Social Theory for Quantum Times: Discourse Meets Agential Realism

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Abstract: Discourse theories and methods have been a staple in social and political studies for a long time. However, even in the most advanced accounts of post-structuralist ontology and epistemology within the social sciences, materiality is somewhat under-theorized, weakening discursive approaches and leading to a sense that social and material/natural worlds are in some significant way separate and operate differently. In this paper, Karen Barad's theory of agential realism, which builds on quantum physics, is deployed to show that this need not be the case. The paper explores the question of materiality and matter and its relation to discourse, by bringing Barad's insight and a strand of post-structuralist discourse theory together. I argue that Barad's agential realism can account for how matter also matters in post-structuralist social science, by discussing the similarities of the two approaches and how they work together. The article contributes to the discussion on new materialism, the question of agency and structure, and to the onto-epistemology of social sciences and the concept of matter.

Keywords: discourse, poststructuralism, materiality, social theory, agential realism

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1.   INTRODUCTION

The methodological and philosophical debate and exploration of the ontological underpinnings of various social science approaches in recent decades has been rich and lively. Many strands of the humanities and social sciences are represented in this "ontological turn" in social theory, with different focuses and perspectives. This means accepting and focusing on the fact "that questions of knowledge, method, and research design require the articulation and clarification of one's ontological assumptions and that social research and its substantive outcomes depend upon a prior set of ontological choices" (Howarth 2013, 91). Epistemological and methodological questions thus presuppose the ontological inquiry of the ultimate character of things and being, and social relations and processes (Howarth 2013, 94; see also Oksala 2011). At stake in this debate are also the questions concerning the differences of the social/human and natural sciences, and the relationship of materiality and discourse.

As a strand in this debate, *new materialism* is a loosely organised field where researchers have examined and deconstructed the boundaries of social/natural, discursive and material, giving materiality its due against previous preoccupations of "just" language and discourse (e.g. Coole and Frost 2010; Gamble et al 2019). A key thinker in the tradition, Karen Barad has been hailed as game-changer that has bought a paradigm-shift also to the social sciences (Fairchild and Taylor, 2019). Barad's theory builds on quantum physics and presents a strongly relational or performative ontology and theory, proposing and arguing in impressive quantum detail how matter and discourse are co-constitutive. As Freitas describes it, Barad "gets inside quantum experiments, unpacking the specific material arrangements to make visible the ever-changing conceptual dimension of matter" (Freitas 2017, 741). It seems however, that Barad's impact thus far seems to be bigger in humanities than in social and political studies, and for example, in her discussion of new materialism and post-structuralism, West (2011) did not discuss Barad's theory. More recently, Nico Carpentier (2017; 2020) has discussed new materialism and post-structuralism extensively, and although he refers to Barad, he does not focus on her in particular.

Glynos and Howarth (2007, 1, 18-20) pointed out in 2007 that in social and political studies in particular, positivism seems to retain its resilience. Indeed, it seems that in the critique and rejection of non-positivist research there is an implied (or sometimes stated) accusation that these other approaches, in particular post-structuralist methodologies, give too much

interpretative freedom to basically say anything about the object of research, with the implied risk being that you can twist and turn "reality" any way you like to suit your (political) agenda. In any case, post-structuralist discourse theory has been discussed in recent years in social and political studies in relation to institutional theory (e.g. Panizza & Miorelli 2013; Jacobs 2019), and for example, Aradau (2010) has discussed and drawn on Barad's theory in the context of security studies, showing the possibilities of material-discursive approaches, so the debate is still expanding.

Discussing the criticisms levelled against the discourse theoretical framework, David Howarth admitted in 2000 that there are certain aspects of the theory which are in need of refinement (Howarth 2000, 6). With Glynos, Griggs and others, Howarth has since discussed the ontological questions and critiques of post-structuralist discourse approach in detail, strengthening the framework and elaborating its methodology (e.g. Glynos & Howarth 2007; Howarth 2013; Howarth, Glynos & Griggs 2016). I claim, however, that one key issue for this methodology is still not properly accounted for—namely its understanding of materiality. This, it seems, is also one of the reasons that the persisting critique and misunderstanding of poststructuralism keeps coming back, namely that it represents some sort of unrealistic linguistic idealism (Glynos & Howarth 2007, 5-6). In fact, as Howarth (2013, 93) has explained, post-structuralists are *realists* in that they affirm the existence of a reality independent of thought, and that our conceptions of things and entities do not exhaust their meaning or being. Or as Oksala (2011, 290) put it when referring to Foucault, it is not pure language, but social practices which "bring into being, or institute, a world of significations, and reality, as we know it, is the result of such an institution." These discussions however do not address the question of materiality directly.

