What’s the Matter with Discourse?

An alternative reading of Karen Barad’s philosophy

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Abstract

The theoretical movement known under the heading of posthumanism has entered the academic field. Posthumanisms most prominent feature is to retrieve the concept of matter into the analytical framework. Matter is understood to be under-theorized within the social sciences as a result of the permeative focus upon language and discourse. A prevailing understanding of posthumanism that has been used within educational science and philosophy thus consists of moving the searchlight from language/discourse onto matter. Notably, these scholars are turning to the philosopher Karen Barad in order to spell out their posthumanistic implications. The aim of the thesis is to give an account of the philosophy of Karen Barad in contrast to other prevailing renderings of her. The analysis is carried out using a contrastive methodological approach. In this study I demonstrate how my reading of Barad differs from the scholarly readings that I choose to engage with. The results show that with an alternative conceptual understanding of Barad’s posthumanistic theory the analysis is being steered towards the entanglement of matter and discourse rather than towards the materialistic components of a posed problem. In addition, the results also show how a focus on the ontological underpinnings of Barad’s theoretical framework can give crucial contributions when it comes to understanding the generative conditions of science and knowledge-making.

Keywords

Karen Barad Posthumanism Material-discursive Intra-action Entanglements Onto-epistemology Philosophy of Education Pedagogy Theory of Science
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Introduction

Language has been granted too much power. The linguistic turn, the semiotic turn, the interpretive turn, the cultural turn: it seems that at every turn lately every “thing”—even materiality—is turned into a matter of language or some other form of cultural representation. The ubiquitous puns on “matter” do not, alas, mark a rethinking of the key concepts (materiality and signification) and the relationship between them. Rather, they seem to be symptomatic of the extent to which matters of “fact” (so to speak) have been replaced with matters of signification (no scare quotes here). Language matters. Discourse matters. Culture matters. There is an important sense in which the only thing that doesn't seem to matter anymore is matter. (Barad 2007, p. 132)

This is a quote from the philosopher Karen Barad that has spawned a great deal of discussion not to say controversy. Is it matter as “things” and “stuff” that the quotation is designed to achieve, or matter as “meaning”, or perhaps both? Is it plausible to claim, as do Barad above, that matter does not matter anymore? As I see it, the only way to go about finding out what a material theory of the kind above amounts to is to answer my posed questions, as trivial as they at first glance may seem. The triviality of the questions does have a tendency to disappear into thin air once we start to retrieve the answers. As Lucas D. Introna puts it: “Now, most people would agree that artefacts or technology does things—a kettle boils water, a hammer drives in a nail, a computer sends an e-mail, etc. Thus, it would not be too controversial to claim that the idea that artefacts have, or embody, some level of agency—even if it is very limited or derived in some way—is generally accepted. What is disputed is the nature and origin of that agency.” (D. Introna 2007, p. 2). The citation is in accordance with the agenda for this thesis in more than one way: first, it acknowledges the fact that agency can be granted to artefacts in a trivial way, so trivial, in fact, that we can discard it in less than no time. Second, it points to where the problem of agency actually resides; it is the “nature” and “origin” of materialistic agency that is being disputed, not the fact that some artefacts work as mediators in some contexts. Already have we stumbled upon sentences that need further scrutiny in order to properly be settled; can agency reside anywhere? Is agency something other than intentionality? How can we differentiate between the two? And so on.

This thesis seeks to close read the philosophy of Karen Barad through the lens of qualitative content analysis. My content analysis is paired with a close contrastive reading of the interpretations of Barad that I address in this thesis. The contrast reading of interpretations of Barad shows that they all unite in their respective take on the notion of ‘matter’ (especially) which accords with the predominant reception of her. I embark on this mission in order to give an account of my alternative reading of Barad’s theoretical implications.

When I first came across the work of the physicist and philosopher Karen Barad, I admit, I was a devoted butlerian. Thus, I struggled to comprehend Barad’s concept of materiality and especially her
conceptual entangling of matter and discourse. This move of Barad becomes apparent in her criticism towards the poststructural reasoning of Judith Butler and Michel Foucault. Matter and discourse is sort of the same thing according to Barad at the same time as her most salient theoretical move in *Meeting the universe halfway* (2007) is to merge them together. How can this be? Barad is most known for her neologisms and unexpected conversational partners across disparate disciplinary fields. As a result, Barad’s theory is challenging, in my view, to take on. The concept of *materiality* is what has spawned the most controversy. Materiality is a word with numerous connotations, and Barad is not settling with just one or two, rather, she is creating an entire ontology based on a reworking of the concept of matter. So what matters? Every-thing and everything, to be laconic. Barad’s point is not to single out different “stuff” that falls into the category of matter, because there are no categories to begin with. This move of Barad to simultaneously object to a categorization of matter at the same time as she maintains the negligence of it is somewhat remarkable. Matter does not exist *per se* but we should tend to it more? Pretty much. Our whole concept of matter needs to be revised and not contrasted against our notion of culture and/or discourse. This particular move has been interpreted, in many respects, as an urge to go back to the material, and certainly, Barad’s theory is a materialistic naturalistic theory, but it is not enough to pay extra regard to the ‘material’ since we first have to come to terms with what the ‘material’ consists of.

In this thesis I will show how my reading of Barad differs from a common reception of her philosophy. My reading demonstrates in what way her conceptual framework can be understood in order to gain knowledge with wider scope. I thus propose an interpretation of Barad’s conceptual framings that comes in handy when we seek to understand how knowledge is being generated. I aim to show how we can make use of Barad’s intra-relational onto-epistemology¹ that both differs from a common reception of her at the same time as it paves the way for understanding how research and knowledge-making within the field of education is being done. With knowledge I refer to the outcome of a scientific undertaking. Hence, the framing of material-discursive relations within educational science, I want to persevere in, is not about setting our pointers towards material components (whatever these may consist of) rather, it is about setting our pointers towards the ontological underpinnings that conditions all types of knowledge making. My focus will thus not be concentrated to material components; I will focus upon the ontological entanglements that Barad’s philosophical framings suggest. I will thus in addition to just mentioned aim also demonstrate where we end up if we keep in line with my reading of Barad.

My results can be summarized as follows: i) I present a different interpretation of Barad in contrast to the prevailing reception of her; ii) I will demonstrate where we end up if we employ my interpretation of Barad’s theoretical framework; iii) Subsequently, I will also show how my proposed interpretation can be put to use within educational- and social science.

¹ I describe Barad’s terminology in more detail in the section titled “Introducing Karen Barad’s philosophy”.
Background

The posthumanistic paradigm is here. Within educational science its theoretical underpinnings has gained a foothold we cannot ignore. Many are the dissertations and scientific publications that subscribe to a posthumanistic approach (See for example Ceder 2015; Ehlin 2015; Gunnarsson 2015; Hultman 2011; Lindgren 2015; Westberg Bernemyr 2015). This thesis is situated inside the domain of philosophy of education, which motivates the commitment to take on the posthumanistic challenge. I set out to investigate how the making of knowledge can be understood under the heading of posthumanism. Through this undertaking I aim to submit to a few research questions where the overall aim is to gain more insights in how a posthumanistic theoretical device might be employed. I will present an alternative reading of the philosopher Karen Barad where my interpretation of her drives at demonstrating how the notion of entanglement can get us out of the materialistic deadlock. In other words, my reading suggests that 1) ‘matter’ is not a category to be retrieved (in its own right); 2) Barad’s philosophy make room for cross disciplinary practices where the notion of knowledge takes center stage, not ‘matter’. This I believe is helpful when it comes to understanding what actually takes place when science is being done.

The concept of posthumanism carries a dystopic feature, so let me spell out what the prefix of “post” in the last analysis refers to. Humanism is a well-worn concept whose different layers of meaning are hard to properly spell out. However, we can extract the notion of “human” in all its various guises. The kind of humanism that is being critiqued by both postmodernists and posthumanists is the one commonly referred to as “Enlightenment humanism” (Ceder 2015; Dolphijn & Tuin 2012; Liedman 1997). Enlightenment humanism is claimed to center the human subject in that it invoke the innate rationality of human beings. The rational subject thus implicates an equivalence between success and the progression of the mind. A humanist subject stands isolated before the interactions with her surroundings. This postulated rational subject is also without divergent traits meaning that it is a white male middle class subject. This has led the humanist subject to be a target of adequate critique.

Postmodernism is almost as spidery a notion as humanism above; the prefix “post” refers to both a moving beyond and picking up, one should say, on humanism in that postmodernism critiques the ready-made humanist subject. Hence, postmodernism starts off with unveiling the hollow humanist subject while claiming adherence to the linguistic turn. There is no ready-made subject that enters into our world of representational concepts, postmodernists claim, all we have is performative doings, deferred meaning, and the making of reality with our words (Dolphijn & Tuin, 2012).

As a successor to the postmodernist movement we find the miscellaneous posthumanists whose most prominent aim is to retrieve materiality into the equation. A posthumanistic stance conceives the concept of matter as something that has been neglected and that matter instantiated as artefacts, technology and embodiment, needs to be put under scrutiny if we aim to reach an answer to our pedagogical endeavors. But it also takes one step further than what is proposed above in that it includes a viewpoint that does not start off with a separation of matter and discourse. Thus, matter and discourse, that is, for instance, subjects and technology, cannot be regarded as different domains of being. They are entangled in an ontological sense of the word. Hillevi Lenz Taguchi (2014), who is one prominent Barad scholar, says that the shift from constructionist to new materialist framings of scientific undertakings is an ontological as well as a conceptual one in that the transcendental underpinnings are moved aside in favor of relational ones. This means that there is no firm ground, no
original starting point, no “lost origin” to retrieve in order to come to terms with complex questions of making science. This shift also includes putting emphasis on the interrelationship of meaning-making that takes place between humans and non-humans in a non-hierarchical manner (Lenz Taguchi 2014). Previous movements such as social constructionism, constructivism and postmodernism all put too much emphasis upon linguistic meaning-making, Lenz Taguchi claims, where language is granted the hallmark of (human) being.

Despite the concept’s potential for a widening, a fairly common usage of ‘matter’ within posthumanistic circles is to reserve it for matter as something other than or different from discourse. Thus, the disreputable dichotomy returns, although in a different guise. The theoreticians that I am engaging with in this thesis use the concept of ‘matter’ in a similar vein inasmuch as they are neglecting the dimension of entanglement that is residing within its posthumanistic inclinations, especially as it is being verbalized by the philosopher Karen Barad. I want to suggest an alternative reading of Barad that keeps in line with her entanglement notion of the concept as she extracts it from the field of quantum physics. The entanglement, in short, amounts to a materiality that is always made in discourse and vice versa. The materiality of, say, particles or human bodies, is not something that is different from our discursive beliefs about the same; they are entangled and thus causally linked to one another. It does not mean that the stuff that makes up ontological relations is always the same since compounds obviously differ, but it does mean that materiality as a concept and discourse as a concept denote the same realm of being, even though instantiations naturally will differ.

My problem in this thesis is the way that the material has been granted a special place within the posthumanistic take on doing science, to the degree that the concept of matter usurps the inquired phenomenon in itself. That is, the postulated matter (artefacts, furniture, buildings, architecture, buckets, rulers) is added to the methodological scheme as a crucial component to also scrutinize. This move is curious, I believe, since the posthumanist commitment, especially in Barad’s vesture, is to explicitly overcome the old dualism of matter and discourse. Matter is already mattering since it is part of our discourse why it is curious to extract a few material components and show how they are agents in the same vein that subjects can be said to be agents. In other words, it becomes curious when the material outline of an object takes center stage since the theory that is being used to invoke the methodological step states that a material-discursive understanding starts off with no reifying boundaries in place. Instead of the phenomenon, or problem itself, the researchers zoom in on proposed material components that exerts agency.

The quotation that introduces this thesis has been read in manifold ways but I want to suggest that the invoking of matter, that Barad is urging us to do, does not in fact entail identifying material components so that we can give them our devoted attention. I understand Barad as proposing a new conceptualization of matter, which means that matter is something that is already caught up in our discursive undertakings.
Literature Review

In this chapter previous research concerning posthumanism will be accounted for. Since my frame of research interest falls upon the philosophy of Karen Barad, in addition to engaging with other readings of her, this literary outline will consist in delineating scholarly works that, in some way or another, clutches on to Barad’s philosophy of agential realism. I have arranged this overview in four groupings: i) Posthumanism in alignment with technology; ii) The subject; iii) New materialism; iv) In a Swedish pedagogical context. This section will serve as a backdrop for my analytical starting point. Similarities and differences will be accounted for and act as a site for my eventual theoretical positioning.

Posthumanism in Alignment with Technology

Posthumanism is a label that captures a great deal of different approaches. As an umbrella term it subsumes diametrically opposite viewpoints regarding the human, the ontological nature of reality, the cultural, et cetera, still, they unite in the acknowledgment of the rapidly growing field of technology. The rise of technology, and then especially the rise of bio-enhancement technology, is forcing us to revisit and re-articulate the being of “human being”. But it’s not just the concept of "human" that is being reworked, it is the accompanying questions regarding the “nature”, the “culture”, the “matter” as well; what does it mean to be a living creature in a post-modern world where everything that used to be part of a human uniqueness easily can be superseded by a bred, or robotically constructed, being? A posthumanism take into account the accompanying consequences of a high-tech society, consequences that necessarily influence the human life form, albeit in different manners.

Tamar Sharon in Human Nature in an Age of Biotechnology: The Case for Mediated Posthumanism (2010) aligns the emergence of posthumanism with technological progress. The technological progress that Sharon is alluding to is bio- and enhancement technology. Posthumanism has engendered a vast array of meanings where Sharon is compartmentalizing four groups: i) Liberal posthumanism, which endorse the progressive nature of bio-enhancement technology; ii) Dystopic posthumanism opposes the bio-enhancement technologies advancement due to the presumed distortion of “human essence”; iii) Radical posthumanism consider the technological progress as an instance of the radical re-thinking of generic concepts, with a steady foothold in the Enlightenment narrative, such as “human” and “nature”, where the presumed primacy of humans are being called into question; and iv) Methodological posthumanism is characterized by its development of
conceptual frameworks that seek to capture the entwinement of technological apparatuses and human beings.

Sharon demonstrates that the two seemingly opposite positions, when it comes to bio-enhancement technology, do share the same fix point regarding the human. For *bioconservatives* (the dystopic posthumanists) the human possesses an essence that the “intervention” of biotechnology runs the risk of contorting. That is, the human comes before the technology. The *transhumanists* (the liberal posthumanists), on the other hand, positions the human as transcendent regarding its environment, since the biotechnology is assigned the task of aiding the human in overcoming that exterior environment.

The grouping that comes closest to my posthumanistic claims in this thesis is the one Sharon names “radical posthumanism”. It has affinities with Karen Barad’s philosophy as well as with Donna Haraway and new materialism (Sharon 2010) insofar as radical posthumanism does not narrowly focus on the technological improvements as such; rather, it seeks to investigate the changing conditions for the delineation of human and nature, technology and culture, animate and inanimate. The pressing question for these scholars is thus tied to objectivity and the making of science and knowledge, not to how we can make a better human with the help of gene imprinting technologies, for instance. The condition for this type of enhancement can be said to be more on the agenda for the radical posthumanists then the actual bio-enhancement technology in itself (Barad 2007; Dolphijn & Tuin 2010; Haraway 1997; Sharon 2010).

Radical posthumanism is thus an interdisciplinary attempt that can be described as a continuation of the postmodern- and poststructuralist project of destabilizing non-exhaustive dichotomies, such as nature-culture and machine-organism. But we should not, just as the word of continuation above suggests, view radical posthumanism and poststructuralism in an analogous manner since radical posthumanism picks up where poststructuralism leaves off. This is most prominently shown in radical posthumanisms emphasis on the material elements that make up our (post)human condition. Donna Haraway, and especially her “A cyborg manifesto” (1991), is invoked as radical posthumanism key figure (Sharon 2010). This is why Sharon places the notion of radical posthumanism along the optimistic axis when it comes to endorsing bio-enhancement technology. Its accentuation takes root in the entwinement of the material and the discursive, the technological and the human. But it’s just as important to separate this optimistic view from the transhumanist view, where the latter endorse bio-enhancement technology on the grounds that is should minister the human in her quest for perfection. Any radical posthumanism worth its salt would not promote the human improvement agenda, rather, it seeks to distort the generic “man” (with no deviant traits) that is embedded within the humanist narrative. A humanist narrative that is all too present within the frames of transhumanism (Sharon 2010; Åsberg et al. 2012). As Barad puts it in an interview with Dolphijn & Tuin:

For example, we considered the new field of bioethics in which ethics is taken to be solely a matter of considering the imagined consequences of scientific projects that are already given. But the notion of consequences is based on the wrong temporality: asking after potential consequences is too little, too late, because ethics of course, is being done right at the lab bench. And so, as for what it takes to be
scientifically literate, the question is what does it take in order to identify the various apparatuses of bodily production that are at stake here (Dolphijn & Tuin, 2012 p. 54).

This extract demonstrates the deeper investigative approach that a “radical” posthumanism employs. It does not take any delineated objects as steady in place, that is, they do not, for instance, take “human” as a generic concept that comprises all human beings (like the transhumanists do, when they call forth the question of ethics in the light of emerging bio-enhancement technology). The question runs deeper for the radical posthumanists in that they look into the ontological and metaphysical implications and conditions for the human life of our age.

