Guest editorial: The Space-Times of Decision-Making

Derek P. McCormack

School of Geography and Environment
University of Oxford
South Parks Road, Oxford
OX1 3QY, England
derek.mccormack@ouce.ox.ac.uk

Tim Schwanen

Transport Studies Unit
School of Geography and the Environment
University of Oxford
South Parks Road, Oxford
OX1 3QY, England
tim.schwanen@ouce.ox.ac.uk

Introduction to "The Space-Times of Decision-Making",
a special issue of *Environment and Planning A,*
guest edited by Derek McCormack and Tim Schwanen

10,733 words (including title page & references)

Final version
2 August 2012

Abstract

By way of an extended introduction to a theme issue on the space-times of decision-making, this article pursues two objectives. We first review some of the ways in which geographers – and especially economic geographers – have examined decision-making over the past decades, showing that previous engagements with the decision are informed primarily by thinking from economics, psychology and certain strands of sociology. Drawing on a wider range of intellectual resources, we then outline eight propositions that might guide future research by geographers and others into the space-times of decision-making. These propositions help us to move beyond the idea that the decision is a singular moment abstracted from the context within which it takes place and undertaken by a discrete actor or set of actors. Instead the decision is understood as a differentiated, affectively registered, transformative and ongoing actualisation of potential against a horizon of undecidability in which past present and future and multiple sites are interrelated in complex ways. A number of research questions follow from the outlined propositions and we discuss four of them. These pertain to the sites and techniques of decision-making, its relationships to the governing of life, and our own decision-making practices as academics.

Introduction

The decision is a central element of how space-times are imagined, inhabited, and transformed. In many spheres of life the imperative to decide is an urgent one that folds and transforms space-times in ways that open up a range of possible futures – themselves refracted through the past – while also foreclosing others. Yet, notwithstanding its ubiquity as a pivotal moment around which lived geographies turn and transform, the decision is not a stable reference point for thinking. Despite the ease with which decisive moments can be identified and accounted for retrospectively, the decision remains a spectral event, difficult to pin down or isolate as a bounded moment. Equally, while often assumed to be taken by an individual, the decision is not so easily located within the limits of a self-contained, sovereign subject, emerging instead as a distributed, relational process. How then are we to account for the space-times of something which is critical to how geographies are lived and experienced and which suggests the occurrence of something transformational, yet whose precise co-ordinates remain difficult to define or fix with any degree of precision?

This question is, and has long been, at the heart of efforts to both understand and govern political and economic life. For political philosophers of a range of different hues the decision requires scrutiny precisely because it provides one of the founding moments of political life. Decisions, and the capacity to make decisions, are central both to the definition of political participation and to the question of who, or what, can participate. For theorists of economic life, the decision requires attention because it is taken to be the unit of behaviour upon which the analysis of economic activity turns. In both contexts, theories of decision-making are underpinned by models of thinking and acting that raise important questions about the nature and capacities of political and economic subjects and their propensities to behave in particular ways. As such, one of the most important aspects of the decision is how it provides a point of articulation between theories of political and economic life and techniques and technologies

employed to govern this life. This articulation is nothing new: practices of government have long been concerned with the kinds of decisions populations make and the possibility of encouraging them to make different decisions. Yet, as Mark Whitehead, Rhys Jones, and Jessica Pykett in their contribution to this issue suggest, there seems to be a growing interest among policymakers in western liberal democracies in the possibility of rendering explicit the practices and processes of the decision with the view to devising techniques and technologies through which individual and collective life can be intervened upon and transformed in more effective and ostensibly less intrusive ways. In this context it becomes all the more important to address the question of where, when, and how decision-making takes place and the practices and techniques that aim to facilitate this process towards different political and ethical ends. Equally importantly, it becomes imperative to examine how practices of decision-making are implicated in space-times – that is, to examine how decision-making takes place in particular spatio-temporal contexts but also how, in doing so, it generates spaces and times with variable reaches and intensities.

Emerging from a series of sessions organized at the Association of American Geographers Annual Meeting in Washington, DC in April 2010, the contributions to this special issue engage with these questions in different ways. In their paper Mark Whitehead, Rhys Jones, and Jessica Pykett argue that the politicisation of the space-times of the decision needs to be understood in the context of the rise of 'soft' or 'libertarian paternalism', the broad thrust of which is to explore possibilities for allowing citizen-subjects to make better decisions and enact 'voluntary' behavioural change. As Whitehead and colleagues suggest, soft paternalism is informed by readings of the science of behaviour change which implicitly separate the rational from the more than rational bases of decision-making. In different ways, both Russell Hitchings' and Jennie Middleton's papers challenge such simplistic understandings by exploring some of the complex processes and practices that characterise everyday decision-making. For Hitchings, the decision only really makes sense if we situate its emergence in the context of the relations between everyday practices and the environments within which these practices unfold in ways

that complicate a model of "cognitive individualism" (Wilcox, 2008) as the basis for intervention. In his study of air conditioning addiction and the indoor practices of London office workers, he draws on theories of social practices (see Reckwitz, 2002) to highlight that people are often guided unthinkingly by contextual factors – clothing, social conventions and specific ambient environments – instead of engaging in conscious decision-making. He asks whether the decision in the sense of the product of individual volition actually exists and argues that "we should resist the temptation to assign authorship to any given factor prematurely". In a similar vein, Jennie Middleton's paper examines the ways in which decisions are folded into the everyday processes and practices of urban mobilities. As Middleton reminds us, while the decision has figured prominently in geographical research about patterns and practices of mobility and transport (Timmermans and Golledge, 1990, Timmermans et al, 2002; Dijst et al, 2008), such work has often drawn on a combination of positivist and behavioural approaches. Paralleling more recent work (Schwanen, 2008), however, and drawing upon a mixed-methods study of walking in London, Middleton points to the importance of examining the qualitative dimensions of everyday decision-making practices of mobility. In doing so she challenges the assumption dominating transport research and policy-making that decisions to walk are somehow made outside the particular place and time of walking as a practice. Her paper also emphasises the importance of habits as enabling rather than obstructing behaviour change. Habit, for her, is not an external force that locks people into certain behaviours but is situated in the ongoing unfolding of journeys on foot.

The final paper in this special section, by Ben Anderson and Peter Adey, foregrounds the relation between contemporary regimes of security and the logics of decision-making through close attention to the details of exercises in UK Civil Contingencies. As they argue, what is perhaps most remarkable about these exercises is not that they aim towards the taking of a decision under conditions of informed choice or transparency: rather, such exercises call attention to the fact that there is always something excessive about the decision, and that its

enactment always involves a relation with that which cannot be decided upon. They demonstrate how the event of the decision stretches out across and indeed generates space-times in ways that complicate rational calculus. Critically, like each of the papers, Adey and Anderson's argument is based upon empirical investigation of how decision-making is understood and enacted in particular contexts. Indeed, what they suggest is that it is precisely through close attention to the specifics of these contexts that we might generate opportunities for conceptualising the space-times of the decision.