In this paper I shall argue for the importance of post-structuralist discourse theory and analysis in its so called "Essex school variant," but I claim that the question of materiality/matter and its relation to discourse still needs to be strengthened. To this end, I argue that Karen Barad's *agential realism* can account for how matter also matters in post-structuralist social science. Based on Barad's theory, this paper makes an onto-epistemological argument that seeks to contribute to the ontology of post-structuralist discourse theory when it comes to understanding the relationship of materiality and discourse, or the natural world vs. the social world. While sometimes the distinction of 'brute facts' vs. social facts (e.g. Panizza & Miorelli 2013) may be a clear or reasonable distinction, it does not resolve the question of what kind of role materiality plays in the ontology of the two issues. In contrast, Barad's theory

builds on quantum physics and addresses the question of matter directly, and shows that this natural/social distinction does not necessarily make sense. It turns out that the material, physical world of our quantum times appears as "post-structuralist" as discourse theory, when considered in the framework of agential realism. By bringing Barad's insight and the post-structuralist discourse theory of the Essex school together, I aim to strengthen the understanding of materiality in post-structuralist theory and research.

Thus far, Barad's work has inspired various applications and critiques, even in terms of post-structuralist theories (e.g. Calvert-Minor 2014; Hojgaard and Sondergaard 2011; Lemke 2015). There are also plenty of studies and analyses using and applying Barad's insights, but these are largely in the humanities and less in social and political studies, and as Hojgaard and Sondergaard (2011, 339) have argued, shortcomings in the understanding of materiality remain. By combining the two onto-epistemological approaches to (social) scientific enquiry, this paper contributes to an enhanced theoretical understanding of materiality for social sciences. To be sure, this paper acknowledges that the fields of post-structuralism and new materialism entail vast literatures, and it is not the aim here to discuss the field in its entirety. Rather, of the numerous new materialist thinkers, I focus on Barad for two particular reasons. Firstly, physics deals with fundamental principles of nature, the structure of the universe, and the properties of matter. For an understanding of the material world, it is the natural science discipline that comes closest to dealing with philosophical and ontological questions. Within physics, Rovelli (2022) claims that quantum theory is "perhaps the most successful scientific idea ever," and describes the behaviour of the physical world at the most elementary level we know, and its relational interpretation suggests that much like post-structuralist discourse theory, there are no things or substances that have properties independent of anything else (see also Rovelli 2020). As this paper aims to examine the very elementary question of matter and materiality in discourse theory, Barad's perspective, which draws on quantum physics, offers a good starting point. Secondly, Barad already discusses and relates her argument with post-structuralist thinkers such as Butler and Foucault, but not directly with the Essex school thinkers, with whom—as this paper aims to demonstrate—a fruitful common ground for can be found. However, my focus on Barad and the particular thinkers of the Essex school (Howarth and Glynos) is not necessarily in contradiction with other proposals to re-think discursivity and materiality. For example Nico Carpentier is known for theorising these questions in detail, in terms of the discursive-material knot (Carpentier, 2017). The starting point in his book is "discourse-theoretical, which is then combined

with an effort to make the material more visible in this discourse-theoretical strand" (Carpentier 2017, 6). While my starting point is also discourse theory, I focus directly on the question of matter or 'the material,' utilising Barad. In his discussion, Carpentier looks at a wide variety of approaches and fields that thematize the material, including some of Barad's ideas and articulations (see e.g. Carpentier 2017, 44-45). Carpentier however does not focus on Barad, but briefly discusses her ideas alongside those of others. He also seems to have some issues or 'discomfort' with Barad's take on post-structuralism and her insistence on post-humanism, while Carpentier ascribes to a more anthropocentric definition of discourse (Carpentier 2017, 7). Carpentier also refers to new materialist approaches that "tend to (mostly implicitly) privilege the material" (Carpentier 2017, 14), yet not mentioning which ones he is referring to. I do not share this discomfort or think that Barad unduly privileges the material, and rather, in this paper I want to specifically engage with Barad's understanding of matter.[1]

The remainder of the paper is structured as follows. I first introduce the Essex school strand of post-structuralist discourse theory as a framework and ontology for social scientific and political research, as it stays truthful to a materialist understanding of social relations, yet is committed to a discursive viewpoint. I explain the main tenets and arguments of the approach that make for a convincing paradigm and ontology of social scientific research. I point out however, how the relationship of discursivity and materiality remains under-developed in this framework, and thus leaves some questions open. I claim that Barad's theory is of use in answering those questions and in producing a better integrated approach. In the second section I discuss Barad's theory of agential realism, introduce its key arguments, and explain its understanding of materiality suitable for the quantum times. In the penultimate section I demonstrate how these two approaches work well together by discussing the question of agency and structure. Finally in the conclusion, I note the limitations of this paper and consider its implications for social science research.