The Subject

Sharon presents an alternative position within the frames of posthumanism that he deems “mediated posthumanism”. The basis for this suggestion is that Sharon finds the posthuman attempt to be somewhat insufficient when it comes to capture the subject’s proper outline. Either both radical- and liberal posthumanists grants too much power to the technologies of body-alteration, to the extent that the “corporeality” of subjectivity goes missing, or, the radical- and methodological posthumanists demonstrate an ambiguity concerning the subject as a site of political resistance (Sharon 2010).

The “incoherence” of radical posthumanisms take on subjectivity that Sharon identifies lies within its inability to ultimately escape the (post)modern dualist framework. It seems to be in reliance of the modernistic project in order to have something to oppose or overcome: “It is not clear, in other words, how the multiple and fragmented nature of posthuman subjectivity, which can understandably act as a site of resistance to modern disciplinary power, can also embody the ideal form of resistance in a post-disciplinary or postmodern configuration of power that is itself multiple and fragmented.” (Sharon 2010, p. 9). This problem that Sharon sketches is in fact a straw man since the dualistic pattern of reasoning, that Sharon ascribes to modernism, is actually vivid within the postmodernistic narrative as well (Barad 2007; Colebrook 2004; Dolphijn & Tuin 2012; Lenz Taguchi 2010; Åsberg et al. 2012). The plethora of fragmented subjectivities that postmodernism, put simply, gives rise to is still stuck within a representationalist worldview where words and things are kept separated through signification. Hence, the plethora of subjectivities that emerge through a postmodern vein of reasoning is made possible on the basis that it starts off from modernisms claim to capture the human essence. Most scholars that Sharon would subsume under the heading of “radical posthumanism” subscribe to a monist ontology and are therefore critical towards postmodernisms implicit dualistic line of reasoning (Dolphijn & Tuin 2010). The philosopher Francesca Ferrando calls the posthumanistic movement “post-dualistic” since its founding gesture rests upon a process-ontology (Ferrando 2013, p. 31-32). This inherent postulate is what grants the crisscrossing move towards (post)modern dualistic thought. Ferrando pins down the crucial differences between both transhumanism and posthumanism, but also the fractions that exist within the frames of
posthumanistic theory. In her article the field of new materialism is granted their own rubric, for instance, and at the same time, her focus remains solidly upon the technology in coherence with nature, culture, embodiment and subjectivity. Technology as such is thus not granted investigative primacy over other realms of interest, such as race and femininity (Ferrando 2013). Thereto, she manages to succinctly state the core dividing line between posthumanism and transhumanism: “For instance, in the case of chattel slavery, slaves were treated as personal property of an owner, to be bought and sold. And still, transhumanist reflections, in their ‘ultra-humanistic’ endeavors, do not fully engage with a critical and historical account of the human, which is often presented in a generic and ‘fit-for-all’ way.” (Ferrando 2013, p. 28)

New Materialism

New materialism originated as a reaction against the prevalent representationalist and social constructivist discourse that somehow seemed to leave the material corporeality untouched (Dolphijn & Tuin 2012). In *New materialism: interviews & cartographies* (2012) Rick Dolphijn and Iris van der Tuin presents an overview of the new materialistic movement and its built-in implications. They pick up the work of Rosi Braidotti, Manuel De Landa, Karen Barad and Quentin Meillassoux in order to map out current strategies that fall under the heading of new materialism. Just as the label suggests a new materialism places emphasis on the material (technological, physiological, embodiment) in an attempt to supplement poststructuralist theory, not supersede it. The new materialism that they localize can be said to unite in their anti-humanist critique of logos. The first part of the book consists in interviews with the aforementioned scholars, and the second part is made up of four chapters discerning new materialisms features.

*Transversality* is a concept Dolphijn & Tuin (2012) employ in order to shed light on the inherent workings of a new materialism. A new materialism is thus something that traverses disciplinary borders since it is not bound to any specific disciplinary practices. This lies in line with new materialisms quest to overthrow dualisms: “The intimate relation between two so-called opposites makes it clear that the transcendental and humanist tendencies, which are fought by new materialist theorists are fundamentally reductive. After all, negation implies a relation, which is precisely what is undone by the dependence of transcendental humanist thought on dualism” (Dolphins & Tuin 2012, p. 98). Dolphijn & Tuin take a moment to demonstrate how a new materialism is being undone when it is invoked within the borders of a discipline (in this case sociology) and tailored accordingly to the imperatives at hand. To introduce a new materialism into a discipline, Dolphijn & Tuin continues, is a “transcendental gesture” since it presupposes two different pre-existent realms of thought (101). When a new materialism is being generated within a discipline the new materialisms generative force is being cut off. This is due to the postulated dualism that is at work in the abovementioned line of reasoning. When a new materialism “emerges from” a discipline, the move is identified as “immanent” since a new analytical framework is being emanated, and, as a consequence, the aforementioned dualism withers away: “Bringing new materialism (here assumed to be a pre-existing body of work) into contact with a scholarly discipline (equally assumed to be pre-existing) has distortive effects. The presupposition that a new materialism is generated contradicts new materialisms own anti-representationalism. New materialism, then, takes scholarship into absolute
deterritorialization, and is not an epistemic class that has a clear referent. New materialism is something to be put to work.” (Dolphijn & Tuin 2012, p. 103 Italics in original).

Another important component that brings the four theorists together in Dolphijn & Tuin (2012) is their common critique fired against representationism in that representationism assumes an existent world that we can never retrieve a first-hand view of. All we have is our representations of it. A representation, the authors suggest, is a linguistic construction that, even if it is grafted upon real phenomena of the world, always remains fully mediated through our linguistic concepts. The ‘matter’ then gets lost along the way since emphasis is being put on our linguistic commitments and use.

However, to include ‘matter’ in the equation is not equivalent to simply adding it as an additional category to the mix; we must regard matter as already part of our discursive/cultural/social/or-what-have-you conceptual scheme (Barad 2007; Dophijn & Tuin 2012). The representational inheritance is a remain from the humanist thought map that sought to place the Human back at its right altar. Thus, postmodern cultural theory inherited a line of thought that was impregnated with humanist taxonomical meaning. This is the reason Dolphijn & Tuin explains (2012) why matter has played such an insignificant role within postmodern theorizing. Poststructuralism, inspired by french thought, has picked up on the importance of granting semiotics power without losing track of the material referent. That is, poststructuralism, and here instantiated in the work of Susan Sheridan and Rosi Braidotti, begins where postmodernism leaves off, and, at the same time, it seeks to give attention to the implicit dualistic reasoning that made up the foundations of postmodernity. A poststructuralism thus goes against both the overemphasis on words (cultural theory) and the sociological overemphasis on things; this seemingly necessary trade-off is therefore deemed false: “Braidotti takes postmodernist constructivism’s specific form of anti-essentialism, which affirms representationalism, to be responsible for this curious situation” (Dolphijn & Tuin 2012, p. 106). It’s also within the figure of Braidotti that Dolphijn & Tuin localizes new materialisms transversality as opposing a dualistic line of thinking instead of simply opposing a specific dualism at hand (which, really, is just the same thing as affirming it). Braidotti accomplishes this by viewing “[t]he exterior and the interior, the subject(ive) and the object(ive), the individual, the social, and the symbolic [...] as co-constitutive instead of pre-determined levels or layers” (ibid). This move is also the one that paves the way for new materialisms “radical” reconfiguring of the material as immanent, instead of starting off from existing concepts of Reason, whether in the form of modernism or postmodernism, since it marks a different starting point where matter and discourse emerge as already entangled. A new materialism questions the modernist conception of matter that comes in the form of one true depiction of “nature”, as it were, and, by the same vein, calls into question the postmodernist understanding, that is generating a plethora of “true” depictions of matter. It’s the representationalism that is inherent in both of these viewpoints that is being overthrown by new materialism: “Matter is a transformative force in itself, which, in its ongoing change, will not allow any representation to take root” (Dolphijn & Tuin 2012, p. 107).

Judith Butler is one poststructuralist theorist that has been associated with the faulty maneuver of invoking “linguisticity”. Language, within the hands of Butler, ends up designating only the “exterior” at the expense of the “interior” that, accordingly, remains un-theorized. In order to overcome this butlerian shortcoming, Dolphijn & Tuin are relying on insights drawn from Karen Barad and Vicki Kirby; language, matter, measuring devices, conceptual frameworks et cetera, are all emergent properties within an experimental set up. That is, matter and language co-constitutes the
problem at hand since neither is granted primacy over the other: “Key to this is the abandonment of assumptions about linguisticity, and about who does the speaking/writing. For Barad (1998: 105 in Fraser 2002: 618), ‘what is being described by our theories is not nature itself, but our participation within nature’. She theorises the intra-action of the observer, the observed and observing instruments, all of which are ‘agential’” (Dolphijn & Tuin 2012, p. 165).

In naming their methodological undertakings a “cartography”, they are taking inspiration from Barad and her neologism intra-action, which basically means that employed concepts do not entail intrinsic meaning prior to their intertwining with other running concepts. That is, the concept of intra-action seeks to capture the immanence of differentiation. It’s the inherent move of “de-territorialization” within new materialism that gives rise to the method of cartography. Put simply, it’s the fixity of pre-made classifications that the method of cartography problematizes and ultimately seeks to destruct.

A criticism directed against the movement of new materialism has been voiced by the philosopher Sara Ahmed (2010). Ahmed is calling upon the implicit form of logical reasoning within a large part of new materialistic writings that claim to speak from a marginal position. When new materialists claim that everything is reduced to language, or that postmodern feminists disregard corporeality altogether, this invokes a position where the majority is being constructed as social constructivists that do not engage with the material body, whilst the new materialists are constructed as “minor” in their quest for reconfiguring the body and the material. Ahmed states that this is an instance of “inflationary logic” since she disagrees regarding the materialistic absence of postmodern feminist thought: “The speech act that calls for us to ‘return to biology’ constructs the figure of the antibiological feminist who won’t allow us to engage with biology, and inflates her power.” (Ahmed 2010, p. 31) This is also a criticism that Ahmed directs at Barad since she is one of new materialisms most referred to scholars. Subsequently, I will spell out Ahmed’s critique and discuss however it affect Barad’s theoretical framework.

**In a Swedish Pedagogical Context**

In a Swedish pedagogical context the theory of posthumanism is quite present in some domains. Especially within the field of feminism and education has the posthumanism taken root. Karin Hultman (2011) is one scholar that conforms to a posthumanism inspired by the works of Barad. In her dissertation *Barn, linjaler och andra aktörer: posthumanistiska perspektiv på subjektspande och materialitet i förskola/skola* (2011) she investigates the creation of subjectivities within the school environment through the lens of posthumanism. Focus is placed upon the relationship between subjects and non-human materialistic surroundings. Hultman claims that the material non-human artefacts that make up a large part of the school environment needs to be regarded as ‘agentive’ in that they influence the children in their subjective formation. Hultman is the first Swedish scholar that I have reason to return to in a later paragraph in this thesis. My discussion of Hultman is taking place next to my discussion of Lenz Taguchi since they are employing a similar interpretation of Barad’s notion of material-discursive.
Hillevi Lenz Taguchi is another scholar that has applied both a new materialistic and a posthumanistic (inspired by Barad) terminology in order to spell out different problems concerning learning, knowledge and subjectivity (Lenz Taguchi 2010; 2012; 2014). Lenz Taguchi is working with concepts extracted from different domains that all share the uniting aim of including ‘matter’ and ‘materiality’ in their knowledge production. I will return to two texts of Lenz Taguchi subsequently in this thesis where my intent is to discuss Lenz Taguchi’s usage of Barad’s concept of specifically material-discursive. I will attend to the problem of putting the concept of material-discursive to work when emphasis seems to be put on one side of the hyphen.

Karin Gunnarsson and Anna Palmer are two scholars, who are tied to the same institution as Lenz Taguchi and Hultman above, whose dissertations also put a posthumanistic framework to work. Gunnarsson (2013) is researching the way health promoting work in schools is connected to subjects, gender and bodies. Gunnarsson is inspired by several posthumanistic theoreticians where Barad is one of them. From Barad she extracts the ontological optics that states that no entities exist before their engagement with other entities, that is, she is adopting the view that opposes individualism. In its place Gunnarsson is thus employing a relational ontology.

Anna Palmer (2010) is also employing an intra-active analysis when she is investigating how the discursive creation of subjectivities tied to mathematics can be understood. In her dissertation a shift is being made from a performative perspective, inspired by mainly Judith Butler, to a posthumanistic perspective inspired by the work of Barad (Palmer 2010). I am mentioning these two scholars on the basis that they too produce a reading of Barad where material artefacts together with corporeality are brought to the foreground. But where they seem to make a halt I want to dig deeper into the work of Barad in order to locate what her notion of material-discursive practices ultimately amounts to. Barad’s vocabulary has to implicate something beyond highlighting the materiality of matter otherwise, what is the point of hyphenating the material-discursive relationship in the first place?

From the University of Lund Simon Ceder (2015) has written a dissertation within the field of philosophy of education where the posthumanistic perspective is consulted. Ceder is leaning towards Barad when it comes to her notions of material-discursive and intra-action since his main aim is to decenter rigid scientific positions (such as the subject) in favor of decentering concepts such as “intra-relationality”. Ceder seeks to invoke a vocabulary that is not contaminated with entity-based categorizations; instead, Ceder’s purpose is to create a new educational theory where the relational underpinnings of learning and knowledge-making are made manifest.

Åsberg, Hultman & Lee (2012) is presenting a corresponding picture of the spiderly notion of posthumanism. Instead of talking about a “radical” posthumanism they substitute the prefix with a “critical” posthumanism (where prominent figures such as Althusser and Foucault grant residence). In their anthology a set of posthumanistic texts have been translated and commented upon. Karen Barad is one of the front persons of posthumanism together with Rosi Braidotti, Michael Callon, Michel Serres, Deleuze & Guattari, Donna Haraway and Annemarie Mol (Åsberg et al 2012). Emphasis is placed upon the performative makings of the posthumanist analyses, that is, the creation of reality (Åsberg et al. 2012, p. 15). What they call a “relational materialism” entails that the way we make use of our concepts also brings forth the world we wish to inhabit (ibid). This is where they localize Barad’s concept of an “onto-epistemological ethics”.
Summary and reflections

Sharon discusses the notion of posthumanism in relation to its anti-humanist underpinnings. This is also prevalent within both new materialism and the work of Åsberg et al. However, a few but no less important differences between the argumentations appear due to their differing points of emphasis. Sharon for one is consequently interrogating the emergence of posthumanistic thought in alignment with the rise of new biotechnology. Thus, Sharon investigates different outcomes regarding the notion of the subject and nature, as a result of the technology and its potentials. Sharon can then conclude that the posthuman subject gives rise to “incoherences” and that, for instance, the growing field of reproductive technologies bring about the potential for new ways of comprehending “the family” at the same time as it consolidates the rigidness of the patriarchal, heteronormative family (Sharon 2012). This is ultimately why Sharon finds himself in need to construct his scheme of “mediated posthumanism”.

New materialism moves beyond the quarrels that Sharon identify since their undertaking does not start off with looking into new technologies effect on human life as such. That is, new materialism seeks to thoroughly traverse the dichotomizing line of reasoning inherited from modernism- and postmodernism, which means that they survey new ways of conceptualizing the human subject. It lies beyond Sharon’s aim since they do not look into the interrelationships between certain technologies and human subjectivities. It is still an important instance of new materialism but it is not its founding gesture as it appears to be for Sharon. New materialism’s anti-humanist stance is also expressed in how they tackle the ghost of representationalism. This they do by traversing dualisms and affirming difference as differing. The notion of materiality that new materialism is putting to work is captured in the following quote: “This is to say that whereas a modernist scientific materialism allows for one True representation of matter, and a postmodernist cultural constructivism allows for a plethora of equally true representations, it is the shared representationalism that is questioned and shifted by new materialism. Matter is a transformative force in itself, which does not need to be re-presented” (Dolphijn & Tuin 2010, p. 164).

Dolphijn & Tuin stresses that new materialism’s cartographic method also entail the criticism of disciplinary and paradigmatic boundaries when they are taken as pre-determined territorial lines, since this is equivalent to a “transcendentalising gesture” (167). Hence, the primary aim within the work of Dolphijn & Tuin appears to be traversing a dualistic line of reasoning that ends up producing a negative form of relation.

New materialism’s emphasis is closely related to Barad’s commitment, notably in their common criticism leveled against representationalism and humanism, but whereas a new materialism seems to strive for the elaboration of new material-semiotic figures (Åsberg et al. 2012), Barad’s philosophy is leaning towards the founding of an ontology. Even though I am persuaded by new materialisms criticism fired against (post)modern thought within the field of cultural studies, I am not left assured when it comes to their delineation of the material. At times it seems that their claim is more similar to the “methodological posthumanists” above, while at other times it seems that they do seek to invoke a “new” material ontology. But it’s just the “flatness” that is being theorized, not the ontology itself.
Now, if this is a strategic move based on some innate feature of the new materialistic framework it still needs some heavy plastering in order to be sorted out.

