Mobility

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abstract   This article offers an overview of the field of mobilities research, tracing its theoretical antecedents and contrasting it to theories of globalization, nomadism and flow. Mobilities theory places an unprecedented emphasis on (im)mobility, moorings, dwelling and stillness as much as movement, speed, or liquidity. The article then outlines key themes and research areas within the field, including mobility systems, mobility capital and movement-space; and lastly presents innovations in mobile methodologies and directions for future research.

keywords   (im)mobility ◆ infrastructure ◆ mobile methods ◆ motility ◆ remediation

Over the past decade a new approach to the study of mobilities has been emerging across the social sciences, involving research on the combined movements of people, objects and information in all of their complex relational dynamics. It emphasizes the relation of such mobilities to associated immobilities or moorings, including their ethical dimension; and it encompasses both the embodied practice of movement and the representations, ideologies and meanings attached to both movement and stillness. Mobilities research combines social and spatial theory in new ways, and in so doing has provided a transformative nexus for bridging micro-interactional research on the phenomenology of embodiment, the cultural turn and hermeneutics, postcolonial and critical theory, macro-structural approaches to the state and political-economy, and elements of science and technology studies (STS) and new media studies.

Although mobility is historically significant, and hence not unique to contemporary times, the world is arguably moving differently and in more dynamic, complex and trackable ways than ever before, while facing new challenges of forced mobility and uneven mobility, environmental limits and climate change and the movement of unpredictable risks. Many parts of the world seem to stand on the cusp of major transformations in existing sociotechnical systems of mobility and communication, despite the apparent 'lock-in' of certain historical structures such as the system of automobility (Dennis and Urry, 2009; Dudley et al., 2011; Urry, 2007). As mobile connectivity begins to occur in new ways across a wide range of mobile devices and 'smart' environments, there is a new convergence between physical movement of people, vehicles and things; information production, storage and retrieval; wireless distributed computing and communications; and surveillance and tracking technologies. These sociotechnical transformations raise new substantive issues for the social sciences, while also being suggestive of new theoretical and methodological approaches.

Mobilities research overlaps with some aspects of globalization studies, communications research, migration and border studies, tourism studies, cultural geography, transport geography and the anthropology of circulation, but it also differs in its scope, foci and methodologies from each of these. In the sociological literature the term 'mobility' is usually equated with the idea of 'social mobility', referring to an individual's categorical movement up or down the scale of socioeconomic classes. But there is also a case for advancing sociological understandings of spatial movement, cultural circulation and informational mediation (topics respectively emphasized in human geography, anthropology and media studies). Unlike the rich tradition of sociological study of social mobility (which will not be addressed here), the new transdisciplinary field of mobilities research encompasses research on the spatial mobility of humans, non-humans and objects; the circulation of information, images and capital; as well as the study of the physical means for movement such as infrastructures, vehicles

and software systems that enable travel and communication to take place. Thus it brings together some of the more purely 'social' concerns of sociology (inequality, power, hierarchies) with the 'spatial' concerns of geography (territory, borders, scale) and the 'cultural' concerns of anthropology and media studies (discourses, representations, schemas), while inflecting each with a relational ontology of the co-constitution of subjects, spaces and meanings.

Furthermore, mobilities theory also builds on a range of philosophical perspectives to more radically rethink the relation between bodies, movement and space. It draws on phenomenology to reconsider embodied practices and the production of being-in-motion as a relational affordance between the senses, objects and kinesthetic accomplishments. It draws on Foucauldian genealogies and governmentalities to address the meanings of (im)mobility, discourses and visual representations of speed and slowness, and the production of normalized mobile subjects. And it draws on postcolonial theory and theories of political economy to rethink the performative politics of racial difference, secured borders and the governance of migration, sea-space and air-space. This article first traces the theoretical antecedents to the study of mobilities, showing how it goes beyond existing approaches to globalization, nomadism and flow; then it outlines some of the key themes and research areas within the field, in particular the concepts of mobility systems, mobility capital and performed movement-space; and finally it addresses the emergence of mobile methodologies and future directions for research.