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1   In contrast to Carpentier, my contribution is a more narrow and specific take on how materiality might be conceptualised in discourse theory, using Barad. From the side of discourse theory, I engage mostly with Howarth and Glynos, because of their detailed and specific discussion on ontology which pays attention to the distinction of 'natural' and 'social' worlds.

2.   POST-STRUCTURALIST DISCOURSE THEORY AND THE QUESTION OF MATERIALITY

Post-structuralist discourse analysis and theory encompasses a variety of thinkers, methods, strands and arguments. Common to them is a focus *not* on objective social structures, or behavioural and statistical population-level variables, but on how *meaning is constructed* through language, 'text,' and discursive practices. Post-structuralist studies are typically historically sensitive and context-specific critical inquiries into how knowledge and identities are created and shaped, and how through these processes power relations and regimes emerge, and are upheld, challenged and changed. In this paper, I rely on a specific strand of post-structuralist theory, in which the ontological underpinnings and methodological commitments of the approach are particularly well developed, namely the ideology and discourse analysis of the so called Essex school. This strand of research builds on the post-Marxist thought of Ernesto Laclau and Chantal Mouffe (2001[1985]) in particular. Its *discourse theory* (henceforth I shall use this formulation for the sake of brevity) emphasizes the political and ideological aspects of discourses, and examines the formation of identities, communities and political movements, and the maintenance or disruptions of hegemony. Various thinkers and analysts can be considered to belong to this school of thought in the past decades, but here I largely focus on the work of Jason Glynos and David Howarth who have developed a comprehensive account of the epistemology and ontology of the discourse approach, and answered the critique levelled against post-structuralist discourse theory (e.g. Howarth 2013; Glynos & Howarth 2007; Glynos & Howarth 2008; Howarth 2010).

Discourse refers to systems of meaning that are historically specific, and central to the formation of any identities and objects (Howarth 2000, 9). In a discourse theoretical approach, all objects and actions are meaningful, and under scrutiny reveal the way in which meaning is made, and how the processes of meaning-making are political. Discourse is thus a system of meaning, and can be seen as an articulatory practice (Howarth 2010) or an "articulated set of elements" (Laclau 1990, 34). Any object's identity is conferred by the particular discourses within which it is constituted. All social practices in turn, can coalesce into constellations called regimes, and both practices and regimes are located within a field of discursive social relations (Glynos and Howarth 2007, 109). In other words, discourse constitutes and articulates a particular epistemological framework which is predicated on a social ontology that "stresses the *radical contingency* and *structural incompleteness* of all systems

of social relations" (Glynos and Howarth 2007, 11, emphasis in original). Here, the talk of *social* ontology and *social* relations seems already to betray some kind of division between social and natural worlds (much like the brute facts / social facts distinction). In any case, in this approach, the constructed and political character of *social* objectivity enables research to show how power operates and how hegemony is formed, challenged and changed, or maintained. The ontological conception of contingency is hence connected to the understanding of power. Power consists of radical acts of institution, and the exercise of power *constitutes* and *produces* practices and social relations. Even social relations that seem natural and stable are inherently contingent, and only become sedimented and reproduced through the mobilization of various techniques of political management, and through the elaboration of ideologies and fantasies (Howarth 2010, 309-310).

Glynos and Howarth (2007, 102) also emphasise that theirs is "a *materialist* ontology, which is predicated upon a relational conception of reality and the radical contingency of social relations and identities." However, they do not explicitly discuss what their understanding of materiality is, and they do not examine in any length the issue of material reality or the natural world, or whether they consider the ontology of that world any differently from *social* reality. When they do refer to the issues of materiality, or the human and social world versus the natural world, their account seems somewhat unclear. On the one hand, they state that in their account "contingency goes 'all the way down' so to speak" (Glynos and Howarth 2007, 32). Here it seems that they do think that all existence is contingent, but it also remains unclear as to what the term "so to speak" then means. On the other hand, they use expressions such as 'social world' and 'social relations,' leaving it open as to whether there might be another ontology for the non-social/natural world. Likewise, Howarth and Griggs (2012, 306, referring to Gottweiss) explain that discourse is "a constitutive dimension of social relations that does not merely describe or make known a preexisting or underlying reality, but instead helps to bring that reality into being." But they also state that "[o]bjects and things in this approach certainly 'exist' independently of any particular discourse, but their meaning and significance –and how they are engaged by social actors—depend on their position within particular symbolic frameworks" (2012, 307). It seems that in this "minimal realism" (i.e. the acknowledgement of the existence of objects and processes external to thought: Howarth 2013, 10), questions about the ontology of the natural world are not relevant because we always encounter those objects within symbolic orders, but perhaps also, because in social science the interest is not in the kind of objects that are a-social and typically associated

with natural sciences.

