

Introduction

Representing space and place: hunter-gatherer perspectives

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Abstract: The anthropological sciences have long been interested in how hunter-gatherers perceive and interact with their spatial environment. The spatially flexible and dynamic modes of subsistence and residence typical of many hunter-gatherer communities have been considered to be key factors in the social organisation and ideological framing of such communities. However, close attention to spatial representation – in the form of categories and distinctions as they surface in everyday communication and behaviour, for example – has so far been largely restricted to certain subfields within the language and cognitive sciences. This inquiry, on the other hand, has not been concerned with the hunter-gatherer category as such, and it has rarely addressed spatial representations in their sociocultural context. The present special issue aims to highlight the potentials of a closer integration of these different research perspectives in advancing our understanding of hunter-gatherer space. The contributions – written by experts on a diverse set of communities – address a range of representational phenomena of core concern to this aim. This introductory paper

presents space as a domain of inquiry into meaning, it reviews the literature on spatial representation among hunter-gatherer communities, and it outlines some of the major patterns of hunter-gatherer spatial strategies that emerge from the literature and the present contributions. Pointing to both diversity and commonalities across communities, the data offer new views of promising ways forward in the inquiry into hunter-gatherer relationships with the environment.

Keywords: space, language, spatial cognition, place, landscape, hunter-gatherers

1. Introduction

Anthropology has long been interested in how hunter-gatherers perceive and interact with their spatial environment. The high degree of mobility characteristic of many hunter-gatherer communities, driven by spatially variegated resource extraction and consumption, has been considered a key determinant in how such communities are socially organised and ideologically framed (Lee & DeVore 1968). Research has focused on mobility as a phenomenon (eg Kelly 1983, 2013; Ingold & Vergunst 2008) as well as on strategies and perceptions related to notions like place and territory (eg Lovis & Whallon 2016; Thompson 2016). Some studies address the wayfinding skills of highly mobile communities (eg Widlok 1997; Istomin & Dwyer 2009). Furthermore, in recent years, rapidly developing techniques of recording, measurement and modelling have nurtured a number of studies of hunter-gatherer spatial behaviour during foraging and socialising (eg Lewis et al 2014; Migliano et al 2017; Pontzer et al 2012, 2015; Raichlen et al 2014).

These lines of inquiry have produced rich descriptions and explanations of cultural practices, ideologies and behaviour related to hunter-gatherer space and place. However, perhaps surprisingly, they have largely bypassed representations of space as expressed by the hunter-gatherer communities themselves. Such representations, as evinced in cognition and communication for example, have instead been addressed by a separately developing field within the language and cognitive sciences (eg Pederson et al 1998; Levinson & Wilkins 2006). A growing number of studies in this field have targeted strategies of cognitive and linguistic representation of fundamental spatial domains such as motion, angular relationships and topological relations, providing in-depth analyses of everyday spatial expression in individual languages, as well as useful frameworks for comparison of spatial categories across communities. Importantly, however, this strand of research has only rarely attempted to systematically explore spatial representational strategies in their wider sociocultural contexts. It also

has not paid specific attention to the hunter-gatherer category as such or its associated spatial characteristics, despite the fact that several of the studies target such communities.

Our understanding of hunter-gatherer spatial cognition and behaviour would benefit from a systematic integration of these diverse research perspectives. This special issue – the outcome of an eponymous session organised by the authors at the Twelfth International Conference on Hunting and Gathering Societies (CHAGS 12) in Penang, Malaysia, 25 July 2018 – works towards this goal. Providing an interdisciplinary meeting point for scholars interested in hunter-gatherer representations of space and place, it brings together expertise from anthropology, linguistics, psychology, comparative religion and geographic information science and takes aim at the representational expression of a number of spatial topics of concern to hunter-gatherer studies. These include mobility and movement, navigation and wayfinding, habitats and habitation, environmental preferences, territoriality, foraging, social spaces, and supernatural and ritual space.

Our starting point is representations of space. Although we wish to apply a generous definition of ‘representation’, what we first and foremost are concerned with are phenomena in the form of observable categories and distinctions employed by communities to create and express meaning in the spatial domain. This can involve phenomena observed in language and other modalities of everyday communication, but also manifestations in cognition, ritual, art and various forms of material culture. In this sense our scope is ‘polysemiotic’. However, for most of the six contributions to this special issue, distinctions in spoken language form the primary analytical target.

