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Digital maps and anchored time: the case for practice theory

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Introduction

Digital maps are increasingly embedded within everyday practices, from choosing a holiday destination to gaining directions to a bar. As hypermediate and remediate forms (Bolter and Grusin, 2000), they are situated within a complex array of connected technologies: web mapping services output digital cartography via popular web map engines like Google and Bing Maps which, in turn, sit embedded on websites. Meanwhile, location-based services allow users to check in almost anywhere on the planet – volunteering their geolocation for public viewing on social media. Likewise, even seemingly unrelated practices like buying a house (landed capital investment) are now informed by digital maps. Property searches offer ready spatialisation of public datasets (school reports, crime statistics and boundary areas) set against the property type. Homebuyers now have the ability to narrow their shortlist criteria and create their own mapping prior to viewing, destabilising the sales practices of estate agents.

Alongside complex developments in the technological configurations of digital maps, and the entanglement with social practices, digital maps are increasingly ubiquitous through a complicated range of possible media. At times, this can negate meaningful analysis of digital map use through data alone: a digital map can be printed out and shoved in a back pocket, committed to memory, used as a back-up resource (just in case), or used in combination with a guide book or local knowledge. In turn, there is increasing complexity and challenge in grappling empirically with digital technology use beyond online-only web science.

This chapter argues that a practice theory approach, centring on how digital maps are used in everyday life, can contribute to the cartographic repertoire. Beginning with a sketch of cartographic theory from academic cartography to date, discussion places contemporary cartographic theory in context. This sets the scene in order to identify a historical limitation in cartographic theory that a practice theory of digital maps could address; namely, the wider anchoring of social practices. The following section provides an overview of practice theory for reference, outlining a simplified framework for analysis. The substantive section applies the framework, drawing on in-depth interview extracts. Three subtly altered socio-temporal practices are discussed through the lens of practice theory: maps as memory, organising time and altered routines. This serves to illustrate how a practice theory might be applied, in order to demonstrate the value it may add. In conclusion, I argue that a practice theory approach provides a useful means to address the relationship between digital map use and shifting temporalities in everyday life.

The contours of cartographic theory sketched out

In this section, cartographic theory is laid out in brief to provide a context against which to situate the value of a practice theory of digital maps. Full histories of cartographic theory have been written elsewhere, with Perkins (2003), Edney (2005) and Crampton (2010) each providing excellent overviews. In summary, cartography has existed for millennia, and in various forms. However, cartographic theory emerged only immediately prior to the Second World War, largely through the work of Arthur Robinson (see, for example, Robinson, 1979) and surrounding researchers (Perkins, 2003; Edney, 2005). As the first sustained attempt to create a more accurate map, Robinson (1979) tried to incorporate a reflexive sensitivity towards end-users while working within boundaries of positivist normal science. Radical cartographers, map artists, map propaganda and psychogeography presented minor challenges (Crampton and Krygier, 2006), but cartographic practices remained relatively stable, even throughout the quantitative turn in geography (Robinson, 1979: 101). In the late 1970s and early 1980s, amidst a wider interpretive turn in social theory and emergence of critical, humanist and radical geographies (Dorling and Fairbairn, 1997: 142–145), the new field of critical cartography began to challenge the dominant perspective of academic cartography (Crampton and Krygier, 2006). This was achievable, first, through critical action-based research seeking to develop alternative representations (Bhagat and Mogul, 2008; Crampton, 2010) and psychogeographic mappings, drawing on a connection between the Avant-Garde and Situationist