Beyond globalization, nomadism and flow

The current mobilities turn should not be confused with the use of metaphors of flow and liquidity in social theory, which have for some time captured the attention of social theorists concerned with emergent social processes in a world perceived to be increasingly globally interconnected. Manuel Castells (1996), for example, famously theorized the 'space of flows' as distinct from the 'space of places'. Zygmunt Bauman suggested that there are 'reasons to consider "fluidity" or "liquidity" as fitting metaphors when we wish to grasp the nature of the present, in many ways novel, phase in the history of modernity' (Bauman, 2000: 2). Mobilities theorists share their critique of traditional sociological imagery of the social world as an array of separate 'societies', bounded entities or sedentary containers of geographical propinquity across which separate 'cultures' circulate in a largely face-to-face 'metaphysics of presence' (Urry, 2000,

2007). Yet they do not entirely agree with such 'epochal' claim-making (Savage, 2009), nor with currently popular images of a flat world of global connectivity or a smooth world of global 'Empire' (Hardt and Negri, 2000). As Sheller and Urry (2006b: 210) put it: 'we do not insist on a new "grand narrative" of the global condition as one of mobility, fluidity or liquidity. The new mobilities paradigm suggests a set of questions, theories, and methodologies rather than a totalising description of the contemporary world.' It delineates the context in which both sedentary and nomadic accounts of the social world operate, and it questions how that context is itself mobilized, or performed, through ongoing sociotechnical and cultural practices.

These initial critiques of sedentary metaphors and state territorial forms of power evoked what some argue was a non-reflexive embrace of deterritorialization, nomadism and rhizomatic transgression (e.g. in the influential work of Gilles Deleuze and Felix Guattari [1983], or Paul Virilio on dromology [1997]). This kind of 'nomadic theory' rests on a 'romantic reading of mobility', and 'certain ways of seeing [arise] as a result of this privileging of cosmopolitan mobility' (Kaplan, 1996; and see Sheller, 2011 on cosmopolitanism and mobilities). For mobilities researchers today it is not a question of privileging flows, speed, or a cosmopolitan or nomadic subjectivity, but rather of tracking the power of discourses, practices and infrastructures of mobility in creating the effects of both movement and stasis. Mobilities are of course the *sine qua non* of globalization; without extensive systems of mobility – and globalist, or neoliberal, claims for opening markets and states to external flows – social processes could not take place at a global scale nor be imagined as such. Yet mobilities research is neither a claim that all the world is mobile now, nor a forgetting that the colonial world economy has long entailed extensive global mobilities – e.g. of slaves, of commodities, of print and images and of capital (Sheller, 2003, 2004b) – and, crucially, continues to entail many forms of immobility, both voluntary and forced. Critical mobilities research instead interrogates who and what is demobilized and remobilized across many different scales, and in what situations mobility or immobility might be desired options, coerced, or paradoxically interconnected (Adey, 2010).

The claim to a new mobilities paradigm, then, is not simply an assertion of the novelty of mobility in the world today (although the speed, intensity and technical channeling of various flows is arguably greater than ever before). Research in this field is in fact highly engaged with revealing what is at stake in debates over differentiated mobility, including

debates over globalization, cosmopolitanism, post-colonialism and emerging forms of urbanism, surveillance and global governance of various kinds of mobility. If movement and spatial fixity are always co-constituted, then mobilities are a central aspect of both historical and contemporary existence, and are always being reconfigured in complex ways to support different modes of trade, interaction and communication, as was recognized by early sociological theorists such as the Chicago School of urban sociology in the early 20th century. Social mobility and infrastructures of human, technological and informational mobility were as crucial to the existence of ancient imperial cities, seafaring empires of early modernity and 19th-century industrializing cities as of the modern megacities today (not to mention of non-urban rural and island locations [Vannini, 2011]).

Mobilities research encompasses not only corporeal travel of people and the physical movement of objects, but also imaginative travel, virtual travel and communicative travel (Urry, 2007), enabling and coercing (some) people to live more 'mobile lives' (Elliott and Urry, 2010). By bringing together studies of migration, transportation, infrastructure, transnationalism, mobile communications, imaginative travel and tourism, new approaches to mobility are especially able to highlight the relation between local and global 'power-geometries' (Massey, 1993), thus bringing into view the political projects inherent in the power relations informing processes of globalization (and associated claims to globality, fluidity, or opening). This sensitivity to power differences originates partly out of anthropological studies of migration, diasporas and transnational citizenship (e.g. Basch et al., 1994; Ong, 1999), and partly out of trenchant postcolonial feminist critiques of the bounded and static categories of race, nation, ethnicity, community and state within much social science (e.g. Ifekwunigwe, 1999; Kaplan and Grewal, 1994). Anthropologists have been prominent in the study of 'routes and roots' (Clifford, 1997), 'scapes' (Appadurai, 1996) and transnational connections (Hannerz, 1996). These concerns with differential mobilities inform contemporary geographies of mobility that focus on the history of mobility, its modes of regulation and the power relations associated with it – in short, the politics of mobility (Adey, 2009b; Cresswell, 2006), if also its poetics (Cresswell, 2011).