The following sections introduce space as a domain of inquiry into meaning, review the literature on spatial representation among hunter-gatherer communities, and call attention to domains and patterns that appear particularly fruitful for further inquiry into hunter-gatherer expressions of space.

2. Space: a fundamental dimension

Space is an inescapable aspect of human experience and activity. It is the dimension in which we locate and orient ourselves, move around and find our way. It is also the dimension in which we experience objects, environments and fellow animates, where we pursue resources, set up our dwellings and interact with conspecifics. Space structures our memory, gives us identity and pervades our expectations, beliefs and worldview. This omnirelevance means that space

exerts a constant pressure for attention and representation, and every human and every community has strategies for representing space in cognition and communication.

These strategies take multiple forms. For example, we employ ways of indexing phenomena in our surroundings; distinguishing angular relationships between different entities; differentiating spatial events, such as motion; discriminating significant classes of features of the spatial environment; and recognising individual entities and settings that are part of that same environment. Our foremost representational access point to this conglomerate of distinguishing strategies is language. Being the primary and universal conduit for information sharing and knowledge transfer, language offers a window into each and every one of these spatial strategies, and into all contemporary human communities (and to some extent into past communities as well). Equally significant but less overt manifestations of representation can be explored in non-linguistic behaviour and cognition. Yet other manifestations materialise in artefacts, architecture and art, although perhaps in less ubiquitous ways.

While space undeniably demands universal representation, extensive cross-cultural research into spatial language and cognition has in recent decades revealed significant and often surprising variation in spatial strategies across communities (Pederson et al 1998; Levinson 2003; Levinson & Wilkins 2006; O'Meara & Pérez Báez 2011). For example, a number of studies have shown that speakers of different languages employ fundamentally different distinguishing strategies when describing angular relationships between static objects in small-scale space (known as spatial frames of reference). Speakers of some languages (notably familiar European languages like English) prefer to use viewpoint-based egocentric ('relative') solutions, such as *The pen is left of the computer (from where I'm looking)*. But speakers of other languages consistently employ abstract allocentric ('absolute') vectors such as cardinal directions to describe the same scene, as in *The pen is north of the computer*. Speakers of yet other languages prefer a third strategy in which inherent spatial asymmetries in the objects themselves are employed to create another form of allocentric ('intrinsic') descriptions, as in *The pen is at the front of the computer*. Furthermore, several studies show that these linguistic strategies correlate with distinct non-linguistic strategies; for example, speakers of languages which prefer 'relative' descriptions memorise spatial scenes egocentrically, whereas speakers of languages whose descriptions are 'absolute' or 'intrinsic' memorise scenes allocentrically (see especially Levinson et al 2002). This runs contrary to established wisdom in cognitive science, which holds that human spatial cognition is fundamentally egocentric (Evans 1985; Li & Gleitman 2002). But

cross-cultural variation in such linguistic and cognitive styles appears to be deep-rooted, astonishingly affecting such diverse operations as memorisation of body movements (Haun & Rapold 2009) and conceptualisation of time (Boroditsky & Gaby 2010).

Spatial experience can also be dynamic, as in events which involve change of location. Motion is a fundamental phenomenon by which we interact with the environment, either by moving through it ourselves or by observing objects in motion, or causing them to move. Self-movement is also the condition in which we are forced to employ our wayfinding and navigation abilities (Gluck 1991). In terms of the different ways motion is represented, language offers ample opportunity for studying the way humans conceptualise motion events. A large body of research has shown that there is considerable cross-linguistic variation in how such events are semantically construed (see especially Talmy 1985, 2000; Slobin 1996; Kopecka & Narasimhan 2012). For instance, in some languages speakers prefer to encode information about the path or trajectory of the moving entity during the motion event in the verb and the manner of motion is optionally encoded outside of the verb (so-called verb-framing languages), as in *The buoy entered the cove (floating)*. But in other languages manner of motion is encoded in the main verb and path is encoded outside the verb in particles, adpositions or some other element, oftentimes called a satellite (so-called satellite-framing languages), as in *The bird flew into the cave* (Talmy 2000). Furthermore, such semantic distinctions and variation in spoken language have been shown to be paralleled in co-speech gestures (Duncan 2005; McNeill 1997). Discussions of the different manifestations and ideologies of motion and mobility have a long tradition in the field of anthropology (see especially the contributions in Ingold & Vergunst 2008); however, this tradition remains largely unconnected to the literature on motion semantics cited above.

