
Commentary

Beware of contingency

“The most important item in the psychical inventory of a civilization ... consists ... in its illusions. What is characteristic of illusions is that they are derived from human wishes. Illusions need not necessarily be false—that is to say unrealizable or in contradiction to reality... We call a belief an illusion when a wish fulfillment is a prominent factor in its motivation.”

Freud (1989 [1927], pages 39–40)

“The falseness of an opinion is not for us any objection to it ... The question is how far it is life-furthering, life-preserving, species-preserving, perhaps species-rearing.”

Nietzsche (2006 [1885], page 7)

As of late, articles and books that make reference to contingency have become so common that we might dare to speak, without fear of erring too far from the truth, of a fetishism of contingency in contemporary social science. To be sure, by postulating that the world changes in contingent ways, we germinate lines of flight, and we help redirect the ultimate purpose of social science away from the narrow search for the truth and toward making the world a better place (Blomley, 2008; Massey, 2008). We need to remind ourselves, however, that laypeople and scholars alike sometimes conflate how things are with how they wish them to be. As critical scholars wholeheartedly fighting for a better world, we prefer to believe that the world is malleable, that the future is open and up to us, that we are in control (Dodgshon, 2008). The en vogue ontology that stresses contingency at the expense of necessity might therefore be not so much the result of painstaking analysis as the enthusiastic projection of our political wishes (Clore and Huntsinger, 2007). The danger that haunts us, as Elster aptly notes, stems from the fact that “even though enthusiasm may produce admirable ends, it may undermine the clearheaded thinking needed to realize them” (2007, page 436).

This paper presumes that, in a community of critical enquiry, the ritualistic invocation of contingency cannot substitute for careful conceptual analysis of its meaning and for an impartial assessment of the possibility of an empirically driven confrontation of the rival hypotheses of contingency and necessity. In what follows, I outline four logical and epistemological problems with contingency, which, taken together, should raise awareness to just what we are getting into when we invoke this politically loaded trope. Given that there are several partially overlapping meanings of contingency, I hasten to add that heretofore it is defined as the opposite of necessity. Necessity betrays itself in natural language by the use of the semifactual “even if...”, whereas contingency’s linguistic signature is the close counterfactual “if only...” (Byrne, 2005). If an event was bound to happen (ie even if there were large changes in its initial conditions), then that event is said to be necessary. Nothing could have been done to prevent it. The obvious disadvantage (or advantage, depending on where one stands) of arguing from necessity is that there is no way to attribute moral culpability. A necessitarian world is a guilt-free and blame-free world. In contrast, if an event would not have happened had its initial circumstances been only slightly different, then that event is said to be contingent. Unlike necessary events, contingent events open up the possibility of moral judgment because people’s different choices could be assumed to have the power to dramatically alter the course of contingent eventuations (Alicke, 1992).

Description-sensitivity of contingency

The first problem with contingency is that different descriptions of the very same phenomenon invite contradictory ascriptions of contingency or necessity (Ben-Menahem, 2009). One can make an event seem contingent or necessary by simply modifying the way that event is described. Logically weak descriptions of an event have diminished conceptual intension and therefore are more probable (more necessary). Logically strong descriptions are characterized by amplified conceptual intension, and therefore are less probable (more contingent). To give an example, the logically weak description ‘This man will die sooner or later’ appears necessary, whereas the logically strong description ‘This man will die of a stroke tomorrow at 7am while shaving’ appears contingent. By adding rich detail to the description of an event, one increases the intension of that event and thereby decreases its probability (or “extension”) and increases its contingency (Tversky and Kahneman, 1983). This state of affairs is subtended by the elementary mathematical fact that the probability of a conjunction $P(A \text{ and } B)$ can never be higher than the probability of its conjuncts $P(A)$ and $P(B)$. What all these logical and mathematical relations mean is not only that contingency is partly in the eye of the beholder but also that we can actively manipulate how audiences perceive the contingency, and therefore the changeability of events, by simply redescribing those events in a profusion of detail. At first glance, we witness some irony here in that contingency itself may appear to be a social construction, even while we go on to make the case in the other direction that the world is socially constructed and therefore contingent. Once we realize, however, that we never explain events as such, but always descriptions of events (and see Tucker, 2004), the irony dissolves, because evaluating the degree of contingency of an agreed-upon description of an event becomes an objective—or at least intersubjective—matter.