New directions in mobilities theory are also a response to several important feminist critiques of nomadic theory, which pointed out that it was grounded in masculine subjectivities, made assumptions about freedom of movement and ignored the gendered production of space. Skeggs argued that

the (old) mobility paradigm could be linked to a 'bourgeois masculine subjectivity' that describes itself as 'cosmopolitan'; and pointed out that 'mobility and fixity are figured differently depending on national spaces and historical periods' (Skeggs, 2004: 48). Yet recent critical mobilities research also moves on from this kind of disavowal of power, and fundamentally affirms the kind of analysis in which 'Mobility and control over mobility both reflect and reinforce power. Mobility is a resource to which not everyone has an equal relationship' (Skeggs, 2004: 49). It is not a question of privileging a mobile subjectivity, but rather of tracking the power of discourses and practices of mobility in creating effects of both movement and stasis, and uneven distribution of 'network capital' (Elliott and Urry, 2010); thus these critiques have been absorbed into the new mobilities paradigm, which takes the position that power relations are at the heart of the field. Critical mobilities research is crucially concerned with friction, turbulence, immobility, dwelling, pauses and stillness, as much as speed or flow, and examines how these textured rhythms are produced, practiced and represented in relation to the gendered, raced, classed (im)mobilities of particular others (Ahmed et al., 2003; Cresswell, 2006; Tolia-Kelly, 2010). But this is not merely an empirical project; it also challenges certain fundamentals of social science epistemology.

While acknowledging and engaging with the macro-level political, economic, cultural and environmental aspects of globalization, the new mobilities paradigm also differs from theories of globalization in its analytical relation to the multi-scalar, non-human, non-representational, material and affective dimensions of social life. The move toward complexity theory within mobilities research is suggestive of non-actor-centered processes of feedback, self-organization and tipping points, which may shape dynamic processes in ways that are not directly caused by reflexive modern humanist subjects and their agency. As Urry argues, 'All systems are dynamic, processual and generate emergent effects and systemic contradictions, especially through positive feedback mechanisms' (Urry, 2008; cf. Dennis and Urry, 2009). Thus mobilities theory branches off into complex systems theory in ways that are deeply grounded in materiality, and depart from the traditions of social theory that focus on structure *in relation to* (human) agency. This is related to the post-humanist turn in some Anglo-American theory (e.g. Hayles, 1999; Law and Hassard, 1999), which is highly critical of Enlightenment liberalism and its theory of history as progress, as well as the crucial turn toward non-representational dimensions of pre-conscious processing

(Thrift, 2008), as discussed further below. Complexity theory offers recourse to unintentional causal processes and implicates causal mechanisms possibly beyond human control, quite unlike the still humanist impulses of much contemporary social theory. Yet mobilities research still maintains a strong interest in human interactions with space, with objects and with others, including a whole host of intermediaries and hybrid inter-embodiments; and it brings these theoretical perspectives back down to ground, so to speak, by leveraging them toward thinking about what is at stake in specific social arenas and policy debates such as sustainable transport, climate change and migrant justice movements.

Mobility systems, mobility capital and movement-space

Mobilities research has taken seriously 'the material turn' and 'the spatial turn' in the social sciences. Influenced by social studies of science and technology, in particular actor-network theory and Bruno Latour's (1987) analyses of 'immutable' and 'mutable mobiles', mobilities theorists pay close attention to the infrastructures, technical objects, prostheses and embodied practices that assist (or disable) mobility (Büscher et al., 2010; Latour, 1993). Everything from shoes and bikes, mobile phones and motor vehicles, passports and satellites, software code and embedded sensors, are part of the sociotechnical assemblages or human/material hybrids that perform mobile systems and support specific mobility regimes (Dodge and Kitchin, 2011). This is not to say that philosophical approaches are unified, as the field is still open to lively debate. While some writers focus on the relation between mobility and immobility, between movement and infrastructural moorings, and between speed and stillness, others critique these dualistic modes of thinking (Bissell, 2007; Bissell and Fuller, 2009). The work of Gilles Deleuze has also been influential on thinking about assemblages, flows, circulations, and 'media ecologies' which are both social and natural, technical and informational, human and non-human (Fuller, 2005; Parikka, 2010, 2011).

