness of the bird, such as Donald Griffin, who said:

It is often taken for granted that purely mechanical, reflex-like behaviour would be a more parsimonious explanation than even crude subjective feelings or conscious thoughts. But to account for predator-distraction by plovers, we must dream up complex tortuous chains of mechanical reflexes. Simple thoughts could guide a great deal of appropriate behaviour without nearly such complex mental gymnastics on the part of the ethologist or the animal.

Ultimately, more assumptions are necessary to explain the behaviour of the bird when it is not taken to be aware of what it is doing than when it is. This example shows that, in science, there is a preference for a certain type of simplicity, not just for parsimony. There is a preference for understanding the world without referring to conscious experience, understanding it as consisting only of matter. A similar thing has happened in the social sciences, Midgley argues, where behaviourism, the study of people in which their feelings and thoughts are not taken into account, only their behaviour, has been very popular.¹⁸⁸

Some people who take the world to be inherently complex, have argued that what science does is looking at only one of the many aspects of the world. Both indigenous and East-Asian traditions tend to be inclusive of modern science, because it is believed that science is

¹⁸³ Keller, *A Feeling for the Organism*, 9.

¹⁸⁴ *Ibid.*, 199.

¹⁸⁵ Midgley, *The Myths We Live By*, 145.

¹⁸⁶ *Ibid.*, 143.

¹⁸⁷ *Ibid.*, 144.

¹⁸⁸ Midgley, *Evolution as a Religion*, 25.

useful, as it does help us understand part of the world, but not all of it.¹⁸⁹ Indian expert on Hinduism Varadaraja V. Raman argues that, in Hinduism, reality can be grasped via science and via the ‘mystical mode’ (meditation, prayer, yogic exercises).¹⁹⁰ There are multiple ways to truth, not only reason and experiments but also reflection and inner transformation. This world can be described in many different ways and different ways of gaining knowledge are valid.¹⁹¹ In fact, the different approaches are considered necessary for understanding the world, because it looks different from different perspectives – just as Nietzsche argues.

Consequently, different methods are necessary for answering different types of questions. Jaeshik calls western thinking ‘substantive thinking’, as even the why-questions are answered with what-answers.¹⁹² For example, many scientists would answer the question of why we care for our children with an answer like ‘evolution made us, since the genes of people who did survive’. Why-questions are answered with causes rather than reasons. This question could also be answered with a reason: ‘because it is the right thing to do’, a reason which could be further substantiated by moral arguments.

In science, answers are almost always explanations in the form of causes, rather than reasons. Jaeshik argues that this difference is connected with the difference between the East-Asian changeology and the western ontology I discussed earlier. In western thinking the basis of reality is what *is*, which makes it sensible to answer all questions with what-answers. In East-Asian thinking the basis is change, what happens rather than what is, which makes the exact physical cause of something less primary. Raman argues that, while science can’t answer why-questions, Hinduism does give answers.¹⁹³ It is important to stress that Jaeshik doesn’t argue that the what-answers of science are wrong. “All of these explanations make sense at their own level. Moreover, all can coexist without contradicting or competing with one another. Taken together they constitute a richer explanation than any provides by itself.” Multiple routes of explanation are seen as necessary to understand something. In Hinduism, the study of the world around, astronomy, medicine and such, are considered equally important as the study of consciousness and experience.¹⁹⁴ Deloria stresses that Native Americans are also open to many different kinds of sources of knowledge:

no data are discarded as unimportant or irrelevant. Indians consider their own individual experiences, the accumulated wisdom of the community that has been gathered by previous generations, their dreams, visions, and prophecies, and any information received from birds, animals, and plants as data that must be arranged, evaluated, and understood as a unified body of knowledge.¹⁹⁵

Many scientists (inspired by or under the pressure of scientism) believe that one way of knowing is enough to understand the whole world. For example, many scientists believe that a

¹⁸⁹ Gregory Cajete, *Native Science: Natural Laws of Interdependence* (Santa Fe: Clear Light Publishers, 2000), 3.

¹⁹⁰ Varadaraja V. Raman, “Traditional Hinduism and Modern Science,” in *Bridging Science and Religion*, ed. Ted Peters and Gaymon Bennett (Minneapolis: Fortress Press, 2003), 191-192.

¹⁹¹ Menon, “Hinduism and Science,” 11.

¹⁹² Jaeshik, “Mapping One World,” 212.

¹⁹³ Raman, “Traditional Hinduism and Modern Science,” 190.

¹⁹⁴ Menon, “Hinduism and Science,” 14-15.

¹⁹⁵ Deloria, *Spirit & Reason*, 66.

'science of consciousness' will eventually be devised, derived from the existing sciences, making consciousness fit in the scientific paradigm as it is.¹⁹⁶ Not only do people with different ways of understanding the world believe that one method is not sufficient to understand the whole world, many believe it is impossible to gain a complete understanding of the world. As Jiang Sheng, expert on Daoism, explains:

The Dao is the totality of all possibles and all impossibles, all knowns and all unknowns. The Dao presents itself everywhere. As the source of our existence, the Dao, or the mother of the universe, is forever beyond the ability of our limited mentalities to capture conceptually.¹⁹⁷

In this understanding, the world is in principle not completely knowable by humans. Indigenous Tanzanian philosopher Raymond Sambuli Mosha explains that the Chagga people of Tanzania have the concept of an 'Eternal Divine Mystery': this mystery creates everything that exists and is principally incomprehensible, "so rich in meaning that it cannot be fully understood."¹⁹⁸ As one of the Blackfoot argues: "The white people, they try to break down everything. Everything is broken down too much. Everything has to have logic. If it doesn't have an explanation, if you cannot explain it, they don't care; they don't believe in it if they cannot explain it. I refer to the great mystery, to the legends, sacred stories - that is something that they cannot do anything about."¹⁹⁹ Minh-ha writes about how differently her people look at what they know (which is located in stories): "the story's (in)finitude subverts every notion of completeness and its frame remains a non-totalizable one."²⁰⁰ Many indigenous people see it as inherently impossible to understand the world completely, whereas there are plenty of scientists who hold that science is in principle able to explain everything that happens in the world. Native American Oglala Lakota activist Russell Means has argued that this optimism has to do with seeing humanity as in a hierarchical relationship with nature, as western people see themselves as Gods, rather than as part of the natural world. He warns the western world for the possible consequences of ignoring what is not understood, stating that "there are forces beyond anything the European mind has conceived."²⁰¹ Western people are not humble enough; they don't follow the harmony of nature because they believe they know enough about it to be able to control it. This arrogance is dangerous.

¹⁹⁶ Midgley, *Science and Poetry*, 9.

¹⁹⁷ Jiang Sheng, "Daoism and the Uncertainty Principle," in *Global Perspectives on Science and Spirituality*, 84.