Rather than pre-empt the arguments and analyses of these papers in this introductory editorial, here we wish to supplement and extend them by doing two things. First, in the opening section of what follows we review selectively some of the ways in which the decision has figured within geographical thinking – the key point that emerges from this is that while a good deal of attention has been paid to the decision, more could be made of its enigmatic, more-than-rational qualities. Then, in the second half of this editorial we outline a series of propositions that might help open up the space-times of decision-making for further scrutiny and examination by geographers and others. In moving towards a conclusion we point to a series of ways in which this research might be pursued.

Geography and decision-making

Geographers have engaged with theories and practices of decision-making in a number of different contexts, including migration (Wolpert, 1965; Brown and Moore, 1970; Halfacree and Boyle, 1993; Silvey and Lawson, 1999; Halfacree, 2004), mobility (Timmermans and Golledge, 1990; Timmermans et al, 2002; Dijst et al, 2008), environmental issues (Dow and Carbonne, 2007), and forms of political life (Cadman, 2009). To review all of the ways in which the decision has been understood and treated in such diverse work is beyond the scope of this discussion. Instead, it is helpful here to focus on one area in which geographers have paid particular

attention to decision-making – economic activity – and not least because attention to this area is largely absent, albeit not by design, from the papers that follow.

An important reference point for the development of economic geographies of decision-making is the emergence, in the 1950s and 1960s, of spatial science, much of which was concerned with identifying the factors influencing location decisions. This work was paralleled by the emergence of regional science in which neo-classical economics was given an explicitly spatial basis (Isard, 1956). The emphasis here was on the possibility of producing models of decision-making that could explain spatial location and organisation across a range of empirical contexts. The problems with early spatial and regional science are by now familiar. They were, for instance, underpinned by the figure of "economic man": a rational, utility-maximizing individual operating under optimal or near optimal conditions, and whose actions could be understood via verifiable generalizations. And even when researchers recognised that such a model did not approximate to 'reality', they often proceeded "as if" it did – the key point was to produce a logically and internally consistent model (see Isard and Reiner, 1962). Equally importantly, the question of the decision itself was left relatively underexplored, "black-boxed" away via a range of mathematical symbols and modelling techniques. Resultant models of decision-making were deductive-normative idealisations which assumed that decision-makers make optimal choices and maximise (net) benefits by default rather than descriptions of what people actually do when making decisions (arrived at through induction).

Such thinking began to be challenged during the 1960s, as geographers sought to acknowledge that decisions are made within the context of "man's simplified and distorted view of reality" (Cadwallader, 1975: 339). Emerging research in the behaviour psychology of economics, and particularly the work of Nobel Laureate Herbert Simon, was influential here. Simon's work addressed the difficulties that arise when "perception and cognition" are acknowledged to "intervene between the decision-maker and his objective environment" (1959:

272). So for Simon the decision-maker's information about his (sic) environment is not so much an approximation: it is "fantastically different from the 'real' world" (*ibid*). Given this, decisions can only ever be made within conditions of bounded rationality. And instead of seeking to maximize utility and make optimal choices, individuals develop sensible decision-making procedures aiming at 'good enough' or adequate outcomes – what Simon called 'satisficing' – within the constraints of these contexts. Geographers drew upon these ideas to examine the spatial dimensions of variations in decision-making in a number of empirical contexts. For instance, Wolpert (1965), in a study of the farmers of middle Sweden, explored how decisions are taken under conditions of spatial and temporal uncertainty. Others drew upon behavioural approaches to complicate the neat equation of decision-making and a self-contained individual unit of analysis. For instance, Dicken argued not only that, as a decision-making entity, the firm was a complex set of actors and structures but also that "the decision-making behaviour of the business organization functions as an open system interacting with its environment and closely resembles the production (transformation) process in that it is essentially a recycling process" (1971: 434). Furthermore, he recognised that decision-making involved both "programmed" decisions and "nonprogrammed decisions", with the latter requiring "conscious deliberation and for which there is no existing standardized solution routine" (1971: 433).

Nonetheless, differences between neo-classical and behavioural approaches should not be overstated. In many respects the latter were more like a modification and extension of the former than a major overhaul. Thus, absolute notions of space continued to prevail, with space understood as a relatively friction-free 'life-space' populated by two-dimensional agents. For Wolpert, this life-space was a "surface over which the organism can locomote" and the question to be posed of "man" concerned his "efficiency or effectiveness as an information collecting and assimilating organism" and his "ability to produce an efficient and unbiased estimation or evaluation of the objective environment" (1965: 163). In addition, the possibility of modelling human behaviour remained an important premise and promise of this work – see, for instance,

Pred's (1967) 'behavioural matrix' for understanding location decision-making. Furthermore, behavioural approaches to decision-making were methodologically not that different from earlier approaches: decision-making continued to be modelled via the analysis of a range of large-scale data sets rather than through, for instance, ethnographic inquiry. Finally, such approaches lacked much in the way of political bite: they seldom engaged explicitly with political-economic structural constraints within which spatial decisions are taken (Johnston, 1977).

Behavioural approaches fell out of favour in economic geography and other areas of the discipline in the late 1970s. Discussing all theoretical traditions that supplanted behaviouralism in (economic) geography is beyond the scope of this manuscript. Suffice it to say that with the waning of behavioural approaches, the emphasis shifted to some extent from decision-making about locations in space to an interest in processes within and between firms. A problematisation of the firm as such was part of parcel of the focus on those processes. Dicken and Malmberg, for instance, suggested that "firms are essentially networks within networks" which are "configured and organised in particular forms of power structure and governance" and whose boundaries are shifting and fluid (2001: 352). Drawing among others on Granovetter's (1985) embeddedness thesis, economic geographers began to criticise the undersocialised conception of firms and the sidelining of contestation and struggles over decision-making between actors within them (O'Neill and Gibson-Graham, 1999; Dicken and Malmberg, 2001; Yeung, 2005). Firms and their decision-making are thus no longer seen as outcomes and vehicles of narrow economic rationality but also of social rationality. For Yeung (2005) and others, firms' decision-making is more-than-rational as conventionally understood in neo-classical economics, and "the business of the firm is to get social actors organised for a collective profit-making purpose of production, exchange and transactions". Rationality, in other words, has been transformed from *explanans* into *explanandum*.

All of this is not to say that location choices have been ignored by economic geographers over the past decade or so. For Dicken and Malmberg (2001), embeddedness – more specifically the non-codified knowledges and competences situated in concrete social relations among firms and between firms and other agents in particular places – is crucial to location choice and the formation of industrial clusters. And, combining embeddedness with evolutionary thinking, Stam (2007) has developed a theory of the locational behaviour of entrepreneurial firms that highlights the agency of entrepreneurs, the importance of human resources and the role of organisational capacities in the location decisions of new firms.

At the same time, behavioural approaches to decision-making have made something of a comeback over the past decade. This reflects the growing popularity across the wider social sciences of behavioural economics, which was born out of the marriage of experimental economics and cognitive psychology in the 1970s. A basic tenet of this work is that when making decisions, people engage in conscious deliberation only infrequently (Kahneman, 2003). They normally rely on heuristics – fast and frugal algorithms (Gigerenzer and Goldstein, 1996) – and habits, or automatic responses to environmental cues that have developed over time to short-circuit the effort of deliberative processes (Verplanken and Wood, 2006; for a contrasting perspective on habit, see Middleton's paper in this issue). And when triggered to consciously deliberate courses of actions, people are at most boundedly rational. Due to innate cognitive biases, they are neither very competent nor consistent in decision-making. They also tend to be overly risk-averse when confronted with possible gains, heavily discount the future, and use information inefficiently (see also Clark, 2010).