Glynos and Howarth (2007) indeed discuss the differences of social and natural science methodology, and in fact discuss in detail the distinctive ontologies underpinning the natural and social worlds. But they do so in terms of methodology (explanation, reasoning and the causal law paradigm), leaving matter and materiality as such out of the discussion (2007, 17-41). They also point to how the way of asking questions and the nature of the object of inquiry in the two domains is typically different, as "in the social sciences the contextual features—including the self-interpretations of the relevant social actors—are strongly bound up with the content" (2007, 221, see also 220[2]). Their focus is thus more on discussing and challenging the role of positivist ideals of prediction and explanation is social sciences, where the goal is "the objective explanation of an independently existing reality" (Howarth 2000, 127). However, as will become evident below, there is no need to consider natural science research as necessarily positivist, and indeed, the contemporary quantum theoretical/mechanical insights show us that a better understanding of ontology, both social and natural, need not go along the positivist line.

3.   AGENTIAL REALISM AND THE ENTANGLEMENT OF MATTER
       AND MEANING

Karen Barad is a philosopher of science with a PhD in theoretical physics. She draws from quantum physics/mechanics (especially Niels Bohr), and also from post-structuralist and feminist theory, engaging thinkers such as Donna Haraway, Judith Butler and Michel Foucault[3]. Barad's theory of agential realism, which she presents in detail in *Meeting the Universe Halfway* (2007) is an ontological and epistemological framework that proposes a non-classical account (in relation to physics) of reality in which objects and entities are seen as being constituted through material-discursive practices. It is thus not a positivist or realist theory in the typical social science understanding of the

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2   These points are made in the notes of the book, which also tells that the ontology of the so called natural world is not in their focus.
3   The relationship of Barad's theory to Butler has been touched upon for example by Carpentier (2017), and Barad and Foucault have been discussed in more detail by Lemke (2021). Lemke argues, contra Barad, that Foucault's oeuvre can in fact provide elements for "a thoroughly relational materialism". But as Lemke writes, "Foucault never directly inquired into the nature of matter" (Lemke, 2021) which is what I seek to do in this paper. I further see the discussion on Barad, Foucault, Butler and others as tangential to the argument of this paper, and my contribution focusing on the Essex school can be seen, in most parts, as complementary rather than contradictory to these discussions.

terms. As Barad shows, in physics, already Niels Bohr developed a nuanced understanding of the intimate relationship between concepts and materiality, matter and meaning (2007, 147). Here, discourse is not merely "supported" or "sustained" by material practices, and nor do non-discursive (background) practices determine discursive practices, as Barad thinks some philosophers purport (2007, 25, 147). Rather, a dynamic and agential conception of materiality that "takes account of the materialization of all bodies (nonhuman as well as human and that makes possible a genealogy of the practices through which these distinctions are made)" (2007, 200) can be developed by combining quantum physics and post-structuralist thinking.

In Barad's lexicon, matter and discourse *intra-act* and become inseparable in the concept of material-discursive practices. There are no separable objects to be discovered existing in "reality," and rather, *all existence is understood as phenomena.* All existence is in a process of becoming, and the basic unit of existence is phenomenon. Phenomena then are produced and come into being through agential cuts produced by apparatuses. To elaborate:

Whereas in classical physics objects are considered to be separable and determinate, in the quantum physical framework "[t]hat which exists is that which we can use to intervene in the world to affect something else" (2007, 41). Hence for instance, electrons "are counted as real because they are effective experimental tools, not because they have been 'found'" (2007, 41). That is to say, the atomistic or positivist worldview in which objects are separable, discrete entities, always poses the question of which representation of the world and the objects in it, is real. For example, is a table a solid mass made of wood or an aggregate of atoms—discrete entities moving in the void? (2007, 48). Barad's agential realism overcomes this kind of question. Based on quantum physics, it is a relational framework and "a non-representationalist form of realism that is based on an ontology that does not take for granted the existence of 'words' and 'things' and an epistemology that does not subscribe to a notion of truth based on their correct correspondence" (2007, 56). Instead, in the quantum physical framework, *reality is indeterminate*, and likewise theorizing, knowing, observing and experimenting are not about intervening from outside, but more about intra-acting within and as part of the world and the phenomena produced (2007, 56, 90). Barad draws from quantum theory and experiments, and explains these in a manner that is accessible also to readers who may be unfamiliar with physics theories. Taking the explanations produced in this field of physics to a wider philosophical field of epistemology and ontology, she argues that the quantum experiments "highlight, exhibit, and make evident the entangled structure of the changing and contingent ontology of the world,

including the ontology of knowing" (2007, 73).