¹⁹⁸ R. Sambuli Mosha, "The Inseparable Link Between Intellectual and Spiritual Formation in Indigenous Knowledge and Education: A Case Study in Tanzania," in *What is Indigenous Knowledge? Voices from the Academy*, ed. Ladislaus M. Semali and Joe L. Kincheloe (New York: Falmer Press, 2002), Taylor & Francis e-Library, 211.

¹⁹⁹ Bastien, *Blackfoot Ways of Knowing*, 104.

²⁰⁰ Minh-ha, *Woman, Native, Other*, 4.

²⁰¹ Russell Means, "For America to live, Europe must die," transcribed speech, The Anarchist Library, <http://theanarchistlibrary.org/library/russell-means-for-america-to-live-europe-must-die.pdf> (accessed July 24, 2018), 6.

8. Knowing

I have discussed how the complexity of the world (partly) determines which methods are used for gaining knowledge. In this section I will get further into these different ways. Firstly, in science, it is often believed that knowledge comes from empirical evidence. However, as Deloria argues, the greatest thinkers in Western science gained their insights in a dream or a vision, rather than through looking at data.²⁰² Whereas dreams and visions are often regarded illusory or delusive in science, they do play a role in gaining knowledge.

In East-Asian traditions, the subjective experience, which is usually excluded from science, is central. East Asian traditions are part of the ‘thinking-experiencing paradigm’, as Menon calls it.²⁰³ Gaining knowledge is not something separated from the rest of life. Thinking and experiencing are fundamentally connected and ways of knowing and ways of living are one. This also means that, in East Asian traditions, great importance is given to the way of living a tradition prescribes. Lin et al. explain that, in Confucian epistemology, through becoming a better person (ethically) one gains knowledge. One can learn from this inner transformation – which is ultimately connected to all that exists. Similarly, Deloria explains, Native American people who take part in the Western system of learning, become troubled emotionally, because in the Western world, knowledge is detached from personal development. Native Americans, on the other hand, see personal development as something that makes knowledge possible.²⁰⁴ Knowing and acting are integrated.²⁰⁵ As Menon explains, “The understanding of a particular school of thought will not be fulfilled by ‘understanding’ its epistemology or even worldview but by following a lifestyle that is prescribed. Experience is the core of understanding.”²⁰⁶ Bastien writes something very similar when discussing a Blackfoot ceremony:

“My cousin, Leonard Bastien, who is one of the Kaaahsinnooni, told me, ‘It does not matter if you do not understand what is going on; come anyway.’ [...] I interpret this to mean: if you begin seeking the cosmic alliances in the teachings of the ancestors, then the understanding will come through participation.”²⁰⁷

In this ceremony, knowledge is supposed to come through transformation and participation, rather than through rational deliberation. As Native American philosopher Lee Hester describes, John Proctor, the oldest living Creek medicine man, once said “If you come to the stompground for four years, take the medicines and dance the dances, then you are Creek.”²⁰⁸

Knowledge from experience is also very central for many women, feminists argue. For example, for many women, giving birth “initiates an epistemological revolution,” and is

²⁰² Deloria, *Spirit & Reason*, 67.

²⁰³ Menon, “Hinduism and Science,” 11.

²⁰⁴ Deloria, *Spirit & Reason*, 139.

²⁰⁵ Lin et al., “Developing a Spiritual Research Paradigm,” 151-152.

²⁰⁶ Menon, “The Puzzle of Consciousness and Experiential Primacy: Agency in Cognitive Sciences and Spiritual Experiences,” in *Global Perspectives on Science and Spirituality*, 11.

²⁰⁷ Bastien, *Blackfoot Ways of Knowing*, 97.

²⁰⁸ Lee Hester and Jim Cheney, “Truth and Native American epistemology,” *Social Epistemology* 15, no. 4 (2001), 327.

considered their most important learning experience.²⁰⁹ Feminist professor Mary Field Belenky et al. suggest that this is because parents have to reassess themselves as knowers when they assume the responsibilities of childhood. Many women also consider grandmothers and mothers, with a lot of life experience, experts, rather than people who have studied in universities.²¹⁰ The practice of midwifery is an example of a practice in which women's ways of knowing used to be dominant. Midwives usually knew what it was like to give birth. They had first-person experience of it, whereas male doctors don't. As Dalmiya and Alcoff write:

“[A] crucial aspect of a midwife's skill was her capacity to be empathetic and sensitive to the situation of her patients as well as to allay their fears and inspire them to have forbearance and hope. This was possible in part because midwives relied so heavily on their personal experience of childbirth.”²¹¹

Today there are still many male doctors who have never experienced childbirth themselves, helping women give birth. This shows that first-person knowledge is not taken to be crucial in science. Sometimes it seems even as if it is the opposite, as female obstetricians have been discredited as 'soft' when they use this type of knowledge.²¹²

Dalmiya and Alcoff argue that most of traditional women's knowledge has been experiential knowledge and has therefore been discredited. “Traditional women's beliefs—about childbearing and rearing, herbal medicines, the secrets of good cooking, and such [...] are considered to be mere tales or unscientific hearsay and fail to get accorded the honorific status of knowledge.”²¹³ One of the reasons traditional women's knowledge has not been taken seriously, is because, in professional philosophy, knowledge has long been thought to fit in the scheme “S knows that p”, where S is a knower and p is a proposition.²¹⁴ This leaves no room for experiential knowledge. It implies that, for example, knowing how to hold a newborn or how to tell from its manner of crying what it needs, doesn't count as knowledge. Traditionally, women have been experts in domains in which knowledge is not learnt from books, but by observing, participating and practicing.²¹⁵

Influential early Daoist master Zhuang Zi (370-287 BC) has written a story about how knowledge can't be learnt from just reading books. In this story a wheelwright asks Duke Huan (ruler of the state of Qi) what he is reading. Huan replies that he is reading the words of long dead sages. “In that case, what you are reading there is nothing but the chaff and dregs of the men of old,” the wheelwright says.²¹⁶

“I look at it from the point of view of my own work. When I chisel a wheel, if the blows of the mallet are too gentle, the chisel slides and won't take hold. But if they're too hard, it bites in and won't budge. Not too gentle, not too hard— you can get it in your

²⁰⁹ Mary Field Belenky et al., *Women's Ways of Knowing: The Development of Self, Voice, and Mind* (New York: Basic Books, 1997), 35.

²¹⁰ *Ibid.*, 60.

²¹¹ Dalmiya and Alcoff, “Are ‘Old Wives’ Tales’ Justified?”, 225.

²¹² *Ibid.*, 229.

²¹³ *Ibid.*, 217.

²¹⁴ *Ibid.*, 220.

²¹⁵ *Ibid.*, 221.

²¹⁶ Sheng, “Daoism and the Uncertainty Principle,” 86.

hand and feel it in your mind. You can't put it into words, and yet there's a knack to it somehow. I can't teach it to my son, and he can't learn it from me. So I've gone along for seventy years and at my age I'm still chiselling wheels. When the men of old died, they took with them the things that couldn't be handed down."²¹⁷

The story shows that, to truly know something, one has to experience it by themselves. Words can't convey the actual experience of understanding something. First-person experience is necessary for knowledge.