In financial geography, Gordon Clark and colleagues have used behavioural economics to understand how decision-making about pensions deviates from the rational actor ideal (Clark et al, 2007; Clark et al, 2009; Strauss, 2009) and the emergence of the global financial crisis (Clark, 2011). The notions of bounded rationality and habits have been employed in evolutionary

economic geography to understand differences between organisations and regions in terms of economic performance (Boschma and Frenken, 2006). Beyond economic geography behavioural economics has so far had the biggest impact in transport geography. Timmermans and colleagues, for instance, have formulated models to simulate and predict consumer responses to policy levers that are based on the notions of heuristics and habits (Arentze and Timmermans, 2004). And one of us has explored the applicability of behavioural economics' most comprehensive model of decision-making – prospect theory (Kahneman and Tversky, 1979) – in the context of people's coping with the space-time constraints that shape their everyday travel patterns (Schwanen and Ettema, 2009). This work, like that by Clark and associates, suggests that behavioural economics has much to offer to geographical studies of decision-making but also brings to light an important blind spot: such factors as social identity, social responsibilities and decision-makers' situated knowledges and life-biographies shape people's bounded rationality in important ways but are typically ignored in behavioural economics research. In economic geography, Kendra Strauss (2009) has drawn on Bourdieu's work to move beyond the "cognitive individualism" (Wilcox, 2008) of behavioural economics. For her, decisions always take place within the enabling constraints of the habitus and social field: decisions are always-already framed by shared and spatialised social and cultural expectations and beliefs. A similar Bourdieun-animated take on decision-making – outside the context of behavioural economics – can be found in a study of shopping practices by Jackson et al (2006).

It should also be noted that behavioural approaches in such sub-disciplines as urban and transport geography behavioural approaches have continued to inspire and animate research (Couclelis and Golledge, 1983; Golledge et al, 1994; Kwan, 2001; Timmermans et al, 2002). Alongside time-geography, GIScience and feminist theory, behavioural geography is one of the building blocks for Mei-Po Kwan's work on feminist geo-visualisation, through which she has rendered visible the gendered geographies of everyday-life decisions (Kwan, 2002, 2008). Further, an important factor for the continued interest in behaviouralism in geography is the proliferation

of attitude theories, such as the Theory of Reasoned Action (Ajzen and Fishbein, 1980) and its successor the Theory of Planned Behaviour (TPB) (Ajzen, 1991), in psychology. These theories assume that an individual's decision-making is intentional and a function of various sets of beliefs; geographers have employed them to examine migration, travel, communication and pro-environmental behaviours amongst others (Desbarats, 1983; Dijst et al, 2008; Reid et al, 2010). However, attitude theories, and especially the TPB, can be criticised for their voluntarism; their static, non-dynamic character; their difficulty in dealing with habits; and their sidelining of the importance of intuition, instincts and other semi-conscious processes (see also Desbarats, 1983; Shove, 2010).

Clearly, decision-making is being explored in a range of interesting and important ways by geographers interested in economic and financial activity. In the process, the rather limited models of human agency upon which earlier work was based have been revised to take into account the fact that decisions are made in social and cultural contexts characterised by uneven power-geometries under the influence of what we might call more-than-rational factors. These developments are promising. However, much greater scope for research on economic and other forms of decision-making exists. This is particularly important given the wider and ongoing backdrop to political, economic, and social life in the contemporary world – the financial crisis – a disruptive event whose effects and affects were registered, governed, and amplified through decisions. Think, for instance, of the import of the decision taken in September 2008 by the late Brian Lenihan, former Irish minister of finance, to issue a blanket guarantee to Irish Banks, a decision which ended up precipitating one of the largest banking crises in history. Think also of the more general concern in the wake of this crisis with the creation of an atmosphere of confidence within which financial decisions – at whatever scale and of whatever magnitude – might be made. And think of the way in which the authority and credibility of certain key decision-making bodies, perhaps most obviously the Monetary Policy Committee of the Bank of England, have been called into question. In each case the question of the decision is always more

than an individual act, becoming a space-time of variable intensity and reach whose effects circulate across and between different sites.

Propositions for thinking through the decision

Any effort to think through the multiple space-times of the decision in economic, financial, or indeed any other context depends upon an engagement with a wider a range of intellectual resources for thinking these space-times than has hitherto been the case. In the process, we would argue, a number of key propositions for thinking through the decision emerge. A first, and perhaps most obvious proposition, is that the *decision is differentiated*. As William James (1950/1890: 529) observed well over a century ago, the decision comes in "many modes" and types. It is certainly not an abstract, universal moment undertaken and experienced in the same way by every individual. A second proposition is that the *decision is distributed*. Clearly, classical models of decision-making conceive of it as the act of a sovereign, self-aware and self-directed subject. However, even when they appear thus, decisions always involve associations between agencies and things at a range of scales. In some ways, the distributed character of decision-making was already implicit in such behavioural geography studies as Dicken (1971) and especially in the Granovetter-style critiques of narrow economic rationality and economic geography research on embeddedness from the past two decades. However, the extent of distribution we have in mind goes deeper than in most previous work. It is material-semiotic and multi-scalar in character. One way in which this sense of distribution can be traced is in the fabrication of complex things, objects, and materials. Thus, in *Aircraft Stories* (2002) John Law traces the decisions that shaped the design and eventual failure of the English Electric P.17A, a long range supersonic aircraft. For Law the decision is part of the process of 'fractional coherence' through which objects are held together without ever becoming centred: decision-making draws things together while also revealing the multiplicity of things. Decisions in this context are also both performative and duplicitous: "they distribute between what is henceforth

to be imagined as important and what is relegated to the supporting role of mere detail. And they presuppose – and indeed require – the singularity of decision-making while effacing what they equally require for singularity, namely its simultaneous multiplicity" (2002: 163). So while decisive individuals may be recognised and named as such, decision-making is distributed across a range of actors and practices such that subjects and objects may only precipitate as discrete entities under certain circumstances, for instance during occasions of failure or crisis.

Such work encourages us to move beyond centred conceptualisations of decision-making to revisit and revise the modernist distribution of activity and passivity between humans and non-humans (Latour, 1993). It also foregrounds the value of thinking about decisions across and between actors and the material hinterlands that constitute their environments (see also the paper by Hitchings in this issue). This may not go far enough, however: perhaps, following the work of philosophers such as Alfred North Whitehead, we might understand the decision as a processual event taking place at many scales. For Whitehead, the world is a society of decision-makers: this is because for Whitehead it is as appropriate to speak of a society of molecules or cells as it is of humans – both kinds of society are composed of actual entities in process. The decision, then, is the way in which the potentiality of this process is actualized. As Whitehead puts it, "just as 'potentiality for process' is the meaning of the more general term 'entity,' or 'thing'; so 'decision' is the additional meaning imported by the word 'actual' into the phrase 'actual entity'. 'Actuality' is the decision amid 'potentiality'" (1978: 43). Whitehead's point here is not, of course, to claim that the cell decides in the manner that a sovereign, rational subject might: his point instead is to molecularise decisions without, in the process, individualising them.