Moving on to more concrete manifestations of space, we find a formidable spatial scene in the geophysical environment itself (the 'landscape'). Although landscapes vary (sometimes dramatically), all human communities inhabit one and must have strategies of representing it in language and thought. The geophysical domain is interesting because it does not typically offer our human perception any clear-cut classes of entities with crisp borders and inherent properties or identities, ready for straightforward linguistic labelling (unlike the domains of plants and animals, for example). Instead it forms a variable but continuous surface which can be conceptually segmented and given meaning in myriad ways. In a sense, languages are free to employ vastly different strategies for categorising geophysical features, and recent research shows that they do (Burenhult 2008a; Mark et al 2011). Thus, the words used to label the large-scale

environment draw on diverse semantic principles in different languages, making translation of seemingly basic terms like English *mountain*, *valley*, *forest* and *river* a surprisingly difficult affair. Comparative overviews offer a glimpse into the scope of this semantic diversity (Burenhult & Levinson 2008; Burenhult et al 2017), but in-depth studies of the meaning of landscape terms in individual languages remain rare (for examples, see Kathage 2004; O'Meara 2010; Rybka 2016; cf Bromhead 2018).

Closely intertwined with landscape, the notion of 'place' is another fundamental aspect of spatial representation, although one that is notoriously challenging to define and capture. In the linguistic sense, 'place' or 'location' express spatial settings which accommodate entities or events. The distinction between a place and an object, for example, tends to be encoded in interrogative words such as *where?* vs *what?*, and demonstrative words like *there* vs *that*. This reading is indifferent to scale, and objects can themselves be turned into places by means of adpositional constructions, like the table in (*the cup is*) *on the table*. In other disciplines – such as anthropology, geography and sociology – 'place', and the associated notion of 'sense of place', express a relationship between people and spatial settings, typically in the large-scale environment. Such relationships can be characterised in terms of affection, attachment and identity, or the opposite feelings of fear and aversion (Tuan 1974). What these two understandings of 'place' have in common is that they both evoke a spatial scene to which some significant attribute is related. From a representational perspective, arguably the most pervasive manifestation of 'place' is place names (or toponyms), a class of words serving to distinguish individual spatial settings, primarily at the landscape scale. Although the origins and etymology of place names have a long tradition of scholarly interest, the role of place names and place name systems in spatial cognition is a surprisingly understudied area, especially from a cross-cultural perspective. An essentially universal class, place names form systems which represent unparalleled conceptual architectures for spatial identification, memorisation and reference in the large-scale environment (see eg Basso 1984; Hunn 1996; Kari 1989, 2010). The ways in which such systems vary across human communities is an area ripe for scientific investigation. A key question in this context is what types of spatial settings place names single out for reference, and perhaps especially if place name ontologies map onto those provided by landscape terms or commit to other conceptual principles (see above; Burenhult & Levinson 2008).

Place names carry social significance and an important part of their function is to stabilise and sustain the social role of spatial settings in large-scale space through time. But representational strategies obviously also target more

ephemeral and dynamic social aspects of space. In this regard the most prominent spatial setting is the scene of communicational interaction, ie the locus of everyday information sharing and knowledge transfer. This interactional scene has essentially three components: the participant conveying information (or ‘speaker’), the participant receiving information (or ‘addressee’) and the object of information (or ‘referent’). Typically, the speaker and addressee are both humans, and are within each other’s perceptual reach. The object can be a thing, an event, a place or a human or other animate, and can be both within and outside of the perceptual reach of the speaker and/or addressee. In conversation these roles are dynamic, and participating individuals shift between being speakers and addressees, and even referents. A basic functional feature of this triadic relationship is the speaker’s management of the addressee’s attention to the referent, for which human communication systems have elaborate indexical strategies. Pointing gestures are one such strategy (Haviland 2000); the universal grammatical category of words known as demonstratives is another (Diessel 1999; Levinson et al 2018). These deictic expressions designate referents in a way that evokes their spatial relationship to the speech situation, such as the pronominal demonstratives *this* and *that*. Such elements are usually interpreted in terms of how far or close they are to a particular deictic centre, which can be the location of the speaker, the addressee or both participants. There are also different types of adverbial demonstratives (eg *here* and *there*), as well as event-representing words such as verbs that encode directional information (eg *go* and *come*) or directional words (eg *hither* and *thither*). Many languages go even further in their employment of spatial distinctions in such deictic expressions, encoding for example angular information in their demonstratives (as in *there.upstream*, *that.downhill*). Indexical strategies are ubiquitous in any natural conversation, making such interaction a rich environment for exploring spatial conceptualisation.