²¹⁷ Ibid.

9. One with the world

There is yet another way of knowing which I have not yet described in, because it is useful to dive deeper into what it can tell us about different ways to understand the world. This section will add to a few different subjects which I have investigated in previous sections.

Many historians have tried to answer the question of why modern science arose in the West, and not in India or China. This question seems to suppose that East-Asia is, in a way, lagging behind the West. However, while science was studying objects (from a third-person point of view) in the West, in East-Asia a lot more effort was put into studying the world from the first-person point of view. One might also ask why, in the West, introspection has not been developed into a tradition of gaining first-person knowledge. While, in the West, introspection is regarded unreliable, in Buddhism and Hinduism, it is seen as fundamental for gaining knowledge.²¹⁸ Many East-Asian traditions focus on understanding the self from the inside, from the first-person perspective, rather than from the outside, as an object, from the third-person perspective. In Buddhism, an elaborate system, of which meditation is an important part, has been developed to reach another state of consciousness: ‘transcendent consciousness’.²¹⁹ Interestingly, it is from this perspective that influential figures in East-Asian traditions have gained an understanding of the world as not consisting of dichotomies, such as the subject/object dichotomy. As Ho writes, the Upanishadic thinkers claimed to have reached [...] a no-thought zone of consciousness in which the knower and the known become one.²²⁰ This idea is also present in indigenous traditions. Bastien writes: “As a result of experiencing the universe as an integral whole, the knower becomes one with the known. In this way one intuitively knows what it is to be the other, because the other is an extension of oneself.”²²¹ Knowledge comes from the merging of knower and known.

The subject/object dichotomy is one of the most central ones in science. It plays a large role in the conception of knowledge. As we have seen, there is a strict distinction between the knower (active) and the research object (passive), and they are in a hierarchical relationship. East-Asian traditions aren’t based on this dichotomy, which gives them very different ways of understanding the world. As I wrote before, many Western thinkers have (had) as a goal to come up with an ontology: an account of what there is in the world. However, as Japanese philosopher Hōsaku Matsuo writes, this means that they start with the idea that ‘being’ is “something which confronts me as an object, which stands apart from me as I think it.”²²² To the western mind, consciousness is so self-evident, that it is not investigated: it is objects that are investigated, from a third-person perspective. East Asian traditions, however, have focussed on the self, our consciousness, the primary thing we experience.²²³

Irigaray writes something very similar about how scientists look at the world: “They posit a world in front of them, in the form of a model [...], and then claim to be ‘rigorously foreign’ to this model.”²²⁴ The instrument which is used to investigate the object separates it

²¹⁸ Menon, “Hinduism and Science,” 8.

²¹⁹ Ho, “Selfhood and Identity,” 122.

²²⁰ Ho, “Selfhood and Identity,” 125.

²²¹ Bastien, *Blackfoot Ways of Knowing*, 97.

²²² Hōsaku Matsuo, *The Logic of Unity: The Discovery of Zero and Emptiness in Prajñāpāramitā Thought*, trans. Kenneth K. Inada (Albany: State University of New York Press, 1987), 7.

²²³ *Ibid.*, 6.

²²⁴ Irigaray, “Is the Subject of Science Sexed?” 61.

from the subject. However, the model itself is created by the subject, which means that the subject can't be excluded from what it investigates.²²⁵ As Little Bear writes: "Mathematics is superimposed on nature like a grid, and then examined from that framework."²²⁶ It is projected onto it, but in science, it is thought that the framework is the object.

Seeing object and subject as strictly separated may still be very productive in some sciences. Sometimes, however, it hinders science. Like many feminists, Fee argues that in a feminist 'science' "no rigid boundary separates the subject of knowledge (the knower) and the natural object of that knowledge."²²⁷ She protests against science in which this is the case. Keller argues that the reason McClintock was able to gain as much knowledge about the organisms she studied as she did, because she came so close to them. She gained 'intimate knowledge' of her organism, through years of close association with it.²²⁸ She knew her plants so well, that she could gain "a feeling for the organism": she could empathize with it.²²⁹ According to McClintock, "[y]ou need to know those plants well enough so that if anything changes, [...] you can look at the plant and right away you know what this damage you see is from something that scraped across it or something that bit it or something that the wind did."²³⁰ When she came close enough, she was able to interpret the plants right away. There are more women in science who made big discoveries by coming close to what they researched. See, for example, English Primatologist Jane Goodall, who changed the model for ethology research, by closely observing chimpanzees in their natural environments and interacting with them.²³¹

Barad has argued for 'agential realism' as a model to understand quantum physics, in which the subject/object distinction disappears. She has based her theory on Niels Bohr's 'philosophy-physics'.²³² As I wrote before, in science, objects are usually taken to have intrinsic properties. Measurement is taken to be transparent, as it reveals the characteristics of the autonomous world. The observer (subject) and object are taken to be physically and conceptually separated. However, in quantum physics, it is impossible to determine what the 'inherent properties' of an object are, because the process of measuring the state affects the measurement.²³³ This means that the measurement (apparatus) is always part of that which is being measured. Barad concludes that what is measured is not an independent reality, as we are involved in it ourselves.²³⁴ What is measured is not an independent object, but a 'phenomenon', a single situation with no inherent distinction between an object and an observer. There is only a distinction between what is measured and what does the measuring, which is created by the apparatus which is used, and which creates the very phenomenon it measures. What is measured and what the theories based on these measurements are about, is

²²⁵ Ibid.

²²⁶ Little Bear, foreword to *Native Science*, ix.

²²⁷ Fee, "Critiques of modern science," 47.

²²⁸ Keller, *A Feeling for the Organism*, 198.

²²⁹ Ibid.

²³⁰ Ibid.

²³¹ Meg Greene, *Jane Goodall: A Biography* (Westport: Greenwood Press, 2005), xi-xii.

²³² Barad, "Meeting the Universe Halfway: Realism and Social Constructivism without Contradiction," in *Feminism, Science, and the Philosophy of Science*, ed. Lynn Hankinson Nelson and Jack Nelson (Dordrecht: Kluwer Academic Publishers, 1996), 165.

²³³ Ibid., 169.

²³⁴ Ibid., 170.

our participation within nature.²³⁵ That does not mean the phenomena are interactions of us and an independent reality. Barad argues: “Reality is not composed of things-in-themselves or things-behind-phenomena, but things-in-phenomena.”²³⁶ She calls these phenomena ‘intra-actions’, as it is them which create what measures and what is measured.²³⁷ The phenomena are not illusions, behind which an independent reality exists, but the reality which we take part in. This way of understanding the world is influenced by scientific discoveries, but is different from how most scientists view the world, although quantum mechanics has led many scientists to question the subject/object dichotomy.