A third proposition is that *the decision is less a discrete moment than it is a space-time of variable duration and intensity* through which multiple temporalities fold together. The decision is not so much a clearly identifiable instant – although it can be understood as that – but a space-time that stretches out in ways that complicate a neat linearity between past, present and future. Clearly,

one of the reasons why decisions matter is because they are implicated in the production of potential futures which, once summoned, can then be drawn down into the organization and governance of an actionable present (De Goede and Randalls, 2009; Anderson, 2010). This orientation towards futurity is woven into mundane and everyday practices of decision-making organized around economic, social, and political issues, from the purchase of houses to pension provision (Clark, 2010) to the struggle to negotiate the uncertainties of unemployment (Jeffrey, 2009). The imaginative simulation of futures – or what Gilbert (2008) calls 'nexting' – in the present is part of the everyday space-times of decision-making, whether or not this involves highly choreographed simulation technologies. That is not to say that these futures are always acted upon. As Johnson-Hanks (2005) has argued, decisions often involve a kind of contingent opportunism rather than the following of anything like a carefully worked through plan of action based upon a set of calculable futures. This orientation towards futurity is not however uni-directional: it is complicated by memory and experience (Ajzen, 1991). While it is tempting to think of the role of memory in this respect as representational, this claim can be qualified. Experience does not just exist as a storehouse of representations upon which we can draw when trying to make a decision – or at the very least this cannot always be a conscious, deliberative process. Rather, memory also subsists below the threshold of conscious awareness as habit and routinised practices whose importance lies precisely with the fact that they do the work of decision-making for us (Damasio, 1994; Bergson, 1911; see also Middleton's paper in this issue). So, while decision-making has a particular relation towards futurity, decisions might be more properly understood as privileged occasions for folding space and time into one another. To enquire about the decision is, therefore, to investigate different ways of performing the now that are by no means reducible to a kind of specious present insofar as they simultaneously involve complex orientations towards pastness and futurity.

Fourth, while distributed and differentiated, the space-times of the decision register *as a transformative happening felt through the displacements they generate in bodies*. Again, William James is helpful here. As he observes:

> "[t]he deliberation may last for weeks or months, occupying at intervals the mind. The motives which yesterday seemed full of urgency and blood and life to-day feel strangely weak and pale and dead. But as little to-day as to-morrow is the question finally resolved. Something tells us that all this is provisional; that the weakened reasons will wax strong again, and the stronger weaken; that equilibrium is unreached; that testing our reasons, not obeying them, is still the order of the day, and that we must await awhile, patient or impatiently, until our mind is made up 'for good and all'. This inclining first to one then to another future, both of which we represent as possible, resembles the oscillations to and fro of a material body within the limits of its elasticity" (James, 1950/1980: 529).

James thus draws our attention to the fact that decisions are not necessarily affectively experienced as 'eureka moments'. They are often better understood as an ongoing modulation of experience through different orientations towards past, present, and future. Equally, he reminds us that decision-making is as much an affective as an intellectual process. As he puts it in *Will to Believe*, "our passional nature not only lawfully may, but must, decide an option between propositions, whenever it is a genuine option that cannot by its nature be decided on intellectual grounds; for to say, under such circumstances, 'do not decide, but leave the question open', is itself a passional decision" (James, 1956: 723). James' claim anticipates more recent work within psychology (Loewenstein et al, 2001; Kahneman, 2003) and neuroscience (Damasio, 1994; Bechara et al, 2000) about the affective elements of decision-making. This work has had an influence beyond such disciplines (Gigerenzer, 2007; Finkelstein et al, 2008; Lehrer, 2009), and parallels efforts in the social sciences and humanities to rethink 'thinking' as a process "layered" by affectual and perceptual processes (Connolly, 2002). However, James goes further than most contemporary research about the affectivity of decision-making by also reminding us that the

inability to make a decision is an affective process: he notes, for instance, the "peculiar feeling of inner unrest" associated with indecision (1950/1890: 528). Beyond this, James can also be read as suggesting that the affectivity of in/decision stems in part from the realisation that making a decision means that certain roads will not be travelled. A fifth proposition, therefore, is that the decision is *both an event of actualisation and a process of cutting off and deflection*. It is not only a generative opening up of the world but also a de-cision – a cutting off and foregoing of possible futures through the process of actualisation.

A sixth proposition relates to the question of who, or what it is that makes or takes the decision: *rather than a prerequisite for the decision, the subject is called forth, and therefore also called into being by the imperative to decide*. Traditionally the decision has tended to be understood as the preserve of the sovereign, thinking subject – in many ways this subject remains firmly ensconced in various spheres of economic, political, and social life and also in the conceptualisations of decision-making in behavioural economics and social psychology discussed above. In these terms, the sovereign subject is a necessary pre-requisite for decision-making. The stability of the sovereign subject has of course been subject to extensive critique influenced by the work of feminist and post-structuralist scholars across disciplines, the upshot of which is the claim that the subject – and consequently the subject as decision-maker – is not a self-contained actor or a pre-constructed platform for decision-making. Perhaps the most emphatic development of this claim comes from Alain Badiou (2007), for whom the decision is the event that constitutes the subject. That is, the subject comes to understand itself through the decision to become consistent with the truths attendant upon events as they reveal themselves. For Badiou, the subject is emphatically *for* the decisive event, the bearer of a certain fidelity to the logic of its unfolding: always operating in the wake of a decision whose meaning is never finally disclosed. This argument is appealing in one respect – it seems to cut through the hesitant tentativeness of particular kinds of politics. Yet it comes with its own problems, not least of which is its rehearsal of a heroic decisionism as the basis for ethics or politics: the task is to seize, and become worthy

of, the decisive act through which one becomes constituted as a subject. Of course this begs a question: on what basis is the decision made in the first place? Arguably Badiou fails to provide a satisfactory answer to this question and falls back on a circular logic in which the subject is constituted through the decision, while the decision remains reliant upon the spectre of a subject that precedes the decisive act (Critchley, 2000; Mullarkey, 2006). Furthermore, the threshold over which the process of something happening must pass before it counts as decisive event is high for Badiou (Calcagno, 2008). Thus, 1968 or the French revolution are worthy of the name event, but what of more modest interventions and decisions? And what of decisions that do not become aligned with fully fledged 'events' – that in some way remain 'indecisive'?

A final proposition is that *the decision always takes place against a constitutive background excessive of the decisive act*. That is, as a potentially transformative event, the decision is both sensible and resistant to sense. The writing of Jacques Derrida is helpful here, particularly insofar as he points to the relation between the decision and a background of undecidability. In the essay *The Force of Law* Derrida (1990) interrogates the claim that for something to be considered just, it must be based upon the possibility of an individual who is free to make, and entirely responsible for, her decisions. The figure of the judge embodies this ideal. And yet, the mere act of following a rule, "enacting a program or effecting a calculation" (1990: 961) does not constitute a just decision. The just decision also rests upon the capacity of the judge to reinvent the law in every case, to inflect it in a new or original way that is not reducible to the terms of a rule or precedent. The just decision is therefore "both regulated and without regulation" (*ibid*: 961). The implication is that the decision is always haunted by the aporia of the undecidable: "the undecidable remains caught, lodged, at least as a ghost – but an essential ghost – in every decision, in every event of decision" (*ibid*: 965). The undecidable is a necessary element of the free decision, but is also that which renders the possibility of any fully just and fully present free decision impossible. The just decision is always an event to come, an eventuality that "exceeds calculation, rules, programs, anticipations and so forth" (*ibid*: 971). As Adey and Anderson make clear in this issue this does

not mean that decisions are not made: it means, instead, that the interval of the space-time in which they take place is a lot more complex than can be calculated.

