

New Materialism

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Introduction

New materialism is a term ascribed to a range of contemporary perspectives in the arts, humanities and social sciences that have in common a theoretical and practical ‘turn to matter’. This turn emphasizes the materiality of the world and everything – social and natural – within it, and differentiates new materialisms from a post-structuralist focus upon texts, ‘systems of thought’ and ‘discourses’, focusing upon social production rather than social construction (Deleuze and Guattari, 1984: 4). The materialities considered in new materialist approaches include human bodies; other animate organisms; material things; spaces, places and the natural and built environment that these contain; and material forces including gravity and time. Also included may be abstract concepts, human constructs and human epiphenomena such as imagination, memory and thoughts; though not themselves ‘material’, such elements have the capacity to produce material effects.

A focus upon materiality has significant consequences for social theory, cutting across a number of dichotomies that have often been fundamental in the humanities and social sciences. These include differentiations between natural and social worlds; between human and non-human, animate and inanimate; and between mind and matter. However, the new materialisms also impact directly upon research epistemology and methodology, challenging conventional distinctions between ‘subjectivity’ and ‘objectivity’ and consequently between realism and constructionism; questioning the aim of research at ‘representing’ the social world; and re-appraising methods of data collection, analysis and reporting. New materialism has been given a cautious welcome by some feminist, queer theory and post-colonial scholars and activists who have seen an opportunity to use the perspective to underpin active

engagement with materiality and bodies, and to model power and resistance within a messy, heterogeneous and emergent social world (Braidotti, 2011: 137).

Principal features of the new materialism

The 'new' materialisms are discontinuous with the earlier historical materialism of Hegel and Marx, which focused on the development of social institutions and practices within a broad economic and political context of material production and consumption. This emphasis inflected materialist analysis with a concern with 'structural' or 'macro-level' forces deriving from the social relations of production; power was conceptualized as a top-down phenomenon, exerted by a dominant social class over an oppressed class of working people. The 'turn to matter' in the new materialism has instead been informed by post-structuralist, feminist, post-colonialist and queer theories, which rejected economic and structuralist determinism as inadequate satisfactorily to critique patriarchy, rationalism, science and modernism, or to supply a critical and radical stance to underpin struggles for social justice and plurality.

New materialists consider that the world and history are produced by a range of material forces that extend from the physical and the biological to the psychological, social and cultural (Barad, 1996: 181; Braidotti, 2013: 3). The materiality addressed in these new materialisms is plural, open, complex, uneven and contingent (Coole and Frost, 2010: 29); crosses boundaries between natural and social worlds; and for some new materialist scholars is invested with a vitality or liveliness, as opposed to being inert and passive matter. The new materialism has been described as an ontology of immanence; in other words, as not dependent upon a foundational or transcendent power such as God, fate, evolution, life-force, Gaia, mechanisms, systems or structures.

Included in the new materialisms are perspectives from affect theories to non-representational theory, but despite this breadth all may be characterized as posthumanist and post-anthropocentric (Braidotti, 2013: 86), materially embedded and embodied (Braidotti, 2011: 128), relational and contingent rather than essentialist or absolute (Coole and Frost, 2010: 29), and as supplying social theory with the means to re-immense itself in a material world

that is plural, complex, heterogeneous and emergent. By rejecting a distinction between the physical world and the social constructs of human thoughts, meanings and desires, new materialism opens up the possibility to explore how each affects the other, and how things other than humans (for instance, a tool, a technology or a building) can be social ‘agents’, making things happen. New materialism’s post-anthropocentrism shifts humans from the central focus of attention, not only emancipating the affective capacities of the non-human but also establishing an ethics that can engage productively with human culture, with other living things, and with the wider environment of inanimate matter (Braidotti, 2013: 60).