movements (Rasmussen, 2004); and second, through theoretical critique of the power relations between map content and spatial knowledge(s). On the latter, key moments include Harley and Woodward's *History of Cartography* (Andrews, 2001) – a massively ambitious (and on-going) project, intended to redress subaltern dynamics within map representation (Harley, 1987). In drawing on Harley's combination of post-structuralism, semiotics and social constructionism, the project sought to critique knowledge-politics in map representation (1988a; 1988b; 1989); and to challenge Wood's (1992; 2010) focus on power relations in mapping processes, and later, Black's (2002) focus on the embedded politics within map representation. Throughout the 1990s and 2000s, sophisticated Geographical Information Systems (GIS) emerged through technological innovation (especially in computing). Subsequent engagement between GIS practitioners (so-called 'GISers') and critical cartographers generated useful debates throughout the 'GIS Wars' (Pickles, 1995; Schuurman, 2000; Goodchild, 2006; O'Sullivan, 2006) – a term reflective of the wider 'Science Wars' (Flyvbjerg, 2001: 1). These culminated in several new fields informed by critical geography: critical GIS (Schuurman, 2008; Crampton, 2010); Public Participation GIS – often termed 'P/PGIS' (Craig, Harris and Weiner, 2002; Dunn, 2007); feminist GIS (Pavlovskaya and Martin, 2007; Elwood, 2008; Kwan, 2010) and postcolonial GIS (Crampton, 2010). Debate continues between GISci (GIS Science), directed towards specialist use of technical tools within a normal science position in line with academic cartography, and more humanist leaning neo-geographers (Turner, 2006) – the latter often opting to use web-based, publicly open proprietary web mapping applications, and informed by a constructivist stance. For example, using Google Maps and Bing Maps alongside 'grassroots' maps (Turner, 2006) to create inductively generated maps through end-user contributions, e.g. OpenStreetMap, inclusive of multiple perspectives and subjectivities.

Recent advances in processing and software technologies afford sophisticated cross-platform digital maps, ranging from popular web maps, e.g. Google Maps (including the realist Street View function) and associated API (Application Programming Interface), through to nation-specific proprietary remediation, e.g. Britain's Ordnance Survey (OS), provided via third-party vendors initially and then online. Alongside map-specific developments, innovations in related technologies continually afford increasing accessibility, ubiquity and mobility. The development of Ajax (Asynchronous Javascript and XML) alongside other Rich Internet Applications (RIAs) enables easy embedding of content within a webpage without the need to reload a page, or re-run search queries (Ying and Miller, 2013). In turn, this made on-screen digital map use far smoother for end-users, especially mobile users with low signal

strength or bandwidth. Similarly, the standard shift from HTML 4 to HTML 5 in 2014 enabled more control and further ease at embedding video and audio content onto webpages, alongside better graphic vectors – facilitating faster and smoother scaling of digital maps (zooming in and zooming out) and richer content to be interconnected, e.g. hyperlinks to videos direct via the HTML5 video element. In turn, this enables semi-skilled web designers to integrate geolocation and geofencing capability onto cross-platform websites with ease (single webpage design for smartphone, tablet and laptop), including bespoke map layers for clients, and all achieved through a user-friendly digital map engine interface.

Despite the increasing entanglement and ubiquity of digital and mobile media in everyday life (Urry, 2008; 2010; Castells, 2009), there is a limited amount of focus on digital map use from a sociological perspective. Research on digital maps is often technocentric (and at times technologically determinist), centring on location-based service modelling, or spatial analyses. This is overt, in the form of usability or User Experience (UX) research (University College London, 2012) for example – a field sympathetic to GISci and academic cartography. At other times, this can be diffuse. For example, Sui and Goodchild (2011) focus on GIS in convergence with social media, remaining at a general level. They do not explore the more widely produced and consumed (prosumed) web-based digital maps. Instead, they opt for the now discontinued Google Latitude feature, and not Google Maps (or digital maps) holistically. As human geographers, their research is vital in understanding a specific configuration of technologies, but it leaves vital sociological questions unaddressed. In abstracting technology from social relations as the site of study, they shift focus away from the wider relationship between digital map use, and the mundane, quotidian, socio-temporal practices that make up everyday life.

A small subfield of dispersed cartographic theorists have begun to engage digital maps, with the most comprehensive landmark text arguably remaining *Rethinking Maps* (Dodge, Kitchin and Perkins, 2009a). This extends the initial impetus of critical cartography, to draw together a dispersed set of contemporary theoretical strands, summarised in ‘a manifesto for map studies for the coming decade’ (Dodge, Perkins, and Kitchin, 2009b: 220). The authors assert contemporary cartographic theory should attend to five key lines of inquiry – which crosscut and intersect. These five key lines of inquiry are as follows: first, the *interfaces* encountered, akin to screen-spaces. Second, a turn to *algorithms* opening up the black-box of map technologies to critique. Third, *cultures of map use*, drawing on visual and comparative media studies (including software/computer game studies) to engage with contextually localised uses. Fourth, *authorship* to explore altered power relations inherent within map produc-

tion (including new prosumer affordances); and fifth, research on *infrastructure* focuses on the materialities of digital maps, both to ‘consider the infrastructure that makes that make mapping possible’ and to ‘analyse the ways in which mapping modes contribute to infrastructure themselves’ (Dodge, Perkins, and Kitchin, 2009b: 228).