Researching the space-times of the decision

These propositions provide important orientations for undertaking research into the space-times of the decision. Indeed, they are necessary elements of any approach to the process of decision-making that seeks to avoid falling back on the claim that the decision is a singular moment abstracted from the context within which it takes place. Guided by these propositions, further research into the decision might explore a series of questions. First, *what are the sites at which decisions are made?* Clearly, the individual, the household and the organisation or firm remain important sites for decision-making, without necessarily being the "unit of analysis" that figured in earlier studies. However, each of these sites is already always part of several assemblages within which decision-making as a distributed and decentred process takes-place. How then to explore this process? The research by Susan Smith and colleagues on housing choices is helpful here (Smith et al, 2006; Christie et al, 2008). They consider the household as a networked site where decisions are made on the basis of a range of emotional as much as financial investments and which becomes related in complex ways with other people, with institutions, with imaginative futures, and with material things of all kinds. Out of the decision-making process emerges not only an outcome but also an assemblage of materially heterogeneous agents and elements with its own space-times. A similar story is provided in Schwanen's (2008) study of the factors that shape the mundane question of who will pick up the child from the nursery or elementary school in the case of eventualities that disrupt the normal division of chauffeuring labour within the household.

Obviously, there are many other, and many other more *privileged*, sites where decisions are enacted and articulated through a wide assemblage of processes and practices. Such sites are important not least because they place a premium upon and demand kinds of decision-making

skills and expertise (Clark, 2011). They can also be understood as centres of calculation (Latour, 1987) in which decisions are performed in such a way that realities are actively assembled as necessarily inhabitable worlds (see also Callon and Muniesa, 2005). Understanding how such decision-making is performed at these sites requires close attention not only to human actors: as Latour (2002) has demonstrated in a study of legal decision-making at the French *Conseil d'État*, it also demands close attention to the mundane associations between humans, documents, and other actors. In this context, rather than a moment of transcendent judgement or wisdom, legal decision-making is a mediation of these associations. These rather more privileged sites are also important, however, because in some cases they provide contexts in which models and theories of decision-making emerge. Consider, for instance, those research institutes and think-tanks in which the question of decision-making becomes the focus of theoretical and experimental practices that in turn generate influential ideas circulating across a range of disciplines. For instance, Herbert Simon's work was shaped in part by encounters with "interesting decision theory types at the RAND corporation" (Augier, 2001: 272) and by collaboration with figures at the Ford foundation and at the Cowles Commission (e.g. Haavelmo, 1950). The RAND Corporation is especially interesting as a site through which knowledge about theories and techniques of decision-making are developed and articulated between academic and other contexts. Reports produced on its behalf often have a sophisticated grasp of the conceptual and methodological complexity attendant upon thinking about decisions in a range of contexts, and particularly in relation to the military and geopolitics (see George, 1967). Close attention to work at these and other sites might therefore provide a way of unearthing a genealogy of the decision as a psychological and political technique.

A second important question for further research concerns *the techniques through which the space-times of the decision are disclosed and rendered actionable*. At the very least, research into decision-making might begin by attending to the different kinds of techniques through which it is rendered explicit, palpable, and actionable. First, there are techniques with the express purpose

of *facilitating* decision-making – that is, of making the thinking of the deciding subject more transparent, accountable, efficient, consistent and effective. There is no shortage of advice on techniques for sharpening the decision-making skills of the subject, not least in relation to business management. So, for instance, in a recent discussion of the relation between decision-making and leadership, Finkelstein and colleagues (2008) point to the importance of developing awareness of the 'red-flag' factors that inhibit good decisions. These include 'misleading experiences', 'misleading prejudgements', 'inappropriate self-interest', and 'inappropriate attachments'. Techniques for facilitating better decision-making are not of course always individualistic in character. They sometimes facilitate collaborative, participatory, and shared decision-making (e.g. www.palisade.com), and can be used to engage diverse kinds of publics in decision-making processes. Some techniques are rather trivial, taking the form of crowd-sourcing, or involving web-based decision-making tools (e.g. www.letsimondecide.com). Others offer the possibility for expanding the space of participation organized around more pressing matters of concern, such as *Decide*, a Europe-wide project designed to explore possibilities for participatory decision-making around a range of ethical issues (Duensing and Lorenzet, 2007).

A second set of techniques are organized around what we might call *influence*. Such techniques attempt to provide some kind of discrete yet influential constraint in the contexts within which decisions are made. These are what Thaler and Sunstein (2009) call "choice architectures" for generating 'nudges' in various directions. As Whitehead, Jones, and Pykett detail in their contribution, the point of these libertarian-paternalist techniques is not so much to tell people what to do but to provide the conditions that encourage them to make decisions that are assumed to be in their own best interest. Often, techniques of influence also include those that foreground the role of 'more-than-rational processes' in decision-making. These are practices that seek to emphasize, for instance, the role that affective or 'intuitive' processes play in decision-making. The goal here is sometimes to 'speed up' decision-making, encouraging the decisive (and usually corporate) subject to act on the basis of 'gut feelings' that short-circuit

contemplative habits of thinking (Gigerenzer, 2007). In a very different vein, other thinkers point to the ethico-political value of the techniques that allow us to slow down, or expand, the space-time of the decision as a way of foregrounding the participation of perceptual and affective processes in the cultivation of ethico-political sensibilities (see Connolly 2002, 2005).

A third set of techniques are organized around *enactment*. These are techniques for generating 'artificial' situations in which decisions can be rehearsed in advance of their actual making. Simulations, scenarios and exercises are all important examples of such technologies (Anderson, 2010; Goodier et al, 2010). In all cases the goal is to provide the conditions in which it becomes possible to learn how to act into situations that require particular kinds of thinking and feeling. The military context is a particular interesting setting where multiple augmented realities, including scenario development within virtual worlds, are used to cultivate distinctive practices of decision-making that engage the entire body (Budd and Adey, 2009). Equally, as Peter Adey and Ben Anderson document in this issue, similar techniques are also part of the production of conditions under which decision-making in emergency planning is made possible. In their paper they explore how exercises are one set of techniques for developing emergency decision-making capabilities.

A final set of techniques revolve around *recognition*. Aesthetic practices, and particularly photography and cinema, are important here. They work as perceptual technologies through which the decisive moment is rendered present as an eventual space-time at which something shifts and changes. In other words, these technologies seek to recognise – and therefore render or capture – the value of something happening making a difference. As Nigel Thrift (2010) has observed, a concern with the recognition of such decisive moments can be traced through a range of Western aesthetic practices. It is perhaps best expressed in the words of the photographer Henri Cartier-Bresson, for whom the decisive moment is the "simultaneous recognition, in a fraction of a second, of the significance of an event as well as the precise organization of forms which gives that event its proper expression" (Pollack, 1977: 155). This

concern can also be found in cinema, which itself can be understood as a machine for producing decisive moments around which all kinds of experiences turn. And it can also be found in literature and poetry, much of which tries to come to terms with the affective experience of wonder associated with minor decisive moments.