This distinctive ontology has been described as ‘flat’ or ‘monist’ (rather than ‘dualist’), rejecting differences between ‘natural’ and ‘cultural’ realms, human and non-human, structure/agency, reason/emotion, animate/inanimate and – perhaps most significantly – between mind and matter (van der Tuin and Dolphijn, 2010). Paradoxically, however, this flat ontology is not a move to universalism or a unitary perspective upon the social or upon subjectivity, but rather opens up a multiplicity and diversity that exceeds and overwhelms the dichotomies they replace (Braidotti, 2011: 211). Multiplicity is acknowledged variously throughout new materialist thought: in DeleuzoGuattarian notions of rhizome, nomadology and becoming; in Karen Barad’s diffractive methodology (2007: 90); in Mol’s (2002) body-multiple; and in Braidotti’s (2011: 211) nomadic subject.

A flat ontology also marks a re-focusing of attention away from hierarchies, systems or structures beyond or beneath the surface of everyday activities and interactions. In new materialist ontology there are no structures, systems or mechanisms at work; instead there are ‘events’ – an endless cascade of events comprising the material effects of both nature and culture that together produce the world and human history. Exploring the relational character of these events and their physical, biological and expressive composition becomes the means for social science to explain the continuities, fluxes and ‘becomings’ that produce the world around us, rather than via structural or systemic ‘explanations’ of how societies and cultures work (Latour, 2005: 130). This has implications for research, requiring a focus upon the specific inter-actions that occur within events.

According to their advocates, the new materialisms afford a variety of theoretical and practical opportunities. First, they reject the boundary dispute between ‘social’ and ‘natural’ sciences, questioning the very separation between nature and culture (Braidotti, 2013; Latour, 2005: 13). Instead, they link the production of the world and everything ‘social’ and ‘natural’ within it to a wide variety of forces, from physical interactions to biological processes to social encounters and emotional reactions. By drawing nature and culture, mind and matter into a single arena, new materialisms radically extend the scope of materialist analysis beyond traditional concerns with structural and ‘macro’ level social phenomena (van der Tuin and Dolphijn, 2010: 159). Issues which have often been regarded as experiential or individual – such as creativity and sexuality – may also be studied materially, acknowledging that thoughts, abstract concepts, memories, desires and feelings also materially contribute to social production (DeLanda, 2006; 5).

Second, new materialists regard the material world and its contents not as fixed, stable entities, but as relational and uneven, emerging in unpredictable ways around actions and events, ‘in a kind of chaotic network of habitual and non-habitual connections, always in flux, always reassembling in different ways’ (Potts, 2004: 19). Whereas critical realists have conceived of a world of hierarchical and stratified structures, things, and essences, new materialists such as Deleuze address a complex, dynamic, and open world founded on difference, heterogeneity, and emergence. For new materialists, human bodies and all other material, social and abstract entities have no ontological status or integrity other than that produced through their relationship to other similarly contingent and ephemeral bodies, things and ideas.

Third, the relationality of the world is in part operationalized via an understanding of agency that no longer privileges human action. Rather, a ‘capacity to affect and be affected’ (Deleuze and Guattari, 1988: 127-128) is a feature of all matter: human and non-human, animate and inanimate. This establishes a perspective upon the world as continuously *emergent* via a series of interactive and productive events/assemblages, rather than founded upon stable structures or systems. De-privileging human agency also serves as an ethical and political counter to the humanism of the social sciences, supplying the basis both for an anti-humanist critique of the environmentally-destructive capacities of humans, but also to re-

integrate humans within ‘the environment’ (Fox and Alldred, 2017a: 42). This latter move underpins a more positive posthumanism, which can be a basis for an eco-philosophy that establishes a continuum between human and non-human matter (Braidotti, 2013: 104).

Fourth, many of the leading new materialist scholars – notably feminists, post-colonial scholars and queer theorists – have developed or adopted these perspectives of their social and politically engagements; finding in the new materialisms a framework that is materially embedded and embodied (Braidotti, 2011: 128) and can be used both to research the social world and to seek to change it for the better. While post-structuralism and social constructionism provided a means to break through top-down, determinist theories of power and social structure, the focus upon textuality, discourses and systems of thought in these approaches tended to create distance between theory and practice, and gave the sense that radical, interventionist critiques of inequities and oppressions were merely further constructions of the social world. The turn to matter offers a re-immersion in the materiality of life and struggle, and the recognition that in a monist world – because there is no ‘other level’ that makes things do what they do – everything is necessarily relational and contextual rather than essential and absolute.