While their five lines of inquiry cover the materiality of digital maps, circuits of production and power relations, they leave a need to expand on how digital map use is entangled, and how it anchors (and is anchored by) other mundane socio-temporal practices in everyday life. Recently, a few researchers have started to address this gap, primarily along the ‘cultures of use’ line of inquiry. For example, Brown and Laurier’s (2005) ethnomethodological conversation analysis of map use in car journeys explores how map use is entangled with other driving related practices, but brackets out other social relations. Likewise, Perkins (2008) provides the most promising purchase through ethnographic research, drawing on actor-network theory (ANT) to explore mapping constructions and circuits of capital bounded within the localised contexts of specific case studies of specialised map use. Meanwhile, Hind and Gekker (2014) focus on moments of (social) interaction between user and technology interfaces (driver-car assemblages), through ludic interactivity, drawing out links to gamification, prosumption and networked individualism in car driving practices (social navigation).

To date, there are few sociological analyses that approach digital map use beyond specialised activity; that is, as just one mundane everyday practice entangled and embedded within many others. In part, this is a historical effect, where academic cartography focused on map design, early critical cartography focused in response on a rebuttal of positivism. It addressed the map as text and the embedded politics. With contemporary cartographic theory following on from critical cartography, focus lies largely on: positivist (and post-positivist) map making and design (UX/GISci); action-based research aiming to redress power imbalances (P/PGIS, neogeography); or theory that addresses cartography as a specific activity – the latter often bracketing out the wider social relations in which use is entangled, contra Perkins’ (2008) position, on which this chapter builds. This is an important limitation for contemporary cartographic theory; current approaches are less amenable to enable understanding or theorising the ways in which digital maps can and do reshape our social world, without which the value of cartographic theory as a wider project cannot be asserted other than as a narrow, specialised area of interest.

In the interest of methodological pluralism, a practice theory of digital map use can contribute towards an understanding of the socio-temporalities involved with digital map use from this wider sociological perspective, employing a

different lens. This wider perspective affords an understanding of how digital map use is connected to, and situated within, a range of complex digital-social arrangements.

Practice theory: a simplified sketch

As a well-established field of study, practice theory can boast an extremely diverse set of influences – from the philosophies of Wittgenstein, Heidegger, Dreyfus and Taylor (Schatzki, 2001) to Merleau-Ponty (Couldry, 2004), and on through to the social (and cultural) theories of Bourdieu (1977; 1992), de Certeau (1988), and Giddens (1984). Ontologically, the position reconciles an older structure/agency debate, holding that ‘the social is a field of embodied, materially interwoven practices centrally organised around shared practical understandings’ (Schatzki, 2001: 3). This requires a separation between actions (individual performances) and practices. Here, ‘practice’ as a general term describes all human action (drawing on the German *Praxis*), and ‘practices’ describes complex series of embodied ways of doing and knowing, drawing on the German term *Praktiken* (Reckwitz, 2002). ‘[I]f practices are the site of the social – then routinized bodily performances are the site of the social and – so to speak – of social order’ (Reckwitz, 2002: 251). This is not to say all practices are habitual routine; a distinction Henri Lefebvre made explicit in separating (while retaining dialectical relations between) cyclical and linear time (Lefebvre, 2004; Gardiner, 2012: 43).

Practice theory is not blind to post-humanist challenges either; see Knorr-Cetina (2001) on objectual practices, for example. Practices are materially mediated, and focus on foregrounded human practices (opposed to a rule of general symmetry) to elicit understandings of how objects are constructed, how objectually mediated performances are (re)enacted, and made meaningful, and on how ‘bodies and “activities” are constituted within practices’ (Schatzki, 2001: 2). Collectively, practice theory coalesces around agreement that shared knowledge is processual, tacit and embodied. This resonates with Geertz’s ‘thick description’ of publicly observable ritual performances (cultural anthropology), where human actions speak to the wider cultural frameworks that simultaneously enable and constrain pace (Giddens, 1984).