Clearly, another question requiring further investigation concerns *how the space-times of the decision are folded into the understanding and governing of different forms of life.* Perhaps the most obvious way in which this question has been addressed is through the relation between the decision and sovereignty. For Carl Schmitt, the essence of sovereignty is a "monopoly of the decision" (quoted in Agamben, 1998: 16). Developing this, Giorgio Agamben (1998) has argued that the story of modernity can be told as an account of bio-political technologies through which life becomes the object of a decision about its inclusive exclusion. In the process he foregrounds certain kinds of 'paradigmatic' figures that simultaneously complicate and precipitate efforts to decide upon the limits of life. As Louise Cadman (2009) has argued, Agamben offers a powerful critique of the founding decisions of contemporary bio-politics regimes and their production of particular forms of life. At stake here is the threshold of inclusive exclusion from the space of human life. And yet Agamben's analysis, based as it is upon certain kinds of historical paradigmatic figures, often pays scant attention to the details of decisions of life and death in the making. Equally, we might pay more attention to how the politics of the decision are increasingly entangled in questions of what kinds of lively matter participate in the processes through which decisions are made and take place. Perhaps the most obvious evidence for this is the way in which the structures of the brain are being identified as locations for decision-making. As Damasio and colleagues suggest, while certain structures within the brain, such as the orbitofrontal cortex, appear to be crucial for decision-making, the latter is a process that arises from "large-scale systems that include" other structures such as the "amygdala, the somatosensory/insular cortices and the peripheral nervous system" (Bechara et al, 2000: 295). Work along these lines complicates the rather too cognitive model of the decision-making

subject underpinning much social-scientific work. And yet it is also problematic insofar as it renders certain behaviours problematic and actionable in reductionist ways. For instance, neuropsychological research is beginning to inform criminological investigation in ways that seem to "link criminal behavior and its immediate milieu with important underlying neural substrates, such as the amygdala" (DeLisi et al, 2009: 1249). Such comments clearly suggest that there is a great deal at stake in competing visions of the relation between different sites and spaces of decision-making, not least for the lives and futures of those whose decisions are rendered problematic. Certainly, they point to the challenges of linking social and cultural models of decision-making (which often black-box neurophysiological processes) and reductionist developments in the neurosciences (see also Wilcox, 2008).

A fourth question for further research concerns *which practices of decision-making inform social scientific thinking, including that by geographers.* Geographers are in principle well-positioned to contribute to rethinking the space-times of the decision, among others because they can provide techniques and technologies for facilitating collaborative decision-making across a range of interest groups, constituencies, and controversies. Such work reflects a broader concern with the question of how to open-up decision-making practices and structures of governance, especially with respect to environmental controversies and planning issues (Dow and Carbonne, 2007; Chilvers, 2008; Reel and Bruyneel, 2010). But it also reflects an interest in the possibility of devising novel ways of making decisions, sometimes utilising public participation geographic information systems (PPGIS) (Sieber, 2006). PPGIS – much of which is rooted in feminist epistemologies and draws on feminist GIS – has been used with particular enthusiasm in order to transform the way in which 'public decisions' are made as part of collaborative planning processes (Sieber, 2006; Ramsey, 2008). At the same time, however, attention needs to be paid to the ways in which such technologies have the potential to foreclose the field and terms of decision-making as part of a wider process of framing participatory experiments in advance of their enactment (Chilvers and Burgess, 2008). Care must be taken to avoid assuming that

participants have the same access to information, or indeed, that all parties agree about the nature of the problem to be decided in the first place. The mere fact that these technologies are used to facilitate 'collaborative' planning does not therefore mean that they are insulated from the "exercise of power" (Ramsey, 2008: 2347).

Pushing things further, we might ask questions about our own decision-making practices in research and teaching, and about how they are shaped by particular cultures of expertise and expectation. To what extent do we remain wedded to a model of decision-making that owes more to neo-classical economics than to more recent theoretical developments? How far do we take seriously and enact in our own practices other ways of making decisions? These questions precipitate issues of subjectivity, event, and affect – all of which have been debated extensively in recent cultural geography (McCormack, 2003; Thrift, 2007; Anderson and Harrison, 2010). Important opportunities exist for exploring productive overlaps between this work and ongoing research about decision-making in economic, urban, transport and other fields within geography.

Such critical reflection on the practices of decision-making needs to be linked with methodological experiment across different research trajectories within the discipline. More conventional methods, such as questionnaires and controlled experiments, can and need to be complemented with others. For instance, think-aloud protocols as developed in psychology (Ericsson and Simon, 1993) could be used to gain at least some understanding of the covert thinking in everyday decisions. But experimentation is also required with other methods that bring out those dimensions of decisions and decision-making that cannot be easily put into words. Examples could be participant observation and video-ethnography but also the participatory design of techniques intended to affect the outcomes of decision-making practices together with those people and organisations whose decisions are to be affected. Exemplary here is the work of Lane and colleagues (2011), in which one of the aims is to produce experimental contexts within which to draw together diverse constituencies that complicate questions of

expertise. Perhaps it is in this way that decisions can become part of the way in which, to paraphrase Isabelle Stengers (2008), geographers "experiment experience". Clearly such experimentation may well close things down or cut things off, but insofar as decisions are experimental "future generating devices" (Rheinberger, 1994) they may also open up possible worlds as part of the practice and craft of geographical research.

Conclusion

What we hope this editorial, and the papers in this special issue do, is open up the question of the decision for further examination by geographers by exploring the many ways in which decisions are made, taken, and take place. However, as Derrida reminds us, we can never accumulate sufficient knowledge to render the decision transparent. Equally, we can never evade it. The decision bears down upon us as a "finite moment of urgency and precipitation" (1990: 967), a moment of crisis that is also a demand to act into the future. So, while recognising the value of a critique of a subject-centred ethics and politics of decisionism, this critique needs to be tempered by cautious affirmation of the decision as an ongoing response to the potential emergence of different forms of life. In these terms, we might think of the decision as an ethico-political event involving "a tempered instance of reaching-out, a touching of that which I do not know" (Manning, 2007: 49). This is also the point at which the decision becomes a matter of ethics. As the pragmatist philosopher John Dewey put it, what is at stake in decision-making is "not a difference in quantity, but what kind of person one is to become, what sort of self is in the making, what kind of a world is making" (1994: 143). This claim supports a kind of ethics that affirms the undecidable as the necessary horizon of any space-time of the decision: it refuses to decide in advance what the final terms of ethics might be or become, while also reaching tentatively or otherwise into the futures of decision-making. We do not need to sign-up to a heroic decisionism in order to affirm this claim. Instead, we might become open to the possibility of being taken by the decision, where the decisive event is something beyond us yet

something felt as a variation in our manifold capacities to act and be acted upon, an ongoing actualisation of potential without a final settlement.