The fact that contingency is description-relative carries one less obvious and less immediate consequence, which I would like to briefly explore by taking a synoptic view of the way in which the theorization of society and space has unfolded in human geography ever since the Marxist critique of the quantitative and theoretical revolution of the 1960s. In table 1 I build on and expand Ruddick’s (2009) work on this topic to highlight the intriguing fact that, with the notable exception of Marxist-inspired scholarship, the other three major schools of thought on society–space give primacy to contingency in their social ontologies.

The credibility of this classificatory scheme receives indirect support from Gregory (2009, page 709), who identifies “the unruliness of time–space” (ie the contingency of time–space) as one of the four shared features of contemporary accounts of space in human geography (the other three being the integration of time and space, the coproduction of time and space, and the porousness of time–space). One can pinpoint at least two potential explanations for this strange conceptual convergence, and they might well be equally true. The first one would marshal the fact that the philosophers and social theorists who serve as inspiration to contemporary geographers are themselves true believers in contingency [see, for example, Foucault (1980), Peirce (1982), Deleuze (1994) and DeLanda (2002), Badiou (2007) and Meillassoux (2008), etc]. Yet, this cannot count as a satisfying, stand alone explanation since it seems only to beg the further question as to why geographers have drawn inspiration from these luminaries and not others. The second, and more interesting, explanation brings us back to the less obvious consequence entailed by the description relativity of contingency. In order to be able to make an event appear more contingent, one must have the cognitive resources to provide a richer, more detailed description of that event. That is, to add detail, and thereby increase the degree of perceived contingency, one needs *more knowledge* of the stuff one is describing. When taken one step further, this line of

reasoning enables us to entertain the distinctly novel idea that belief in contingency prevails in contemporary human geography because now we have more knowledge of how the world works than we did in the past. Indeed, to be a researcher of society and space means, above all, to carefully scrutinize one's object of research. As Kahneman and Miller have put it (2002, page 353):

“The mutability of any aspect of a situation increases when attention is directed to it... unattended aspects become part of the presupposed background.”

Table 1. Relative importance of contingency and necessity in the four main approaches to society–space in contemporary human geography (an extension of Ruddick, 2009).

Approach	Key attributes ^a	Representatives	Primacy of contingency or necessity
Society–space as structured coherence	“Rooted in a Marxist vision of social inequity, whereby social relations are defined by exploitation, its debates have focused on the logical primacy of particular unequal relations (classed, gendered, and racialized) and their attendant spatialities”.	David Harvey Milton Santos Richard Peet Edward Soja James Blaut	<i>Primacy of necessity and, most often, of economic necessity</i> Changes emerge “through an internally-driven logic (the unfolding of the dialectic characteristic of structured coherence)” (page 222).
Society–space as strategic field	Society–space is “constituted through productive relations of governance—an occupied zone in which struggles resemble the engagements of a war... societies are organized through a constellation of discursive logics, enacted in everyday spaces”.	Stuart Elden Derek Gregory Matthew Hannah Chris Philo	<i>Primacy of contingency</i> “Changes in the dispositif emerge genealogically—through accidents, adaptations, and improvisations” (page 222).
Society–space as performative field	Society–space is “fundamentally unstable, its subjects perpetually hybridizing, caught in structured instabilities—in a social field that is conflictual and paradoxical”.	Gillian Rose Nicky Gregson Griselda Pollock Katherine McKittrick	<i>Primacy of contingency</i> This approach presumes “the instability of multiple subject positions as a productive uncertainty—a performance or a becoming. Society is inherently unstable, improvisational, continuously differentiating” (page 223).
Society–space as immanent field	Society–space is “an expression of continuous differentiation, its subjects are unstable because they continuously transform themselves, engaging in acts of conjunction, connection, or collaboration with their milieu”.	Robyn Longhurst Mark Bonta Nigel Thrift Manual DeLanda	<i>Primacy of contingency</i> “instability as an endemic, persistent societal condition... society flees... . Subjects, bodies, are not bounded entities, containers, but rather organizational arrangements in a continual state of reaction to their milieu” (page 224).