Finally, new materialists emphasize ontology (concern with the kinds of things that exist) over epistemology (which addresses how these things can be known by an observer). Epistemological debates over whether it is possible to know a social world beyond human constructs (or even if there is such a world independent of human thought) has divided social scientists, and has erected barriers between quantitative and qualitative research approaches that appear to deal with different aspects of the social. New materialist scholars regard their own efforts to re-focus on ontology as a means to cut across an irresolvable argument between realists (who believe there is a knowable world independent of observers) and idealists (who regard the world as the product of human constructs), but also as necessary to address assumptions about what matter is and what it does. This has profound significance for research methodology, as will be seen later in this entry.

Strands within the new materialism

Beyond these commonalities, new materialist scholars have diverged in how they have conceptualized materialist ontology. Having identified the key features of the new materialisms, this section examines in greater detail distinctive aspects of the work of some key new materialist scholars.

Deleuze, Guattari and the microphysics of becoming

Together and separately, the work of philosopher Gilles Deleuze and psychoanalyst and social activist Félix Guattari has been the starting point for much new materialist theory and concepts, including non-representational theorists Nigel Thrift and Derek McCormack; feminist and queer theory scholars including Rosi Braidotti, Moira Gatens and Elizabeth Grosz; the ‘vital materialism’ of Jane Bennett; some theorists of the ‘affective turn’ in the social sciences such as Patricia Clough and Brian Massumi; and Manuel DeLanda’s assemblage theory of interaction, organization and society. For new materialists, Deleuzism offers a radical microphysics of materiality based upon a mix of Nietzsche’s philosophy of becoming, Spinoza’s monist rejection of a transcendent level independent of the everyday world of material interactions, and Marx’s analysis of capitalist production.

DeleuzoGuattarian materialism regards human bodies and all other material, social and abstract entities as relational, having no ontological status or integrity until drawn into ‘assemblages’ (Deleuze and Guattari, 1988: 88) with other similarly contingent and ephemeral bodies, things and ideas through their capacities to affect or be affected. Such capacities – which, following Spinoza, Deleuze (1988: 101) simply called *affects* – may be physical, biological, psychological, social, political or emotional. Some affects specify or ‘territorialize’ a body’s or other relation’s capacities, while others generalize or ‘de-territorialize’ what they can do; occasionally the latter can be so dramatic that a body achieves a ‘line of flight’ (ibid: 9) into a new physical, cultural or psychological state.

Assemblages develop in unpredictable ways around actions and events as affects ‘flow’ between different materialities in ways Deleuze and Guattari liken (1988: 6) to an underground rhizome: branching and multiplying, breaking and re-connecting. The flow of

affect within assemblages is consequently the means by which lives, societies and history unfold, by adding capacities during interactions. The quantity and quality of such capacities are markers of both human and societal well-being; it follows that movements for emancipation and social transformation need to focus upon broadening and deepening capacities to think, feel and act.

Karen Barad: a materialist onto-epistemology

The inspiration for feminist Karen Barad's materialism derives from quantum mechanics (particularly the theories of physicist Niels Bohr), in which apparently-independent sub-atomic particles seem entangled, and the act of observation appears to affect what is observed. Barad (1996) extends this theory to include the world of the everyday, arguing against a view of a fixed, stable reality and pre-existing or independent objects, and for a world that is always physically and socioculturally contextual. If there is a reality, it is one constructed by 'things in phenomena' (1996: 176), in other words, in the interactions – or 'intra-actions' (1996: 179) – that constitute a phenomenon, event or action, including interactions with observers or measuring devices.

This analysis provides Barad (2007: 185) with an 'onto-epistemology', cutting across the conventional separation of concerns with the nature of reality and issues of observation and knowledge. Phenomena are entirely context-specific, rather than absolute, and there is no way to reveal the pure 'essence' of reality (1996: 170). Intra-actions within a phenomenon constitute an 'agential reality' that necessarily includes both object and observer, as well as both sides of nature/culture and word/world dualisms (ibid: 177). Scientific inquiry is not neutral: every research design, method or theory is an 'agential cut' that reflects a particular power-laden epistemological move (2007: 185).