Acknowledgements

We would like to thank Nigel Thrift and Ros Whitehead for their help with this special issue. Thanks also to the *Environment and Planning A* editors for their comments on this manuscript and each of the contributors for their time, patience, and participation.

References

Agamben G, 1998 *Homer Sacer: Sovereign Power and Bare Life* (Stanford University Press, Stanford, CA)

Ajzen I, 1991, "Theory of planned behaviour" *Organizational Behaviour and Human Decision Making Processes* **50** 179 – 211

Ajzen I, Fishbein M, 1980 *Understanding Attitudes and Predicting Social Behavior* (Prentice Hall, Englewood Cliffs, NJ)

Anderson B, 2010, "Preemption, precaution, preparedness: anticipatory action and future geographies" *Progress in Human Geography* **34** 777 – 798

Anderson B, Harrison P, 2010 *Taking-Place: Non-Representational Theories and Geography* (Ashgate, Farnham)

Arentze T A, Timmermans H J P, 2004, "A learning-based transportation oriented simulation system" *Transportation Research Part B* **38** 613 – 633

Augier M, 2001, "Simon says: bounded rationality matters: introduction and interview" *Journal of Management Inquiry* **10** 268 – 275

Badiou A, 2007 *Being and Event* (Continuum, London)

Bechara A, Damasio H, Damasio A R, 2000, "Emotion, decision making and the orbitofrontal cortex" *Cerebral Cortex* **10** 295 – 307

Bergson H, 1911 *Matter and Memory* (George Allen & Unwin Ltd, London)

Boschma R, Frenken K, 2006, "Why is economic geography not an evolutionary science? Towards an evolutionary economic geography" *Journal of Economic Geography* **6** 273 – 302

Brown L, Moore E, 1970, "The intra-urban migration process: a perspective" *Geografiska Annaler: Series B, Human Geography* **52** 1 – 13

Budd L, Adey P, 2009, "The software simulated airworld: anticipatory code and affective aeromobilities" *Environment and Planning A* **41** 1366 – 1385

Cadman L, 2009 "Life and death decisions in our posthuman(ist) times" *Antipode* **41** 133 – 158

Cadwallader M 1975, "A behavioural model of consumer spatial decision making" *Economic Geography* **51** 339 – 349

Calcagno A, 2008, "Alain Badiou: the event of becoming a political subject", *Philosophy and Social Criticism* **34** 1051 – 1070

Callon M, Muniesa F, 2005 "Peripheral vision: economic markets as calculative collective devices" *Organization Studies* **26** 1229 – 1250

Chilvers J, 2008, "Environmental risk, uncertainty, and participation: mapping an emergent epistemic community" *Environment and Planning* A **40** 2990 – 3008

Chilvers J, Burgess J, 2008, "Power relations: the politics of risk and procedure in nuclear waste governance" *Environment and Planning A* **40** 1881 – 1900

Christie H, Smith S, Munro M, 2008, "The emotional economy of housing" *Environment and Planning A* **40** 2296 – 2312

Clark G L, 2010, "Human nature, the environment, and behaviour: explaining the scope and geographical scale of financial decision-making" *Geografiska Annaler, Series B: Human Geography* **92** 159 – 173

Clark G L, 2011, "Myopia and the global financial crisis: context-specific reasoning, market structure, and institutional governance" *Dialogues in Human Geography* **1** 4 – 25

Clark G L, Caerlewy-Smith E, Marshall J, 2007, "The consistency of UK pension fund trustee decision-making" *PEF* **6** 67 – 86

Clark G L, Knox-Hayes J, Strauss K, 2009, "Financial sophistication, salience and the scale of deliberation in UK retirement planning" *Environment and Planning A* **41** 2496 – 2515

Connolly W, 2002 *Neuropolitics: Thinking, Culture, Speed* (University of Minnesota Press, Minneapolis, MN)

Connolly W, 2005 *Pluralism* (Duke University Press, Durham, NC)

Couclelis H, Golledge R, 1983, "Analytic research, positivism, and behavioural geography" *Annals of the Association of American Geographers* **73** 331 – 339

Critchley S, 2000, "On Alain Badiou" *Theory and Event* 3, no pagination

Damasio A, 1994 *Descartes' Error* (Vintage, London)

De Goede M, Randalls S, 2009, "Precaution, pre-emption and technologies of the actionable future" *Environment and Planning D: Society and Space* **27** 859 – 878

DeLisi M, Umphress Z R, Vaughn M G, 2009, "The criminology of the amygdala" *Criminal Justice and Behaviour* **36** 1241 – 1252

Derrida J, 1990, "Force of law: the "mystical foundation of authority"" *Cardozo Law Review* **11** 921 – 1045

Desbarats J, 1983, "Spatial choice and constraints on behaviour" *Annals of the Association of American Geographers* **73** 340 – 357

Dewey J, 1994, "Deliberation and choice", in *The Moral Writings of John Dewey* ed J Gouinlock (Dover, New York) pp 139 – 144

Dicken P, 1971, "Some aspects of the decision making behaviour of business organizations" *Annals of the Association of American Geographers* **47** 426 – 437

Dicken P, Malmberg A, "Firms in territories: a relational perspective" *Economic Geography* **77** 345-363

Dijst M, Farag S, Schwanen T, 2008, "A comparative study of attitude theory and other theoretical models for in-store and online shopping" *Environment and Planning A* **40** 831 – 847

Dow K, Carbone G, 2007, "Climate science and decision making" *Geography Compass* **1** 302 – 324

Duensing S, Lorenzet A, 2007 *Decide Evaluation Report*, available at www.play**decide**.org/download/**decide**final.pdf, last accessed 4th January 2010

Ericsson K, Simon H, 1993 *Protocol Analysis: Verbal Reports as Data*, second edition (MIT Press, Boston, MA)

Finkelstein S, Whitehead J, Campbell A, 2008 *Think Again: Why Good Leaders Make Bad Decisions and How To Keep It From Happening To You* (Harvard Business Press, Cambridge, MA)

George A, 1967 "The 'operational code': a neglected approach to the study of political leaders and decision-making" *International Studies Quarterly* **13** 190 – 222

Gilbert D, 2006 *Stumbling on Happiness: Why the Future Won't Feel the Way You Think It Will* (Harper Collins, London)

Gigerenzer G, 2007 *Gut Feelings: Short Cuts to Better Decision Making* (Penguin, London)

Gigerenzer G, Goldstein D G, 1996, "Reasoning the fast and frugal way: models of bounded rationality" *Psychological Review* **103** 650 – 669

Golledge, R G, Kwan M-P, Gärling T, 1994, "Computational process modelling of household travel decisions using a geographical information system" *Papers in Regional Science* **73** 99 – 117

Goodier C I, Austin S A, Soetanto R, Dainty A R J, 2010, "Causal mapping and scenario building with multiple organizations", *Futures* **42** 219 – 229

Granovetter M, 1985, "Economic action and social structure: the problem of embeddedness" *American Journal of Sociology* **91** 481 – 510

Halfacree K H, Boyle P J, 1993, "The challenge facing migration research: the case for a biographical approach" *Progress in Human Geography* **17** 333 – 348

Halfacree K, 2004, "A utopian imagination in migration's *terra incognita*? Acknowledging the non-economic worlds of migration decision-making" *Population, Space and Place* **10** 229 – 253