Likewise in Åsberg et al (2012) we find an approach as that within new materialism. The focus is put on the materialities as agentive factors. With a flat ontology put to work they seek to annunciate new material-semiotic figures that overcome obsolete dichotomies of the (post)modern past. Åsberg states that the differences that we come across in a posthumanistic survey, such as the one outlined above, is due to the scholars separated disciplinary belonging (Åsberg et al. 2012). In some regard this is undoubtedly true, however, in my view, it is the way that the problem at hand is formulated and approached that eventually sets the approaches apart.
Theoretical Framing and Methodological Design

In this thesis I will employ theoretical concepts that I extract from the work of Karen Barad and especially from her seminal text *Meeting the universe halfway* (2007). I will thus deploy an alternative understanding of Barad’s philosophy in that I consult her conceptual framework using a contrastive methodological approach. The approach that I am using falls under the scope of qualitative content analysis inasmuch as I interpret the texts (by other scholars) while I am accounting for the discovered interpretational patterns (Cohen et al, 2007). That is, first I will give an account of the philosophy of Karen Barad as it is presented in *Meeting the universe halfway*. Second, I will put to work a contrastive close reading, inspired by textual analysis to be found within Solvang & Holme (1997), of the scholars that I chose for this thesis; thus, my utilized qualitative content analysis should be understood as contrastive reading. In my section titled “Introducing Karen Barad’s Philosophy” I will spell out Barad’s philosophy at length, and in my section titled “In Contrast to Other Reading’s” I will conform to my methodology of choice.

I am also inspired by Donna Haraway’s methodological approach that advise an accounting of the partiality when it comes to the invoking of a specific scientific perspective. This partiality is what I hope to make manifest in the deployment of my contrastive reading of the interpretations of Barad that are most prevalent. I have identified a problem within the widespread reception of Barad and I seek to demonstrate my starting point through the contrastive reading. Many posthumanistic scholars, especially the ones active within new materialism, subscribe to a diffractive methodology. This diffractive methodology is to be found within the writings of Haraway (1991; 1997) and subsequently within Barad (2007). This is how one Barad scholar describes the diffractive practice: “The diffractive analysis is transparent with respect to this relationality in that it sees the value in unexpected partners and acknowledging the role of the agential nonhumans in the research process. This means acknowledging that the researcher is not the only agent, and that all aspects of the research are co-constructing the agential process through the interactions” (Ceder 2015, p. 77). This compressed definition of diffraction as a methodology that we find in Ceder (2015) captures what many Barad scholars succumb to in their understanding of the same. Diffraction as a method within these scholarly works seeks to effectuate an understanding of diffractive that boils down to incorporating ‘non-human’ or ‘material agents’ in the process.

The fact that the researcher is part of the knowledge production is readily being accounted for through the transparency of actual method of choice. Hence, I subscribe to a textual analysis that aims at uncovering inherent contradictions and also crucial differences that all matter. That is, I do not seek to uncover a certain truth, I do not even want to claim that my reading is more correct or valid than the contrast interpretations that I take on in this thesis. Nevertheless, I do propose that with my methodological and theoretical approach we reach a reading that is close to Barad’s writings at the same time as it aims at dissolving a proposed problem of mine, that is, when it comes to the construction of ‘material’ components within the interpretations of Barad. This is the main reason
why I do not put a (new materialistic) diffractive methodological approach to work. In its place I put a textual contrastive analysis inspired by Haraway’s (1991) partiality.
Aim and Research Questions

In this thesis my aim is to chalk out an alternative reading of Karen Barad’s philosophy as it is outlined in her work *Meeting the universe halfway* (2007). I chose to engage on this exercise due to the fact that her philosophy has fueled a vast array of interpretations. But it’s not just the fact that her philosophy has spawned different readings; what calls my attention is the common understanding of her notion of *material-discursive practices*. Thus, it is the relation between the material and the discursive that I aim to discuss and discern in this thesis, both how it is being outlined within the philosophy of Barad, together with how it has been put to work by other scholars. The finishing instance of my overall research aim is to conclude how my alternative reading has bearings on philosophy of education.

I intend to carry out my aim by submitting to following research questions:

Δ What does an alternative-contrastive reading of Barad’s philosophy bring about?

Δ How can researchers conceive of knowledge-making differently through the employment of Barad’s terminology?
Introducing Karen Barad’s Philosophy

In this chapter my aim is to present the philosophy of Karen Barad as it is outlined in her Meeting the universe halfway (2007). I will do this by simultaneously delineating and explaining her core concepts, and give an account of how Barad is entering into a conversation with physicists Niels Bohr and Werner Heisenberg. Thereafter I intend to show how Barad engages with the discourse philosophers Michel Foucault and Judith Butler. This chapter ends with a review of Barad’s quantum physical commitments, where the EPR paradox and the cat of Erwin Schrödinger will be touched upon.

Cutting Through Different Disciplinary Realms

Barad is moving within the borderline of science theory, philosophy, feminist science studies, queer theory and quantum physics. Now, this starting point in itself indicates that Barad’s task is slightly different from, for instance, the scholars who subscribe to the realm of cultural studies. Although the affinities between the scholars are clear as a bell, the differences are what calls upon my attention. These differences are, in short, predicated on Barad’s grounding within above mentioned domains of science. Hence, she is not only trying to construct a theoretical framework where agents of all kinds finds a residence, rather, she shows in what particular way, across aforementioned fields, this may enfold. For this reason Barad’s philosophy is almost provocatively challenging to take on. She is grounding her theoretical convictions in empirical findings, empirical findings that she localizes across different fields, and she walks one through it, forcing one to gain knowledge and insights in as segregated realms as queer theory and quantum physics. And this is Barad’s main strength and novelty in my view; she demonstrates in what manner queer theory and quantum physics overlap within the laboratory and without. Now, one may wonder why one should have to learn queer theory in order to learn quantum physics, a relevant question indeed, however, this is not Barad’s viewpoint. She is not dictating the way to go about to gain “real” knowledge. What she does do, besides putting light on unexpected affinities, is promoting an ontological theory that cuts across disciplinary lines. However, skimming through her quantum physical parts of Meeting the universe is bound to result in a somewhat shallow reading of her. It is not about being a generalist its simply about assimilating Barad’s theory as a whole.

Agential realism is the name of Barad’s theoretical framework. Barad is drawing her insights mainly from the works of Niels Bohr, Michel Foucault, Judith Butler and Donna Haraway. Her agential realism is a posthumanism insofar as it is rewriting the concepts stemmed from humanism. Barad, who holds a PhD in particle physics and is currently a professor of Feminist Studies, Philosophy, and History of Consciousness at the University of California at Santa Cruz, takes no boundaries as a given. Rather, she explores how boundaries come about, how they work and how we can conceive of
them differently, providing that we do the necessary genealogical groundwork. This is what Barad’s theoretical framework amount to; it has no time for dichotomies, to start an inquiry based on dichotomizing categories is to “arrive too late” (Barad 2010, p. 7). This is basically what Barad is getting at when she is urging us to “do the genealogical groundwork”. It means that we should inquire into how the dichotomies come about in the first place. One of the most persistent dichotomies of our time is the one between nature and culture. Especially feminist scholars have shown how the workings of dichotomies, and particularly the one just mentioned, have material consequences for the bodies that they affect. The culture half has been associated with the masculine, whereas the nature half has been associated with the feminine. This is of course a simplified description indeed, but the point remains vivid enough: dichotomies within society, culture and science determine bodies (not just human ones) as they regulate them.

I will not go into details here since it lies outside the scope of this thesis, I will, however, remark that the dichotomy nature/culture seems to have been slightly modified in our present day. Today it seems as if the natural is hooked up with the masculine and the cultural is tied to the feminine, that is, if we keep in line with the aforementioned dichotomies “original” meaning where constructed was tied to the male and the natural was aligned with the female. In other words every-thing that is “constructed” is viewed upon as derived whereas “the natural”, the brain, the synapses, the high-dimensional space, or what have you, is viewed upon as “real”, equivalent to steady in place before we lay our inquiring eyes on it. Barad is opposing both of these semicircles; the nature is no less real than the culture is constructed. But neither is our nature filtered through a cultural sieve, it is always both.

A social constructionist view claims that ‘nature’ is something that we represent through our linguistic operation. Representationalism thus lies embedded in that view since it makes the claim that our language is representing things that we as subjects have access to through our linguistic domain of representing. It’s a tripartite relation where things, concepts and subjects make up clear cut entities (Barad 2007). Needless to say, due to our presentation above, Barad does not take kindly of this division. She is as critical of the representational view as she is of the dividing line between nature and culture. Since Barad is reworking a lot of old classical concepts a whole new vocabulary is being borne out of her naturalistic theory. This reworking is not just a playing around with tricky concepts, it’s a result of empirical findings, both within quantum physics and feminist science studies paired with queer theory.

The concepts that Barad is working with in her philosophical reasoning are intricate and enmeshed. In her magnum opus Meeting the universe halfway she is developing her composed concepts by way of examples. These examples are going to be used as nodes in my elaboration of Barad’s theory below. I have chosen to go about this way in order to make her philosophy as comprehensible as possible. Since my emphasis lie on the notions of material-discursive and onto-epistemology I have chosen examples thereafter.

Below I will go through Barad’s key concepts and how they are configured within her posthumanism outlined in Meeting the universe halfway. Hence, I will demonstrate how the different concepts can be put to work while giving examples extracted from Barad’s own writings.
Heisenberg versus Bohr

One prominent figure that has had an enormous impact on Barad’s theorizing is the physicist Niels Bohr. Bohr was a rarity in the beginning of the last century, within the physics community, since he paired his physical convictions with philosophical ones (Barad 2007). In the search for the ontological status of light Bohr drew up his theory of the principle of complementarity (Barad 2007). In short, Bohr laid down the epistemological framings of how science gets done. Our physical-conceptual undertakings are always intertwined for Bohr since the conceptual is embodied in the physical apparatus in place. I will map this crucial insight of Bohr’s in subsequently paragraphs, but for our purposes now it’s enough to state that Barad takes Bohr’s notion of physical-conceptual and supplants it with her notion of material-discursive (Barad 2007). The hyphenated notion of material-discursive intends to capture the intertwining of the natural with the cultural. These are not two separate fields according to Barad, since the materiality of bodies and things make up our discursive views as much as doings, there is no telling them apart. The apartness that start off with the cut between the material and the discursive is both question begging and at odds with contemporary science (Barad 2007).

Barad is extracting Bohr’s complementarity principle by contrasting it against Heisenberg’s famous uncertainty principle. I do want to take some time to spell out these quantum quandaries since the scope of Barad’s theory involves an understanding of how uncertainty differs, ontologically, from indeterminacy. In order to do this I need to spell out the details of the context within which these quandaries actually emerged.

In the beginning of the 20th century physicists were contemplating the fact that both waves and particles can exhibit dual particle-wave behavior depending on the experimental set up in place. Now this was mind-boggling since the meaning of “particle” is basically to be a bit of lump that has a definite measurable position in space, whereas wave is a disturbance that propagates in different mediums, occupying more than one position at any given moment. And what is more, waves interfere with one another, they overlap, and so can occupy the same position, unlike particles. To make a long story short, Bohr based his conclusions of the matter that the newtonian logic, that rests upon metaphysical determinism, is faulty since it’s based on the assumptions that objects of study (e.g. particles) have inherent properties that is utterly observation independent. Now, if a measurement in any way disturbs the object under study (this was nothing mind-boggling for the classical mechanics) the disturbance can be calculated and subtracted out, as it were, so that the agencies of observation still can extract the correct value at hand. These assumptions are false according to Bohr since the measured properties at hand are not determined prior to the particular measurement. But, how can this be? How can measurement determine the properties of the matter at hand? Barad demonstrates how Bohr settled the matter by way of example. If we want to determine a particles position, for instance, we need to have an experimental set up that is designed to measure just that. That is, we need a fixed photographic plate to be in place, and not a movable one, that is needed when we want to determine a particles momentum (Barad 2007, p. 111). Thus, our concepts are literally embodied in the measurement apparatus where the notion of position requires the steadiness of the tripod. And, by the same logic, if we want to measure the momentum of a particle it requires an apparatus with movable parts. This means that the photographic plate in the momentum-set-up needs to rest on a movable platform instead of a fixed one as in our example above. Thus, the measurement of position and momentum are mutually exclusive which means that we cannot extract the position and momentum out of the same set of measurement.
Heisenberg’s uncertainty principle is an epistemic one that states that we cannot know the value of the particle as it is in itself; epistemically we are just able to reach the value after we have conducted our measurement, that disturbs the particle, and so we can never know its ontological nature. Bohr, on the other hand, deems it indeterminacy where the indeterminable discontinuous interaction states that there is no inherent cut between the object and the agencies of observations. However, this does not mean that we cannot obtain proper values from our measurements, surely we can do that, what it does mean is that we cannot subtract the disturbance of our measuring tools upon the measured objects because there are no pre-fixed objects with inherent qualities to detect in the first place. The indeterminacy can thus be resolved by taking the measuring device into account, that is by stating its specific physical arrangement (Barad 2007, p. 114). Thus, the measurement apparatus always needs to be specified in order for our measurement to obtain good enough values. In Barad’s words: “Clearly, then, as we have noted, observations do not refer to properties of observation-independent objects (since they don’t preexist as such).” (Barad 2007, p. 114 italics in original).

The fact that Barad is merging several renowned scientists in her theorizing is an integral part of her composed methodology that she calls a diffractive methodology. Diffractive stems from the physical concept of diffraction that denotes a natural phenomenon that waves of all sorts exhibit. Thus, sound waves as much as ocean waves (as they are not particles but rather disturbances that propagate through different mediums) have the ability to superimpose one another which means that they can overlap and generate a resultant wave with higher amplitude than the original ones, or they can cancel each other out. Diffraction is a method within Barad’s theoretical framework that aims at uncovering how different differences come to matter, how they emerge, and what exclusions and inclusions they fundamentally construct (Barad 2007). There is thus no denying of the existence of differences between separate fields of interest; what is being denied is the objective differentiation as an inherent quality or property of different fields. A diffractive methodology gets its hands dirty since it is accounting for the genealogical workings of the differentiation that takes place between different disciplines. For instance, what is Foucault singling out that Bohr’s theoretical apparatus is overlooking? The diffractive methodology is also an acute alternative to the methodological stance known as reflection. Within the reflection figure the scientist is not regarded as a neutral probe that un-problematically communicates her scientific findings, rather, the reflexivity stance urges the scientist to give an account of herself and her undertakings. The assumption of observer independency is thus being called into question within the employment of reflection. However, this figure is still relying on an inherent distance between observer and observed, according to Barad, in that the scientist is conceived of as standing at a far from what is being observed. Where reflection is built upon a reverberation model, that is, sameness, a diffractive stance seeks to account for both similarities and differences that may, or may not, occur.

ii Barad’s diffractive methodology is not being employed in this thesis due to the fact that I do not find a qualified difference between qualitative content analysis and diffractive methodology. A close reading of a data-content together with picking up on un-answer questions is basically, in my view, what a diffractive approach ends up in. Thus, the equivalence with qualitative content analysis is apparent. To not take disciplinary boundaries as pre-given reifications is thus in my view a result of any acceptable qualified qualitative close reading approach. The diffractive methodology is better understood, I propose, as a necessary consequence of Barad’s theoretical framework.
To diffractively read Bohr and Foucault through one another does not, however, entail being a faithful exegete. Barad finds the need to widen Bohr’s scope of materiality when it comes to measuring devices in order for her theoretical framework to obtain consistency. One shortcoming within Bohr’s theorizing that Barad localizes is the fact that the apparatus is, paradoxically enough, deemed rather static as it is the communicability together with the reproducibility of an experiment that makes it objective (according to Bohr). The apparatus is part of the material arrangement, as we have seen, and is thus what resolves the inherent ontic-semantic indeterminacy. Apparatuses for Bohr are what make up the determinate boundary between the object of observation and the agencies of observation due to their conceptual embodiment. Now, this rigidness of the apparatus is what Barad finds quite alarming; with this determinate function of the apparatus at hand Bohr reinstalls, according to Barad, the human spectator at center stage (Barad 2007).

In order to get past this shortcoming of Bohr’s Barad turns a diffractive eye towards Foucault and his concept of discursivity. The material phenomena that is being produced in Bohr’s conceptual scheme is supplemented with Foucault’s notion of discursive practices. The resultant of this magic potion is an understanding where apparatuses do not merely embody concepts, they are discursive practices, that is, “specific material re-configurings of the world” where subjects and objects are produced (Barad 2007). The diffractive reading of the two prominent figures together is specifically apt since where Foucault grants discursivity solely to human bodies, Bohr takes into account the production of nonhuman phenomena while taking for granted the prior existence of a human onlooker (Barad 2007, p. 169). Both of these stances, in Barad’s reading, is predicated on dichotomies such as nature-culture, human-nonhuman and social-scientific. Apparatuses are what create the division between abovementioned dichotomies, that is, they are made, not pre-given. Apparatuses within Barad’s agential realism are neither socially constructed nor transparent tools of the natural world. Within the framework of agential realism the apparatus is granted an active role, in that it is not pre-determined as a detector or measurer of a specific object that we localize at a distance, rather, it is being designed as a result of its intra-action with the object in question. In the subsequent section I will spell out in more detail Barad’s notion of the material-discursive entanglement of humans, concepts and apparatuses.

A Closer Look at Bohr

For Bohr phenomenon designates “quantum wholeness”, that is, there exist no inherent cut between objects and agencies of observation. The actual physical arrangements that we employ in our scientific undertakings mark the cut between the object and the agencies of observation. Thus, our measurement practices are the discursive source out of which our concepts obtain meaning. Bohr reworked the notion of objective knowledge through reworking the notion of referentiality; within Bohr’s conceptual scheme we find the objective referent within the phenomenon itself. This stands in poignant contrast to a newtonian framework where the objective referent is placed outside of the observed object, namely, in the observer as it is conceived of as observation independent. According to Bohr we can still obtain objective knowledge with reference to ‘marks left on bodies’; that is, our actual scientific arrangements produce specific marks on bodies that the whole phenomenon in itself indicates. Thus, our giving up on the inherent distinction between objects and agencies of observation
does not necessarily lead to our giving up on objective knowledge. Instead, our objective knowledge is found to be the phenomenon itself (Barad 2007).