From a sociological orientation, practice theory has two ‘waves’ (Schatzki, 2001; Couldry, 2004; Bräuchler and Postill, 2010). The first, exemplified by Bourdieu (1977; 1992), de Certeau (1988) and Giddens (1984), sought to theoretically resolve agency/structure dualisms through embodied practical action – practices. The second (contemporary practice theory) is not a unified ‘school’ of

thought, but a ‘body of highly diverse writings by thinkers who adopt a loosely defined “practice approach”’ (Bräuchler and Postill, 2010: 7). For Shove, Pantzar and Watson (2012), practice theory can be summarised in a simple framework. Drawing on ‘Innovation Studies’ and ‘Science and Technology Studies’, they assert that technologies (such as digital maps) emerge as historically informed artefacts enacted within practices. They work through a combination of *materials*, *competences* and *meanings*. Where innovation occurs, new material forms are presented, e.g. digital maps present challenges to paper ones. Material forms require user competence for enactment (uptake of digital maps requires familiarity with a computer or mobile phone app, an understanding of paper maps or how maps operate, and access to relevant software). Similarly, competence and material form do not predicate change without a shift in meaning. Digital maps must be *understood* in some way as different from paper maps. This aligns with both Abrams (1980; 1982) and Wessels (2014) that social change is processual and historically informed.

For Shove, Pantzar and Watson (2012), focus lies on materials, competencies and meanings through two analytical categories – *elements* and *linkages*. ‘Elements’ are the pre-existing aspects that make up practices (the materials, competencies and meanings) considered as three simultaneously practically enacted parts. ‘Linkages’ are the connections that hold elements in place as they are practised. Any new practices may incorporate a change in elements, while shifts in linkages provide analytical purchase.

Where innovations (such as digital maps) are brought about, or new material forms are developed, new skills or competencies are required and/or gained, and new meanings emerge. These three ‘elements’ as Shove, Pantzar and Watson (2012) term them, are what constitute a practice (materials, competencies and meanings). Any intervention in the form of a new technology, or challenge to existing practices, may destabilise relationships or ‘linkages’ in the terminology of Shove, Pantzar and Watson (2012). As a process, social change requires a continual destabilisation of practices.

Drawing on Bourdieu’s (1977; 1992; 2010) concepts of cultural capital, economic capital, social capital and *habitus* (loosely – internalised dispositions) – a pre-existing social order can be seen within practices through linkages between elements. In practice theory, rather than mapping out the network of actants, and thus flattening social ontology, the focus sits closer to a ‘Social Shaping of Technology’ (SST) derived approach, centred on how embodied human activity (practice) produces and maintains social order through this framework of materials, competencies and meanings. It also asserts that the rules and resources available to an individual may limit or afford specific interpretations (meanings), competence or access to materials (Giddens, 1984). In Bourdieu’s (1977)

terms, economic capital, cultural capital and social capital are all at play, and infuse the set of predispositions an individual may hold, shaping their past and future practices.

Employing practice theory to address the cultures of digital map use diverges from some lines of inquiry set by Dodge, Kitchen and Perkins (2009a), connecting well with others. In focusing on meanings and competencies, it moves beyond material *interfaces* encountered as objects, or connected semiotics defined by the researchers' position. Similarly, in opening up the black-box of map technologies to critique, the focus shifts from a technological determinist stance on algorithms as *a priori* – either in the form of a diffuse background source code of power or as self-contained data products. Likewise, understandings of *infrastructure* shift from benign affordances, to humanly enacted constructions. Supporting materialities are not taken for granted either, but understood as contingent on competencies and meanings. Likewise, *authorship* no longer conceals a systems-based process – encoded from map information by the sender, and decoded or interpreted by an audience (with a minor note on new prosumer affordances as feedback loops). The approach is most closely aligned with the *cultures of map use* explored by Perkins (2008). Where Perkins (2008) draws on ethnographic methods informed by ANT, he provides important detail on contextually localised practices within specific case studies. In drawing on ANT, Perkins maps out the relationships (network) between various human and non-human actants; providing analysis on how local cultures are enacted and performed and how they are constructed or circulated through a praxeological lens (Reckwitz, 2002). A shift to practice theory moves beyond the moment of enactment, the actants involved, moments of translation or the assembled network. Instead, the focus lies on historically informed human action (practices not practice) – what people do – with the practices carried out as constitutive of social order (Giddens, 1984) – and not the individuals or maps directly.