Barad builds on Bohr's argument for the indeterminable nature of measurement interaction. Indeterminacy of the 'real' and the intra-active nature of measurement basically mean that "concepts are defined by the circumstances required for their measurement" (2007, 109). Theoretical concepts thus are not ideational, but specific physical arrangements. This is the sense it which this is a materialist framework. Measurement and description entail each other through their mutual implication, and concepts obtain their meaning in relation to a particular physical *apparatus* (2007, 109-120). Remember here that Barad is all the time discussing phenomena that are what we traditionally see as physical and material, and not social or cultural (in the traditional sense)—although, as will become clear, this onto-epistemology applies to both fields, or to all existence. An indeterminacy of reality thus means that rather than separate objects or 'independently existing' units/things, reality is to be conceived as phenomena—a relational ontology in which all existence is in a process of becoming. But how do objects and boundaries then emerge and appear? Or in discourse theoretical terms, how is meaning made?

For Barad, apparatuses are "the conditions of possibility for determinate boundaries and properties of objects and meanings of embodied concepts within the phenomenon" (2007, 143). They are boundary-making, dynamic practices that are "formative of matter and meaning, productive of, and part of, the phenomena produced" (2007, 146). Apparatuses are also themselves phenomena that have no intrinsic boundaries, but are open-ended practices. Consequently, it does not make sense in this framework to talk about apparatuses being located in the world, in space and time, rather they are material configurations that (re)configure the world, producing "determinate boundaries and properties of 'entities' within phenomena, where 'phenomena' are the ontological inseparability of agentially intra-acting components" (2007, 148).

Barad in effect demonstrates and explains in great detail in her book (which it is difficult to do justice to in a short explanation of her argument) how and why separating semantic and material is not possible and does not make sense.

> It is only through specific agential intra-actions that the boundaries and properties of 'components' of phenomena become determinate, and that particular articulations become meaningful. In the absence of specific agential intra-actions, these ontic-semantic boundaries are indeterminate (2007, 148).

Following on from this, materiality *is* discursive because material phenomena are inseparable from the apparatuses of production. Matter emerges out of apparatuses of production, and includes as part of its being the ongoing reconfiguring of boundaries, in the same way that discursive practices *are always already* material (i.e., they are ongoing material [re]configurings of the world). Discursive practices and material phenomena do not stand in a relationship of externality to each other; rather, the material *and* the discursive are mutually implicated in the dynamics of intra-activity. The relationship between the material and the discursive is therefore one of mutual entailment, where discursive practices and material phenomena entail one another, and neither is ontologically or epistemologically prior to or determined by the other (2007, 151-152). This has implications for research and analysis. As Barad puts it:

> Material constraints and exclusions and matter's historiality and agency (including, for example, the material dimensions of regulatory practices) are important factors in the process of materialization. Material conditions matter, not because they 'support' particular discourses that are the actual generative factors in the formation of bodies, but because matter comes to matter through the iterative intra-activity of the world in its becoming. The point is not merely that there are important material factors in addition to discursive ones; rather, the issue is the conjoined material-discursive nature of constraints, conditions, and practices. The fact that material and discursive constraints and exclusions are intertwined points to the limited validity of analyses that attempt to determine individual effects of material or discursive factors. (2007, 52)

Apparatus is a key concept for Barad. It marks the subject-object distinction, and the physical and conceptual apparatuses form a non-dualistic whole. In this framework, concepts obtain their meaning in relation to a particular physical apparatus, and this relationship is not random but embodies a particular concept to the exclusion of others. Apparatuses provide the agential cut (or Bohrian cut) between the object and the agencies of observation (2007, 120). As Barad is all the time discussing physical reality and physics experiments, and also bearing in mind the question of the material reality of objectivity in social sciences, "[t]he question remains: what is the objective referent for the determinate value of the property measured?" (2007, 120). Barad explains how the understanding of reality as phenomena, as a process of becoming, resolves this question:

> Since there is no inherent distinction between object and instrument, the property measured cannot meaningfully be attributed to either an abstract object or an abstract measuring instrument. That is, the measured value is neither attributable to an observation-independent object, nor is it a property created by the act of measurement (which would belie any sensible meaning of the word "measurement"). My reading is that the measured properties refer to phenomena, remembering that the crucial identifying feature of phenomena is that they include 'all relevant features of the experimental arrangement.' (2007, 120)

This also explains why Barad's theory is named agential realism. It does not abandon the idea of reality (i.e. that discourse would somehow dictate material reality or be separate from it) or the idea of causal effects (see next section), but that agentiveness is inherent in the phenomena/matter—it is not human discursive agency that decides or produces the boundaries, but rather the apparatus executes the *agential cut* that produces a particular phenomenon, and also enacts a resolution (within the phenomenon) of the semantic, as well as ontic, indeterminacy (2007, 148).

"The line between subject and object is not fixed, but once a cut is made (i.e., a particular practice is being enacted), the identification of boundaries, the line between subject and object, is not arbitrary but in fact materially specified and determinate for a given practice" (2007, 155). The inherent ambiguity of the resolution of the boundaries through particular cuts and practices is not about phenomena appearing in conscious subjective (human) experience in the phenomenological sense, but in ontological sense, about any/all boundaries.

Perhaps the connections with discourse theory to the reader are already apparent. I claim that discourse theory and agential realism in fact go very well together, and share an ontology which is both quantum physical and post-structural. While Glynos and Howarth and others focus on how such an ontology can be the basis of social scientific research methodology (especially in research on political and ideological change, et cetera), Barad focuses on the level of matter in physics experiments, which reveal the indeterminate nature of all existence. While both Barad and Glynos and Howarth refer to some of the same thinkers and utilize post-structuralist insights that are broadly understood (both for instance refer to Foucault), coming from different backgrounds (theoretical quantum physics and post-Marxist and linguistic theory, respectively), they utilize somewhat different vocabularies. However, as the ontologies are so similar, these concepts often forward almost exactly the

same kind of theoretical work. Table 1 below lists some of the key articulations that comparatively perform similar functions in each theory.

To further explain how the two go together, let us discuss the question of agency and structure to demonstrate that both theories overcome this distinction in a similar manner. Understanding this point means that the question of materiality will be better accounted for in discourse theory through Barad's explicit theorization of matter.

Table 1. *Compatibility of the key ideas of discourse theory and agential realism*

Discourse theory	Agential realism
Discourse: historically specific relational system of meaning and practice which form the identities of subjects and objects; articulated set of elements. Any object's identity is conferred by the particular discourses within which it is constituted.	Apparatuses provide the agential cut between the object and the agencies of observation; produce particular phenomena. The referent is not an observation-independent object but a phenomenon.
In moments of dislocation, the 'spaces' or 'gaps' of social structures are rendered visible and the notion of a political or radical subject can emerge through what might be called particular 'acts of identification'	Inseparability of the observed phenomenon/matter and the agencies of observation. The boundaries and properties of "components" of phenomena become determinate and particular articulations meaningful through specific agential intra-actions.
Radical contingency: The irreducibility of the real to the concept. Our conceptions of things and entities do not exhaust their meaning or being.	Reality is indeterminate. Entities do not have inherent, fixed nature.

4.   RESOLVING THE QUESTION OF AGENCY VS. STRUCTURE

In discourse theory, the question of agency is mainly discussed through political agency. At the heart of the agency vs. structure dilemma are questions such as to what extent people have power (i.e. agency and a possibility to make a difference in the world), how can people change society and politics and how do structures affect and constrain political action, and what motivates and makes political activity, or more widely, any agency, possible? Here, in the context of social science, structures refer to sedimented social institutions and material configurations such as family, structures of ownership and legal frameworks,

as well as more seemingly immaterial cultural structures such as traditions and assumptions about things such as gender roles, race, etc. As discussed above, the social ontology of all of these aspects is considered to be unstable. Particularly, the understandings of subjectivity and agency are not reducible to questions of identity—but rather the question is about how subject positions within a discourse allow for action and agency.