If this is the case, how can we vouch for the objectiveness of our inquiry without being charged with the claim of circularity? Bohr settles this matter in the form of reproduction and communication where each solid inquiry is possible to be performed owing to descriptions of the constitutive steps. So, the objectiveness resides within our scientific enactments that show the marks on bodies in specific ways depending upon the physical-conceptual arrangements in place. Instead of talking about objects with inherent and determinate properties that cognizing subjects discover due to investigation, Bohr talks about phenomena that inhabits both of these poles: the object and the agencies of observation. Within Bohr’s notion of phenomena the object is not said to exhibit determinate properties since the properties in question vary as the measurement procedure does.

Barad’s solution to the problem is to introduce her famous neologism *intra-action* which refers to the values of properties as already a part of the phenomena. The notion of intra-action aims to designate the inseparable nature of objects and agencies of observation within phenomena. The separable entities that we discover as part of the phenomena are thus always entangled and at the same time possible to cognize as distinct entities as a result of our measuring procedure. This distinctness within phenomena is what Barad deems *agential separability*, that is, the condition for objectivity that is enacted within the phenomenon through the agential cut. Agential separability is thus understood as *exteriority-within* rather than premised on metaphysical separateness. Metaphysical individualism (separateness) is the belief that the world is made up of individual objects with inherent boundaries. *Agency* is something that is being done; it is an enactment, and it is thus not an attribute that someone or something ‘has’ (Barad 2007, p. 214). When Barad is calling her theory an *agential realism* she is alluding to the agency that can be found within non-human forms as well. However, the agency is not equivalent to *intentionality* or *subjectivity*. Agency pertains to the enactment of a phenomenon or a material-discursive action.

Barad differs from Bohr in the sense that where Bohr remains within the borders of epistemological claims due to phenomena, she pushes the understanding of entanglement further when she understands the ontological nature in itself to be predicated on relations in contrast to objects, that is, in contrast to an object oriented ontology (abbreviated as ‘OOO’). The concept of intra-action aims at capturing the mutual constitution of material-discursive practices where Bohr’s demand for an unambiguous account of the discovered marks on bodies is taken care of through a description of all the relevant features of the experimental arrangement. Again, in the famous “wave” or “particle” debate that took place in the early twentieth century within the physics community, the ontological status of light was in question; is light a wave or a particle? Bohr solved the dilemma with the aid of his epistemological framings where wave and particle refer to different sets of phenomena in contrast to different kinds of objects (Barad 2007, p. 198). This viewpoint keeps the quantum theory consistent since mutual exclusive experimental arrangements amounts to mutual exclusive phenomena in the form of wave or particle; it cannot simultaneously be both. Barad emphasizes that this shift in referentiality, from an observation-independent viewpoint to the phenomena itself, constitutes the condition for objective knowledge (Barad 2007, p. 198).

It’s important to note that Barad’s critique against metaphysical individuation is premised on her relational ontology and thus targets the classical physical view as much as constructivist views that
claim adherence to dichotomizing domains (usually in the form of the ‘social’ and the ‘natural’). In Barad’s own words:

Some forms of cultural and social constructivism rely on a geometry of absolute exteriority. For example, in the inscription model of constructivism, culture is figured as an external force acting on passive nature. There is an ambiguity in this model as to whether nature exists in any prediscursive form before its marking by culture. If there is such an antecedent entity, then its very existence marks the inherent limit of constructivism. (In this case, the rhetoric might usefully be softened to more accurately reflect the fact that the force of culture ‘shapes’ or ‘inscribes’ nature but doesn’t materially ‘produce’ it.) On the other hand, if there is no preexistent nature, then it behooves those who advocate such a theory to explain how culture can materially produce that from which it is allegedly ontologically distinct, namely, nature. What is the mechanism of this production? The other usual alternative is also not attractive: the geometry of absolute interiority amounts to a reduction of the effect to its cause, or in this case nature to culture, or matter to language, which amounts to one form or another of idealism. (2007, p. 176)

Agential separability resolves the question of whether absolute exteriority or interiority reigns since the separateness of culture and nature, as two delineated domains, no longer is taken as a given.

The phenomena in Barad’s revision is thus “the ontological inseparability of intra-acting agencies” (Barad 2007, p. 206). Consequently, the phenomena in Barad’s terminology refers to both the world’s most primitive building blocks (that is, relations without pre-definitized relata) and to a specific problem at hand that is being brought about through the agential cut. Phenomena in Barad’s language costume differ thereof from a phenomenological point of view in that the subject as a pre-configured entity is being dislocated. However, as I will make manifest subsequently in this thesis, there are contact points between my reading of Barad’s philosophy and phenomenology. They do not necessarily cancel one another out.

In Barad’s reading Bohr falls short when it comes to give an account of the social dimension of scientific practices, whereas Foucault, on the other hand, grants too much agency to the discursive dimensions of scientific practices at the cost of materiality. That is, according to Barad, Foucault takes the non-human materialities as a given as he solely concentrates his inquiry to the discursive doings of human agency. Barad diffractively merges these two elaborations on materiality and discursivity together which ultimately enables her to present the notion of intra-action that inhabits the material-discursive domains of phenomenon. This is done through the reading of the two figures when it comes to how they conceive of the workings of apparatuses. The shortcoming of Foucault’s concept of discursive practices, and their efficacious workings on docile bodies, is mainly that the materiality of non-human objects is left un-theorized. It is in principal the same critique that Barad fires against Butler (see my discussion below) that also targets Foucault; what is the relationship between discursive practices and materiality? With the aid of Bohr’s insights that the materiality of particles and waves emerge differently due to different experimental settings, Barad incorporates Foucault’s
concept of discursivity into Bohr’s quantum wholeness. In other words, Foucault’s discursivity, when it comes to measuring devices, is reconfigured as an enactment that also includes, as an inherent part, the materiality of, both, the apparatus and the object under study. The main difference between Barad’s understanding of the entanglement of matter and discourse and Foucault’s orientation towards the same is to be found in the ontological dimension of Barad. Hence, it is the ontological entanglement, the ontological inseparability of intra-acting agencies, of matter and discourse that works efficaciously on all kinds of bodies that Barad incorporates into her theoretical framework.

Piezoelectric Crystal and the Making of a Baby

A vivid example of how the material and the discursive gets their hyphenated status of material-discursive is when Barad compares Foucault’s concept of power workings on the body to a piezoelectric crystal (Barad 2007, pp. 189). Since Foucault’s notion of discursive power is transmitted through the workings of docile (and not so docile) bodies, the parallel to a piezoelectric crystal, and how it is being used within obstetric sonography, is as telling as it is elegant. The piezoelectric crystals capacity to emit electric signals while exposed to pressure is what is granting its use within, among other things, ultrasonography. Conversely, the piezoelectric crystal will undergo deformation, that is, it will contract or expand when subjected to an electric signal. The crystal thus has a dual use since it works both as a receiver and a transmitter. Barad is using the piezoelectric transducer as an example of how the material-discursive practices of ultrasonography always contain both sides of the hyphen. The technology that produces a fetus on a screen can surely be described as one of today’s iconic notions when it comes to observation. The fetus is from the outset ascribed not only traits but functions together with gender qualities. And even though the mother, or the host body, is not visible among the moving pictures on the screen (as a whole that is, of course she is present in the screening since she is the bunkeriii wherein the fetus resides), she is not being freed from the process of ascription; bad motherhood comes in handy when the fetus shows signs of disability or illness due to the “mothers behavior” (I will return to this matter shortly). If we apply an agential realist understanding of onto-epistemology upon our observing devices it becomes quite apparent that we are not dealing with clear cut or idealized surveillance apparatuses; the piezoelectric transducer does not simply present us an image of a fetus on a screen that we can observe, nor does it offer constraints on what there is to see; instead the transducer both produces and is part of the image on the screen (Barad 2007, p. 202). Consequently, the knowing in being, that the concept of onto-epistemology seeks to make manifest, is utterly determined through the entanglement of the object of study and the agencies of observations. Here is also where we find the production of knowledge; since what we can know is dependent upon what we are, and ultimately what scientific apparatuses we employ, the resultant knowledge is solely determined by the agential cut.

Remember that the objective referent in Barad’s framework lies within the phenomenon itself rather than in some safeguarded external cloak that only a few initiated has access to. With this in mind

iii The body could for instance be referred to as a “bunker” if we are talking about altruistic surrogacy. The point is that there cannot exist pre-determined conceptualizations.
Barad proposes that we dwell on the thought what would happen, what would be the actual case, if we trade in the “fetus” as an objective referent for the phenomenon at large? (Barad 2007, p. 203). That is, the usage of “fetus” is usually understood to be the object under study within obstetric sonography, which, as we have seen, is not the same thing as the objective referent (Barad 2007, p. 202). This conceptual shift has far reaching consequences since the phenomenon of which the fetus is a part is a production of multiple intra-actions predicated upon material-discursive practices. With this example at hand it is hard to deny how our metaphysical convictions determine the way we view reality. The fetus is no less real within the framework of agential realism it is just not the sole object of observation with a capital O. I will return to this matter and investigate it further below.

With this example Barad aims to demonstrate the shortcomings of Foucault’s framework when it comes to how discursive practices operate and regulate the individual body. The discursive can never be separated from the material within the scope of agential realism; they are intertwined, entangled, never to be fully articulated without the other. However, this is not equivalent with claiming that the material-discursive floats free of boundaries or properties; of course we can tell them apart (within the phenomenon through the agential cut, more precisely the agential separability within the phenomenon. I will return to this matter shortly) the transducer is not the same thing as the fetus or the physician for instance, we can easily view them as separable entities. Nonetheless, they are co-constitutive of the emerging phenomenon, that is the phenomenon is a part of reality that determines how we regard, for instance, healthy fetuses (the curve is all right), good mothers (the curve is all right), absent fathers (where is your bloke? Is he at work?), shaky physicians (took some time to get the gel out nicely didn't it?), or whatever it may be.

What is more is that Barad is reworking the entire notion of causality; agential realism contains a causal mechanism that works along the lines of intra-actions, which means that the specific measurements that we employ, our agencies of observation, discovers “marks on bodies” (the effect) since our agencies of observation constitute a measurement of specific features of the object (the cause) under study. Moreover, the causality within the frames of agential realism is non-deterministic as a result of exclusions due to the enactment of a particular cut. To put it bluntly, with the aid of the piezoelectric transducer above, the cause of the ultrasound can be said to be the fetus on the screen, and the agencies of observation is made up of the technology and physician in place. Due to the agencies of observation we are able to spot the living creature on the screen. However, if the sole reason for undertaking this screening is to make sure the fetus is well, we are thereby excluding other factors such as the mother’s blood count for instance (which also needs to be stable in order for the fetus to remain “well”). Thus, the way we choose to enact our cut forecloses other ways of intra-acting with the phenomena in question (since the phenomena is dependent upon the cut). In this manner the causality is said to be non-deterministic since the agency, residing within the phenomena, is an open-ended question. Key to remember is that within agential realism nothing is observer-independent, all the values that we extract out of an observation is a direct result of our agencies of observation, that is, our measurement procedure. Here we can also see how Barad’s notion of intra-action, which differs from inter-action that presumes two distinct entities prior to the experiment at hand, dislocates the objective referent in the shape of an observer-independent position and replaces it with the phenomenon. Thus, our objective referent is the phenomenon at large in contrast to an observer-independent viewpoint.

Another example that comes in handy when we want to display how different agencies gets excluded
and included depending on the material-discursive practices at play is the abortion question. Opponents of abortion make a case against it on the grounds that the fetus is a living subject; abortion is equalized with murder since the fetus is presumed to be a living creature installed with agency. The referent that these opponents use in their line of argumentation is thus predicated on the ultrasonography as presenting a clear cut object-subject of study, in this case the fetus. When the fetus is viewed upon in this manner it forecloses other factors that may, or may not, be crucial when it comes to determine the phenomenon in place. What happens for instance with the mother? Isn’t she also a clear-cut subject installed with agency? What happens if she wants to go through with an abortion? How do we determine which agency trumps the other? Fortunately, agential realism do not commit us to choose between the fetuses' and the mothers agency, as it were, nor does it force us to place the objective referent in a clear cut object separated at a safe distance from the agencies of observation. This division is, as we have seen, non-existent within the frames of agential realism, and it is this move that grants agency to the phenomenon as a whole, rather than picking out a few “inherent parts” of the phenomenon and install them with agency at the expense of other components.

For Barad reality is what phenomena are constitutive of. Part of Barad’s understanding of phenomena is, as we have touched upon, that the apparatuses are not mere observing equipment but agentive in that they make up boundary drawing practices. But this is not the whole story; apparatuses are themselves phenomena since they are material-discursive and thus constituted by specific intra-actions. Barad is quick to assert that this does not turn phenomena into some sort of ideal entity since what it boils down to is specific configurations of the world. What is being described and captured by Barad’s ontological agential realism is not the “realness” behind well-defined objects in the world, nor nature in itself; rather, it is our intra-active practices, which is part of nature, that is being outlined (by our agential cuts). Thus, reality brings about a strong ethical implication since it comes with the task of providing correct descriptions of that reality (phenomenon) of which we are intra-acting. This is reminiscent of Haraway’s (1997) plea for accountability within situated knowledge. In other words, we need to give an account of what we are doing in order for our presented phenomena to obtain the status of being “real” at all. Hence, the importance of the diffractive methodology that is part of Barad’s framework as a whole.

**Barad and Performativity**

Judith Butler is another theorist that Barad is engaging with diffractively in order to spell out her agential realism. Butlers understanding of how matter and discourse are intertwined is subsumed under her concept of *performativity*. However, the link between matter and discourse is under-theorized within Butler’s scope, according to Barad, and this is why she is picking up the concept and meshing it with her posthumanistic insights. In what follows I will discuss in what manner Barad outlines Butler’s understanding of performativity and how she ultimately solves it.

Butler’s theoretical concept of *performativity* rests upon an understanding of iterative citationality that both regulate and designate the sexed body. The performative doing of gendered beings take different routes depending upon within which discourse the doing is taking place. For instance, “sex” is
conceived of differently if it is extracted from the domain of “mature women” or “queer boys”. By the same token sexed beings can be conceived of differently if the interpretation takes place within different frameworks, or in Butlers own words: “It must be possible to concede and affirm an array of ‘materialities’ that pertain to the human body, that which is signified by the domains of biology, anatomy, physiology, hormonal and chemical composition, illness, age, weight, metabolism, life and death. None of this can be denied” (quoted in Barad 2007, p. 211). This, however, is not in accordance with agential realism since its theoretical texture does not include different kinds of materialities. More to the core: Barad’s contention is that our inquiry should not start with pre-given entities that attain their meaning through different kinds of discourses. There are no different-in-kind materialities in the sense that they attain different qualities, or layers of meaning, depending upon which discursive contexture that embeds them. If we keep with this line of thought we are still dwelling within the dichotomizing boundaries, the same ones that we sought to deconstruct with our agential realist account. What is needed is an account of the differentiating practices that are being enacted in the first place; how we enact the agential cut(s) bring about the same responsibility.

So, the main difference between Butler and Barad is the role assigned to matter and materialization; where Butler remains within the demarcation of linguistic discourse, Barad is widening the radius for materialization by merging it together with discursive practices. In this way there is no telling the discursive practices from the materialization processes since they are already part of the same phenomena. Matter is not postulated as an analytical category that lies at a safe distance from our discursive practices in the form of an external referent point; this would be to invoke matter as a part of something that is beyond reality, which is just as banal as it is inconsistent. To reinstate matter as brute nature is thus not the way to go about according to Barad. But what is this matter then if it is not brute…matter? Matter is first and foremost never delineated in itself; there is no such thing as pure brute matter in as much as matter is always already a part of our discursive practices. Barad explains that the notion of material-discursive practices entails an understanding of matter and materialization in terms of the causality of intra-actions. Barad posits no different sets of materialities (that Butler proposes according to Barad) due to her understanding of materiality as always also discursive; the discursive regulative norms and constraints have an efficacious effect on material bodies because they are causally linked to one another (p. 214). If we consider Butlers (1990; 1993) example of child interpellation that starts upon birth, where the infant immediately is ascribed gender qualities, Butler understands this as iterative citationality, a performative doing that thus constitutes the subject through its actions. The regulative and discursive norms that interpellate the subject have a materializing effect on the subject insofar as it strives for recognition and reward. The discursive constraints thus affect the body as a part of the subject in discourse. However, the question whether the materializing process is something other than, or a part of, discourse remains underdeveloped. Barad localizes a pressing question that fails to get addressed within Butler’s framework: how does the connection between matter and discourse work? The main complaint that Barad fires against Butler is her “reifying” of different kinds of material categories without doing the important genealogical analyses how they came about in the first place. Within Barad’s framework the connection between matter and discourse loses the “mystery” burden that weighs heavy on Butlers theory; there is no mystery when it comes to how matter effects discourse since they are always intertwined. Hence, within Barad’s framework the discursive embodiment is the materializing instantiation; the difference in contrast to Butler is that Barad is ontologically merging the discursive and the material while Butler remains within the linguistic realm. As I understand Barad’s reading of Butler it’s primarily Butler’s reification of different material categories, at the outset, that grants discourse active agency over matter; thus, matter remains mute (and brute?) due to Butler’s positing
of different materialities as a result of different discursive contexts. This causal link is denied by both Butler and Barad, but as Barad shows in her reading of Butler, the link between matter and discourse remains highly underdeveloped within Butler’s framework, and, moreover, it evokes the dualism between nature and culture even though Butler’s articulated goal is to overcome it. The material and the discursive are hyphenated within agential realism since they are always intertwined. As we have seen with the help of Heisenberg and Bohr above, we now understand in what sense they are intertwined.