Extending practice theory, Swidler's (2001) proposal for a focus on bodily-inscribed (embodied) action is a useful addition. She avoids idealism-materialism dualisms to focus on practices simultaneously in two directions. First, a move 'up' from internalised *ideas* (and away from Weberian 'world images') or *meanings* – in the narrow sense of conscious ways of knowing, not as a challenge to the use of the term by Shove, Pantzar and Watson (2012). Swidler's (2001) position is commensurable with Bourdieu's opposition to methodological individualism. In complement, the second move is 'down', away from impersonal *discourses* (Swidler, 2001: 74–75) in the sense of semiotic codes, structures and uniform understanding or interpretation (a position commensurable with Bourdieu's criticism of Levi-Strauss' structuralism). In taking up Bourdieu's (1992: 25–26) call to move beyond an either/or subjectivism-objectivism

duality, and in simultaneously shifting ‘up’ away from methodological individualism, and ‘down’ from structuralism, Swidler (2001) turns to the more empirically researchable – that is the Geertzian inspired notion of *practices* as publicly observable processes (Couldry, 2004: 41). For Swidler, a turn to practices enables theory to attend to the relative importance of practices towards anchoring others, and situations of anchored practice; where some may be ritual reproductions, others ‘public ritual practices ... able to create and anchor new constitutive roles’ (Swidler, 2001: 90). Here, practices provide a locus to access social order as constituted through practices, alongside when and how practices anchor or organise entire practice bundles (Schatzki, 2002) – and social order.

Relating this approach to the cultures of map use in everyday life, the mundane, quotidian, taken-for-granted senses of time (temporality) may be assessed in four ways. First, through a sensitivity towards practices as historically informed and unfolding, contingent on technological innovations as material mediations that are socio-culturally practised by subjects. Second, through an understanding of digital maps as material artefacts that require some level of competence and meaningful sense of how and what to do with them (Shove, Pantzar and Watson, 2012) – as *cultural* artefacts. Here, practices act as the observable nexus of elements – material, competence and meanings that situate digital maps as innovations which may/may not (de)stabilise linkages. Third, through an understanding that diversity in practices (including negative cases or non-use) can provide insight onto the cultural, economic and social capital involved with digital map use. Fourth, through a focus on digital map practices that can be mobilised to explore how digital map practices can/do alter socio-temporal practices of everyday life, that is – how digital map practices anchor and are anchored by other social practices. The benefits of moving up to a more general level, and assessing digital map use as one practice among many others, does have a price; practice theory is limited in any epistemic guidance offered, and lacks any clear means for assessing how practitioners are recruited; a key strength of ANT.

Towards a basic practice theory of digital maps

In the previous sections, both cartographic theory and practice theory are discussed in abstract terms: first, to identify and historically situate a specific gap that a practice theory of digital maps might address; and second, to set out a simplified framework for doing so. This section seeks to illustrate one way to operationalise the approach. There are several ways to employ practice theory, with several extant works.¹ In this section, excerpts from in-depth interview

transcripts are analysed through the simplified practice theory set out above. Three socio-temporal issues are explored: maps as memory; organising time; and altered routines. Analytically, they do not depict a full analysis. At best, they are impressionistic and reflect the application of practice theory in sketch form only. These are not intended to depict a full analysis, but simply serve to highlight how practice theory can open up understandings of the ways in which digital map use anchors, and is anchored by, other socio-temporal practices. In short, this section illustrates that a practice theory of digital maps might be a useful means to understand how digital maps reshape everyday life.

Maps as memory

Digital maps provide an affordance for new ways of remembering and reconnecting with personal biography. In this example, Sarah, a recently widowed retiree spent a large portion of her life in Africa (several countries), raising her children there while working with her husband for a non-governmental organisation (NGO). She notes on trying to use Google Maps and Google Street View via a laptop, as an aid to memory, that:

I couldn't get the ... level of detail that I wanted, to go and see where we lived, because I did want to go and see where we lived. I wanted to be able to zoom in and see the church where we got married, and I wanted to be able to zoom in on the houses we lived in each of those three places ... you can't see the level of detail you can here ... there are some significant buildings where you think, 'Oh, I should be able to find that' – you know ...