The basic idea is that subjects (can) act, speak or decide in novel ways when they identify with new discourses or objects. This is agency. The condition of possibility for agency is thus "the dislocation of the seemingly sedimented social structures," and "the idea of a 'lacking subject' that is divided between its identity and the ever-present threat of its dissolution or negation when structures are disrupted" (Howarth 2010, 314, referring to Laclau). As Howarth (2010) explains, when structures fail to provide stable points from which to speak or act, a form of subjectivity opens up wherein subjects are literally compelled to be free, as they have to somehow identify anew—i.e. use their agency. Thus there is no opposition between structures and agency, and rather this distinction begins to dissolve when we see that in fact the relationality and undecidability (indeterminacy) at the heart of post-structuralist ontology necessarily opens up the prospect of choice for subjects (Howarth 2010, 314). There is rather a constant interplay between different elements of discourse which does not rely on essentialist conceptions that would mean there is a deterministic role for what is seen as either structural or agential. Rather, the idea is of a 'thrown' subject that is produced by the practices and identities that its environment (material and symbolic environment, culture, its 'world,' or various apparatuses) confers. Here,

> the subject is marked by an internal *lack* or *impossibility*, which is only disclosed in certain circumstances […], *dislocatory* events, which are social situations where it is no longer clear how the subject is to 'go on'—how it is to follow the rules, for instance, or engage in routinised practices. Lack is thus revealed when identities are exposed to situations where the contingency or the undecidability of *dislocated* social structures is made visible (Glynos and Howarth 2008, 162-163).

Furthermore, when any moment of disruption can be overcome or made anew by identification with new objects and ideologies, the subject is basically always an agent in its world (Howarth 2010, 314). Indeed, it should be emphasized that these disruptions can also be understood as minuscule everyday events, and not only revolutionary moments of change (Hoppania and Vaittinen, 2015).

This way of covering or dissolving the structure vs. agency question is similar in Barad's work—only in Barad it is not only a question about human agency or political agency, but how any agency (the agency of matter) operates, or how any change happens at all. Whilst Glynos and Howarth discuss how "the emergence of novel ideas or problems in a particular tradition offers opportunities for individuals to reflect and act in different ways, and the resultant social practices can have the effect of altering institutions and traditions" (Glynos and Howarth, 2008, 159)—Barad shows how any phenomena (not only social institutions or traditions) enact change via the agential cuts that the apparatus produces.

In Barad, agency extends to materiality. Indeed, "matter plays an agentive role in its iterative materialization" and "the space of agency is much larger than that postulated in many other critical social theories" (Barad 2007, 177). Firstly, agency is a matter of intra-action, and is not an attribute or something that someone or something has. Agential realism does not support determinism or unfettered free will, but presents a different way of thinking about temporality, spatiality and possibility—and thus about the question of structure and agency. Namely, intra-actions always entail particular exclusions, and exclusions foreclose the possibility of determinism, providing the condition of an open future. All activities (thinking, measuring, theorizing, observing) are material practices of intra-acting within and as part of the world. Apparatuses enact the agential cuts that produce any determinate boundaries or properties. So not anything is possible at any given moment. Indeed, intra-actions iteratively reconfigure what is possible and what is impossible, and this is also true on the atomic level (2007, 177-178). The agential realist account of agency is thus also post-humanist, as the idea of agency is not aligned with human intentionality or subjectivity. But this does not mean that there are no causal relations or space for ethical consideration in agential realism. On the contrary, as particular possibilities for (intra-)acting exist at every moment, and different agential cuts materialize different phenomena with different causal structures, it means that our intra-actions contribute to the differential mattering of the world: "Cuts are agentially enacted not by wilful individuals but by the larger material arrangement of which 'we' are a 'part'" (2007, 178). Likewise,

> apparatuses must be understood as phenomena made up of specific intra-actions of humans and nonhumans, where the differential construction of the "human" (and its "others") designates an emergent and ever-changing phenomenon. Agency is not about choice in the lib-

eral humanist sense; agency is about the possibilities and accountability entailed in reconfiguring material-discursive apparatuses of bodily production, including the boundary articulations and exclusions that are marked by those practices. (2007, 218)

Glynos and Howarth (2008, 163) on their part have explained what their kind of understanding of change means: "there is no avoiding the concrete analysis of a particular historical conjuncture in order to explore the specific reasons and conditions in which the radical contingency of social structures and relations is made visible, thus offering new possibilities for action and identification." Research is then about accounting for the different ways in which dominant orders and regimes are contested (successfully or not) by counter-hegemonic or other resistance projects, as well as the ways in which certain political projects or social practices remain or become hegemonic (Glynos and Howarth 2007, 5-7, 104; Howarth 2000, 5). In both agential realism and discourse theory, understanding the radical contingency/indeterminacy of reality also means that the structure and agency dilemma is about relationality and contextuality, and whenever answering questions about agency or structures, it is necessary to analyse the apparatuses/discourses that produce the issue and the question at hand, and which are always contextual.