Barad's onto-epistemology makes the point (also made by Deleuze and Guattari but from a different starting place) that ontologically, culture and nature cannot be differentially privileged, and that 'constructedness does not deny materiality' (Barad, 1996: 181). It offers a foundation for scientific practice that is 'material-cultural', based not upon a distinction between independent observer and independent object of inquiry, but in 'the movements

between meanings and matter, word and world, interrogating and re-defining boundaries ... in “the between” where knowledge and being meet’ (ibid: 185).

Rosi Braidotti, the posthuman and the post-humanities

Of new materialist theorists, Rosi Braidotti offers the most thoroughly developed and penetrating critique of humanism and anthropocentrism: the pervasive post-Enlightenment outlook that has considered humans (and more typically, white male Western humans) as the centre of concern, and the ‘measure of all things’. Braidotti’s interest has been in the materiality of the lived and living body (2011: 130), and in developing an embodied and embedded, feminist and materialist, nomadic and posthuman theory of the body and subjectivity (2013: 51). Her work draws eclectically from feminist scholarship, and upon the ‘nomadology’ of Deleuze and Guattari, which has supplied the basis for a philosophical trajectory towards posthumanism and the post-humanities.

Philosophical nomadism contests ‘the arrogance of anthropocentrism’, allying instead with the productive and transformational forces of *zōē* or ‘life in its inhuman aspects’ (2011: 139). As in Bennett’s (2010) vital materialism, for Braidotti matter – including the matter that comprises bodies – is lively, intelligent and self-organizing, and not opposed to culture, but continuous with it (Braidotti, 2013: 35). The resulting posthumanist feminist perspective cuts across natural and social science boundaries, and across essentialist dualisms such as man/woman, human/animal, and mind/body.

Braidotti has used her conception of the posthuman as the philosophical foundation for the ‘post-humanities’, the successor to the anthropocentric humanities. The subject of the post-humanities is not ‘Man’ (Braidotti, 2013: 169) but rather the processes of change and becoming of the natural and social world, and an ecology of the human and the non-human in which neither is distinguished from, or privileged over the other. In practice, this means shifting focus away from essentialist and organic notions of ‘life’ towards a concern with practices and flows of becoming, and of complex assemblages that cut across natural and cultural domains. This supplies a model for a new posthuman synergy between the physical sciences, social sciences and humanities. Braidotti argues for a new science that is ‘ethically transformative, and not bound to the economic imperatives of advanced capitalism’: a ‘minor

science' (to use a Deleuzian term discussed in the next section of this article) that recognizes its material subject as complex, assembled from disparate materialities, and relational (2013: 171).

Bruno Latour and actor-network theory

Actor-network theory (ANT), a well-established perspective in science and technology studies, gains its most powerfully new materialist presentation in Bruno Latour's later work. ANT is notable for ascribing agency to transient relational networks or assemblages comprising both human and non-human 'actants' (Latour, 2005: 54). From this perspective, social life is heterogeneous engineering, 'in which bits and pieces from the social, the technical, the conceptual and the textual are fitted together' (Law, 1992: 381). ANT has been applied to offer a materialist sociology of technological applications and to the practice of science inquiry. Latour's (2005) *Re-assembling the Social* develops these arguments to establish an agenda for a 'sociology of association' that collapses the dualism of nature and culture, and criticizes sociology's long-held view of 'the social' as a distinct domain of reality to be revealed through the specialized methods of social scientists (Latour, 2005: 4).