Along with spatiality and materiality there is also a growing interest in temporalities. Temporalities of slowness, stillness, waiting and pauses, are all part of a wider sensuous geography of movement and dwelling in which human navigation of embodied, kinesthetic and sensory environments are crucial (Dant, 2004; Jensen, 2010; Merleau-Ponty, 1962). Thus mobilities research ranges from the individual body up to the most complex systems. Building on Georg Simmel's ideas of 'urban metabolism' and

Henri Lefebvre's 'rhythmanalysis', urban theorists today argue not only that bodies and objects shape cities through their rhythms of movement (Edensor, 2011), but also that new mobile communications systems are transforming urban temporalities, leading to new forms of 'networked urbanism' (Graham and Marvin, 2001: 30–3), 'networked place' (Varnelis and Friedberg, 2006), or 'net-locality' (De Souza e Silva and Gordon, 2011). 'Critical mobility thinking' in the field of urban studies now calls for 're-conceptualising mobility and infrastructures as sites of (potential) meaningful interaction, pleasure, and cultural production' (Jensen, 2009), where people engage in 'negotiation in motion' and 'mobile sense making' (Jensen, 2010).

At the largest scale, John Urry argues that the complex character of mobility systems stems from the multiple fixities or moorings often on a substantial physical scale that enable other things to be fluid (Urry, 2007). There are interdependent (and intermittent) systems of immobile material worlds and especially some exceptionally immobile platforms (transmitters, roads, stations, satellite dishes, airports, docks, factories) through which mobilizations of locality, labor and capital are performed – sometimes on a global scale – and rearrangements of place and scale materialized and spatially fixed (Hannam et al., 2006). The increase in cross-border transactions and of 'capabilities for enormous geographical dispersal and mobility' go hand in hand with 'pronounced territorial concentrations of resources necessary for the management and servicing of that dispersal and mobility' (Sassen, 2002: 2). Such infrastructures and concentrations of mobile capital – linked to what David Harvey described as 'spatial fixes' and later elaborated as 'spatio-temporal fixes' (Jessop, 2006) – at one and the same time enhance the potential mobility of some, while detracting from the mobility potential (or 'motility') of others by leaving them in a relatively slower or intentionally disconnected position.

Walls, borders, check-points and gated zones are crucial to the new mobility regimes that produce the securitized corridors, cocoons and bubbles through which certain 'global' flows travel, even as they evict, splinter, or slow other flows (Cwerner et al., 2009; Graham and Marvin, 2001). Thus mobilities research attempts to account for not only the quickening of liquidity within some realms, but also the concomitant patterns of (risky) concentration that create zones of connectivity, centrality and empowerment in some cases, and of disconnection, social exclusion and inaudibility in other cases. This links mobilities research to the field of critical border studies (Cunningham and Heyman, 2004), which understands borders as constituted by the regulation

of mobility, i.e. of how they are legally and illegally crossed by people, by goods and by cultural flows. We can think of various kinds of 'offshoring' processes, moreover, as producing 'states of exception' (Agamben, 1998), where normal rules governing the mobility of people, capital, or information are suspended (along with certain rights claims and forms of citizenship) to allow for particular kinds of global financial mobility and interregional commodity flows (Baldacchino, 2010; Sheller, 2009).

Complex global mobility systems also go hand-in-hand with tightly coupled systems that are subject to sudden immobilization, as seen, for example, in several major disruptions of the air transport network across Europe in 2010, whether due to volcanic ash clouds or common snowstorms (see special issue of *Mobilities* 6(1)); or in the collapse of urban mobility systems as seen in the aftermath of Hurricane Katrina in New Orleans or the January 2010 earthquake in Port-au-Prince, Haiti, requiring military mobilization to restore the circulation of road systems, airports and aid personnel and materials (see Graham, 2010 on militarized urbanism; and Cowen, 2010 on critical geographies of logistics). Forced migration and statelessness are also crucial dimensions of contemporary global (im)mobilities, whether due to war and occupation, or global warming and climate change (see special issue of *Mobilities* 6(3)).

With an emphasis on the relations between mobilities and immobilities, scapes and moorings, movement and stillness (Hannam et al., 2006: 3), the frictions of differential mobilities are at the heart of recent mobilities research. Differential capacities and potentials for mobility are analyzed via the concept of 'motility', defined as 'the manner in which an individual or group appropriates the field of possibilities relative to movement and uses them' (Kaufmann and Montulet, 2008: 45). A person may have a high degree of motility without actually moving (for example a well-connected professional who works from home), or they may be among the 'mobility pioneers' who live highly spatially distributed lives yet seek sameness everywhere (Kesselring and Vogl, 2008); while another may be involved in much physical displacement, but have low motility in terms of capacities, competencies and choices, especially if that movement is involuntary (for example someone caught in the grips of a human trafficker). Here one can also begin to conceptualize 'mobility capital' (Kaufmann et al., 2004) as the uneven distribution of these capacities and competencies, in relation to the surrounding physical, social and political affordances for movement (with the legal structures regulating who or what can and cannot move being crucial). Uneven mobility capital

is crucial to processes of globalization, effectively being created by particular forms of globalized demobilizations and remobilizations (in the process of ongoing spatial fixes, temporal fixes and spatio-temporal fixes).