[W]e thought 'which old building is that?' and then we zoomed in, and had a guess as to which building it could be, having to think back, and bearing in mind I only lived there a couple of years. It was the town hall ... it had just been a focus for town-build superiority, but years ago it had been a British colony, things like that. But the quality is poor ... they still haven't got a photograph of that 'quality' ...

... It's what's important to them I guess – the users. I mean there aren't that many people in Mbale who are going to be zooming in to see where they live on a street map in the way we do here. (Interview conducted by author with 'Sarah' (pseudonym), 1 November, 2014)

For Sarah, digital maps are understood as anchoring of personal memory and history, alongside acting as a public historical record. The disconnect is user-generated; poor quality equates directly to the practices of others, where more users would drive a better quality map. Clear links to the politics of representation and the uneven distribution of image quality are of interest, set against collective forms of memory (or purposeful omission) of colonial histories – an

ideal line of inquiry for a critical cartography project, and perhaps a P/PGIS or neogeographic project. Likewise, for practice theorists, an onus might lie on whether digital map prosumers lack the materials (allocative resources/economic capital) to access digital maps, either through screen technologies or lack of underlying infrastructure, or whether competence in doing so (cultural capital) differs across national contexts. More importantly, practice theorists consider how such elements are linked and enacted. Here, the strength of a practice theory is in the simultaneous accounting of the cultural frameworks in which practices are carried out, e.g. limitations in national internet access infrastructure, while also accounting for the individual actions that constitute those frameworks through recursively stabilising linkages, e.g. using digital maps. However, remaining with the specific socio-temporal case at hand, the focus is on how digital maps are practised as mundane everyday technology in this context. As a socio-temporal practice, memory (collective and biographical) may be anchored by digital map use in different ways. Possessing both the required materials and competence to use a digital map, Sarah attempted to use Google Maps to virtually visit a past place, with digital maps meaningfully affording this practice elsewhere. She found disappointment where a colonial legacy continues to anchor the technical architecture and public data of the country (Kenya), and in turn, the quality of digital maps available as a memory resource. In this sense, digital maps can be seen as complex forms of memory.

Organising time

Beyond the broad entanglement within affective senses of time or temporalities described above, digital maps are used in very instrumental ways. For Emma, digital maps help bridge alternative life rhythms. As a teacher, her working or 'available' hours differ from those of her partner, affording different routines:

usually on the tablet while I am sat there, having a browse while something is on the telly. Um, but then there will be, you know, he might text me saying 'have you seen this house ... have a look at this one ... and I'll look it up, and it will be some of the times either me at work being bored, or me at home having a look and going 'ooh, another one's come on the market, have a look at this one'. (Interview conducted by author with 'Emma' (pseudonym), 12 April, 2015)

In search for a house to buy, she is free to search from homes all day in the summer period in which schools are closed, while her partner is at work. At other times, she is at home but working. In order to manage the search

criteria, several strategies are at play. Socio-temporal practices mediated by various material objects overlap pace (Couldry, 2004); Emma is actively watching television while also speaking on the phone, and navigating a property search. Meanwhile, her partner, stealing time from work, akin to de Certeau's (1988) *la perruque*, is remediating property search returns into an SMS text. As a shared practice (coordinated activity), digital maps can be seen to reconfigure temporality in two ways here. First, through a complex arrangement of materials and competencies used as authoritative resources, Emma and her partner are able to coordinate property search activities at more convenient timings. In turn, this affords retention of free time for her and her partner when physically co-present. Second, Emma notes an ability to use digital maps at moments of boredom, in which digital maps act as a means to make efficient use of non-productive time at work for private gain. In short, digital map practices allow the meaning of time to be altered subtly. In property searching when choosing home, activity can be coordinated and co-presence is no longer required. Likewise, previously unproductive time can be regained or repurposed. In everyday life, digital maps afford new ways of managing time.

Anchored routines

In everyday life, socio-temporal practices are materially mediated in complex arrangements. They constitute a total field of practices (Schatzki, 2001; 2002), the sum of all practices anchored together. Following just one practice (holiday-making), two excerpts are drawn out from in-depth interviews, and discussed comparatively through the lens of practice theory to draw out the process of anchoring (Swidler, 2001).