^a All quotations from Ruddick (2009, page 217).

The upshot of this intense scrutiny is more knowledge, which in turn, allows us the far-from-innocuous choice to describe events in more detail, and hence—bringing in Freud’s opening quote on self-deception—to unwittingly render them more contingent not only to others but also to ourselves. I propose that this way of reasoning has some merit and deserves further exploring. Isn’t the great chasm between Harvey’s early description of capitalism (1982), Gibson-Graham’s (1996), and Peck and Theodore’s (2007) late descriptions of it the cumulative result of the focused attention of hundreds of geographers to the minutiae of how the beast seems to work? As we have learned more about capitalism, we have improved our skill at describing the events that constitute it in more detail, and hence we have become more adept at discursively constructing (and conveniently rationalizing) them as merely contingent. Whether this particular interpretation will find a receptive audience remains to be seen; more important for my purposes is to appreciate that (a) since contingency is description relative, and description is knowledge relative, and (b) since (a) is a logically transitive relation, it follows that contingency itself is knowledge relative, in line with what the recent history of human geography seems to illustrate. Bearing Freud’s warning on self-deception in mind, a related important point, on which I will dwell in the end of this paper, is that having enlarged one’s store of knowledge about the world means only that we can *discursively* construct and rationalize events as more contingent, *not in any way* that we can objectively adjudicate whether those events actually are, as a matter of indisputable fact, contingent.

A continuum of contingency and necessity

The foregoing observations usher in the next problem, namely the fact that contingency and necessity are best conceptualized as the extremes of a continuum, rather than as binary categories (Ben-Menahem, 2009; Byrne, 2005). If ‘it was bound to happen’ marks the necessitarian end of the continuum, and ‘it could easily have been wildly different’ marks its contingent end, propositions such as ‘very difficult to avoid, but not quite inevitable’ and ‘it could have been possible, but not likely’ are located in the large gray area demarcated by these two ends. Instead of struggling to decide whether event *x* is contingent or necessary, it might be more accurate to think in terms of the degrees of necessity or contingency involved in that particular eventuation. This is because, as a leading researcher of many-valued logics stressed (Kosko, 1993, page 5):

“Science reveals a world of jagged edges and quantities that vary smoothly. More precision does not take the gray out of things—it pins down the gray.”

Binary distinctions yield artificial borders, and as soon as one faces borders, one faces the quandary of border cases and the ensuing temptation to fudge them so as to fit neatly into one box or the other.

To offer just one illustration of the epistemic gains that accrue by attending to the gray area between contingency and necessity, consider the ongoing debate on the relation between multiplicity and contingency in feminist theory (Butler, 2005; Butler et al, 2000; Callard, 2003; Gregson and Rose, 2000; Haraway, 1997; Pratt, 2004; Rose, 1993; 1999; Whatmore, 2002). Antihumanist accounts of subject formation such as Althusser’s theory of interpellation by means of ideological state apparatuses (family, school, religion, media) have rightly been criticized for their necessitarian implications. The antihumanist subject emerges as nothing more than an outcome of ideological indoctrination, such that when she speaks up it is merely prevailing ideology that speaks through her. In other words, the subject is reduced to a site of negative agency, deprived of any sense of positive agency. In the last two decades, one of the most pressing theoretical and political challenges for feminism has been to rescue the subject from these necessitarian chains without resurrecting naïve and pious humanist celebrations