5.   CONCLUDING REMARKS

My argument in this paper is that directly dealing with the question of materiality and explaining it in the Baradian manner, strengthens discourse theory. It becomes possible to say that indeed, contingency does go all the way down, and not only "so to speak." Taking on board the Baradian idea of agency of matter opens up the possibility to explain what this ontological conception of matter in fact means in social sciences, or in transdisciplinary research. This kind of account is necessary in particular when it comes to research objects and issues that are not clearly just 'social' or 'natural,' for example climate change, pandemics, or when research centres on human bodies, like in issues such as genetics or sex/gender. It is here that Barad's theory is of help, and explains what contingency all the way down to the material world actually means. This paper proposes that Barad's agential realism can be integrated with the post-structuralist, discourse-theoretical framework to produce a fuller and more convincing post-structuralist discourse approach.

Unlike in the positivist worldview, a world opened up by the quantum revolution looks a lot like a post-structuralist world of elements arranged and partially or seemingly sedimented and fixed in discourse that is always

open for politicisation. In this paper I have shown an avenue for social and political theory to go on to strengthen the ontological basis of post-structuralist discourse theory and methodology. This is by no means a full exploration of Barad's agential realism and discourse theory, and others have examined for example the Foucauldian approach and Barad (e.g. Lemke 2021; Nyckel 2022). The concepts of objectivity or causality could be examined through both discourse theory and agential realism to produce a stronger materialist understanding of these notions. Likewise, critiques of Barad's theory's notion of responsibility, for example, as inadequate in that it risks to depoliticize the ontological question (Hoppe and Lemke, 2015), could be further examined in conjunction with discourse theory, which might be of use in producing a stronger agential realist account of politics, responsibility, and so on. Likewise, this paper has not sought to engage the extensive variety of new materialist or discourse theorist thinkers, as the focus has been on making this specific connection between Barad and the Essex school.

The analytical work of this paper could also strengthen possibilities for cross-disciplinary work, when the ontological bases of research can be better understood and shared across the natural science—social science (/humanities) divide. When we combine the agential realist account of materiality with discourse theory, we get a fuller view of any phenomena we have under scrutiny, also in the social sciences. In quantum times and in the light of discourse theory strengthened by agential realism, a scientific investigation of any issue would entail not only accounting for the social and political dynamics at stake, but also of the 'material' aspects of the 'natural world'—indeed of any and all relevant factors which figure in the phenomenon. It is the job of research to show how and in what way and with what weight different elements and practices figure in the production of phenomena under scrutiny. In her book, Barad also discusses (briefly, in comparison to her physics examples) some social-political issues and topics, such as the shop floor as an apparatus producing workers (Barad 2007, 226-243). Accordingly, there is wide potential in agential realism for social and political research.

In health research for example, there are discussions concerning 'oppositional collaboration' for areas with high ideological polarization, such as bioethics (e.g. Stanford 2016; Battin 2005). This would mean working together across divides to increase understanding and to generate more accurate data that all agree is as objective as possible for the relevant questions being asked. In Barad's terms, the apparatus that produces the agential cut that makes the data emerge is widened, and thus made more complex through the collaboration of researchers with different (ethical and disciplinary)

viewpoints. Here, data is admittedly seen to be affected by the viewpoints or the apparatuses used by the scientists—i.e. that the apparatuses involved in producing data are more complex and multidimensional than is often acknowledged, and that different underlying assumptions and conceptual and ethical frameworks produce different kinds of data and different results. In various questions of social sciences too, such collaborations could be fruitful and benefit from Baradian-discourse theoretical insight. Sometimes, social science research results or policy suggestions are dismissed as being ideological or seen as somehow polluted, for example by the researcher's (assumed) ideological (e.g. feminist/socialist/neoliberal) perspective. Behind these dynamics linger positivist dreams of data and knowledge unpolluted by ethical or political outlooks, and an outdated classical understanding of reality as determinate. However, this paper emphasizes that reality is indeterminate and is about phenomena, and that in fact we should make visible the outlooks and frameworks that shape our research work, data, results and policy recommendations. We should articulate the apparatuses that produce our facts, data and objects as carefully and comprehensively as possible, which also requires an explanation of *materiality*, or what is meant by objective (or 'brute') facts in any given issue. Barad's insight strengthens the discourse theoretical approach to social science by explaining how discourse does indeed go 'all the way down' in producing objects. This does not mean that the result can be anything at all, or that reality can be twisted and turned on the whim of the researcher, but that the (research) apparatus must be properly accounted for, and the agency of matter taken into account. That is why it is ever more crucial to give better accounts of what kind of realities and facts we produce, and how they are produced in both 'social' and 'natural' sciences.

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