**Agency**

All intra-actions contain agency of some sort, so what does agency purport to within Barad’s agential realism? Agency is an enactment and not something that someone or something ‘has’; it is not an attribute but a doing. It’s commonplace to install agency with meaning pertaining to subjectivity and intentionality; however, this is not what agency according to agential realism pertains to since the agency is an enactment it can be distributed over non-human forms as well. Therefore, it’s a mistake to confuse agency for subjectivity and vice versa. This is a common mistake that critical readers of Barad commit themselves to when they read agency as synonymous with intentionality and/or subjectivity (I will discuss this interpretation of Barad in a later section).

Barad makes the point even more poignant when she discusses fetal agency in terms of fetal enactment which includes the intra-acting pregnant woman with the apparatuses of bodily production. She uses the example of the political theorist Monica Casper who is reluctant to ascribe agency to fetuses on the grounds that it forecloses the opportunity for agency in the pregnant woman. Casper seems to end up in the conclusion, according to Barad, that you are only accountable to that which you grant to be an agent. Thus, in Casper’s case she ascribes agency to the mother at the cost of the fetus. Barad asks what consequences this foreclosure of fetal agency might amount to with reference to ‘girled’ fetuses that are aborted or murdered upon birth (Barad 2007, p. 216). Her point here is to show how narrow and problematic the conclusion turns out to be due to aforementioned reified categories. A fetus cannot simply be said to be an agent in some cases where in others it is not; how can we even begin to decide which contextual parameters determines the fetuses' agency? As we have seen, Barad circumvents this problem altogether when she posits the world’s most primitive building blocks to be made out of relations in contrast to objects. There are no fetuses that either do or do not have agency, since agency is not an eigenstate but an enactment, a doing, which emerges through the material-discursive practices. In cases where the fetus is constructed as a free floating object which reaches our human eyes as a result of the all-seeing-eye of science, objectivity is assumed to be an integral part of the science practice in question as it is seen from the view of the human. That is, the practice and agency that includes the material-discursive constrains are occluded at the outset. This is tied to the agency question since agency is taken to be an inherent part of the observed object (in this case a fetus) determined by the focus of the observation. Where Casper assumes that the pregnant women is stripped of her agency due to the postulation of fetal agency, Barad deems the reduction of
pregnant women to mere containers as a result of the object-subject distinction that aligns agency with subjectivity (Barad 2007, p. 217). The crucial point for Barad is to view the fetus in relation to its objective referent, that is, view the fetus as a phenomenon that arises through specific agential cuts. That the fetus “kicks back” is thus not the same as fetal subjectivity. With the aid of Donna Haraway’s critique of spatialization, a view that takes intricate processes and reify them as things inside containers, Barad wants to explore new ways of theorizing space, time and matter (Barad 2007, p. 224). The abovementioned new ways pertains to her agential realist materialist account of power and its effect on the production of bodies. Matters dynamism is to be understood as an entangled process with shifting relations rather than a property of things.

For Barad the concept of agency is tied to the concept of space and matter; in chapter six of Meeting the universe she explores the possibilities of dislocating the container model of space together with the reification of matter and the spatialization of time. Barad undertakes this exploration through the diffractive reading of the political theorist Leela Fernandes’ work on a Calcutta jute mill (Barad 2007, pp. 224). Barad proposes that we view the shop floor within Fernandes’ work as a mix of intra-acting material-discursive apparatuses of bodily production. The material apparatuses are not an external force that work on bodies from the external outside, rather, they are part of the produced bodies through which power manifests its effects. Apparatuses are not equivalent to objective lenses that we apply on observed objects. They are part of the configuration of the observed phenomena. This echoes Barad’s appropriation of Bohr’s critique earlier against concepts of measuring devices within classical physics where the apparatuses are designated as something external to the observed object and thus already as steady in place. This is most vividly shown in Barad’s reading of Fernandes’ take on marxist conceptions combined with poststructuralist conceptions of class, work and gender. Fernandes’, in the reading of Barad, does not start her survey with reified categories of class, work and gender; rather, she construes the categories through one another while investigating how they emerge and negotiate with the material surroundings in place. Barad diffractively reads Fernandes’ through Bohr, Butler and Foucault in order to shed light on the workings of a diffractive approach. As we have seen a diffractive methodology presumes no separate domains of inquiry as already steady in place; insights from the cultural field, the social sciences and natural sciences are meshed together since the demarcation between these realms are blurred for the sake of obtaining knowledge with wider scope. Moreover, the interlaced insights that Barad harvests from social and natural theories make up an integral part of her understanding of specific entanglements; thus, we can never reify different realms of study at the outset, rather, we must diffractively look into how the dividing lines come about genealogically. In the next section I will discuss Barad’s conception of entanglement closer up. Up until now I have invoked it in relation to my discussion of material-discursive practices, but the reality is that entanglement is a key concept within Barad’s terminology that I will outline next.
Quantum Entanglements

We know that matter and discourse are entangled within the frames of agential realism. The relation is hyphenated as material-discursive practices. It is something that is being done, rather than something that is pre-existent as such. Now, this is something that Barad harvests from feminist science studies, queer theory and quantum theory; it is now time to outline her quantum context at length.

The Danish physicist Niels Bohr is a key figure within Barad’s writings, and in her *Meeting the universe* she delineates the discussion that took place between Einstein, Podolsky and Rosen, on the one hand, and Bohr on the other. Barad also includes other heavy physicist names such as Schrödinger and Bell. I will describe the events that circulated around the quandaries of quantum formalism, and how Barad, with the aid of Bohr, ultimately presents a new view regarding the “measurement problem” within quantum physics.

In order to grasp this we need to sort out what an entanglement is. An entanglement is really the same thing as a superposition. A superposition is a part of a wave function which means that when for example two waves (it can be ocean waves) overlap their respective amplitudes combine and results in an combined amplitude. The resultant wave is a superposition which means that it is a linear combination of the component waves (Barad, 2007: 255 pp). Keep in mind that it is a difference between superpositions and mixtures. Superpositions are disturbances that propagate in different mediums whilst mixtures designate localized particles. Superpositions and mixtures leave different objective marks.

In 1935 Einstein, Podolsky and Rosen presented a paper pertaining to demonstrate a flaw inherent in the quantum formalism, as it was outlined according to the Copenhagen interpretation. Their objection, which is most commonly known under the heading of the EPR paradox, suggests that in order for the QF to be true, its postulated variables must represent physical reality.

Let us say that we have a system of energy that produces an electron and a positron, that is, the system is responsible for a so called pair production. Alice is in charge of measuring the spin of the electron, while Bob is in charge of measuring the spin of the positron. Let’s assume that Alice measures the spin along the z-axis and discovers that the spin is “up”. Now, Bob knows, without performing any measurements of his own, that the positrons spin along the z-axis is “down”, that is, without in any way “disturbing the system B”. They are (anti)correlated. The EPR paradox asks how this seemingly instantaneous communications is possible, that is, how can the positron know that the electron has been measured along the z-axis? The EPR suggests that there are two possible answers to this question: a) instantaneous communication at a faster than light speed, which is a violation against the theory of special relativity, is taking place (that is what is called a violation of locality), or, b) there exists some hidden variables that governs the electrons and positrons behavior in such a way to ensure that they are always entangled with one another. Obviously the EPR paradox suggests that a violation of locality is outright wrong, and that there must be some hidden variables that govern the outcome. Hidden variables are practically the same as inherent properties and are thus premised upon
metaphysical individualism, that is, it has a built in supposition that each particle has a pre-determined set of traits.

In Bohr’s response to the EPR paradox we find that the question of “disturbance” is not an issue for Bohr, in fact it is a “red herring” (Barad 2007, p. 274). The real issue lies within our understanding of the “objective resolution” when it comes to make a distinction between objects of investigation and agencies of observation (ibid.). The “ontological indeterminacy” between objects of investigation and agencies of observation is resolved due to specific experimental arrangements. This is why the notion of phenomena contains both of the realms of objects of investigation and agencies of observation, since they are entangled with one another to the extent that they make up the agential cut in question. If our experimental set up is changed in any way, then, correspondingly, so is our cut between object and agencies of observation.

The EPR paradox contains a fuzziness regarding “physical reality” since the properties of the objects, that they presume exists with inherent qualities at the outset, cannot be said to exist, without ambiguities, outside of any experimental realm. “[S]ince they use different experimental arrangements to measure different complementary variables, there is an essential ambiguity in their criterion of physical reality” (Barad 2007, p. 275).

This debate between Bohr and Einstein contained what has been known as the measurement problem within quantum formalism. As we have seen the EPR paradox seeks to demonstrate how the supposition of instantaneous communication between separated atomic objects must be incomplete, it must be something else that is taking place (the hidden variables). In order to get to the core of what Barad is building up to here we need to include the austrian physicist Schrödinger whose cat is probably more known than him.

**Schrödinger’s Cat and the Measurement Problem**

In the famous Schrödinger cat paradox the physicist Erwin Schrödinger presents a quandary residing within the measurement procedure of quantum formalism. Schrödinger proposed the paradox in the same year as the EPR paradox above, namely in the year of 1935 (Barad 2007). The cat puzzle goes like this: a cat is penned up in a steel chamber together with a geiger counter and a radioactive source. If the geiger counter detects that one of the atoms has decayed a hammer is arranged to smash a bottle into pieces—a bottle containing hydrocyanic acid as it happens. Thus, the cat’s state is entangled with the state of the atom; if the atom decays, the cat dies, if the atom does not decay, the cat lives on. The whole event is constructed so that the cat’s fate is entangled with the unfolding microscopic event of the atom. Now, the wave function that expresses the system at hand, with the cat’s entangled state with the atom, would look something like this:
Where $|c_a|^2$ and $|c_b|^2 = \frac{1}{2}$ which means that there is a fifty percent chance of either outcome. What Schrödinger wants to direct our eyes at with this cat example is the fact that without a proper measuring equipment at hand we cannot determine which state the cat is in. We would have to open the chamber in order to find out the current state of affairs. This is the point the Barad is trying to make in conversation with Schrödinger’s incarcerated cat; we won’t find the cat in the state of both being alive and dead at the same time, we will find it being either dead or alive. That is, we will not find the cat in a superposition of conditions, and this is equally true of microscopic objects such as atoms. Once we measure its condition, or eigenstate, we find it in one of the eigenstates rather than in a superposition of eigenstates (Barad 2007, p. 280). The matter to settle for Schrödinger and Barad is thus how to account for the transition from a superposition to a mixture. This transition is sometimes referred to as a “collapse” which basically means that when the transition from a superposition to a mixture takes place the superposition “collapses” into one specific state (that we can measure). It has been heavily debated whether this collapse is governed by physical reality or if it should be regarded as a mathematical addendum (Barad 2007). We do not need to get into historical details at this moment, however, I do want to stress how Barad with the help (again) of Bohr settles the matter of measurement within QF. For Bohr it is not the case that a collapse occur, nor is the transition best captured by von Neumann’s mathematical addendum, in fact, there is no transition taking place at all! Barad make a case for this notion of Bohr’s with reference to a fairly recent experimental finding within the lab. The experiment that Barad is alluding to is nothing less than the quantum eraser experiment. In short, the experiment is a modification of the double-slit experiment that we are already acquainted with, but this time before the atom passes through the barrier a laser beam will excite it, causing it to leave a photon in one of the cavities that is has to go through on its way to the screen. Between the two cavities is now placed shutters that can either be opened or closed. The combination of the detection of the photon and the shutter system makes it possible to erase the “which slit” information. If the shutters remain closed we end up with a scatter pattern on the screen. If we, on the other hand, open the shutters something different will happen, namely, now it’s a fifty percent chance that the photons will be detected and a fifty percent chance that they won’t. If we keep track of the atom whose emitted photon is detected by the photodetector then an interference pattern will emerge on the screen.

What the experiment of the quantum eraser ultimately makes manifest is Bohr’s notion of complementarity. Complementarity means that there is a necessary trade-off between which-path information and wave behavior since the experiments demand different experimental arrangements that implicates that we cannot draw any sharp distinction between the atomic object and the measuring devices that we employ in order to monitor them. The findings of the quantum eraser experiment is only found to be “mysterious” on the grounds that we regard the atomic object as delineated in itself before the experiment is being conducted. If we, however, regard the atomic object as entangled with our devised measuring devices then it becomes clear that the postulated line that marks the cut between object and observation is being enacted through our agential cut. There is no inherent cut. In Bohr’s and Barad’s notion the objective referent is not to be found in the separate atomic object, rather, it is to be found in the phenomenon (which includes “the micromaser cavities, the photodetector-shutter system, the double slit diffraction grating, the screen etc”). Barad puts it thus:
Indeed, it is the quantum entanglement between the ‘object’ and the ‘agencies of observation’, in this case, between the atom and the apparatus that is precisely what we need to attend to in making the interference pattern evident. [...] If one focuses on abstract individual entities the result is an utter mystery, we cannot account for the seemingly impossible behavior of the atoms. It's not that the experimenter changes a past that had already been present or that atoms will fall in line with a new future simply by erasing information. The point is that the past was never simply there to begin with and the future is not simply what will unfold; the ‘past’ and the ‘future’ are iteratively reworked and enfolded through the iterative practices of spacetimemattering— including the which-slit detection and the subsequent erasure of which-slit information— all are one phenomenon (Barad 2007, p. 315 Italics in original).

While discussing the example of the quantum eraser experiment Barad seeks to demonstrate in what manner the entanglement of objects and agencies of observation should be understood as an ontological claim. Where both Schrödinger and Bohr remain within epistemic limits Barad urges us to view the results from the quantum eraser experiment as an instance of ontological entanglement. In the experiment the objects and agencies of observation are entangled due to the fact that the interference pattern emerges as a consequence of the erasure of the which-path information. Barad argues that the fact that the interference pattern returns once the which-path information is being erased shows that the quantum coherence was not “collapsed” into a mixture by the which-slit investigation (Barad 2007, p. 344). Hence, in Barad’s theoretical framing, there is no collapse taking place of the entanglement upon measurement, it’s an agential cut, and that is what needs to be fully accounted for.

‘Observer’ and ‘observed’ are nothing more than two physical systems intra-acting in the marking of the ‘effect’ by the ‘cause’; no human observers are required (though ‘humans’ may emerge as being part of practices). And objectivity is not defined in reference to a human observer: it is not merely about what humans can do to facilitate unambiguous communication about laboratory results. […] Accountability to marks on bodies requires an accounting of the apparatuses that enact determinate causal structures, boundaries, properties, and meanings. (Barad 2007, p. 340)

The human subject is an intra-active agent in the same sense as the system that is being investigated. This is the main consequence of Barad’s theory when it comes to human subjects as not being regarded as a special system. The subject is, in the same vein as physical systems are, constituted through different intra-actions, and this is why the subject as an intra-active part of the phenomenon needs to be accounted for by the same token (Barad 2007, p. 340). Bohr does not follow through on this thought even though he touches upon it several times in his writings (Barad 2007). That is, even though Bohr acknowledges the quantum inseparability he still draws on the human as already steady in place within the laboratory operation. And it is this assumption that Barad deems as stuck within a
humanist orbit. In her view the human is not pre-given in the same way as no phenomena is pre-given.

“In my naturalistic conception, knowing is a physical practice of engagement, and as with other physical processes, there should be an account of it within our scientific theory.” (Barad 2007, p. 342)
In Contrast to Other Readings

In this section I will carry out a few readings of interpretations of Barad that have influenced the general reception and understanding of her theory of agential realism. The reason I choose to go about in this manner is due to my fascination of her entwinement of matter and discourse, and how also particularly this move has caused multiple renderings of her. Primarily it’s the concept of ‘matter’ that haunts the interpretations of my choosing. I deem it interesting to undertake such an analysis on the basis that it makes no difference whether the interpretation is benign or unfavorable, they all get stuck in Barad’s notion of matter, some way or another. That is, I will demonstrate in what fashion these readings of Barad seems to take her entanglement concept in a colloquial sense, and thereby foreclose an understanding that take material-discursive practices as part of the same phenomena without granting either side (there really are no sides) too much power, or agency. Thus, my overall aim of this section is to present a reading of Barad that unlocks the reification of the concept of ‘matter’.

Entangled Readings

In my view, it is crucial to read Barad’s notion of entanglement within the context of quantum physics. “Entanglement” is thus to be understood as quantum entanglement. Just as the subheading of her magnum opus suggests: quantum physics and the entanglement of matter and meaning we cannot afford to take her concept of entanglement outside of its origins without taking full account of it. This is not to suggest that we cannot extract the concept of entanglement from Barad and modify if for our own current purposes, of course we can, however, we cannot extract the entanglement-concept, as it is understood within the range of quantum physics and, haphazardly, apply it onto domains of inquiry that uses/understands the entanglement-concept in a colloquial sense. This is how Barad puts in an article with the rubric “Nature's queer performativity”: “Phenomena are entanglements of spacetimemattering, not in the colloquial sense of a connection or intertwining of individual entities, but rather in the technical sense of ‘quantum entanglements’, which are the (ontological) inseparability of agentially intra-acting ‘components’” (Barad 2012, p. 32).