Encompassing not only human mobility, but also the mobility of objects, information, images and capital, mobilities research thus includes study of the infrastructures, vehicles and software systems that enable physical travel and mobile communication to take place at many different scales simultaneously. Systems of transportation and communication have been one important area of research. Sheller and Urry (2000) argued that sociology's view of urban life has failed to consider the overwhelming impact of the automobile in transforming the time–space 'scapes' of the modern urban/suburban dweller. A number of important studies of automobility (Merriman, 2007; Packer, 2008), historical geographies of road systems and bicycling (Furness, 2010; Merriman, 2009) and ethnomethodological studies of driving and passengering (Dant, 2004; Laurier, 2011; Laurier et al., 2008) have begun to address this lack. Research on the sociocultural dimensions of air travel and airports has also generated a new subfield of 'aeromobilities' research (Adey, 2004a, 2004b, 2009a; Adey et al., 2007; Cresswell, 2006; Cwerner et al., 2009; Salter, 2008; Sheller, 2010; Urry, 2007). Peter Adey especially emphasizes the sociotechnical production of air-space, the ways in which it is embodied and practiced, and its affective and experiential dimensions (Adey, 2010; Budd and Adey, 2009). Aeromobility is 'a complex enfolding of the social and technical' and it remains 'a space whose embodied, emotional and practiced geographies remain to be adequately charted' (Adey et al., 2007: 774). All of these practiced geographies come together to form 'movement-space' of various kinds.

Macnaghten and Urry argue that there are ambivalent and contested 'affordances' that 'stem from the reciprocity between the environment and the organism, deriving from how people are kinaesthetically active within their world' (Macnaghten and Urry, 2000: 169). Like walking, biking, or riding, driving and flying can be included among the active corporeal engagements of human bodies with the sensed world, suggesting many different kinds of affordances between varied bodies, vehicles, and 'movement-space' (Thrift, 2003), and the affects and feelings that these produce. These feelings are neither located solely within the person nor produced solely by the car (or bike, or skateboard, or bus, etc.) as a moving object, but occur as a circulation of affects between different persons, different vehicles and historically situated mobility cultures and geographies of mobility: 'Motion and emotion' are 'kinaestheti-

cally intertwined and produced together through a conjunction of bodies, technologies, and cultural practices' (Sheller, 2004a: 227). Thus there is a growing interest in the affective affordances of place and the multi-sensory performance of places, mobiles and immobiles of various kinds, which leads into issues of non-representational theory (Thrift, 2008).

New mobile media are further reshaping urbanism and its 'technoscapes' and 'mediascapes', creating new affordances for people to navigate public places and built environments, generating new forms of urban spatiality, transmediality and public interaction. The concept of 'technoscape', derived from Arjun Appadurai, emphasizes 'that contemporary landscapes are shot through with technological elements which enrol people, space, and the elements connecting people and spaces, into socio-technical assemblages – especially the transportational technologies, such as roads, rail, subways and airports, but also the informational technologies such as signs, schedules, surveillance systems, radio signals, and mobile telephony' (Sheller and Urry, 2006a: 9). Both people and information, bodies and data, move through these technoscapes within the software-embedded and digitally augmented urbanism that some describe as 'remediated' space (Graham), 'hybrid space' (De Souza e Silva), or 'networked place' (Varnelis and Friedberg). Screens and sensors emerge everywhere, moving with us as we move, such that computing will 'become a pervasive part of the urban environment, with even the most mundane device having some computing power and some ability to communicate with other devices, so producing a constant informational hum' (Amin and Thrift, 2002: 102). The notions of 'cybercities' and 'digital cityscapes' (De Souza e Silva and Sutko, 2010) describe a form of contemporary urban development that 'involves the intimate recombination of urban places, the corporeal presence of people's bodies, physical mobilities, and complex, multi-scaled mediations by all sorts of ICT and mobility systems' (Graham, 2004: 113).