The first, a long quote from an interview with two Bed and Breakfast (B&B) owners (Mary and Michael) outlines how digital map practices are entangled within sets of social relations, and anchor their daily routines:

when we were younger, before all this lot came along, and we used to go away, sort of a few books, and the first thing we used to find out was the place. So, then you go off for the day and you know where you're coming back, whereas now, because of SatNav and Google Maps and everything else, we can have guests coming in at any time. I mean we say a three o'clock check-in, but they can be ten/eleven at night, because they've gone off.

... people don't, they check-in when it gets to, I mean obviously it's light tonight, so they just check-in when they feel like ... we used to do it, especially if you would find somewhere that was in the middle of nowhere – down a track in Cornwall or whatever, you would go off and find it first and go 'right, now remember that road'.

... these days people don't need to, because they know it's easy to find ...

... yeah, 'booking.com' all of them, they can write a review on – whether it is through the tourist board, or through late rooms, or booking.com, however you book you can put a review on afterwards, but most guests that I talk to, mostly use TripAdvisor, just to double-check that the place is going to be okay when they get here. (Interview conducted by author with 'Mary' and 'Michael' (pseudonyms), 14 June, 2014)

In these fragments, Mary and Michael discuss digital technologies broadly, identifying linkages between various elements that have been destabilised and restabilised (Shove, Pantzar and Watson, 2012). Where new material elements, e.g. SatNav, websites and web-based digital maps, have become a mundane part of their customers' holiday-making practices, they have subsequently destabilised linkages in holiday-makers' previously set 'checking-in' times. In their account, geospatial media and digital technologies are recent innovations, increasingly adopted in everyday life (requiring user competence). The account assumes their visitors perceive these technologies as meaningfully understood as more efficient and accurate than previous tools. In combination, they interpret their customers' use of maps as attributable towards an increased sense of ontological security (not getting lost), and an increased set of affordances.

However, this is not uniform – Mary and Michael use the operative '*... can have guests coming in at any time ...*' to suggest uncertainty (instability in practices). This leans towards a suggestion that cultural and economic capital may differ between visitors. Not all have access to the relevant materials (the technological artefacts) or possess competence in using them. Others may have both but remain predisposed to adhere to the suggested three o'clock check-in deadline through previous education as a form of social capital (Bourdieu, 1977). Alternatively, at the interplay of authoritative resources and rules (Giddens, 1984), their visitors may understand the technology as meaningful for increasing a sense of ontological security. At a descriptive and individual level, Mary and Michael later discuss the disruption to their entangled habitual routines and everyday life family rhythms. They had previously enjoyed an evening glass of wine watching television together on most nights, part of their dream for retiring and taking over the B&B. Instead, an increase in late check-ins brought about a perceived need for one of them not to drink. As a crude and singular example, their account describes the customer practices of checking-in late as anchoring of their family life routines. What this example depicts is that a practice theory affords meaningful analysis of digital maps within a wider set of social relations. One limitation of practice theory (a key strength of actor-network theory) is the analysis of recruitment and translation – the processes by which using the new technologies and sharing a sensibility towards acceptability of checking-in late are carried out.

In comparison, David notes that small shift in the practice of locating a hotel through digital maps and associated (entangled) technologies, affords an increased sense of ontological security:

it would be really weird to go somewhere, like I say, if I know that I'm going somewhere, I'm kind of like already on TripAdvisor for example, I figure out if I could be staying there or, where are we going to stay, then decisions are made based on, yeah, absolutely. I mean, I needed to find a hotel at the weekend, again, somewhere we hadn't been before and I just went on Kayak and said 'I need hotels near this place'. I didn't then say map them for me. Because I knew where I was going to be and I could see them in a proximity to me. (Interview conducted by author with 'David' (pseudonym), 6 October, 2013)

In his account, digital maps are not directly recognised as tools he uses. Instead, he uses web applications (apps) previously downloaded onto his smartphone, for which he has competence in using (Kayak and TripAdvisor), and understands as meaningfully accurate (real) through experience. He views the apps as separate entities, despite both returning results from a cross-platform, bespoke Google Maps Engine derived layer delivered using Ajax technology and HTML 5. Both return search results weighted by user-generated reviews (prosumption) volunteered by others. As a hypermediate, at-hand, allocative resource enacted as authoritative resource (Giddens, 1984), a digital map is mundanely immediate, yet assists in hotel choice. The timing of doing so is not necessarily pre-planned. The map spatialises hotels in proximity to a set location, requiring far less time to plan, and thus his planning practices are afforded far more mobility.