ANT collapses not only this nature/culture binary, but also the agency/social structure dualism endemic to much sociology. Latour is critical of approaches such as critical realism and Marxism that explain social processes in terms of deep or underlying structures or mechanisms. For Latour, 'explanations' – such as 'capitalism', 'patriarchy' or 'hegemonic masculinity' are the very things that need themselves to be explained (ibid: 130-131). The task of social inquiry, he argues, is not to describe and explain 'social forces', but to explore how a range of heterogeneous elements from the physical, biological, economic, semiotic and other 'realms' produce social aggregations such as nations, social organizations and elements of human culture (ibid: 5-6). Sociology should not restrict itself to studying social ties, but instead 'travel wherever new heterogeneous associations are made' (ibid: 8), in order to understand how the social is continually assembled from non-social associations. For these reasons ANT theorists including Latour have on occasions been criticized for failing to engage with politics and the exercise of power.

New materialism and research methodology

The ontological insights from the new materialist ‘turn to matter’ are fundamentally significant for how the social and natural world may be studied, and hence for research methodology. Materialist and posthuman perspectives pose challenges for the foundational humanism underpinning much qualitative inquiry, with its focus upon human actions and voices, and interpretations of those voices and actions via humanistic collection methods such as interviewing and ethnographic observation and interpretive analysis and reporting. ‘Post-qualitative’ research scholars have questioned how – beyond this humanist focus – an object of research may be identified, researchers might be extricated from the entanglements of the research enterprise, and how an unstable and continually changing social world may be studied (Lather and St Pierre, 2013).

To address such challenges some new materialist researchers have found inspiration in Deleuze and Guattari’s (1988: 369-370) advocacy of a ‘minor science’ that runs alongside mainstream, major or ‘royal’ scientific endeavours (1988: 367). Whereas the latter developed formal disciplines in the natural and social sciences to underpin authoritative statements about the world by monarchy, State or societal establishment, minor science is practically-oriented: providing local knowledge to achieve specific tasks while acknowledging a world that is dynamic and heterogeneous rather than stable and consistent. What differentiates these two kinds of scientific enterprise is their orientation toward their objects of study. A ‘minor science’ perspective steps back from the efforts of major or royal science to generate data that *reproduce* researched events truthfully, and is instead concerned with ‘following’ the flow of events as they unfold. Rather than observing and documenting a river and its contents from a fixed point on the bank, Deleuze and Guattari (ibid: 372) suggested, minor science takes to a boat and becomes part of the flow it wants to fully understand.

In this minor science vein, non-representational theorists in human geography have favoured a more direct and affective engagement or ‘witnessing’ over traditional representational modes of knowledge-production. This approach incorporates experiential and corporeal sensing, and valorizes affective processes that precede consciousness and reflection (McCormack, 2005: 122), with the aim not of representing the world but of generating ‘difference, divergence, and creation’ (Thrift and Dewsbury, 2000: 416). In homage to

Deleuze and Guattari's minor-scientific 'schizoanalysis' (1984: 322), other new materialist scholars have described their efforts to do research that 'follows' affective flows in events as 'schizoanalytic' or 'rhizoanalytic'.

Karen Barad's (2007) onto-epistemological perspective offers a different analysis of research methodology. As was noted earlier, her Bohrian assessment of the process of scientific observation led to the conclusion that researcher and researched are always inextricably 'intra-acting', to the extent that the effects of the observer may never be 'controlled out' or discounted by means of sophisticated methodologies. All knowledge should be seen as situated; consequently every time a researcher uses a specific research design, method or theory it establishes one particular point of view upon the object of study, what Barad (2007: 185) calls an 'agential cut'. But rather than treating this as the basis for relativist pessimism about gaining knowledge from social inquiry, Barad argues that science's successes in both explaining and predicting the world has been due not to methodological strategies to acquire objective (observer-independent) knowledge. Rather, it is *because* all research data are produced by human engagements that we can gain knowledge about reproducible phenomena that is relevant to the human enterprise (Barad, 1996: 186). Using a further analogy with physics, Barad has promoted Donna Haraway's (1997: 16) suggestion of a 'diffractive methodology' that fully acknowledged the standpoint of the social researcher and made this a core element of any analysis of research data. Different methods and methodologies 'cut' data in multiple ways, as does intra-action with researchers' own theories, insights or reflections. Diffractive approaches are engaged and creative, and incorporate researchers' experiences and insights as means to specify a particular contextual cut in how data is analysed (Taguchi and Palmer, 2013).