The idea that, trying to gain knowledge of something, we influence it, is shared by people from different traditions. Deloria for example, writes that in science, “we may elicit and force secrets from nature, but it is only answering the specific questions we ask it.”²³⁸ Applying ‘brute force’, trying to gain knowledge by interfering, impacts the entity which is investigated. Measurement itself shapes the ‘object’ which is measured. Sheng also refers to quantum physics to explain Zhuang Zi’s Daoism. Zhung Zi wrote: “The Way [Dao] cannot be heard; heard, it is not the Way. The Way cannot be seen; seen, it is not the Way. The Way cannot be described; described, it is not the Way.”²³⁹ In Daoism, it is thought that people can’t actively grasp the world, because by doing this, they affect it. As there is no object/subject distinction in Daoism, the world can only be grasped through ‘keeping the Oneness with it’.²⁴⁰ Rather than trying to gain knowledge of seemingly separate objects around us, we should try to become one with the world, to really understand it.

However, this does not mean that, in Daoism, there exists the kind of ‘independent’ reality beyond the phenomena, which Barad criticizes. As Xia explains, the *Dao* is not separated from the appearances. In the West, on the other hand, reality has often been seen as dualistic, the phenomena around us on Earth being mere appearances or illusions and the ‘true’ reality being located somewhere else.²⁴¹ The opposite of *Dao* is *wu* (the things/matter). “Wu is transient, Dao is eternal; wu is structured, Dao is shapeless; wu involves distinct objects, Dao permeates all; wu is many, and Dao is one.”²⁴² As in yin-yang thinking, *Dao* and *wu* are inseparable, forming each other, existing through each other. As Xia explains: “One can also think of these opposites as poles along an ontological continuum. In this perspective, they are joined in space, as simultaneous aspects of a unified reality. In that sense, wu is like matter, Dao is like energy, and Dao is wu just like matter is energetic.”²⁴³ The things around us are equally real as the *Dao*, which can’t be actively grasped and the *Dao* is in everything. As Zhuang Zi writes: “there’s no place where it is not present; even ants, the panic grass, tiles and shards have the Dao.”²⁴⁴

Similarly, in Buddhism, in introspection, spiritual experiences are not experiences in another world, beyond the ordinary world – though this is often how it is understood in the

²³⁵ Ibid., 175.

²³⁶ Ibid., 176.

²³⁷ Ibid., 179.

²³⁸ Deloria, *Spirit & Reason*, 236.

²³⁹ Sheng, “Daoism and the Uncertainty Principle,” 76.

²⁴⁰ Ibid., 84.

²⁴¹ Xia et al., “A Daoist response to climate change,” 199.

²⁴² Ibid., 198.

²⁴³ Ibid.

²⁴⁴ Ibid., 199.

West. A spiritual experience, Menon argues, is simply an experience from another point of view.²⁴⁵ The ordinary 'self' is transcended, which creates a different type of experience.

²⁴⁵ Menon, "The Puzzle of Consciousness," 12.

10. Human knowledge

Whereas, in science, the goal is usually to understand an independent, 'objective' reality, in other traditions I have discussed this is different. If we understand ourselves as inseparable from the world around us, we are always part of what we investigate ourselves. In this section I will investigate how this difference influences how we think about knowledge.

If we take ourselves to be inseparable from the rest of the world, our knowledge of the world is never 'objective' in the sense that it is not dependent on the subject. It is never just about something outside of us, but always (also) about us, the subject. This means that, rather than 'objective', knowledge becomes very 'human'. Human knowledge, in this sense, is not independent from the subject, on the contrary. That is why Lee Maracle, indigenous Canadian writer, writes: "It takes a lot of work to delete the emotional and passionate self from story, to de-humanize story into 'theory'. So we don't do it."²⁴⁶ Whereas, in science, abstract knowledge is often seen as superior to particular knowledge, indigenous people do not see abstraction as preferable if that means the knowledge becomes less relatable for humans.

When knowledge is understood as something that must be independent from the subject, emotions are problematic for understanding the world. When knowledge is seen as human, there is room for emotion. Both McClintock and Goodall saw emotion as necessary for understanding other organisms.²⁴⁷ In a biography on Goodall, Meg Greene describes how, through months of close observation, she discovered that chimpanzees are much more intelligent, have much richer mental lives and are much more like humans than scientists used to think. Greene argues that "through her work, Goodall brought a woman's touch, a view that emphasized relationships rather than rules, to be receptive rather than controlling, to be empathetic instead of objective."²⁴⁸ She emphasized with the chimpanzees, created relationships with them and described what she saw and felt when she observed them, rather than writing about measurements and using technical terms.²⁴⁹ Goodall believed it was not necessary and even undesirable to be objective and that feeling empathy for what you are observing can help you understand them.²⁵⁰

In science, knowledge is limited to the rational, unemotional part. Again, the splitting into parts of human beings plays an important role. The scientist is expected to be 'objective' in the sense of 'unemotional' and 'impartial'. Knowledge should be looked for purely for the sake of gaining knowledge and other motives disturb the objectivity of science. In indigenous research, however, typically there is a motive for gaining knowledge, which is not gaining knowledge itself and which involves emotions. Indigenous professor Eber Hampton, writes: "Emotionless, passionless, abstract, intellectual research is a goddam lie, it does not exist."²⁵¹ He argues that, while in science this impartiality is fundamental, in practice it does not exist, which means that, in fact, scientists' emotions do guide them in their knowing.

When knowledge is seen as human, it is not seen as universal, because it is acknowledged that knowledge is dependent on the knower. Rather than being universal,

²⁴⁶ Rauna Kuokkanen, "Towards an 'Indigenous Paradigm'," 421.

²⁴⁷ Keller, *A Feeling for the Organism*, 199; Greene, *Jane Goodall*, 60.

²⁴⁸ *Ibid.*, xii.

²⁴⁹ *Ibid.*, xiii.

²⁵⁰ *Ibid.*, 60.