of the primacy of agency over structure. Feminist scholars have attempted to solve the problem by, among other tactics, zooming in on the subject to show that under the appearance of a unified entity lies an unstable, ever-changing multiplicity. That is, we should conceive of ourselves not as ‘individuals’, but as archipelagos of dividual selves, spread in time–space and involved in the difficult task of rendering coherent our necessarily distributed agencies and affects. The production of self-narratives resulting from this messy involvement entails contingent practices of localised learning predicated on abilities that include observation, imitation, improvisation, and expression. Because we embody a multiplicity of incoherent discourses and subject positions, we are inherently unstable; because we are unstable, our choices are often contingent; and because our choices are often contingent, we can claim *some* freedom from the necessitarian logic of any of the multiple discourses that have co-constituted us. Yet, that freedom is limited, and some discourses such as the heteronormative matrix of sex–gender–sexual orientation seem to hold a particularly strong grip on us [see the growing despondency in Butler (2005)]. On the contingency–necessity continuum, we would locate the events of individuation shaped by such discourses very close to the necessitarian pole, *but not quite there* (‘very difficult to avoid, but not quite inevitable’), because, to keep with the above example, even gender’s apparently stable citational iterations can be parodied, with some political effect, as the figure of the drag vividly reminds us. Whereas this limited freedom from necessity has already spurred sustained reflection and analysis, the way in which extreme contingency itself thwarts our freedom has escaped largely unnoticed, as we shall now see.

Contingency and control

While contingency encapsulates the far-from-trivial idea that slightly different initial circumstances could lead to radically divergent outcomes, this should not be misconstrued as licensing the patently false inference that higher degrees of contingency amount to greater powers to control the course of events. Taken to its limit, the capricious logic of a radically contingent world would render it just as uncontrollable as the preordained logic of a purely necessitarian world, because our attempts to achieve goals would be systematically thwarted by the world’s extreme sensitivity to the specifics of how exactly we try to achieve them (Bunge, 2006; Cohen and Stewart, 1994). When trying to switch on an air conditioner, for example, it would make a great difference whether we were dressed in blue or in red, whether we felt sad or happy, or whether we wore sport shoes or boots. Radical contingency, just like extreme necessity, is the foe, not the friend, of progressive social scientists. The world is (partially) under our control precisely because it is only moderately contingent. We can therefore reliably achieve effects and take for granted our ability to do so when planning for the future. It appears that, ironically, the very possibility of *radical* social science may (or may not; see below) depend on *moderate* contingency in worldly eventuations.

By way of example, the fine-grain distinction between extreme and moderate contingency can fruitfully be deployed, or so I shall argue, to elucidate the deeper reasons for the widening rift separating the traditional Marxist-inspired radical geography of David Harvey (2000; 2006) from the more recent Deleuzian-inspired nonrepresentational geography of Nigel Thrift (1996; 1999; 2008). To set the stage, note that both schools of thought belong to critical geography—that is, they are critical of the current political and economic order—and they commit to the generous goal of making the world a better place. Yet, they have radically different visions as to which are the best means to achieve this goal [see the exchange between Amin and Thrift (2005; 2007), and Harvey (2006)]. I shall argue that Thrift’s social ontology gravitates much closer to radical contingency than Harvey’s and that it is this difference

that best explains why the two scholars endorse different means and, more generally, different definitions of what counts as the sphere of the political. To forestall criticism that I am veering into groundless conjecture, let me document my claims. Thrift asserts that nonrepresentational theory attempts to show “how the worlds are, *given that encounters are all there is, and their results cannot be pre-given*” (2008, page 2, emphasis added). To say that amounts to claiming that contingency is all there is. Here is why. An encounter between two entities is semantically equivalent with, and therefore describable as, the collision of two causal chains. In the language of information theory, whenever two entities collide, their informational entropy increases, that is, their degree of organization temporarily decreases, and their instability increases (Cohen and Stewart, 1994, chapter 8). For a stable system to change suddenly and markedly, it must first become unstable. Contingent eventuations occur precisely in unstable systems, because it is here that slight differences in initial and intervening circumstances can lead to dramatically different outcomes. That said, to defuse suspicions that the above quotation was taken out of context and, thus, is unrepresentative of Thrift’s thought, note that one of the mottoes opening his earlier *Spatial Formations* (1996) is Deleuze’s “Everything in the universe is encounters. Happy and unhappy encounters” and that in his richly textured theory of place (Thrift, 1999, from unnumbered front matter) one can find, in addition to a reassertion of the fact that “places can never be pre-ordained” (page 310), the telling phrase “frighteningly contingent life” (page 317). Why is this phrase so telling? Well, if life were only moderately contingent, we could exert a great degree of control over it, and feelings of control invite confidence, not fright! There is little doubt in my mind, then, that Thrift’s account betrays a deeply held belief in a radically contingent social ontology. Because of this conviction, for him a better world does not reduce simply to a world free of the hydra of capitalism (as with Harvey). Instead, a better world is one in which we can afford to enrich our range and depth of experience, that is, a world in which we take time not to exert control but to open our eyes wide to see the beauty of this frighteningly contingent, and therefore largely uncontrollable, life [see also Abbott (2007) for a similar project in sociology]:

“The quest of all modern thinking on TimeSpace has been *to be filled by and to amplify the presence of now*, to make the present habitable and visible. How can we inhabit the present as if it were a place, a home rather than something we pass in a mad scramble to realize the future?” (May and Thrift, 2001, page 37; emphasis added).

That to Harvey this amounts to cozy bourgeois ideology and foolish surrender in the real fight to be fought is hardly surprising and will not be further discussed here, because this would carry us too far afield. When all is said and done, and whatever the specific merits and demerits of the above argument, I hope that it will at least succeed in driving home the point that the apparently remote abstract analysis of radical versus moderate contingency can illuminate in surprising ways central debates about society and space in general, and the feasible course of social change in particular.

Contingency and ignorance

I have left for the end of this paper what seems to me the most sobering and humbling of the four problems that beset our grasp of contingency. In brief, the truth status of the hypothesis that a particular event was contingent is empirically undecidable. To the fundamental question of what kind of evidence about an event would unambiguously discriminate between the contingency hypothesis and the necessity hypothesis, the only honest answer is a replay of history itself. Since we cannot replay history, we substitute for it either counterfactual reasoning or computer simulations. Both substitutes are

inadequate to the task, or so I shall argue. Before proceeding further, a caveat is in order. However much I recoil from admitting it, I fear that astute readers will not fail to retort that my argument against reliance on counterfactuals and computer simulations carries little weight with those who reject epistemological and ontological realism in general and a correspondence theory of truth in particular [parenthetically, this is also the reason why there is an (incommensurable) world of difference between my rather mainstream logical-analytical approach and those inspired by continental philosophers (cf Bunge, 2006; Povinelli, 2003)]. My replies to them are two-fold. First, I submit that outside academe, in our everyday lives, we are all realists and we do, most often unwittingly, endorse a correspondence theory of truth. Hence, I expect that my argument will not ring entirely hollow even in adamantly antirealist camps. Second, there are several alternative ways to expose the poor probative value of counterfactuals and computer simulations, so failure to be moved by my particular line of argument cannot be taken as ground for claiming, hastily, that they are perfectly adequate after all. To give two examples of these manifold alternatives, counterfactuals can be subverted (i) indirectly, by attacking modal realism [the make-believe hypothesis of possible worlds (cf Bunge, 2006)] and (ii) directly, by deductively demonstrating that most of them *must* be false, as Alan Hájek has just begun to do in philosophy (Hájek, 2010). Having said these, here is my argument. Counterfactuals are plausible-sounding but impossible to refute speculations (Dawid, 2000; Lebow, 2000). Whereas a counterfactual looks like evidence, it is in actuality an unverifiable theory about what the world would have been like had one or another element in it been modified in this or that manner. In short, mistaking counterfactuals for evidence is mistaking theory for data (Bunge, 2006; Dawid, 2000). As for computer simulations, they are impoverished models of reality, several orders of magnitude less complex than reality itself (Clifford, 2008; Parker, 2008). Since contingency is about changes in tiny little details, and since simulations leave most of the world outside their compass, one cannot tell apart a contingent eventuation from a necessary one from simulating history alone. More technically, and following Pollock's logic of defeasible reasoning (Pollock, 2008), any verdict of any computer simulation can always be undermined with the undercutting defeater that what it left outside would have been crucial in the respective chains of causation, and hence, in its final output. In short, computer simulations are too coarse a tool for settling any particular dispute between the contingency hypothesis and the necessity hypothesis. The empirical undecidability of the truth status of contingency means that, short of time travel, no claim about the contingency of a geographical event could ever be falsified even in principle. Since the contingency hypothesis is at once politically appealing and empirically unfalsifiable, progressive social scientists are safe to endorse it because their belief is, and forever will be, sheltered from refutation. It is fair and wise to note, however, that endorsing this hypothesis over its necessitarian rival constitutes a blatant violation of the most basic normative strictures of rational belief-formation (Elster, 2007). In the jargon of Bayesian epistemology, because all the evidence available in this world is equally compatible with contingency and necessity, the two hypotheses *must* be ascribed the *same* degree of epistemic credence [ie subjective probabilities (Oaksford and Chater, 2009)]. Why are we not ready to do so? Maybe the two quotations that began this paper point to an answer. Maybe our concern for a better world has superseded our respect for truth. And maybe it is worth it. In Ben-Menahem's words (2009, pages 129–130):