In the two examples above, digital map practices anchor socio-temporal practices (check-in time, hotel choice and planning routines). It may be tempting to follow-up on the network, to assess how (and if) the local taxi firms have adjusted their operating times and fares to adjust to later check-in times, or how these changes have translated to the local pub meal serving times. Likewise, it may be interesting to focus on web development choices behind specific apps (opening the black-box). Instead, practice theory operates at a more general register; looking to the embodied practices (the act of checking-in late) and on the underlying tacit knowledge of human actors that carry them out (using the SatNav, using TripAdvisor, using Google Maps – all as resources). This includes affective knowledge (internalised dispositions) akin to Bourdieu's *habitus* (Bourdieu, 2010). In these fragments, the B&B owners' shift in daily practices is of central interest, noting that a minor change in the complex arrangement of technological and social practices of their visitors can have profound effects on their own domestic routines. The shift in planning and choosing a hotel is of interest

too, but the analysis does not map out connections between the two through technological actants, or trace connections. Instead, the focus sits on how socio-temporal routines are de/stabilised; that is, how digital map use informs other socio-temporal practices (tracing connections between the practices, not the actants), and on how practices are enacted to construct the cultural frameworks that re-inform (enable/constrain) future practices.

Conclusion

This chapter began with a sketch of cartographic theory, starting with the emergence of academic cartography, working through to contemporary approaches. Key leanings were introduced. At present, the central statement in cartographic theory remains Dodge, Kitchin and Perkins (2009a) manifesto that cartographic theory continues to coalesce around. This provided opportunity to turn cartography outward, and to expand the field towards a focus on maps broadly. Some theorists have done so, centring on how digital maps relate to infrastructure, exploring how software code flows from, into and through maps to alter the flows of people and things in urban space. Others focus on issues of authorship in an age of prosumer affordance. An important line of inquiry set out by Dodge, Kitchin and Perkins (2009a) was cultures of use. To date, this avenue has been explored by only a handful of researchers, ranging from: ethnographic case studies of specialised map use in localised contexts, drawing on actor-network theory (Perkins, 2008); through to actor-network theories of locative media in driving practices (Hind and Gekker, 2014). This chapter stresses the need for a theory of everyday digital map practices that centres directly on digital map use as a mundane activity situated within a complex arrangement of other socio-practices. In doing so, a practice theory framework is put forward in simplified form, and then operationalised in three short examples. This chapter serves to highlight a limitation of cartographic theory in gaining purchase on how digital maps anchor everyday socio-temporal practices, or on how various social practices in turn can anchor understandings and uses of digital maps. That is, on how digital map use shapes everyday life, and how changes in everyday life routines shape digital map use. Both are vital avenues, theorisation of which can only serve to strengthen the argument for the importance of cartography theory, given the complex arrangement and entanglement of digital maps and associated technologies.

It is worth noting that in this chapter practice theory has been isolated as a unitary approach in order to illustrate the strength it offers. However, practice theory can easily be combined with other approaches.² What a practice theory can offer is the ability to connect individual action with larger cultural

frameworks; for digital cartographic theory this provides an ability to understand how digital map use fits within everyday life. In late modernity, digital technologies sit as ubiquitous background media, ready at-hand, and seamlessly integrated into an increasingly mobile (Urry, 2010) and technologically mediated world (Castells, 2009). Digital map integration is such that use may be unconscious, amenable only as tacit knowledge. It is only through an exploration of digital map use situated within everyday practices that entangled anchoring of practices can be accessed, with minute, mundane activities used to explore both the enacted cultural frameworks that inform digital map use and the ways in which digital maps contribute towards social order.

Notes

- 1 For a diverse range, see Pantzar and Shove's (2010) practice theory of Nordic walking, Shove *et al.*'s (2008) extended book on a practice theory of DIY and digital photography, Nicolini's (2011) discussion of telemedicine, or Murphy and Patterson's (2011) study of motorcycling edgework.
- 2 See González (2013) for an example of a practice theory based approach (PBA) and actor-network theory (ANT) in combination.

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