²⁵¹ Wilson, "Progressing Toward an Indigenous Research Paradigm," 171.

knowledge is seen as belonging to a specific community.²⁵² The Kwara'ae of Malaita Island of the Solomon Islands understand knowledge as something that is so entrenched in the community that it can't be detached from it and understood and used by another community.²⁵³ Minh-ha describes how knowledge, in the form of a story, is not possessed by anyone personally: "the story circulates like a gift; an empty gift which anybody can lay claim to by filling it to taste, yet can never truly possess."²⁵⁴ The individuals in the community use and influence the story, but no person can decide where the story goes by themselves. As Minh-ha writes, "my story, no doubt, is me, but it is also, no doubt, older than me."²⁵⁵ Knowledge is always shared by a group and the knowledge is dependent on the group, as "[t]he story depends upon every one of us to come into being. It needs us all, needs our remembering, understanding, and creating what we have heard together to keep on coming into being."²⁵⁶ The story doesn't allow something like 'objective knowledge' to be conceivable. In feminist epistemologies it is also acknowledged that a community is crucial for creating knowledge.²⁵⁷ Belenky et al., for example, have argued that 'gossip', which is often dismissed as superficial, is actually a form of 'connected knowledge', knowledge which belongs to a group rather than to an individual.²⁵⁸

Human knowledge can't be separated from the people who have created it, or from the place in which the knowledge has evolved. The knowledge is a map, which orients people in life.²⁵⁹ Native American professor Gregory Cajete describes the Native way of knowing as shaped by the human experience with the world: "native science is born of a lived and storied participation with the natural landscape."²⁶⁰ It is "the collective heritage of human experience with the natural world; in its most essential form, it is a map of natural reality drawn from the experience of thousands of human generations."²⁶¹ As Hester argues, both in the West and among native Americans, maps are used to describe the world around us. However, western belief implies a correspondence between the map and 'territory', while Native Americans are agnostic about the relationship of their map and the territory. That is because it is meant to be action guiding, rather than as 'accurate' or 'true'.²⁶² The knowledge of native people is located in guiding stories. That is because the purpose of knowledge, is to find a "proper road along which, for the duration of a person's life, individuals were supposed to walk," Deloria explains.²⁶³

When knowledge is understood as being knowledge of our human experience in the world, it is knowledge of a relationship between us and something else, rather than about a thing. This type of knowledge is called *relational knowledge*. In a holistic way of understanding

²⁵² Bastien, *Blackfoot Ways of Knowing*, 77.

²⁵³ Gegeo et al., "How we Know," 62.

²⁵⁴ Minh-ha, *Woman, Native, Other*, 2.

²⁵⁵ *Ibid.*, 123.

²⁵⁶ *Ibid.*, 119.

²⁵⁷ Nancy Tuana, "Revaluing Science: Starting from the Practices of Women," in *Feminism, Science, and the Philosophy of Science*, 18.

²⁵⁸ Belenky et al., *Women's Ways of Knowing*, 166.

²⁵⁹ Cajete, *Native Science*, 74.

²⁶⁰ *Ibid.*, 2.

²⁶¹ *Ibid.*, 3.

²⁶² Hester and Cheney, "Truth and Native American epistemology," 329.

²⁶³ Deloria, *Spirit & Reason*, 46.

the world our knowledge is dependent on our relationships with the world around us, just like our identity is (6).²⁶⁴ The Blackfoot think of the identity of humans as dependent on their relationships with everything around them, knowing who you are is “knowing one’s place in the universe.”²⁶⁵ This relational understanding of knowledge is also present in East-Asian traditions. As I wrote earlier, when knowledge is gained through meditation, this is explicitly described as the knower and known becoming one. As Lin et al. write, knowledge comes from understanding our connection to the world.²⁶⁶ It can be argued that, when one sees the subject and object as strictly separated, knowledge is also dependent on a relationship. However, what is meant with the term ‘relational knowledge’ is not just knowledge which is dependent on a relationship, but knowledge about a relationship.

When knowledge is understood as essentially relational, it is usually not seen as belonging to an individual. Bastien describes that, for the Blackfoot, humans are not the sole creators of ‘their’ knowledge. As Bastien explains: “The land, animals, and spirits are not separate but an integral part of the Siksikaititapi world. They, too, are the source of science and knowledge.”²⁶⁷ Knowledge comes through alliances with other entities in the world. After all, when people use herbs for healing, it is not the people themselves who know exactly what happens in the body that heals the person. The herbs and the people together have the knowledge of how to heal someone: “healing is not a given but is dependent upon the relationships of gifts given by the alliances.”²⁶⁸ Knowledge also comes through alliances with animals. For example, the Blackfoot are “dependent upon animals for guidance and protection. The animals are helpers because they possess a powerful source of knowledge and wisdom. Their behaviour, if observed carefully, will reveal many secrets of balance and harmony.”²⁶⁹

Scientists, on the other hand, usually think about knowledge as something which belongs to them, which *they* have gained through examining the world around them. If a scientist made a discovery after closely examining the behaviour of an animal, they would still consider it *their* discovery. The Blackfoot, instead, see knowledge as something that flows from the relationships between humans and the world around them, in which multiple entities play an active role and are respected. As Opaskwayak Cree scholar Shawn Wilson, argues, in indigenous worldviews knowledge is always relational.²⁷⁰ It is created when two entities meet, when they get to *know* each other.

In science, knowledge can be owned by an individual, and is knowledge of a world independent from the human subject. American feminist philosopher Nancy Tuana traces back this conception of knowledge to René Descartes. He argued that the only way to gain true knowledge is alone, without any influence from other people, culture in general and the body (emotions, desires).²⁷¹ In science, just as people are considered primarily individuals, rather than part of a collective, knowledge is also seen as individual and detached from culture.

²⁶⁴ Mathews, “The dilemma of dualism,” 61.

²⁶⁵ Bastien, *Blackfoot Ways of Knowing*, 95.

²⁶⁶ Lin et al., “Developing a Spiritual Research Paradigm,” 157.

²⁶⁷ Bastien, *Blackfoot Ways of Knowing*, 82.

²⁶⁸ *Ibid.*, 83.

²⁶⁹ *Ibid.*, 93.

²⁷⁰ Wilson, “Progressing Toward an Indigenous Research Paradigm,” 176-177.

²⁷¹ Tuana, “Revaluing Science,” 18.

11. Truth

When knowledge is understood as human and relational, this has consequences for how one thinks about truth. In this section I will go into different ways of understanding truth and what knowledge is for.

Since many indigenous peoples see knowledge as something which describes their relationship with the world, it can be expressed with many other things than just facts or theories. As Cajete explains, “cultural stories of origin are creative interpretations of the experience of a people in participation with places. Literal fact is woven with metaphoric meaning.”²⁷² Western people have a tendency to think the stories of native peoples are ‘incorrect’ or ‘untrue’. However, Hester argues that truth is not as central in indigenous cultures as it is in western thinking, where it is extremely important. Cajete explains:

Just think about how you would characterize different philosophical schools, or different genres in the Euro-American philosophical tradition. This school believed this... the central tenets of that school were... this famed philosopher thought that ... Beliefs, beliefs, beliefs. Indeed, in the Euro-American philosophical tradition, it is unclear how one would go about doing epistemology at all without belief.²⁷³

In science, knowledge is always connected to belief, a belief that something is true. For example, when western anthropologists describe the ‘religion’ of native people, they often call them ‘animists’, which means that they *believe* that everything has spirit – something these anthropologists don’t consider *true*.²⁷⁴ Deloria argues against this description:

“The problem with that type of analysis is that it is not an article of faith in any Indian religion that everything has spirit. [...] It is not an article of faith; it is part of human experience. I think that non-Indians sometimes experience this also when they are in natural environments.”²⁷⁵

The western observers project their own tendency towards creeds, doctrines and dogmas on the indigenous people. Native peoples aren’t that focussed on truth. Most Native Americans don’t record history by keeping a record of what happened when, though they do tell many stories about the past. The stories start with something like ‘It was a long time ago...’ as the story itself is considered important, not the exact time when it happened.²⁷⁶ When tribes came together in social events, Deloria explains, they recited their stories and different accounts of the past were accepted, because what had factually happened didn’t matter that much to them.