Such intra-actions between object of study and observer (including all the paraphernalia of doing research) may be further unpacked when a detailed materialist micropolitical analysis is applied to the research process, and to specific research designs and methods. From a new materialist perspective, each and every research act may be considered as an assemblage comprising specific research tools (such as questionnaires, interview schedules or scientific apparatus); recording and analysis technologies, computer software and hardware; theoretical frameworks and hypotheses; research literatures and findings from earlier studies; the 'data'

generated by these methods and techniques; the ‘events’ to be researched; the physical spaces and establishments where research takes place; the frameworks and cultures of scientific research; ethical principles and committees; libraries, journals, books and editors; and the human researchers themselves (Fox and Alldred, 2014).

This complex assemblage can be decomposed into a series of simpler research machines that undertake specific tasks within a research process such as data collection, data analysis or ethical review. Each machine has a specific affective flow between event, instruments and researchers that make it work. Thus a ‘data collection machine’ would take aspects of an event as its raw materials, and by the means specific to its design, generate ‘data’. An analysis machine processes data according to rules specific to an approach (for instance, statistics or thematic analysis) to produce ‘findings’ in the form of generalities or summaries, and so forth. Research techniques such as sampling, ethical approval or data validation can also be treated as machines that plug into a research-assemblage, enabling particular research capacities in a methodology.

Research machines can be analysed to assess their affective flows and the micropolitical effects they produce in events, researchers and data. Analysed together, the machines in a research-assemblage can reveal the micropolitical movements that occur when events are turned into ‘data’ or ‘findings’, and who gains and who loses in the process. To give an example: in a randomized trial, research machines that control the experimental conditions and apply statistical techniques together limit the affective capacities of ‘confounding’ relations found in ‘real-world’ settings, empowering the research-assemblage to model an ‘uncontaminated’ effect of one variable upon another but inevitably removing the study from ‘real-life’ conditions. By contrast, naturalistic research machines in qualitative studies privilege human respondents’ accounts of events, but paradoxically also enhance the capacities of the researcher to interpret these accounts. The differing micropolitics of these research designs are due entirely to the specific affect economies within their constituent machines.

This analysis of research as assemblage reveals that all research designs, methods and techniques are imbued with affective relations that link events, researchers and data to enable

certain kinds of research output (for instance, collection of a dataset or analysis of textual data), and quashes any assertion that research can be a transparent process that simply translates events into data that accurately reproduce these events. Some methods may indeed alter the very events that they purport merely to observe (the ‘Hawthorne’ phenomenon). A comprehensive review of common methods and techniques undertaken in social research has revealed how almost all privilege the perspectives of researchers over researched (for example, to justify sampling techniques or experiments on animals or human subjects), and most tended to aggregate data to produce uniformity and underplay real-world changes (Fox and Alldred, 2014).

While this assessment of the micropolitics of research offers justifications for approaches such as minor science, non-representational theory and diffractive analysis discussed earlier, it also opens up potential for a more nuanced response. A materialist analysis of precisely how and in what ways a research machine interacts with an event, and what effects it produces in data, enables every aspect of a research design to be subjected to scrutiny, with various options then open to the researcher. Research assemblages and machines can be re-engineered to avoid specific affects. For example, open-ended questions can reduce aggregation of subject responses; research participants rather than researchers can control data production by substituting directive interview schedules with walking tours of a location or setting. Where affects cannot be designed out (for instance, if statistical analysis of data is essential), specifications and aggregations can be acknowledged and their effects on the research process critically assessed, evaluated and discussed as shortcomings to a study. Finally, the negative effects of specific research machines can be balanced out by judicious mixing of methods. For instance, a study might combine a (minimally-aggregative) descriptive case study that produces a rich picture of the concerns and values of research participants in a setting with an intervention (highly aggregative) that attempts to alter aspects of the setting to address these concerns and values. A subsequent evaluation might combine aggregative quantitative measures with opportunities for participants to offer their own unmediated assessments of any improvements, and use the research outputs to challenge policy or improve their living environment (Fox and Alldred, 2017b).