I will subsequently in this paragraph also evaluate Sara Ahmed’s critique of Barad as it comes across through her reading of new materialism. I believe that this is an important reason why Barad has been (mis)read in such a manner: interpretations of Barad’s framework that have had the most impact, to my knowledge at least, is to be found within the readings of new materialism (Ahmed 2010).
It is important, as we have seen, not to lose track of the objective referent as part of the phenomenon. A unilateral understanding of ‘materiality’ unfortunately ends up doing just that. In one sense my choosing of the word “unilateral” is a bit unfair since these interpretations are everything but shallow. However, I do want to persist in my view that they are unilaterally putting their focus upon ‘matter as matter’ in their employment of Barad, to the degree that they invoke the old dichotomy of nature/culture, and reverse it (Ahmed 2010). Thus, ‘matter’ usurps the discursive together with the subjective and the notion of Barad’s material-discursive intra-active entanglement goes missing in action.

My purpose is thus to spell out these readings under different headings that I have found to be quite useful devices during my read through. These are, in turn, Critical voices and In a Swedish pedagogical context. These are not stable groupings, obviously, but will work perfectly for my aforementioned intent of this section.

**Critical Voices**

In this first grouping that I have labeled Critical voices I will take you through some readings of Barad that due to their granting of too much agency to matter turns matter into a hollow concept; it becomes everything and nothing at the same time. First runner up is the philosopher Chris Calvert-Minor (2013) who reads Barad’s call for the merging of the material and the discursive as aligning agency with subjectivity. Calvert-Minor understands Barad to be reluctant to grant agency to humans while ‘matter’ is granted too much power. Calvert-minor even identifies it as “key” within Barad’s agential realism. Now, it is certainly true that Barad posits matter and its dynamism as an agentive force, but matter is never delineated in itself, it is always as part of a phenomenon, that is because she works consistently against dichotomies where matter/culture can be viewed as the most pervasive one. Calvert-minor is especially keen to find out how the “objective” in Barad's usage of ‘objective referent’ can do its acclaimed job since “the objective referent for observed properties is not contextually defined object (e.g., the electron that hits the photographic plate), but the entire phenomenon because one cannot make a priori distinctions between matter within phenomena before that matter engages in its own ‘agential separability’” (Calvert-Minor 2013, p. 129). As we have seen agential separability is not something that “matter” does “on its own” as Calvert-minor puts it, rather, agential separability is the exteriority within the phenomena, the cut that the agencies of observation (together with the subject) enacts as it intra-acts with the observed object in question. I used Barad’s example of ultrasonography above to highlight in what manner agential separability can make itself visible as a part of a phenomena. We saw that referents to a phenomena does not mean referents to “the whole universe” but refers to the observation instead of claiming the objective referent to be the actual fetus itself. Now, we could also see, with the aid of that example, that this does not mean that Barad is deeming the fetus irrelevant for proper investigation; she did the opposite, in fact, when she went against Monica Casper who ascribed the pregnant women agency at the expense of the fetus. Barad’s solution to this macabre “choice” of Casper’s is to show how an agential realism does not align subjectivity with agency, and that it is this alignment that strips the pregnant women of her
agency within abortion movements. In other cases it is the ‘girled’ fetuses, as we saw, whose agency gets occluded at the outset due to economical, political, gendered and cultural material-discourse. This is Barad’s point: that we shall not take the fetus as a delineated object/subject as it is in itself because, with the above mentioned examples at hand, we can clearly see that there is none. There are always phenomena, and to view the phenomena as an objective referent we are obliged to communicate our cuts together with the “marks on bodies” that we, through our cuts, enact. It is through this move, by shifting our point of referentiality, that we circumvent running the risk of referring to “the whole universe”.

Thus, to view the objective referent as a part of a phenomena is not to escape the subjective elements, there is always someone who is making the cut, for instance, Barad’s point is just that it’s never solely the subject who determines the outcome of the cut since our measuring apparatuses decides, together with the object under study, how the cut will be enacted. This is what her denying of absolute exteriority entails; we cannot beforehand state that there are objective points in space that make up a safe spot for certain knowledge-making, as the classical Newtonian logic presumes. This is also what Bohr goes against in his epistemology when he states that we make up the experimental setting in tune with our measuring devices. The object under study does not preexist as such with determinate inherent properties for us to discover since we are also always part of the undertaking. Thus, marks on bodies as much as the communication and reproduction of an experiment is highly present even within Barad’s theoretical framework. Where she modifies Bohr is for his shortcomings when it comes to the rigidity of the apparatus. But this is not a fatal flaw for Barad since she is easily supplementing it with the help of Foucault’s discursivity concept, as we have seen above.

Further down in his text we come across another clue as to why Calvert-Minor understands Barad to be dislocating the human cognizer and discursivity altogether. He writes: “Rather, matter is given a much more prominent epistemic role within the practices of phenomena” (Calvert-Minor 2013, p. 130). In several places in Meeting the universe Barad states, explicitly, that matter is not something that trumps the discursive in the form of some idealized category well hidden from our subjective view. It’s quite the contrary. For instance in chapter three of Meeting the universe Barad states: “Any attempt to reinstate materiality as ‘natural’- as brute positivity or the essential givenness of things – would be exposed as being quite bizarre, since this would be to assign materiality to a place outside the real (i.e., it would be to lose track of the objective referent)” (Barad 2007, p. 211). It’s quite apparent that Calvert-Minor has not fully grasped Barad’s entanglement concept that she extracts from quantum physics. The concept of entanglement is, and I say it again, key within Barad’s work since it aims at re-figuring matter and discourse as parts of the same phenomena. It is hard to grasp, and one of the reasons for this is, I believe, that our OOO is both quite useful and ubiquitous when it comes to telling us apart from trees, stones and other people. It’s obvious that we can, thank goodness, so why state that everything is ultimately grounded within relations in contrast to delineated objects (or subjects)? Barad’s relational ontology does not deny that we can tell each other apart, or that cats are not the same thing as yellow tulips. What it does say is that we cannot start our surveys with reified categories in the form of already at hand delineated objects with ready made properties. Then we have arrived too late. The above mentioned example regarding Heisenberg and Bohr’s quandary over the impact of measurements demonstrates just that; where Heisenberg stopped to conclude that our knowledge couldn’t reach any further, Bohr showed that it is only stopped as a result of the usage of classical physical concepts that turned out to be at odds with new empirical findings. Bohr concluded thus that it is our concepts we have to change in accord with our new empirical findings since they are entangled. And, what is more, Barad’s relational ontology is not
predicated on some “apriorism” (that Calvert-Minor assumes) it is based on specific empirical findings within quantum physics, feminist science studies and queer theory. Barad’s agential realism is premised on intra-actions that seek to overthrow the good old Newtonian metaphysics that posits observer-independency. Thus, with this in hand, it’s hard to end up where Calvert-Minor does claiming that Barad is dislocating the subjective element within our scientific endeavors. We are present but we are not all there is.

**Matter Understood as a Category**

The philosopher Sara Ahmed (2010) is frequently being called upon as a fierce critic of the movement known as new materialism (Hultman 2011; Dolphijn & Tuin 2010; Palmer 2010). Her focus of criticism is placed upon the invoking of matter within new materialism as a category installed with novelty. Certainly the move to engage with the category of matter is installed with novelty, and this is ultimately what Ahmed is questioning: “I would argue that the very claim that matter is missing can actually work to reify matter as if it could be an object that is absent or present. By turning matter into an object or theoretical category, in this way, the new materialism reintroduces the binarism between materiality and culture that much work in science studies has helped to challenge. Matter becomes a fetish object: as if it can be an ‘it’ that we can be for or against.” (Ahmed 2010, p. 35). This I couldn’t agree on more when “matter” is being called upon as a category of analysis that we can be either “for or against” the discussion has gone off track. And, what is more, it has definitely lost track of Barad’s view on matter, as we have demonstrated clearly already. The criticism that Ahmed fires against new materialisms founding gesture is thus something that I fully support, but at the same time maintain that it does not affect Barad to the same extent, if at all. This is because Barad does not posit matter as a category, in fact, she is developing her chain of reasoning based on concepts that are entangled and thus never delineated in themselves. Barad is ontologically merging the material with the discursive through her use of the hyphenated material-discursive.

I read Ahmed as justified in her critique against new materialism especially the one directed at their claim of novelty. This novelty, as Ahmed shows, is deemed novel through the positioning of former scholars, Judith Butler in particular, as being against biology and matter. Now, how you can even begin to be against biology or matter, as Ahmed so eloquently phrases it, presumes an opposition that is hard to detect. Butler is hardly against biology; she is against *biological determinism* which is something else. Ok, so we settled that matter (no pun intended) what about the dualism thing? This nut is a bit tougher to crack since it is tricky, in my view, to determine which kind of dualistic thought that is benign (Bergson and Deleuze are deemed as doing just fine) and which kind that is not. When Butler, for instance, deconstructs the gender/sex-dichotomy she is being criticized by new materialists on the basis that she is remaining within the modernistic framework inasmuch as she is picking up on a dualism that modernism itself generated (Dolphijn & Tuin 2012). Instead of picking up on modernisms dualistic train of thought, one should rewrite it and traverse it:
It is precisely by thinking through sexual difference to its remotest aspirations, thus alluding to difference as structured by an affirmative relationality, that Beauvoir came to produce the revolution in thought that has made her famous, and infamous, for constituting feminism as a rewriting of modernity, that is, feminism-as-differing. Beauvoir thus exemplifies a new materialist take on difference, since by traversing the (sexual) dualism structuring modernist thought, modernity comes to be rewritten and difference is shown differing. It is only by the repetitive post-modernist gesture (of Butler) that the sexual dualism gets to be stifled. (Dolphijn & van der Tuin, 2012, p. 135)

As I understand this quote it is the difference as something affirmative that separates de Beauvoir from Butler. So the material turn within new materialism seems to be predicated on recognizing difference that is differing. This stands in stark contrast to a postmodern dichotomous scheme since the difference between two concepts, say between nature and culture, is predicated upon one term structuring the other. The difference that emerges is thus solely different from, its never different in itself and so, by this, it cannot be productive, it can only be restrained and somewhat determined. My concern with this line of reasoning is reminiscent to Ahmed’s critique above: what happens when matter turns into a delineated category? Perhaps not matter as delineated in itself, but the ideality of matter is called upon as something that other theorists have consequently overlooked. Hence, Ahmed’s critique regarding the positing of ‘matter’ as a category is valid as long as its recipients is spelled new materialism; when it comes to Barad it misses the mark since her theoretical reasoning seeks to dissolve categorical conceptualizations of the sort new materialism bring about.

This line of reasoning within new materialism that seems to turn matter into a sort of ideality differs from the other interpretations that I aim to outline below. For instance, in a Swedish Pedagogical Context the concept of ‘matter’ is most often conflated with physical things, technology, material environment and/or artefacts. Either stance positions matter as a neglected element of inquiry that needs to be brought back to our analytical undertakings in order to get a handle on our surrounding world of which we are a part. As I mention in my previous research section above the concept of ‘matter’ is deemed differently within new materialism and within Barad’s writings respectively inasmuch as a new materialistic conceptualization aims at constructing new semiotic figures, Barad’s theory aims at constructing a new ontology.
In a Swedish Pedagogical Context

Subjects and Material Artefacts

Karin Hultman (2011), in her dissertation, sets out to investigate the relationship between the subjectivity of pupils and the material surroundings that make up an integral part of a school environment. Hultman states that within the field of educational science focus have been put on the material surroundings as a mediator of knowledge, in other words, the materiality of things has not been scrutinized *in itself*. Even though ‘materialities’ in some forms have been articulated, it has been as always already envisaged as a ‘tool’ or mediator for/of our human knowledge. The power of materiality has thus not been accounted for within the field of educational science (Hultman 2011, p. 5). Hultman localizes the subordination of materiality in relation to language and discourse within the social sciences to the movement known as the “linguistic turn” (2011, p. 8) The incentive to make inquiries about the materiality of things, concepts and bodies, is thus present and persistent. However, ‘matter’ has not been granted as much attention, or agency, as it rightfully deserves, Hultman suggests, and this is why she seeks to discern the interdependence of humans and non-humans.

In a few paragrapical places of the dissertation Hultman stresses that it is hard to find a proper definition for human and non-human materialities respectively (Hultman 2011, p. 13 & 29). I conceive of this difficulty as stemming from Hultman’s positing of non-human-matter as something *other than* human-matter. This is the starting point that I believe leads her astray. Why enumerate different ‘non-human-materialities’ in order to accentuate its importance? Important for whom? Important when? I believe that these type of questions needs to be articulated before we inquire into ‘materialities’. Not because a human subject alone is in charge of the knowledge production, but because only through providing answers to these kinds of question can we get a glimpse of the phenomenon. And surely it is the phenomenon at large that we are interested in and not, let us say, “wall bars” in themselves (or the inclusion of them)?

This approach seems, in addition to above mentioned implications, to invoke matter as a category, along the lines that Ahmed is identifying, since it brings about a supposition that some matter is never/seldom granted agency (and, with this, that it is a category with an outline), and the posthumanistic perspective that Hultman is expending is highlighting the “neglected” materiality. This approach seems to go against Barad’s urge to put the entanglement notion to work in that it starts off with reified categories, at least this seems to be an inherent consequence of Hultman’s reasoning. Her explicit purpose is to rid herself of a routinized humanist viewpoint that solely focuses upon the human as agent, and as a result of this she is focusing the matter as agentive right at the start, as it were; matter seems to curiously switch places with the human.

As we have seen in my discussion above Barad’s commitment is not primarily to grant material things agency and power. ‘Matter’ that gets invoked and induced with agency within Barad’s framework is always part of a phenomenon, that is, matter is never delineated in itself. And, what is more, matter is
not something that we always have to include in our investigations in order to obtain consistency since matter is already part of our discursive practices. Hence, our object of investigation may, no doubt, include elements that some may want to dismiss out of hand due to their material status, or the like, but the posthumanist stance that Barad proposes does not implicate that we have to involve everything that, so to speak, does not fit into a chosen object of study. For instance, if we want to look into how schoolchildren make use of their surroundings it is important, just as Hultman stresses, to inquire into these specific conditions. However, this viewpoint is not equivalent to the act of incorporating everything that might fall into the background, as it were; if leaves are important items of a study then we should look at the leaves, but not as delineated in itself, as an external power that acts on the child. If we just focus on the leaves, for instance, what does it bring about? One slice of reality, of a phenomenon, is not enough in our quest for investigating how material-discursive practices acts and enacts. It simply states that the surrounding is somehow important. I wonder if not Hultman is putting too much emphasis on what she regards as ‘matter’ in her text. If we, for instance, consult her discussed field notes Hultman is challenging us to not only view the children as agents in the example but also view the leaves, that the children are discussing, as “collective collaborators” who “prescribes” action (Hultman, 2011 p. 17). How does the leaves prescribe action? Surely the leaves are being spoken about and negotiated about by the children but is it the same as agency? I am not convinced that it is the leaves’ agency that is being outcropped, if anything, it is the pupil’s negotiating that is being outlined. Again, I am not opposing this view I do believe that the environment or the material surrounding does play a crucial role, but only as part of a phenomenon, never in itself. This is why I am reluctant to embrace, what I call, the “enumeration interpretation” of Barad. I am reluctant to do this because it contradicts the essence of Barad’s theory; a theory that places emphasis on the intra-action of different agencies together with the entanglement concept. Let me also stress that this is not equivalent to saying that we cannot draw a line between for instance matter and discourse. This we can do. What Barad wants to invoke with her relational ontological inclinations is that the relational entities come about as part of the entanglement (this is what Barad refers to as agential separability and the exteriority within) they are not smeared out or collapsed into one another. In the article “Nature’s queer performativity” Barad states that:

Alternatively, we could ask: What about the nonhuman when it comes to performative accounts of abjection, subjection, agency, and materialization? Surely nonhumans as well as humans must figure in, but widening the radius of performativity’s applicability to include nonhumans is not what is at issue. Rather, the point is that the very practices of differentiating the ‘human’ from the ‘nonhuman’, the ‘animate’ from the ‘inanimate’, and the ‘cultural’ from the ‘natural’ produce crucial materializing effects that are unaccounted for by starting an analysis after these boundaries are in place. (Barad 2012, p. 31)

This quote contains something crucial when it comes to fully realize Barad’s turn to the ‘material’; it is not matter as a delineated category in itself, as we already have stated, that should be brought under scrutiny within agential realism, it is the effects of the dualistic reasoning, or dividing lines, when they are taken as already in place, as something given, that is being disputed. Moreover, the disputation is
not where the agential realistic reasoning comes to a halt; Barad’s theoretical framework necessarily bring about a modification of naturalistic and metaphysical concepts such as *causality* and *agency*. Hence, this is where I, following Barad’s own exhortation, suggest that an application of Barad should take its starting point in the enacted agential cut and in the phenomenon itself, in contrast to categories that we for some reason or another deem as neglected. As we have seen, this kind of categorization only has reifying effects, and the agential realistic interpretation goes astray since focus no longer is placed upon neither the cut nor the phenomenon. I submit to Estrid Sörensen’s assertion when it comes to discerning the material component of a configuration: “More than compromising the notion of agency, the principle of general symmetry requires that we start out by looking empirically at situated processes and relations, and only after describing these do we – if these classifications are at all still relevant – decide on what is classified as subject, object, nature, culture, active, passive and so on.” (2013, p. 118) Thus, my aforementioned questions need to be addressed in order for an interpreter to be in a position to make the sort of claims that Sörensen is mentioning. Otherwise I believe that we may end up in a situation where the ‘objective referent’ ends up referring to everything and nothing at the same time (that is, we run the risk of verifying Calvert-Minor’s “misgivings”).