However, there is also an important sense in which the stories of indigenous peoples are ‘true’. Minh-ha argues against the idea that that story is the ‘tool of primitive man’.²⁷⁷ It is often placed opposite to history, where history is considered to be about facts and truth, and

²⁷² Cajete, *Native Science*, 75.

²⁷³ Hester and Cheney, “Truth and Native American epistemology,” 327.

²⁷⁴ Deloria, *Spirit & Reason*, 224.

²⁷⁵ Ibid.

²⁷⁶ Ibid., 290.

²⁷⁷ Minh-ha, *Woman, Native, Other*, 119.

story is consigned “to the realm of tale, legend, myth, fiction, literature.”²⁷⁸ Minh-ha notes that, in science, there is only place for the factual, which is considered true, and not for the fictional, which is considered not true or even false. In story, Minh-ha argues, fact and fiction are not mutually exclusive, as stories contain facts about what has happened, but also a different kind of truth: truth about human nature.²⁷⁹ Stories which are not true are not always simply ‘lies’. Scientists have argued that ‘primitive people’ have attempted to explain what they don’t understand through stories, but have failed because of their limited knowledge. However, Minh-ha argues, stories are not attempts at factual descriptions. Stories have many uses: they don’t only contain facts and ideas about how nature works, but they also make people laugh and cry, they contain the identity of a people and they combine what in the western world would be called literature, religion and philosophy (including ethics) in one.²⁸⁰

Indigenous peoples often consider oral tradition to be a better way of preserving and communicating this human knowledge than the written word. However, as Smith argues, in the western understanding of the world, history begins where literacy starts and “[e]verything before that time is designated as prehistorical, belonging to the realm of myths and traditions.”²⁸¹ Ethiopian indigenous philosopher Teodros Kiros explains that, in the western world, philosophy is taken to be necessarily written, which implied that Africa had no history of philosophy, as African thinking is traditionally oral.²⁸² It is no coincidence that in science literacy is used for determining how developed a society is. In science, written text is usually taken to be superior, more trustworthy, than oral tradition.²⁸³

However, in many indigenous cultures oral knowledge is valued much more than written knowledge. Their history is stored “within genealogies, within the landscape, within weavings and carvings, even within the personal names that many people carried.”²⁸⁴ Scientists have categorized this knowledge as ‘tradition’ rather than ‘history’, which means that they are not seen as valuable sources of knowledge.²⁸⁵ Professor of religion Vasudha Narayanan explains that this attitude of the Western world has also influenced Hinduism. Philosophical works, like the Upanishads, have played quite a limited role in the development of Hinduism. She writes:

Dharma is all-important in Hindu communities, but the texts that define and discuss *dharma* were known only by a handful of Brahman men. Instead, notions of *dharma* were communicated through stories from the epics and Puranas, and such moral tales were routinely retold by family or village elders.²⁸⁶

²⁷⁸ Ibid., 120.

²⁷⁹ Ibid.

²⁸⁰ Ibid., 119.

²⁸¹ Smith, *Decolonizing Methodologies*,” 31.

²⁸² Teodros Kiros, “An Interpretative Introduction to Classical Ethiopian Philosophy,” in *The Palgrave Handbook of African Philosophy*, ed. Adeshina Afolayan and Toyin Falola (New York: Palgrave Macmillan, 2017), 181.

²⁸³ Wilson, “Progressing Toward an Indigenous Research Paradigm,” 173.

²⁸⁴ Smith, *Decolonizing Methodologies*,” 33.

²⁸⁵ Ibid.

²⁸⁶ Vasudha Narayanan, “Water, Wood, and Wisdom: Ecological Perspectives from the Hindu Traditions,” *Daedalus* 130, no. 4 (2001), 182.

Only after colonization by the British, Hindus started to rely on texts and only after the “intellectual colonization by the West” have Hindus started to think of texts as authoritative.²⁸⁷ The study circles on the *Bhagavadgita* are the result of this recent development.

Dalmiya and Alcoff argue that the negative characterization of oral tradition has not only been used to delegitimize the knowledge of non-Western cultures, but also that of women within Western culture. As I discussed before, women’s experiential knowledge has often not been taken seriously and midwifery has often been characterized as ‘primitive’. When male obstetricians took over the domain, this was justified by reasons such as that “midwives were ignorant and uneducated and, having learnt their vocation through “hearsay,” were unreliable.”²⁸⁸ ‘Hearsay’ is a telling term: women are discredited for believing and repeating what other women before them have heard and said. However, relying on the body of knowledge accumulated by experts is exactly what many scientists do. In all knowledge traditions the ideas of previous generations are an important source of knowledge. The knowledge of midwives, however, was not (or rarely) written down, whereas scientists did write.²⁸⁹ In science, the written word is trusted more than the spoken word.

Somali-Canadian sociologist Ali A. Abdi argues that written text should not be a replacement of orality and discusses the differences between the two forms of communication and the benefits of orality.²⁹⁰ Whereas written text is detached and depersonalized (which may also have benefits), orality brings people together. In speech, emotions have a more prominent place than in written text, which means that more can be conveyed through speech. Also, orality is multidirectional while written text is one way communication. A benefit of orality is that someone trying to communicate something can get to know the person(s) they are communicating with and adapt their words to them. Learning can happen on both sides of the communication, since there is an immediate exchange of ideas, whereas people writing texts will only get a reply to their ideas after they finish writing them down. This way of learning may be characterized as reciprocal. Abdi concludes that the value societies attach to either oral or written communication, reflects their ways worldview. For example, he argues that oral societies are more “willing to understand the needs of the Other” and “more attuned to the possibilities of colearning”.²⁹¹ In 1980, Means gave a speech in which he criticized, among other things, writing. As I wrote before, the West has used writing to create an image of non-Western cultures as primitive, and discredit their knowledge. The speech has been written down by others, which Means had allowed, because “it seems that the only way to communicate with the white world is through the dead, dry leaves of a book.”²⁹² Means calls written text dead, as it is removed from the spoken relationships of actual people. Minh-ha explains why one might consider written text dead. She writes:

In this chain and continuum, I am but one link. The story is me, neither me nor mine. It does not really belong to me, and while I feel greatly responsible for it, I also enjoy

²⁸⁷ Ibid., 182.

²⁸⁸ Dalmiya and Alcoff, “Are ‘Old Wives’ Tales’ Justified?”, 223.

²⁸⁹ Ibid., 224.

²⁹⁰ Ali A. Abdi, “Clash of Oralities and Textualities: The Colonization of the Communicative Space in Sub-Saharan Africa,” in *Indigenous Knowledge and Learning*, 148.