To summarise, space is a fundamental dimension crucial to human cognition and communication, necessitating representational solutions in a number of domains relevant to universal human experience. As outlined, current evidence suggests these solutions vary considerably across languages and cultures. In the next section we consider such spatial representation in hunter-gatherer contexts.

3. Is hunter-gatherer space special?

Hunter-gatherers display considerable diversity in terms of their economic, residential and social characteristics, and delimiting and defining the category

has remained a challenging endeavour. Some definitions have focused on mobility or nomadic aspects of everyday life, so much so that Lee and DeVore (1968:11) defined hunter-gatherers as people who 'move around a lot' (although some groups who practise agriculture and herding also move around a lot). In contrast, other definitions of foragers (in some cases this term has replaced 'hunter-gatherers') have been framed in terms of food production strategies such that their livelihood is not based on a food production system that controls the way food resources are reproduced (see Binford 2002; Güldemann, McConvell & Rhodes 2020:7). Hunter-gatherer or forager groups have also been described as having small populations, in contrast with farmers (but some agriculturalist groups are also small). The literature on hunter-gatherer societies has also focused on the topic of how resources are shared among different members of an extended kinship network, as well as the tendency for hunter-gatherer societies to practise egalitarianism. However, forager groups show a vast amount of diversity in many areas, including, for instance the degree of mobility or nomadism they practise, whether they are oriented towards seafaring or are land-based, and to what extent they have incorporated agriculture and animal husbandry into their daily lives. Such changes and adaptations in cultural practices among foragers is often linked to contact with others, including cases where foragers are incorporated in the larger economy of dominant groups. However, even taking into consideration this diversity, certain general properties exist that can be used to characterise many hunter-gatherers, such as high rates of mobility, food procurement from the wild, including foraging, and small-scale societies that are based on egalitarian principles.

These fundamental characteristics of many hunter-gatherer societies might be expected to be discernible in cognitive and linguistic strategies of representation among such communities. However, recent studies have highlighted the fact that, in general terms, languages spoken by hunter-gatherers do not differ systematically from those spoken by agriculturalists, at least not at the level of phonological and grammatical structure (Bickel & Nichols 2020; but see Blasi et al 2019). Yet, studies of specific semantic domains have claimed that certain hunter-gatherer languages engage in semantic strategies which distinguish them from related languages spoken by non-hunter-gatherers, notably in the domains of ingestion (Burenhult & Kruspe 2016) and perception (Majid & Kruspe 2018). Furthermore, several studies have illustrated that hunter-gatherer languages make use of fewer binomial terms at the specific or varietal level in biological taxonomies than those of non-hunter-gatherer groups (eg Brown 1985, 2020; Epps 2013) and that they in some areas (but not on a global scale) tend to have

smaller systems of numerals than their non-hunter-gatherer neighbours (Epps et al 2012).

Given the particular patterns of spatial behaviour observed among many hunter-gatherer groups, the spatial dimension may be particularly interesting to explore in relation to strategies of representation in communication and thought. For instance, frequent movement among foraging groups, whether it be for the purpose of foraging for widely distributed resources, moving camp, or procurement of other resources, requires particular spatial orientation or wayfinding skills and attendant strategies in communication. As Istomin and Dwyer (2009:29) point out, numerous anthropological studies have looked at the extraordinary orientation skills found in various hunter-gatherer societies, skills that had popularly been categorised as ‘instinctive’ and even inherited genetically (Widlök 1997). Yet, from the perspective of psychologists or geographers, there are different theories to account for spatial orientation practices, namely, the so-called ‘mental map’ and ‘practical mastery’ theories; the former is based on stored spatial information in the form of a mental map, as well as inferred information, while the latter rejects the notion of mental maps and claims that orientation is based on experience of individuals in particular environments (Istomin & Dwyer 2009). While some have argued that these two theories do not mutually exclude each other (Istomin & Dwyer 2009), others have criticised them as not accounting for all forms of orientation, for example, dead-reckoning among the Hai||om, which could be more adequately described as involving both indexical and non-indexical factors (Widlök 1997).