Haavelmo T, 1950, "The notion of involuntary economic decisions", *Cowles Foundation Paper 38a*, reprinted from *Econometrica* **18** 1 – 8

Isard W, 1956 *Location and Space-Economy* (Wiley, New York)

Isard W, Reiner T, 1962, "Aspects of decision-making theory and regional science" *Papers in Regional Science* **9** 25 – 34

Jackson P, Perez de Aguila R, Clarke I, Hallsworth A, de Kervenoael R, Kirkup M, 2006, "Retail restructuring and consumer choice 2. Understanding consumer choice eat the household level" *Environment and Planning A* **38** 47 – 67

James W, 1950/1890 *The Principles of Psychology, Volume 2* (Dover Publications, New York)

James W, 1956 *The Will to Believe and Other Essays in Popular Philosophy* (Dover Publications, New York)

Jeffrey C, 2009, "Fixing futures: educated unemployment through a North Indian lens" *Comparative Studies in History and Society* **51** 182 – 211

Johnson-Hanks J, 2005, "When the future decides" *Current Anthropology* **46** 363 – 385

Johnston R, 1977 "Urban geography: city structures" *Progress in Human Geography* **1** 118 – 129

Kahneman D, 2003, "Maps of bounded rationality: psychology for behavioral economics" *The American Economic Review* **93** 1449 – 1475

Kahneman D, Tverskey A, 1979, "Prospect theory: an analysis of decisions under risk" *Econometrica* **47** 263 – 291

Kwan M-P, 2001, "Cyberspatial cognition and individual access to information: the behavioral foundation of cybergeography" *Environment and Planning B: Planning and Design* **28** 21 – 37

Kwan, M-P, 2002, "Feminist visualization: re-envisioning GIS as a method in feminist geographic research" *Annals of the Association of American Geographers* **92** 645 – 661

Kwan, M-P, 2008, "From oral histories to visual narratives: re-presenting the post-September 11 experiences of the Muslim women in the United States" *Social and Cultural Geography* **9** 653 – 669

Lane S N, Odoni N, Landström C, Whatmore S J, Ward N, Bradley S, 2011, " Doing flood risk science differently: an experiment in radical scientific method" *Transactions of the Institute of British Geographers* **36** 15 – 36

Latour B, 1987 *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge University Press, Cambridge)

Latour B, 1993 *We Have Never Been Modern* (Harvard University Press, Cambridge, MA)

Latour B, 2002 *La Fabrique du Droit: Une Ethnographique du Conseil d'État* (La Découverte, Paris)

Law J, 2002 *Aircraft Stories: Decentring the Object in Technoscience* (Duke University Press, Durham, NC)

Lehrer J, 2009 *The Decisive Moment: How the Brain Makes up Its Mind* (Canongate, London)

Loewenstein G F, Weber E U, Hsee C K, Welch N, 2001, "Risk as feelings" *Psychological Bulletin* **127** 267 – 286

Manning E, 2007 *Politics of Touch: Sense, Movement, Sovereignty* (University of Minnesota Press, Minneapolis, MN)

McCormack D P, 2003, "An event of geographical ethics in spaces of affect" *Transactions of the Institute of British Geographers* 28 488 – 207

Mullarkey J, 2006 *Post-Continental Philosophy* (Continuum, London)

O'Neill P, Gibson-Graham J K, 1999, "Enterprise discourse and executive talk: stories that destabilise the company" *Transactions of the Institute of British Geographers* **24** 11-22

Pollack P, 1977 *The Picture History of Photography: From the Earliest Beginnings to the Present Day* (Harry N Abrams, New York)

Pred A, 1967, "Behaviour and location: Pt 1." *Lund Studies in Geography* B **27**

Ramsey K, 2008, "A call for agonism: GIS and the politics of collaboration", *Environment and Planning* A **40** 2346 – 2363

Reckwitz A, 2002, "Toward a theory of social practices: a development in culturalist theorizing" *European Journal of Social Theory* **5** 243 – 263

Reel M, Bruyneel S, 2010, "Rescaling environmental governance, rethinking the state: a three-dimensional review" *Progress in Human Geography* **34** 646 – 653

Reid L, Sutton P, Hunter C, 2010, "Theorizing the meso level: the household as a crucible of pro-environmental behaviour" *Progress in Human Geography* **34** 309 – 327

Rheinberger H, 1994, "Experimental systems: historiality, narration, and deconstruction" *Science in Context* **7** 65 – 81

Schwanen T, 2008 "Managing uncertain arrival times through sociomaterial associations" *Environment and Planning B: Planning and Design* **35** 997 – 1011

Schwanen T, Ettema D, 2009, "Coping with unreliable transportation when collecting children: examining parents' behaviour with cumulative theory" *Transportation Research Part A* **43** 511 – 525

Shove E, 2010, "Beyond the ABC: climate change policy and theories of social change" *Environment and Planning A* **42** 1273 – 1285

Sieber R, 2006, "Public participation geographic information systems: a literature review and framework", *Annals of the Association of American Geographers* **96** 491-507

Silvey R, Lawson V, 1999, "Placing the migrant" *Annals of the Association of American Geographers* **89** 121 – 132

Simon H, 1959, "Theories of decision-making in economics and behavioural science" *The American Economic Review* **49** 252 – 283

Smith S J, Munro M, Christie H, 2006, "Performing (housing) markets" *Urban Studies* **46** 81 – 98

Stam E, 2007, "Why butterflies don't leave: locational behaviour of entrepreneurial firms" *Economic Geography* **83** 27-50

Stengers I, 2008, "A constructivist reading of *Process and Reality*" *Theory, Culture & Society* **25** 91 – 110

Strauss K, 2009, "Cognition, context, and multimethod approaches to economic decision making" *Environment and Planning A* **41** 302 – 317

Thaler R, Sunstein C, 2009 *Nudge: Improving Decisions about Health, Wealth and Happiness* (Penguin, London)

Thrift N, 2007 *Non-Representational Theory: Space, Politics, Affect* (Routledge, Abingdon)

Thrift N, 2010, "Halos: making more room in the world for new political orders", in *Political Matter: Technoscience, Democracy, and Public Life* eds B Braun, S Whatmore (University of Minnesota Press: Minneapolis, MN) pp 139 – 174

Timmermans H, Golledge R G, 1990, "Applications of behavioural research on spatial problems II: preference and choice" *Progress in Human Geography* **14** 311 – 354

Timmermans H, Arentze T, Joh C-H, 2002, "Analysing space-time behaviour: new approaches to old problems" *Progress in Human Geography* **26** 175 – 190

Verplanken B, Wood W, 2006, "Interventions to break and create consumer habits" *Journal of Public Policy & Marketing* **25** 90 – 103

Whitehead A N, 1978 *Process and Reality*, Revised version (Free Press, New York)

Wilcox N T, 2008, "Against simplicity and cognitive individualism" *Economics and Philosophy* **24** 523 – 532

Wolpert J, 1965, "Behavioural aspects of the decision to migrate" *Papers and Proceedings of the Regional Science Association* **15** 159 – 169

Yeung H W-C, 2005, "The firm as social networks: an organisational perspective" *Growth and Change* **36** 307-328