“The perspective of contingency has become not only a lever for social critique and political change, but also a manifesto for greater human independence in every realm... Reframing the past as contingent is an ethical–political mission that enables us to forever change ourselves and forever change the world.”

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References

- Abbott A, 2007, "Against narrative: a preface to lyrical sociology" *Sociological Theory* **25** 67–99
- Alicke M, 1992, "Culpable causation" *Journal of Personality and Social Psychology* **63** 368–378
- Amin A, Thrift N, 2005, "What's left? Just the future" *Antipode* **37** 220–238
- Amin A, Thrift N, 2007, "On being political" *Transactions of the Institute of British Geographers, New Series* **32** 112–115
- Badiou A, 2007 *Being and Event* translated by O Feltham (Continuum, New York)
- Ben-Menahem Y, 2009, "Historical necessity and contingency", in *A Companion to the Philosophy of History and Historiography* Ed. A Tucker (Wiley/Blackwell, Oxford) pp 120–130
- Blomley N, 2008, "The spaces of critical geography" *Progress in Human Geography* **32** 285–293
- Bunge M, 2006 *Chasing Reality: Strife over Realism* (University of Toronto Press, Toronto)
- Butler J, 2005 *Giving an Account of Oneself* (Fordham University Press, New York)
- Butler J, Laclau E, Žižek S, 2000 *Contingency, Hegemony, Universality: Contemporary Dialogues on the Left* (Verso, London)
- Byrne R, 2005 *The Rational Imagination: How People Create Alternatives to Reality* (MIT Press, Cambridge, MA)
- Callard F, 2003, "The taming of psychoanalysis in geography" *Social and Cultural Geography* **4** 295–312
- Clifford N J, 2008, "Models in geography revisited" *Geoforum* **39** 675–686
- Clore G, Huntsinger J, 2007, "How emotions inform judgment and regulate thought" *Trends in Cognitive Sciences* **11** 393–399
- Cohen J, Stewart I, 1994 *The Collapse of Chaos* (Penguin, London)
- Dawid A P, 2000, "Causal inference without counterfactuals" *Journal of the American Statistical Association* **95** 407–424
- DeLanda M, 2002 *Intensive Science and Virtual Philosophy* (Continuum, New York)
- Deleuze G, 1994 *Difference and Repetition* translated by P Patton (Columbia University Press, New York)
- Dodgshon R A, 2008, "In what way is the world really flat? Debates over geographies of the moment" *Environment and Planning D: Society and Space* **26** 300–314
- Elster J, 2007 *Explaining Social Behavior* (Cambridge University Press, Cambridge)
- Foucault M, 1980 *Power/Knowledge: Selected Interviews and Other Writings, 1972–1977* Ed. C Gordon (Pantheon, New York)
- Freud S, 1989[1927] *The Future of an Illusion* (W W Norton, New York)
- Gibson-Graham J K, 1996 *The End of Capitalism (As We Knew It): A Feminist Critique of Political Economy* (Blackwell, Cambridge, MA)
- Gregory D, 2009, "Space", in *The Dictionary of Human Geography* 5th edition, Eds D Gregory, R Johnston, G Pratt, M Watts, S Whatmore (Wiley/Blackwell, Oxford) pp 707–710
- Gregson N, Rose G, 2000, "Taking Butler elsewhere: performativities, spatialities and subjectivities" *Environment and Planning D: Society and Space* **18** 433–452
- Hájek A, 2010 *Most Counterfactuals Are False* monograph in progress, available at <http://philrsss.anu.edu.au/people-defaults/alanh/>
- Haraway D, 1997 *Modest_Witness@Second_Millennium. FemaleMan©_Meets_OncoMouse™: Feminism and Technoscience* (Routledge, London)
- Harvey D, 1982 *Limits to Capital* (Verso, London)
- Harvey D, 2000 *Spaces of Hope* (University of California Press, Berkeley, CA)
- Harvey D, 2006, "The geographies of critical geography" *Transactions of the Institute of British Geographers, New Series* **31** 409–412
- Kahneman D, Miller D, 2002, "Norm theory: comparing reality to its alternatives", in *Heuristics and Biases: The Psychology of Intuitive Judgment* Eds T Gilovich, D Griffin, D Kahneman (Cambridge University Press, Cambridge) pp 348–366