Here issues of surveillance and privacy, algorithmic prediction and 'premediation' (Grusin, 2010) emerge as crucial research areas. The various systems throughout a modern city are beginning to maintain persistent memories of their own use, communicate with each other about their status, and even reconfigure themselves based on dynamic needs (Greenfield, 2006). High-density broadband will make Open Data Cities increasingly possible. Within a dynamic urban infrastructure, city-scale services like power (smart grids), data (ubiquitous computing) and transportation (ITS) will soon begin to adapt in real-time to the changing needs of the public, according to proponents. Such systems are anticipatory rather than reactive. Pervasive data-surveillance and forms of continuous real-time calculation – referred to by Nigel Thrift as 'qualculation' (Thrift, 2008) – create an artificial world that is increasingly sentient, and potentially adaptive. This suggests a fundamental change in the everyday practice of mobility, as we delegate coordination to smart and intelligent environments, or lean on them to support already learnt habits and routines. Most importantly for the purposes of social research, these developments are changing the nature of the empirical, reconfiguring the relationship between observer and observed, and reinventing methods. Mobilities research leads us to see that along with the political and material relations that structure the world, social science itself – what we *do* with it and what it does – is also at stake here.

Empirical evidence: Mobile methods

Mobilities research as described above promotes interdisciplinary or transdisciplinary study, requiring multiple methods that can address the intertwined practices of many different kinds of contemporary (im)mobility at a variety of scales, including public and private transport systems; tourism, migration and border studies; mobile communications and software-supported infrastructures; automobility, aeromobility, velomobility and various kinds of passengering (e.g. Laurier, 2010, 2011; Laurier et al., 2008); children's mobilities, elderly mobilities and studies of gendered mobilities (Uteng and Cresswell, 2008); walking, climbing, dancing, biking and other forms of trained bodily movement (Cresswell and Merriman, 2011; Dewsbury, 2011; Lee and Ingold, 2006; Spinney, 2009, 2011); and studies of the regulation, governance and legal structures pertaining to all of these. Also important are the in-between and liminal places at which movement is paused, slowed, or stopped: borders, airports, toll roads, hotels, motels, detention centers, refugee camps, etc. (Mountz, 2010). Mobilities research in its broadest sense concerns not only physical movement, but also potential movement, blocked movement, immobilization and forms of dwelling and place-making (Büscher and Urry, 2009). Issues of uneven motility and of mobility rights, ethics and justice have become crucial to the field (Bergmann and Sager, 2008; Cresswell, 2006, 2011; Uteng and Cresswell, 2008). It especially requires attention to subaltern mobilities (and immobilities), as well as recognition of the importance of uprooting, dwelling, 'homing' and 'grounding' (Ahmed et al., 2003; Sheller, 2004b).

One of the most important contributions of

mobilities research is the lively experimentation with multiple methods, and the creation of new 'mobile methods' that can capture, perform and even intervene in processes of movement as they happen (see Büscher et al., 2010; Fincham et al., 2010; *Mobilities* 6(2)). As Eric Laurier notes, in these emerging mobile methodologies 'research topic and research resource are confounded, and profitably so' (cited in Büscher et al., 2010: xiv). The generative focus on mobilities has led to methodological innovation, as researchers have pushed to find empirical evidence pertinent to the study of mobilities and to invent instruments up to the task of measuring the changing nature of time, space and movement. Some have called for new analytical orientations and new methodologies in order to study especially the more ephemeral, embodied and affective dimensions of interlocking relational (im)mobilities that are not captured using traditional methods (see e.g. Adey, 2009b; Cresswell and Merriman, 2011; Hannam et al., 2006). New 'mobile methods' are emerging to try to capture some of these complex, dynamic processes, including cyberethnographies, following-the-thing, participant-observation on the move such as walk-alongs (Myers, 2011), drive-alongs (Laurier, 2010), being 'mobile-with' (Bissell, 2009), mobile video ethnography (Spinney, 2011) and various phenomenological approaches, in addition to forms of mapping, visualization, future scenario building, action-research and arts-based urban interventions into what André Lemos (2009) calls informational territories.

Sheller and Urry's article 'The new mobilities paradigm' called for new research methods that would be 'on the move' and would 'simulate intermittent mobility' (Sheller and Urry, 2006b: 217). Their 'mobile methods' included: interactional and conversational analysis of people as they moved; mobile ethnography involving itinerant movement with people, following objects and co-present immersion in various modes of movement; after the fact interviews and focus groups about mobility; the keeping of textual, pictorial, or digital time–space diaries; various methods of cyber-research, cyberethnography and computer simulations; imaginative travel using multimedia methods attentive to the affective and atmospheric feeling of place; the tracking of affective objects that attach memories to place; and finally methods that measure the spatial structuring and temporal pulse of transfer points and places of in-between-ness in which the circulation of people and objects are slowed or stopped, as well as facilitated and speeded (Sheller and Urry, 2006b; see also Urry, 2007). Advancing this program, Büscher et al. argue that 'Through investigations of movement, blocked movement, potential movement and

immobility, dwelling and place-making, social scientists are showing how various kinds of "moves" make social and material realities.' The mobilities turn, they continue, 'open[s] up different ways of understanding the relationship between theory, observation and engagement. It engenders new kinds of researchable entities, a new or rediscovered realm of the empirical and new avenues for critique' (Büscher et al., 2010: 2).