²⁹¹ Ibid., 148.

²⁹² Russell Means, “For America to live, Europe must die,” 1.

the irresponsibility of the pleasure obtained through the process of transferring. Pleasure in the copy, pleasure in the reproduction.²⁹³

Stories change through time, not because the truth is forgotten, but because they belong to the people who tell them and change with them. Truth itself, then, is not static, but changing, as it depends on the people who know it. One may be more inclined to think of truth in this way, when one understands the world as a whole as changing rather than as static. Likewise, Bastien writes:

Our theory of knowledge is found in the sacred stories that are the living knowledge of the people. [...] They are the accumulated knowledge of centuries. Each generation of Kaaahsinnooniksi [grandparents] is responsible for retelling the stories to the next generation. The knowledge contained in them is living because it is applicable to each generation. Each generation, however, must listen carefully so that they can adapt the lessons and wisdom that apply to the present situation.²⁹⁴

Minh-ha writes: “To listen carefully is to preserve. But to preserve is to burn, for understanding means creating.”²⁹⁵ When stories are written down, they usually stop changing. People living hundreds of years later find it much harder to understand the stories than the people who lived when the story was written down. In science a lot of effort is put into preserving what is known, what is written down, but while this may be thought of as keeping it alive, it can also be considered killing it.

²⁹³ Minh-ha, *Woman, Native, Other*, 122.

²⁹⁴ Bastien, *Blackfoot Ways of Knowing*, 104-105.

²⁹⁵ Minh-ha, *Woman, Native, Other*, 121.

Conclusion

Differences that matter

There are different ways of understanding the place of humanity in the world. We may see ourselves as one form of life or part of the world among many parts, which are on the same level and which are strongly connected with it. We may also see ourselves as part of the culture/nature dichotomy, in which the two are separated and have opposite qualities. The way we understand our place in the world matters, because it influences (among other things) how we interact with the rest of the world. For example, when we think about nature as separated from us, there is a danger of underestimating how much we are dependent on the rest of the world and affecting it in a way which ultimately harms us. The difference between understanding nature as passive or active also matters, because when it is approached as passive, the risk of irresponsible behaviour is even bigger. Since humanity has already affected the world in many detrimental ways (climate change, pollution, etc.) reciprocal models of our relationship with nature may be useful for changing our behaviour.

I have also discussed that, within science, it matters whether (parts of) objects are characterized as passive or active, because this influences the types of theories scientists can come up with. The same goes for whether systems are approached as hierarchical, adversarial or reciprocal. It may be very useful for scientists to be aware of these different ways of understanding systems, which make different kinds of insights possible. More generally it can be useful to be aware of how hierarchical and adversarial systems affect us. For example, in childbirth, a tendency of wanting to control nature can put women in danger and in academia the tendency of writing critiques and arguing against rather than for ideas, is not always the most productive.

The culture/nature dichotomy is connected to other dichotomies, as culture is seen as the active, male subject, while nature is seen as the passive, female object. Dichotomies are one way of understanding difference: as the difference between two distinct opposite things. One may also think about opposites as polarities, in which case difference isn't inherent, but flows from relationships. In the case of both dichotomies and polarities, difference is still seen as the difference between two opposites. Yet another way of understanding difference, is seeing it as something which creates a larger variety than two opposites, where that which is different from something else is not its mirror image, but something which is impossible to express in terms of the other. One may also understand 'difference' as either 'difference between' or 'difference within'. Different ways of thinking about difference matter, because when difference is understood as 'difference between', for example, this often leads or contributes to the exclusion of groups of people.

Two very central different ways of understanding the world I have discussed, are atomism and holism. In atomism, the whole (world) is approached as consisting of distinct parts and is understood through its parts. In holism, the whole (world) is approached as primarily a whole and its parts are understood through their relationship with the whole. This difference matters, because when one sees the whole as secondary to the parts, the whole can be interpreted as being less real than the parts. Vice-versa, when parts are seen as secondary, they may be considered less real. A disadvantage of the former is that it creates a tendency of reducing certain human experiences (such as emotions) to what happens in our bodies on a

molecular level, which does not help us understand these experiences, as experiences. However, focussing on parts has led to, for example, many technological developments and biological discoveries, so atomism is very useful in certain contexts.

Atomistic ways of understanding the world usually are connected to ontologies, which means that the world is understood as primarily consisting of something which is. One may also think of change as the basic essence of the world, or understand the world in a more pluralist way, in which the world can be several (seemingly) contradictory things at the same time, none of them being the 'essence' of the world. People who understand the world as being reducible to one basic essence, may lean towards simple theories or descriptions for understanding it and be very optimistic about how well they understand (and will understand) the world. People who understand the world as inherently complex are more inclined to question these simple theories and descriptions. They may even believe that the world is fundamentally incomprehensible to human beings. One of the risks of being (too) optimistic about how well we understand the world, is, again, that we affect the world in ways which we believe will not harm us, but eventually do. When the world is taken to be very complex and we are very aware of what we don't know, we may treat the world around us more cautiously and responsibly.

Whether we see the world as very comprehensible or very incomprehensible, simple or multidimensional, atomist or holist influences which ways of gaining knowledge are seen as valid. Also, it matters whether we understand the world we want to know as independently standing apart from us as subjects, or as fundamentally connected to us. When we see it in the former way, we can get to know it from a third-person perspective, while when we see it in the latter way, we can get to know it via subjective methods, such as meditation and introspection. If the world is considered multidimensional, many different ways of trying to know it are necessary to understand it. It matters which things we acknowledge as being (reliable) sources of knowledge. We may see empirical data as the only reliable source of knowledge. We can also see dreams and visions as reliable sources. Reaching another state of consciousness may be seen as the best way of gaining knowledge. Or we may believe we mainly learn through developing as a person, or from personal experiences. When we restrict ourselves to only one or two of these sources, what we can know becomes very limited. There are many types of questions we will not be able to answer. In the West, we are seeing that many people asking questions about, for example, what the purpose of life is, how we should live and what happens after death, turn to non-western traditions for answers, because empirical evidence does not give them. A benefit of the mere variety of ways of understanding the world which are possible, is that many different types of questions can be answered.

Finally, the status we believe our understanding of the world has, or we want it to have, matters. We may only consider something 'true' when it is a fact, or 'true' may mean something different, such as 'meaningful'. Are truths static, or do they change with us? We may want to have a worldview which is supported by evidence. We may also want to have a worldview which is useful for us. I have often heard (western) people say that they 'want' to believe in one thing or the other, but that they just can't, because science says it isn't true. If we don't think of our ways of understanding the world as ideas we have to believe, as something that has to have truth, we are freer to look at the world in a way that is beneficial to us.