Further reading

- Barad, K. (2007). *Meeting the universe halfway. Quantum physics and the entanglement of matter and meaning*. Durham, NC: Duke University Press.
- Bennett, J. (2010). *Vibrant matter*. Durham NC; Duke University Press.
- Braidotti, R. (2013). *The Posthuman*. Cambridge: Polity.
- Coole, D. (2013). Agentic capacities and capacious historical materialism: Thinking with new materialisms in the political sciences. *Millennium*, 41(3), 451-469.
- Coole, D.H. and Frost, S. (2010). (Eds.) *New materialisms. Ontology, agency, and politics*. London: Duke University Press.
- DeLanda, M. (2006). *A new philosophy of society*. London: Continuum.
- Fox, N.J. and Alldred, P. (2017). *Sociology and the new materialism*. London: Sage.
- Latour, B. (2005). *Reassembling the social. An introduction to actor network theory*. Oxford: Oxford University Press.
- Thrift, N. (2008). *Non-representational theory: Space, politics, affect*. London: Routledge.

References

- Barad, K. (1996). Meeting the universe halfway: realism and social constructivism without contradiction. In L. H. Nelson and J. Nelson (Eds.), *Feminism, Science and the Philosophy of Science* (pp. 161-194). Dordrecht: Kluwer.
- Barad, K. (2007). *Meeting the universe halfway. quantum physics and the entanglement of matter and meaning*. Durham, NC: Duke University Press.
- Bennett, J. (2010). *Vibrant matter*. Durham NC; Duke University Press.
- Braidotti, R. (2011). *Nomadic theory*. New York: Columbia University Press.
- Braidotti, R. (2013). *The posthuman*. Cambridge: Polity.
- Coole, D. H. and Frost, S. (2010). Introducing the new materialisms. In D. H. Coole and S. Frost (Eds.), *New materialisms. Ontology, agency, and politics* (pp. 1-43). London: Duke University Press.

- DeLanda, M. (2006). *A new philosophy of society*. London: Continuum.
- Deleuze, G. (1988) *Spinoza: practical philosophy*. San Francisco: City Lights.
- Deleuze G. and Guattari F. (1984). *Anti-Oedipus. Capitalism and schizophrenia*. London: Athlone.
- Deleuze, G. and Guattari, F. (1988). *A thousand plateaus*. London: Athlone.
- Fox, N. J. and Alldred, P. (2014). New materialist social inquiry: designs, methods and the research-assemblage. *International Journal of Social Research Methodology*, 18(4), 399-414.
- Fox, N. J. and Alldred, P. (2017a). *Sociology and the new materialism*. London: Sage.
- Fox, N. J. and Alldred, P. (2017b). Mixed methods, materialism and the micropolitics of the research-assemblage. *International Journal of Social Research Methodology*. Advance online publication. DOI: 10.1080/13645579.2017.1350015
- Haraway, D. (1997). *Modest_witness@second_millennium. Femaleman_meets_oncomouse*. New York: Routledge.
- Lather, P. and St. Pierre, E. A. (2013). Post-qualitative research. *International Journal of Qualitative Studies in Education*, 26(6), 629-633.
- Latour, B. (2005). *Reassembling the social. An introduction to actor network theory*. Oxford: Oxford University Press.
- Law, J. (1992). Notes on the theory of the actor-network: ordering, strategy and heterogeneity. *Systems Practice*, 5(4), 379-93.
- McCormack, D. P. (2005). Diagramming practice and performance. *Environment and Planning D: Society and Space*, 23(1), 119-147.
- Mol, A. (2002). *The body multiple: ontology in medical practice*. Durham: Duke University Press.
- Potts, A. (2004). Deleuze on Viagra (Or, what can a Viagra-body do?) *Body & Society*, 10(1), 17-36.
- Thrift, N. and Dewsbury, J. D. (2000). Dead geographies—and how to make them live. *Environment and Planning D: Society and Space*, 18, 411-432.
- van der Tuin, I. and Dolphijn, R. (2010). The transversality of new materialism. *Women: A*

Cultural Review, 21(2), 153-171.