One important area of interest within recent work focuses on the micro-mobilities of the body, from forms of dance, to the bodily rhythms and motion in activities such as bicycling, rock climbing, or walking (Vergunst, 2010); another concentrates on particular subjects, such as tourists, commuters, passengers, or refugees (see Cresswell and Merriman, 2011). Empirical data collection includes everything from time–space diaries and participant-observation to the use of mobile video, autobiographical narrative and bodily immersion of the researcher in mobile activities, or for that matter, moments of paused mobility (Fincham et al., 2010; Vannini, 2009, 2011), while others examine how interactive technologies generate new modes of empirical research. Büscher's (2006) work on mobile visualization and interactive design and research processes, for example, is suggestive of the ways in which methods are performative, bringing into being the realities that they are alleged to merely observe (Majima and Moore, 2009). By working collaboratively with designers using mobile visualization technologies, the social researcher becomes a part of the design process, just as technical visualization becomes part of the research process (and its presentation). Other researchers draw on innovative visual methodologies combined with group walking experiences to explore the affective and material dimensions of both interior homescapes and exterior landscapes, particularly for transnational migrant communities (Myers, 2011; Tolia-Kelly, 2006, 2008).

But these are not the only methods employed in mobilities research. There are historical, comparative and cross-national approaches that are more concerned with the historically and regionally specific patterns of large-scale mobility systems such as motorways (Merriman, 2007) and cycling infrastructure (Furness, 2010), transnational flows of people (Mountz, 2010, 2011) and global military logistics (Cowen, 2010). There are also deeply ethnographic and ethnomethodological studies of the daily experiences of (im)mobility for different groups of people, including understanding how fairly mundane forms of travel and transport are accomplished (see Laurier et al., 2008; Vannini, 2009, 2011). More traditional transport geographies have also begun to focus on mobilities, flows and spaces

(Knowles et al., 2006), and there has been recognition by transport geographers of the need to 'bridge the quantitative-qualitative divide' (Goetz et al., 2009) by embracing the more qualitative work associated with the new mobilities paradigm. The currently lively interface between transport geography and mobilities research has the potential to stimulate transformative research agendas that intervene in public policy debates that will reshape modes of transport decision-making and investment in the future. Mobilities research has also been recognized as an important addition to the fields of migration studies (Blunt, 2007) and tourism studies (Hannam and Knox, 2010). In every case the expansive and innovative outlook of the mobilities paradigm (if we call it that) lends new insights to existing research fields, bringing to light alternative perspectives and unnoticed relationships.

Conclusion: Future directions

This article has given a broad overview of the field of mobilities research. While it connects to important currents within sociology that began to focus on globalization, flows and liquidity in the 1990s (as well as to certain historical traditions within urban sociology), the 'mobilities turn' is distinct from these in its philosophical orientations, its empirical diversity, its transdisciplinary openness and its methodological innovations. It breathes new life into old sociological questions, while bringing a more mobile sociology to the forefront of contemporary social science. It has generated exciting conversations between sociologists, geographers, anthropologists, architects, urban planners, media and communication theorists, artists, and many other related fields. It also has the potential to inform a wide range of public policy issues because it addresses so many concerns of urgent relevance, such as: refugees and border politics (Amoore and Hall, 2009; Mountz, 2010); sustainable transportation and livable cities (Dudley et al., 2011; Freudendal-Pedersen, 2009); cybercities and surveillance (Adey, 2004b; Graham, 2004); the effects of mobile social networks on urbanism (De Souza e Silva and Gordon, 2011; De Souza e Silva and Sutko, 2010); climate change and future fuel systems (Urry, 2008, 2011); critical geographies of logistics (Cowen, 2010); transnational raced and gendered spatialities (Tolia-Kelly, 2010).