On the next coming page of Hultman’s dissertation we come across another clue as to why our interpretations differ. Hultman writes that it may be regarded as a “problem” that she is investigating the construction of school subjectivities while employing a posthumanistic approach (2011, p. 15). She grounds this thinkable questioning in the gesture that she is focusing the subjects, that is, the children themselves and not the material surroundings. Right here an implicit dividing line is being drawn when the subjectivity or the subject cannot be granted focus (without some explanation) within a posthumanistic framing. This is why I think this type of research would benefit immensely from a close reading of Barad since her theory does not compel one to choose between either granting primacy to matter or granting primacy to discourse. The entanglement that Barad proposes contains both. Moreover, a question that lingers unanswered after Hultman’s remarks above is why it is questionable to pose subjects and matter in the same study? Why is it just the *surroundings* that are granted the status of matter or materiality? Surely, matter is also always a part of a living, breathing subject? As we saw above Barad’s boggles when it comes to Butler has to do with Butler’s un-theorized notion of matter. That is, matter for Butler ends up being something other than the discursive and this is what Barad is questioning and elaborating on. This is where we seem to come across a paradox in the readings and/or employments of Barad: matter is viewed upon as distinct from the human and found in her surroundings, and/or matter is viewed as something that is always entangled with the human, but never as part of the human herself (for instance in her body).

In a few brief examples Hultman calls upon the materiality of a human body, for instance, at one point in her dissertation Hultman exemplifies with a pupil who climbs a pedagogue’s body. With this example at hand Hultman states that the skeletons mineral also makes up an integral component of what enables a child to climb up a teacher’s body. This example is still relying on a distinction between matter and discourse, but it also picks out materialities that do not seem to be relevant for a study of subjectivities. I understand that this anecdote is most probably posed as a rhetorical example to demonstrate how matter usually gets forgotten about or neglected in studies of schoolchildren. However, I believe that this example is symptomatic of an interpretation of Barad that seeks to invoke matter as a valid agent, and, what is more, that does so at the expense of the entanglement notion. The example still relies upon a distinction between matter and discourse since the skeletons mineral is posed as something that is not part of our discursive scheme. The skeleton is thus mentioned as a part
of something material that oftentimes gets neglected within educational studies. I want to suggest that it is not that far off to neglect or even actively ignore the mineral of the skeleton when your investigation is concerned with the subjectivities of schoolchildren. Not because matter does not matter but because this positioning of matter does not matter; it’s not part of the investigated phenomenon which is school subjectivities (unless, of course, your investigation sets out to make a case for the linkage between skeleton mineral and subjectivity. My point is thus not that the skeletons mineral may never ever be of interest when it comes to a “discursive” inquiry, it can, just not in this particular one, as I am sure Hultman would agree). Thus, to say that the skeletons mineral does not matter for this particular survey is not equivalent of stating a difference between matter and discourse, it is not, for instance, the same as positing subjectivities within the discursive realm whereas the skeletons mineral resides within the materialistic realm. The whole point of Barad’s hyphenated concept of material-discursive is to thwart an accustomed optics that drives a dividing line between matter and discourse (see my example above concerning the piezoelectric crystal and the making of a baby). Another implication of an interpretation of Barad where the hyphenated relation of material-discursive practices gets lost, or at any rate not fully focused, is the invoking of matter as a category in its own right. This category is then regarded as housing “stuff”, “artefacts”, “raw material”, that is, anything that one can put in contrast to “discourse”. Again, the hyphenated concept of material-discursive practices or relations states something utterly different, as Barad puts it poignantly in an interview:

Actually, it is not only matter in the sense of stuff that is materialized through intra-actions, but also matter in the sense of mattering or meaning. For example, a particular ‘apparatus’— that is, a particular set of material-discursive practices that materializes, say, particles, in this case – has the dual function of giving meaning to the notion of ‘particle’ as well as participating in materializing ‘particles’, that is, determinately bounded things with determinate sets of particle properties (within the phenomenon). This is to the exclusion of resolving indeterminacies in a way that would make sense of and materialize ‘waves’. (Barad 2012, p. 80)

Matter is thus not something that stands on its own so to speak, it is always supported by the enacted phenomenon in place.

In one section of the dissertation Hultman is attending to the problem of putting emphasis on human subjects and material surroundings respectively (2011, p. 56). Hultman persevere in the point of view that seeks to focus upon the relational (my emphasis) nature of humans and non-human matter. That is, as already intertwined. Hultman thus stresses explicitly that she is not interested in distinguishing performative materialities, rather, what she is on the look-out for is entanglements. However, the entanglements that Hultman identifies in her thesis seem to be identified on the basis of the material components that make up a part of the inquired object. That is, the material is localized in the first instance and subsequently used to warrant the investigative approach as a posthumanistic endeavor as a whole. I believe that where our readings of Barad part ways is exactly here. Barad’s strength as a materialistic philosopher lies in her naturalistic taxonomy that considers matteriality as agentive in that it is not detachable from the surrounding nature and discourse. In other words, they are entangled which is shown in the hyphenated concept of material-discursive.
Entanglement and intra-actions are not just a matter of how we make use of our non-human surroundings it is premised on a quantum understanding of how objects are entangled and always relational. Relational should thus not be understood in the colloquial sense of the word of two parties benefitting from each other’s presence, or the like, they are entangled in the sense that they are non-separable, in an ontological sense. Thus, it is not the case that matter is reserved for something that is made out of flesh and blood, or simply technological artefacts. If it is a component of a phenomenon then it is a configuration of material-discursive practices. And the material-discursive enacts a causal force upon human bodies due to the components inherent linkage.

One voiced aim of Hultman’s study is also to highlight the ethical aspects that always accompany science in the making. This is an integral part of Barad’s body of work as we have seen. Is it not possible that Hultman’s examples above wants to direct our eyes onto that fact, that our undertakings always exclude other possible entities at the expense of others? In that case it may be fully plausible to include rulers and leaves in the studies and to view how they, as materialities, influence the subjects. Well, the discursive framings are still intact even though we seek to invoke the ethical implications of doing science by including material bodies that are usually looked upon as inanimate and, by default, without agency. My critique against Hultman lies thus not in her explication of Barad (and other posthumanists) but in how she puts the concept of material-discursive to work. The point is that the leaves and rulers do not exhibit agency (since agency is being posited as something that is tied to the material which is posited as something that is other than discourse and/or human subjectivity) not even within Hultman’s framings that is set up to demonstrate just that.

**Diffraction and Intra-action Applied**

In *New materialisms and play* (2014) Hillevi Lenz Taguchi examines different ways to regard a child in its intra-active play in a sandbox. She positions humanistic, social constructivist and new materialistic/posthumanistic interpretations in parallel to one another in order to highlight their inherent ontological differences. The humanistic and social constructivist narratives only put focus upon the child as an active agent whose playing in the sandbox. The sand and the bucket within these framings are viewed as inanimate matter, tools for the human to make use of (Lenz Taguchi 2014, p. 82-83). The three different epistemologies are important to highlight, according to Lenz Taguchi, since our viewpoints are always also strictly ethical and political in that our theoretical observational narratives does not simply portray knowledge as they emerge, rather, they are being created (Lenz Taguchi 2010; 2012; 2014). I want to quote Lenz Taguchi at length here in order to establish where our interpretations of Barad part ways. This excerpt is taken from aforementioned chapter where she is discussing the potentialities of invoking materiality in our scientific undertakings:

In a new materialist reading of the image, the glittering sand and the child are in a co-constitutive relationship. The child cannot thinkfeel (perceive) the beauty of sand
swirling and shining in the wind and sunlight without these particular grains of sand, the wind and the sunlight. And the grains of sand cannot be grabbed, tossed in the air, rearranged or reflect sunshine as they are dropped from the hand of the child without the child and its discursively inscribed actions, the wind and the sun. The sand cannot swirl around without the wind either, independently of the human child. Mutual transformations, thus becomings-with, are produced among all these agents in their intra-actions. In the chain of events, human discursive thinking is entangled somewhere along the line as well. To state it simply: the sand is affected by and affects the child; and the child (and its’ discursively inscribed perceptions) affects and is affected by the sand (Deleuze, 1988). Barad (2007: 152) summarizes this relation when stating that neither discursive practices nor material phenomena are ontologically or epistemologically prior: ‘the material and the discursive are mutually implicated in the dynamics of intra-activity’. To repeat, and to conclude this section; ontologically, nothing can exist on its own: a body cannot pre-exist its interaction with other matter (Barad, 2007). (Lenz Taguchi, 2014, p. 83)

My appropriation of Barad differs from Lenz Taguchi’s in that her employment of agential realism is connected to the ethical dimensions of material-discursive practices (Lenz Taguchi 2014). By “ethical” I refer to the way in which Lenz Taguchi grants agency to the “grains of sand”, the “wind” and the “sun” in the example above in order to display the flat ontology of beings that she works with; that is, the sand and the girl in the sandbox are equally agentive in their creation of play. This is undoubtedly an important feature of Barad’s philosophy, and it is equally important to stress the ethical and political accompanying implications of doing science that Lenz Taguchi rightfully claims. However, with that said, although I cannot really contest this (the ethical and political dimension) I do view her exemplification of it in the form of the sand as not fully in accordance with Barad’s framework. That is, the way that Lenz Taguchi is conceptualizing the entanglement of material-discursive practices remains both somewhat truistic (of course the sand is being played with in a sandbox) and at other times somewhat too caught up with the “material agent” (the sand as an active agent). For instance, in the above example with the girl and the sandbox, Lenz Taguchi is calling upon our attention to view the sand as an agent, but I am not persuaded how this view (sand as agent) demonstrates the material-discursive intra-action since emphasis is being put on the sand, the sun and the wind. We are moving our visual apparatus and putting emphasis upon entities (such as the sand) that usually do not take center stage within this kind of research, that I agree on. In an entanglement one entity cannot exist without the other, that is, the phenomenon makes them through the agential cut.

An alternative reading of the event would be to focus the phenomenon in contrast to its supposedly material components. I believe that this way to go about is more fruitful in that it circles a problem, or event, that it seeks to inquire into. When one is giving an account of what one has been doing, that is, when one is accounting for the agential cut that has been made, the different components of material-discursive practices will emerge. I thus propose that it is more fruitful (wider scope and more close to contemporary science) to focus the phenomenon at hand in contrast to putting emphasis on its ‘material’ components. Since the articulated purpose of Barad’s concepts of material-discursive, intra-action and entanglement is to emphasize how no two entities can be individuated at the outset, and that their entwinement is of both material and discursive “stuff”, a focus that gravitates towards the postulated ‘matter’ as part of a phenomenon (without framing the phenomenon as a whole, that is) loses track of what Barad calls the objective referent. Moreover, if matter is being brought to the
foreground as in abovementioned examples then the dualism between nature and culture is still steady in place since matter is granted prime focus in relation to something else (this time humans). But what is matter? And humans? As both Hultman (2011) and Lenz Taguchi (2014) discusses persuasively in their respective texts we must not be too hasty when it comes to demarcating the difference between matter and humans since they are components that emerge within our different inquires. This is what I am building up to when I claim that an employment of Barad should subscribe to its inherent metaphysical and ontological commitments that are grounded within a relational ontology. Hence, to invoke matter as something other than humans, or whatever it might be, simply re-instates the boundaries that the theory seeks to overcome. That is, other at the outset; of course we can tell things apart, but what is the point of stressing that a thing is not a subject is not a rose, unless we have a specific phenomenon in mind? Or in other words, in my view the interpretation goes astray when matter is understood as something that always acts or displays significance, as if matter could be regarded as a category. Here is also where the concept of onto-epistemology yet again does well to enter the stage. It aims to point out that knowing resides within being why the question of knowledge necessarily is tied to a specific phenomenon rather than a specific material constituent. That is, since being is always relational and thus not demarcated in itself beforehand, as it were.

To reiterate: my concern regarding Lenz Taguchi’s employment of the concept of material-discursive and/or ‘matter’ resides in the dividing line between sand and human that comes across in abovementioned example. Matter emerges as an outlined category that intra-acts with the child. I am not opposing the fact that the child and sand are viewed as different systems, what I am concerned about has to do with the implications of the material reading that Lenz Taguchi is conducting with this example. The implications are that the material-discursive perspective gives rise to including seemingly inanimate matter in the analysis, but I am not left assured as to why? What does the sand and the sun do, for instance, that we need to include them in our reading of what the child does? The analysis loses its width, I believe, as a result of the emphasis that is being put on ‘matter’. The agencies of observation does not seem to correlate with the object of investigation in the sense that Barad proposes above in that the agencies of observations of Lenz Taguchi get the upper hand while focusing on the ‘matter’ rather than the phenomenon.

In the article “A diffractive and Deleuzian approach to analysing interview data” (2012) Lenz Taguchi seeks to bring out a diffractive interpretation where the interrelationship of matter and discourse appears. In her own words: “Here I want to explore what it might mean to do research where discourse and matter are understood to be mutually constituted in the production of knowing in a flow of continuous differentiation.” (Lenz Taguchi, 2012, p. 4).

In this article the difference that is presented is one between Lenz Taguchi and a PhD student, namely in their different interpretations when it comes to their appreciation of a schoolboy. They view the boy differently, but I am left unconvinced that it is as a result of Lenz Taguchi’s intra-active reading of the events, as, again, I do not find concrete examples of how the material and the discursive are entangled in an efficacious manner. However, to be fair, Lenz Taguchi is not claiming to be an exegete of Barad, rather, she is diffractively meshing together insights drawn from new materialism, feminism and posthumanism, which may be the reason for our different takes on Barad’s philosophy.

Further down in the article we encounter a description of her methodological inclinations that may serve as a clue as to why our readings differ: “Becoming minoritarian is about thinking otherwise and
away from norms and rigid power-producing habits of thinking by ways of new encounters and engagements. It is these aspects of embodied involvement, transformation and the capacity for change that make a diffractive methodology both feminist and political.” (Lenz Taguchi 2012, p. 8) My hunch is that this is being stressed at the expense of the material-discursive practices that are actually taking place. This is also where I believe that Ahmed’s critique against the utilization of new materialisms inflationary logic makes itself apparent. The statement that a diffractive methodology works against norms and prevalent power relations runs the risk of disqualifying other approaches that does not stress the agency of ‘matter’, or, it runs the risk of positioning other approaches as immersed within the power relations that only a few has identified and consequently tries to work against.

Still further down in the same page Lenz Taguchi explains in which way the diffractive reading may open up data in unexpected ways; ‘matter’ is described as being “interpreted in new ways” (ibid.), and, what is more, these proposed new ways are described as unveiling a reality that lingers beyond (italics in original) the interpretations that reflexive and/or discursive interpretational frameworks offer. Does this entail that the ‘pre-discursive’ is ‘material’ and that it is attainable with the help of the employment of our ‘bodymind’? This is a question that I believe needs to be tackled with in order for our understanding of material-discursive practices, and diffraction as a methodological tool for reading data, to fully emerge as graspable. My suggestion is to return to the writings of Barad and engage with her own used examples in order to see in what way the material-discursive practices ought to be employed. I dare to say “ought to” since Barad is building a case against representationalism (among other isms) based on her explicit and inherent disdain towards dualistic reasoning. For this reason the hyphenated notion of material-discursive should remain in a hyphenated entangled state, which implicates that neither component of the hyphen is granted primacy over the other. But this seems to be an implicit consequence of Hultman and Lenz Taguchi’s readings of Barad’s concepts. The material is presumed to be something neglected that needs to be taken into account whereas the relational mechanism of which the entangled state is granted emergence is being under-articulated. In one example that Barad is presenting in Meeting the universe the political theorist Leela Fernandes work on a Calcutta jute mill (see my above discussion) is being invoked as an instance of a theorizing that does not start off with reified categories. However, Fernandes is being read by Barad as a poststructural, marxist influenced discourse theorist that does not have the entanglement notion at her disposal. Yet, Fernandes is being viewed upon by Barad as successful in her data analysis because she is avoiding to delineate her objects of observation. Instead, Fernandes, according to Barad, is viewing the different objects under study as relational and dependent upon one another. Hence, it is not the case that a diffractive analysis must transgress a discursive or poststructural analysis of data in order to reach a certain ‘beyond’ or the like. Because, if we claim this, we are also in the business of making pre-determined dividing lines (reification) between different categories or realms of thought and/or ways of conducting science. A claim, that is, that both Hultman and Lenz Taguchi seeks to work against (as I understand it). And, also, Barad is clear that her understanding of a diffractive methodological reading is not about making hierarchical gradations of different disciplinary cultures or paradigms (Barad 2007; 2011). It is about being sensitive towards other disciplinary methods, theorizing tools and scientific results, and find out whether a certain scientific result may be enriched if we look into how the dividing lines between disciplines are being drawn, on what grounds, and how that may (or may not) affect the knowledge that is being produced within respective lines.