- Kosko B, 1993 *Fuzzy Thinking: The New Science of Fuzzy Logic* (Hyperion, New York)
- Lebow R, 2000, "What's so different about a counterfactual?" *World Politics* **52** 550–585
- Massey D, 2008, "When theory meets politics" *Antipode* **40** 492–497
- May J, Thrift N, 2001, "Introduction", in *Timespace: Geographies of Temporality* Eds J May, N Thrift (Routledge, London) pp 1–37
- Meillassoux Q, 2008 *After Finitude: An Essay on the Necessity of Contingency* (Continuum, New York)
- Nietzsche F, 2006 [1885] *Beyond Good and Evil* (Echo Library, Teddington, Middx)
- Oaksford M, Chater N, 2009, "The uncertain reasoner: Bayes, logic, and rationality" *Behavioral and Brain Sciences* **32** 105–120
- Parker W, 2008, "Computer simulation through an error-statistical lens" *Synthese* **163** 371–384
- Peck J, Theodore N, 2007, "Variegated capitalism" *Progress in Human Geography* **31** 731–772
- Peirce C S, 1982 *Writings of Charles S. Peirce: A Chronological Edition* 6 volumes, Ed. M H Fisch (Indiana University Press, Bloomington, IN)
- Pollock J L, 2008, "Defeasible reasoning", in *Reasoning: Studies of Human Inference and its Foundations* Eds J E Adler, L J Rips (Cambridge University Press, Cambridge) pp 451–470
- Povinelli E A, 2003, "Radical worlds: the anthropology of incommensurability and inconceivability" *Annual Review of Anthropology* **30** 319–334
- Pratt G, 2004 *Working Feminism* (Edinburgh University Press, Edinburgh)
- Rose G, 1993 *Feminism and Geography* (Polity Press, Cambridge)
- Rose G, 1999, "Performing space", in *Human Geography Today* Eds D B Massey, J Allen, P Sarre (Polity Press, Cambridge) pp 247–259
- Ruddick S M, 2009, "Society–space", in *International Encyclopedia of Human Geography* Eds R Kitchin, N Thrift (Elsevier, Oxford) pp 217–226
- Thrift N, 1996 *Spatial Formations* (Sage, London)
- Thrift N, 1999, "Steps to an ecology of place", in *Human Geography Today* Eds D Massey, J Allen, P Sarre (Polity Press, Cambridge) pp 295–322
- Thrift N, 2008 *Non-representational Theory: Space, Politics, Affect* (Routledge, London)
- Tucker A, 2004, "Holistic explanations of events" *Philosophy* **79** 573–589
- Tversky A, Kahneman D, 1983, "Extensional versus intuitive reasoning: the conjunction fallacy in probability judgment" *Psychological Review* **90** 293–315
- Whatmore S, 2002 *Hybrid Geographies: Natures Cultures Spaces* (Sage, London)