While these may appear as disparate subjects when viewed from particular disciplinary perspectives, what mobilities research does is to break down disciplinary silos and thereby enable us to begin to see the connections across topics and scales, and to recognize the potential for more experimental methods to open up a new place for social investigation in contemporary worlds-in-making. A crucial emerging area of research concerns the ways in which cities are being transformed by embedded technologies, digitally augmented spaces and ambient environments that many have begun to describe as 'remediation' (Bolter and Grusin, 1999) of the material environment with digital technologies. Here mobilities research intersects with media ecologies and software studies (Fuller, 2005, 2008) and current work on the 'internet of things' (Bleecker, 2006), mobile gaming (De Souza e Silva and Gordon, 2011) and 'sentient cities' (Crang and Graham, 2007), but also should not leave out how new mobile technologies might reconfigure connections within and between non-urban and 'peripheral' localities (Sheller, 2009; Vannini, 2011).

Ultimately, social theory and social research can draw on mobile locative arts, mobile gaming practices and social networks, not only to develop better understandings of these hybrid spaces and networked places as they emerge from contemporary practice, but also to transform social research itself, its modes of practice and forms of dissemination. Collaborative methods such as 'ethnographically informed design, future laboratories and living labs, and interdisciplinary, collaborative analysis' can be creatively facilitated by research groups such as the Smart Cities Lab at MIT, or the new Mobilities.lab at Lancaster University 'to enrich understanding of complex socio-technical phenomena and to practically inform policy, design, and socio-technical change' (www.lancs.ac.uk/fass/groups/mobilities-lab/about.htm). Mobilities research ultimately can help to reshape academic practice in the 21st century, marshaling new kinds of institutional connectivity, political commitments and methodological cross-fertilization to generate transformative hybrid approaches to the social-spatial-cultural matrix in which we move, dwell and build the future.

Annotated further reading

Adey P (2010) *Aerial Life: Spaces, Mobilities, Affects.* Oxford: Wiley-Blackwell.
    Compelling historical analysis of the making of air space, aerial bodies, and 'aereality' that brings together non-representational theory, embodiment, affect, and materiality with a sensitivity to warfare and colonial violence.
Büscher M, Urry J and Witchger K (2010) *Mobile Methods.* London and New York: Routledge.
    Good introduction to recent methodological challenges and emerging mobile methods, which are said to be producing a new realm of the empirical.

Cresswell T and Merriman P (eds) (2011) *Geographies of Mobilities: Practices, Spaces, Subjects.* Farnham and Burlington, VT: Ashgate.
Excellent overview of practices like walking, running, dancing, driving and flying; spaces like roads and airports; and subjects like commuters, tourists and refugees, by some of the leading thinkers in the cultural geography of mobilities.

Kaplan C (1996) *Questions of Travel: Postmodern Discourses of Displacement.* Durham, NC: Duke University Press.
An early and influential feminist critique of postmodern nomadic theories, which helped to shape new approaches in the subsequent mobilities turn, attended more carefully to power, exclusion, and differential experiences of travel and movement.

Mountz A (2010) *Seeking Asylum: Human Smuggling and Bureaucracy at the Border*. Minneapolis: University of Minnesota.
Award-winning study of recent border-practices and the production of the (im)mobilities of refugees and asylum-seekers under new conditions of surveillance, detention camps and states of exception.

Urry J (2007) *Mobilities*. London: Polity.
One of the first definitive guides to the field of mobilities research, by one of its leading theorists, introducing its central tenets, research areas and implications for the social sciences.

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résumé   Cet article propose une vue d'ensemble du champ de la recherche mobilités, retraçant ses antécédents théoriques et l'opposant aux théories de la mondialisation, le nomadisme, et la fluidité. Mobilités théorie met l'accent sans précédent sur les (im)mobilités, amarrages, le logement et le quiétude autant que le mouvement, la vitesse, ou de liquidité. Il décrit ensuite les principaux thèmes et domaines de recherche dans le domaine, y compris les systèmes de mobilité, les capitaux mobiles, et l'espace-mouvement, et enfin présente des innovations dans les méthodes mobiles et directions pour la recherche future.

mots-clés   (im)mobilité ◆ infrastructure ◆ méthodes mobiles ◆ motilité ◆ re-médiation

resumen   Este artículo ofrece una visión general del campo de la investigación movilidad, la localización de sus antecedentes teóricos y contrastándola con las teorías de la globalización, el nomadismo, y el flujo. La teoría de movilidades tiene un énfasis sin precedentes en la (in)movilidad, amarres, vivienda y quietud tanto como el movimiento, la velocidad o la liquidez. A continuación, describe los temas clave y áreas de investigación en el campo, incluyendo los sistemas de movilidad, la capital movilidad, y movimiento-espacio, por último presenta innovaciones en las metodologías de móviles y direcciones para futuras investigaciones.

palabras clave   (im)movilidad ◆ infraestructura ◆ métodos móviles ◆ motilidad ◆ re-mediación