My suggestion is, again, to consult the writings of Barad and apply her notion of material-discursive as non-hierarchical in the sense that they are not collapsed into one another, they are different
components that in varying degrees may, or may not, emerge as a crucial element of an inquired phenomenon. This is exactly what Barad has in view when she urges us not to start a survey with a dualistic framework at hand. Barad’s viewpoint regarding material-discursive components are non-hierarchical as a result of her opposing an anthropocentric stance, in another sense it can, I suppose, be regarded as hierarchical in that not all components of a phenomenon may matter to the same extent. However, again, this will not emerge as a pressing problem if we try to give an account of the phenomenon together with our agential cuts instead of starting out with demonstrating that some ‘matter matter’ (because this ‘mattering’ can only take place as part of a phenomenon). The agential cut and the phenomenon are the notions that Barad is launching in order to circumvent the problem of both measurement and demarcation.
DISCUSSION

In this chapter I will discuss my analytical findings and debone how these results may contribute to an extended baradian version of contemporary posthumanistic theory. I will evaluate how my stated aim and research questions cohere with my conducted analysis.

Aim of the Study

I have in this thesis engaged with the philosophy of Karen Barad and especially how it comes across in her seminal work *Meeting the universe halfway* (2007). In order to pin down my alternative reading of Barad’s theoretical framework I chose to conduct a qualitative contrastive reading of four interpretations of her: I took on writings signed Ahmed (2010), Calvert-Minor (2013), Hultman (2011) and Lenz Taguchi (2012: 2014). In my contrastive reading of the four agonists just mentioned we could see that they all, despite their different starting points and disciplinary belongings, unite in their interpretation of Barad’s concept of *material-discursive, intra-action*, and to some extent *entanglement*. Ahmed targets the notion of ‘matter’ as it is being outlined within the frames of new materialism; this critique is also fired against Barad since she is one of new materialisms most referred to scholars. I showed how Ahmed’s misgivings when it comes to the concept of ‘matter’ does not affect Barad’s standpoint since Barad is not delineating ‘matter’ as an analytical category in itself.

In my discussion above we could also see that Hultman and Lenz Taguchi first centers the notion of ‘matter’ before they tackle the proposed problem at hand. Calvert-Minor goes about in a similar fashion when he take Barad’s notion of *objective referent* and claim that it reaches over too vast a referents. It only becomes too vast (and referring to “the whole universe”) when we fall short of framing our actual problem. When Hultman and Lenz Taguchi center the concept of matter before the problem at hand we end up in a similar situation: the referred to components take center stage rather than the proposed problem. Thus an already pointed out part of a problem set the terms for how the investigation will fall out. Would a different number of leaves, for instance, have changed the children’s discussion about the same (if we speak with Hultman)? Perhaps. But then also the concept of number and the environmental setting needs to be brought to the foreground, which means that we have an entangled phenomenon at our disposal. It is thus not the case that we have to frame the actual leaves that the children are engaging with in order to articulate the intra-action, or so I argue.

To put the entanglement notion first, as I propose in this thesis, does not have the same consequences as in the examples aforementioned since it does not point out components beforehand, neither does it point to “the whole universe” since it is always part of a certain problem, a *specific phenomenon*.

I have thus reached my aim in that I managed to draw up an alternative reading of Barad’s philosophy by contrasting it with pre-dominant renderings of her. My proposed appreciation that I deem
“alternative” displays many contact points with other Barad scholars such as Ceder (2015), Juelskjær (2014) and Hoel & van der Tuin (2013). However, I keep with the deeming of alternative since although above mentioned scholars do extract a similar notion of ‘matter’ out of Barad’s texts that I do in this thesis, they do not fully get out of the enumeration interpretation. That is, they put focus upon how matter and/or non-humans exerts agency (which is not wrong or at odds with Barad’s theoretical framework; I simply claim that these kinds of renderings are too weak to be ontologically interesting). I thus answered my first posed research question through the employment of my contrastive reading which demonstrated how an alternative reading of Barad’s philosophy could be brought about. In the next paragraph I aim to outline further in what way this alternative reading could be put to use.

Material-discursive and the subject(ive)

Where other posthumanistic scholars leave the human subject to the refuse pile I suggest that we do not have to go down that road. The subject is not a centric problematic category in itself. Rather, I have shown in my analysis above in what way Barad make use of her concepts of entanglement, intra-action and material-discursive practices. We could see that the subject is not dissolved in favor of centering the ‘material’, as it were, since materiality and discourse together with the subject are integral parts of a specific phenomenon. There is always someone making the cut, hence the subject is not pushed aside. I want to suggest that Barad’s main contribution and strength lies in her shift of referentiality, that is, from a newtonian observer independent position to the phenomenon itself. In order for the phenomenon to emerge at all a cut need to be carried out and the executive force lies within the subject but not solely so. In other words, the subject is not the sole determinant of an undertakings (the agential cut) outcome since the phenomenon is intra-active of various material-discursive practices. This is basically the same thing as stating that we, as subjects, are always immersed within discourse and that discourse is also always material. Hence, I have argued that Barad’s philosophy should not be used as a template that picks out certain components deemed as ‘material’ in order to demonstrate the agential status of also ‘non-humans’. Thus, the alternative positioning of the concept of material-discursive that my reading bring about puts emphasis on relational phenomena rather than ‘material’ components. Moreover, this relationality does not cancel the subject out since the demarcation between subjects and matter dissolves through the engagement with Barad’s optics. This dissolvent is predicated on the ontological condition that states that no pre-inherent properties exist within entities prior to its engagement with its surrounding world. Key to remember is that the dissolvent just mentioned is not to be regarded as a collapse where things swallow up one another, as it were; we still come across dividing lines in the shape of different categorizations.

How can this alternative reading that I am presenting be of any relevance for social science?

There are several reasons as to why Barad’s philosophy has bearings on social sciences. Firstly, to my knowledge, a similar interpretation as the one I present in this thesis has not yet been conducted. Secondly, Barad’s shift of referentiality, as I am discussing in my analysis above, could be applied to both theoretical and empirical studies within education. This I suggest because Barad’s taxonomy frames the problem at hand without losing sight of its complex entwinements with other proximate problems. For instance, variables such as gender and class can with the aid of Barad’s framework be understood as material-discursive intra-actions. It goes one step further than Butler’s concept of
performativity in that it merges matter with discourse, but it also, I want to suggest, paves the way for understanding the relational implications without bracketing the subject. Just as Barad seeks to deconstruct or dissolve binary divisions such as nature/culture, a consequence of her theorizing is to also seek the dissolvent of hierarchical gradations between subjects and matter. Since subjects and matter are entangled these kinds of gradations turns out to be illogical and meaningless. As we have seen above, when the analysis ends up in extracting material components out of a problem or phenomenon the entanglement notion is not properly applied. Thus, gender is a valid analytical category as long as we center the phenomenon through the agential cut, not extract, beforehand, gender typified qualities, or the like. To put focus on the relational entanglement thus still includes the subjects, albeit altered in the sense that matter is embedded within the subject instantiation. For example, Ceder (2015) seeks to decenter the human subject in order to frame the relationality of intra-actions. This is an interesting approach, however, it differs from my approach in this thesis since I do not want to give up on the subject.

In my introduction to Barad’s philosophy above we could see in her discussion of abortion how neither the fetus nor the host body needs to be stripped of their status as agents in order for the researcher to circle the phenomenon. In contrast to Ceder’s de-centering hypothesis I propose that the subject need not dissolve as a result of our posthumanistic approach, rather we can see how it emerges through the agential cut. This is also where the question regarding ethics comes in; to give an account of the performed agential cut, that is the investigation at hand, implicates a delineation of the undertakings constitutive steps. As we saw in my analysis above we now know how Barad’s accounting of the constitutive steps differs from Bohr’s; the subject is as much an intra-active system for Barad as is the investigated problem. That is, the subject is not dispersed and the material does not take center stage. They both re-emerge as entangled.

This has implications for social science since the built-in approach is materialistic without giving up on either the subject or ethicality. It is not the subject of enlightenment humanism that emerges but nonetheless an agentive subject. There is no necessary trade-off here between subjectivity and materialistic agency since the subject also is a part of a phenomenon in that it is made up of material-discursive practices. The body is material-discursive and the body is subjective. I also believe that this insight demonstrates the intersection (or perhaps intra-section?) of Barad’s posthumanism and phenomenology. For instance, Sara Ahmed (2006) and Sara Heinämaa (2003; 2010) come close to articulating a bodily experience that Barad would designate as material-discursive. Also, with regard to Barad’s concept of onto-epistemology we find contact points between Barad’s posthumanism and phenomenology. Especially when it comes to articulating the entwinement of subjective elements with bodily- and material ones the similarities appear. Noteworthy is how phenomenological figures such as Simone de Beauvoir and Sara Ahmed are being inserted into new materialistic formulations of posthumanistic reasoning (see for example Dolphijn & van der Tuin 2012). I suggest, with my reading in this thesis, that phenomenological implications can with great success be included in a baradian ontological framework as long as the entanglement notion remains in the forefront. Thus, it is crucial, as I have argued throughout, that in order for a baradian framework to circle a particular problem, or phenomenon at hand, the enacted agential cut needs to take account of all ingoing material-discursive practices.

In the next section I intend to answer the question how we can use the results stemmed from my analysis when it comes to questions regarding how science and knowledge are constructed.
Baradian Posthumanism as a Theory of Science

In this thesis I have demonstrated how Barad’s theoretical framings gives rise to an understanding of science in the making where the objective referent is placed within the phenomenon. This has implications for how we regard the knowledge-making processes that take place within the educational field. Since I situate myself within the domains of philosophy of education the results that stem from this thesis can be applied to both theory and practice. One potential objection (which is also a common critique fired towards Barad) leveled against the phenomenon as a site for the objective referent is that we need categories and dividing lines, at least temporarily, in order to conduct analysis. This raised issue is actually a straw man since it is easily refuted by the invoking of Barad’s concept of *agential separability*, that is, exteriority is to be found within the phenomenon. In other words, categories are not deemed irrelevant a priori; instead, the categorizations that emerge do so as part of a phenomenon and are therefore as good a categorization as any. There is thus no dissolvent of categories taking place neither before nor after the conducted agential cut. In order to keep with the working of onto-epistemology temporary categorizations as part of a specific phenomenon needs to be properly spelled out. Since the most primitive building blocks of our world are made up of relations and, if we zoom out a tiny bit, phenomena, categorizations make up an integral part of our material-discursive practices.

A second issue that may be raised, and that is tied to the first one, is that in order to conduct empirical inquiries we need to zoom in on material components since that is the only way to go about when we seek to apply Barad’s theory. Hence, in order to demonstrate how matter is always caught up in the discursive it needs to be articulated. This is also, I suggest, a straw man; empirical analysis that conform to a baradian take does not need to enumerate material components. In fact, in order to remain faithful to Barad’s theoretical outline one needs to treat matter as part of a problem. To put it plainly, matter as part of an empirical problem can be articulated as matter as long as it is, and is shown to be, an integral part of the phenomenon at hand. If we, for instance, want to inquire into how pupils intra-act with computers we frame the proposed intra-action, not the computer. If we want to inquire into how computers affect the learning subject, how it somehow mediates knowledge, then it is something else we are doing in that it would, sort of, frame the material component (the computer) rather than the intra-action or the subjective learning as part of a phenomenon. There is an important difference here, then, between zooming in on the computer and zooming in on the relation. When the relation takes center stage the knowledge-making is of interest. For example, acquiring writing skills using a computer could be used as a material-discursive intra-action. Note how this framing is not equivalent to circling the computer itself, nor is it equivalent to how the subject make use of the computer; what is of interest is how the knowledge emerge through the agential cut. Thus, writing may be conditioned by the computorial setting which means that the process of learning is embedded within the setting that the computer (and the subject) affords.

Here I would also like to point out how we can make use of the results that we harvested from the section entitled *Quantum Entanglements*. At first sight it may seem as a long shot how social sciences might benefit from these quantum findings. However, as I have argued throughout, the example put forward in that paragraph (among the other ones) is an example of how science gets done at its most...
fundamental level. That is, it shows that there is no layer of ‘matter’ or “real” observation independent knowledge that we can apply our discursive template upon; it shows that nature and culture make up one mutual domain of entangled knowledge. It demonstrates how natural science can benefit from insights gained within the humanities and the social sciences, rather then just the other way around. I believe that the influences of naturalistic insight are quite present and unproblematic whilst the other direction of influence is more viscous. It is the question of ontology and especially onto-epistemology that the section of quantum entanglements make vivid. How we frame a problem is caught up in how we regard the object together with the objective of our proposed study. We saw through the quantum entanglements example how our perceptions of the inquired particles (that is, if we regard them as pre-determined with inherent properties or as entangled with our enacted cut and employed apparatus) influence how we interpret and make use of our conducted experiments. This influence is crucial to map, I believe, if we seek an understanding when it comes to how science and knowledge gets done.

I have thus established in what way my reading of Barad may contribute to a shaping of a posthumanistic theory that does not bracket the subject or other valuable temporary categorizations altogether. With my reading of the entanglement notion, that does not center neglected or un-theorized ‘matter’, we stand better equipped when it comes to scrutinize how knowledge gets done. The affinities between queer theory and quantum physics are an outstanding example of that. Another instance of a posthumanistic cross-breeding is the one between literary science and computer science in the form of programming in libraries. Literacy is key when it comes to both close reading a novel and writing code. With Barad’s entanglement notion in use we can see how the literacy goes both ways: from programming to close reading and from close reading to programming. There is no pre-set way of determining the intersection of these knowledges. Previous interpreters may want to put emphasis on the materiality of the books and/or the computer, but as we have seen, this is not in accordance with my reading of Barad. I have shown that this is not in accordance with my reading of Barad since it just amounts to an enumeration interpretation that comes to a halt after the ‘material’ values have been articulated. If we keep in line with my interpretation we can see that knowledge is made out of the same “stuff” no matter its disciplinary habitat. That is, knowledge has the potential to cut across disciplinary boundaries since there is no different in kind materialities or discourses to investigate; there are just different phenomena and material-discursive practices.

I have suggested an alternative reading of Barad that helps to construe a theory of knowledge that closely examine the relationality of ontology. This I believe is fruitful since ontology is what fundamentally steers our takings on what knowledge ultimately amounts to. How knowledge come about is crucial to investigate in order to come to grips with our construction of the same. With my reading of Barad above we can see that her notion of relational ontology dissolve the modernist entity based metaphysics and put an intra-active ontology in its place. However, this intra-active move, where her notion of material-discursive takes center stage, is not to be confused with giving an account of the material where material is conceived of as artefacts, technology or what-have-you that exerts agency on its own, as it were. The examples that I have grappled with in this thesis all, one way or another, make use of Barad’s material-discursive concepts as an additional materiality that we need to pay extra attention to. I have shown that this is not in accordance with my reading of Barad’s theory. What I have shown is how we can understand her theory in a different light where the material remains within its postulated material-discursive phenomenon. This way we better frame our problem at hand instead of focusing on proposed ‘matter’ that has agency.
Theoretical Contributions

Through my contrastive reading I have demonstrated how we can read Barad’s posthumanistic philosophy with the aid of a different or alternative optics.

To get out of what I deem the materialistic deadlock, that I have in this thesis also referred to as the enumeration interpretation, a fruitful theoretical way is to tend to the entanglement notion as a first conceptual narrower, not the ‘material’. As we have seen, when the ‘material’ takes center stage the study in question set its pointers towards already in place ‘material’ stuff. This materiality is also then, as a consequence of the aforementioned reasoning, delineated as something other than discourse, which seems to have led previous scholars to engage with the question of ‘matter’ even more. Hence, the materialistic deadlock is a fact. In order for a posthumanism to remain consistent and to be in a position where new scientific knowledge has the potential to emerge and grow, we need to remove the ‘material’ out of the equation. In its place I suggest that we put the notion of entanglement paired with an understanding of the entanglement as always material-discursive. No side of the hyphen trumps the other, at least not in the outset before our undertaking has taken off.

With my alternative reading of Barad’s philosophy we could also see that in the place of different expected or important agentive actors (for instance within Hultman and Lenz Taguchi the agentive actors are to be instantiated as artefactual surroundings such as in buckets and leaves) we should put the knowledge that is being borne out of the scientific setting. It’s through the positioning of the actual scientific practice, I suggest, that we can harvest the most out of Barad’s posthumanism. When the setting is in place and we discern what the specific knowledge production is conditioned by, then we will stand equipped to readily face the material-discursive practices that, through the differentiation of settings, will produce differing scientific knowledge. As we have seen the difference is not an instance of some hidden relativism; the difference stems simply from the different scientific settings in place (for instance waves or particles above). And, obviously, the knowledge that is to be found within different settings is not equally good or productive. The evaluative conclusion should base its verdict upon how the ingoing conceptualizations cohere with the overall scientific investigation. When it comes to my take on Barad’s posthumanism I suggest that this is to be done through the employment of the entanglement notion, as it is understood within quantum physics.

The subject as a site of knowledge making is also something that my reading of Barad’s posthumanism paves the way for. I suggest that the subject does not need to be cancelled out due to our inclination towards material-discursive practices. Many present posthumanistic scholars display a tendency to bracket the subject altogether. I believe that this reasoning is at odds with a baradian posthumanism since it specifically seeks to dissolve the hierarchical gradations that take place between different scientific categorizations. If we want to keep in line with both Barad’s posthumanistic reasoning and a new materialistic semiotic conceptualization the subject is not a necessary sacrifice since the strive within both Barad and new materialism is to transgress dualistic lines of reasoning. My suggestion is that we keep the subject but neither as a humanist subject nor a bracketed subject but as a working system that deserves our attention.
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