Choosing our ways of understanding

There are different reasons for wanting to see the world in different ways, or specifically in ways which are not dominant in science. One perspective on the world gives us a very limited understanding of it. Each way of understanding the world has its own benefits and disadvantages, dependent on the context. Therefore, we should be aware of which ways of understanding the world we use, why we use them and what their effects are. The way we understand the world strongly affects the world. Since, in many cases, there is no way to tell which way of looking at the world is more 'correct' or 'true', when one perspective causes problems in the world, that's a reason to prefer another perspective. It *matters* how we understand the world. I have mapped some of the different ways of understanding the world and some of their benefits and disadvantages. Obviously the picture I sketch is far from complete. Still, it is a rather more diverse picture than the limited perspective western societies and science have come to hold under the influence of (implicit) scientism. Also, the picture is informed by what some of the most vocal and articulate proponents of alternative ways of understanding the world have argued. In any case, I have gained new ways of understanding the world during my project (which I will discuss below), so for me, personally, this project is successful. I can only hope it was illuminating for the reader as well.

Reflection/diffraction

Having gained some insight into different ways of understanding the world, knowing that these differences matter, I think it is important to 'reflect' on our own ways of understanding the world – or even better, let what we have learned change our ways of understanding and be a happy participant in this diffractive process. Below I have listed some questions which may be used to gain insight in how we understand the world, why we understand it this way and also why we don't understand it in different ways. Keep in mind that the way we see the world does not necessarily have to be based on what we 'believe' or 'know' is correct, 'truth' can be interpreted in different ways and there are many more reasons for understanding the world in certain ways than just epistemological ones.

Why do we (not) see knowledge as:

- Something we can take from an object?
- Something we can find?
- Something we have to listen for?
- Something which is given to us?
- Something we possess?
- Something we create?
- Something we take part in?
- Something which is shared?

Why do we (not) see those who seem different from us as:

- Having a different identity than we do?
- Differing from us in degree?
- Differing from us less than we differ among ourselves?
- Containing a multitude of differences?
- Being the same in many ways?

When confronted with ideas which are different from our own, why do we:

- Argue against them?
- Try to understand them?
- See them as incompatible with what we know?
- Try to learn from them?
- Try to find a middle way?
- Focus on the differences?
- Focus on the similarities?
- Let them interact?

Why do we see the world as:

- Knowable?
- Having a basic essence?
- Simple?
- Contradictory?
- Fundamentally complex?
- Incomprehensible?
- Multidimensional?
- A whole?
- A collection of parts?
- Static?
- Changing?

Why do we see 'nature' or the world around us as:

- Something which gives?
- Something we can take from?
- Something we depend on?
- Something which stands apart from us?
- Something we are connected to?
- Something we are a part of?
- Something we work with?
- Something which is passive?
- Something which acts?
- Something which likes us?
- Something which hates us?
- Our home?
- Our enemy?
- Our friend?
- Our family?

Why do we see the following sources and methods for gaining an understanding of the world as (il)legitimate?

- Empirical evidence?
- Third-person observations?
- Subjective experiences?
- Living in a certain way?
- Being connected to the world?
- Introspection?
- Meditation?
- Dreams?
- Visions?
- Memories?
- Participation?
- Developing as a person?
- Relationships?
- Stories?
- Myths?
- Tradition?
- Emotions?

Why do we want our understanding of the world to be:

- True?
- Correct?
- Useful?
- Meaningful?

My project

As I wrote, I have been affected by my project. I have started to understand the world in different ways than I did before. These ways of understanding have influenced my project. I will discuss here in which ways.

In the beginning of my research I have tried to make lists of different ways of understanding the world and I have tried to split them up into categories. This is an atomistic and hierarchical way of looking at my work. The content of my research has resisted these categories. The different ways of understanding the world are so connected to each other that this type of hierarchical categorization makes it difficult to discuss each of them properly. I have realized that I don't want to approach the different ways of understanding as falling into several categories. This would imply that the different ways of understanding would be grouped together based on shared characteristics and this would leave no room for acknowledging and portraying cross-category shared characteristics, which would often be no less important. I have found that the different ways of understanding are connected to each other in many different ways and I don't want to neglect any of these connections. Instead, I have approached the content of my research holistically, showing how the different ways of understanding are related to each other. However, it can also be argued that my research is atomistic because I focus on ways of understanding the world which are parts of traditions, but don't give an account of these traditions as wholes.

I have approached the 'object' of my research as active rather than passive, by diffractively reading ideas through each other. Also, though I may have tried to dominate it at first, I have listened to it when I realized that it refused to be cut up into categories. However, it may be argued that this is actually a problem, because this has ultimately made the structure of my research less easy to follow. Each of the eleven sections is about a different type of subject and is structured in a different way. Maybe my story would have been more structured as a whole if I had approached my object in a different way, choosing its direction rather than following where it 'naturally' went. I have chosen the interactive approach because it is because it allows for a richer understanding of my 'object'.

Even though I have said many times that my thesis is not a critique, one can still find a dichotomical and adversarial structure in my work. I do not directly put science and other traditions opposite each other, but I do compare the dominant ways of understanding within these traditions and criticize those dominant in science. While I have my reasons for doing this (people need to know what the disadvantages of these ways of understanding are, because otherwise most will not see a reason to de-centre them), it may be that someone else has much better reasons for why I should not have done this and why another way of writing about these ways of understanding is much more beneficial.

In this thesis I have also positioned myself as not detached from what I am trying to know, but part of it. I have accepted my limited point of view and I am aware of my influence on the very world I am trying to know. Also, I have started with a pluralist perspective, in which different ways of understanding the world create a more complete understanding of it.

My thesis is not written about the 'truth'. I approach different ways of understanding the world not as attempts of formulating a correct description of the world, but as ways of *understanding* the world. We can understand our experience within the world in different ways

and I can be agnostic about the truth in this thesis, even when I am criticizing different ways of understanding the world.

Finally, there are ways in which my thesis is very much in line with ways of understanding which are dominant in science, mostly because it is a thesis. My thesis is based on one type of source: texts of other people. In academia other sources, such as dreams and personal experiences, are in most contexts not accepted as sources of knowledge, although there are exceptions. I have based my thesis on written text and I have written it down, so it may be considered a very 'dead' work. However, there is no escaping this, because a thesis is a written text. However, I have noticed that explaining my ideas in a dialectical way, where the listener can ask questions or argue against me, is a very effective way of getting people to understand what I have learned. In a written text, one has to spend a lot of time answering possible counterarguments (which has to do with the adversarial model in academia). When talking, on the other hand, one can focus on the core and answer only the objections raised by the person(s) one is talking to, even objections they may not have thought of themselves. Additionally, I might change my ideas while talking to someone. As I wrote, my understanding of the many different ways of understanding the world is limited and will probably change, which means that writing a definitive description of it is counterintuitive. Singularity and definitiveness are themselves rejected by several ways of understanding the world that I have discussed. Besides, there could always be a new unthought of or unencountered perspective which would contribute meaningfully to our ways of understanding the world. This diffraction of ways of understanding, then, is as good a place as any to start for those looking to broaden their horizon.

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