Mobility among hunter-gatherer societies may not always be tied to ‘utilitarian’ purposes (Whallon 2006). Moving around and interacting with other groups of people also allows for the creation and maintenance of social relationships and such social ties can then function as ‘safety nets’ when natural resources are scarce, where groups can move from an area of resource scarcity to an area of abundance without facing potential hostility from other groups (Whallon 2006). This type of mobility can also be motivated by ritual and ceremonial activities that necessarily take place in a particular location or together with other groups. In fact, mobility itself is a key component in maintaining certain egalitarian cooperative practices such as demand sharing (Lewis et al 2014), and high frequency of mobility among large expanses of land can be linked to tendencies of low population density, all being general characteristics of hunter-gatherer societies.

Given these characteristics, should we expect such groups to employ particular types of systems for spatial reckoning, leading them to engage in specific strategies for thinking and talking about, say, angular relationships?

The literature on spatial frames of reference cited in section 2 explores such strategies in a number of hunter-gatherer and non-hunter-gatherer speech communities, offering opportunities for comparison. In a broad review of reference systems in 20 diverse languages, five of which are spoken in hunter-gatherer communities, Majid et al (2004) find no correlation between subsistence mode and dominant strategy of spatial reference in proximal ('table-top') space. However, what is clear from this and existing studies of specific languages is that no hunter-gatherer speech community has to date been described as relying predominantly on egocentrically anchored (or 'relative') solutions to spatial problems. Instead, they employ allocentric systems ranging from highly abstract cardinal directions-type ('absolute') strategies – as in eg Guugu Yimithirr (Haviland 1998) and Hai||om (Widlok 1997) – to strategies relying on the more concrete ('intrinsic') asymmetries of the environment – as in Jaminjung (Schultze-Berndt 2006), Jahai (Terrill & Burenhult 2008), Seri (O'Meara 2011) and Dâw (Obert 2019). Importantly, however, this allocentric bias is shared with most other speech communities outside industrialised, urban contexts. So, while we might propose a generalisation that hunter-gatherer communities are more likely to employ allocentric than egocentric strategies, they are not unique in preferring them, and the allocentric strategies they use vary considerably across communities. Our knowledge of this cross-cultural variation is so far largely based on highly controlled spatial tasks (but see Brenzinger 2008). However, recent developments involve systematic studies of naturalistic communicative settings which promise to further enrich our understanding of the intricacies of spatial reference. For example, Cialone's contribution to this special issue investigates the role of angular expressions in orientation and wayfinding among Bininj Kunwok speakers on the move, revealing systematic shifts between distinct allocentric strategies within one and the same group of speakers (2020; see also Cialone 2019).

Furthermore, could everyday activities of nomadic foragers lead to their perceptual experiences being 'tuned in' to particular ways of thinking and talking about movement around their territories? Existing typologies of motion expressions (such as Talmy 2000; Levinson & Wilkins 2006) offer little in terms of specific semantic patterns that can be linked to languages spoken by hunter-gatherers. We should therefore not expect the hunter-gatherer mode as such to result in specific semantic solutions to motion representation. However, existing descriptions do suggest that some hunter-gatherer languages harbour intricate and unusual language-specific ways of encoding motion events, possibly bearing witness to the cultural emphasis on mobility. Arrernte provides an intriguing example (Wilkins 2006; cf Koch 1984). Whereas most languages encode motion

events primarily in verbs, Arrernte has a set of motion-encoding affixes which systematically attach to non-motion verbs to express when events take place on the move ('action concurrent with motion', in Wilkins's 2006:50 terms), rendering meanings corresponding to eg 'do-while.moving.downwards', 'speak-while.coming.back', and 'sit-while.going.away' (cf Guillaume 2016). Motion is therefore deeply engrained in Arrernte grammar in a way that appears to bespeak an interactional ecology in which events 'stand out' and unfold against a constant background of movement. A different example of unusual linguistic expression of motion is described for Jahai in Burenhult & Purves's contribution to this special issue. Exploring actual motion events using GIS, the authors show that Jahai motion verbs encode movement trajectories in relation to topographical features and form a systematic set of semantic oppositions which encapsulates Jahai movement practices in the landscape. As in Arrernte, motion here imbues a larger (but very different) conceptual whole. Similarly, Hoffmann (2020) looks at the ways motion is lexicalised in three unrelated hunter-gatherer languages of Australia, Jaminjung, Kriol and MalakMalak, and finds that while on the surface Kriol differs from the other two, looking at larger pieces of narrative and how motion events are packaged in discourse, all three languages show similar patterns. These similarities are tentatively attributed to the facts related to hunter-gatherer ways of life, including intimate knowledge of each of the group's territories. To summarise, languages spoken by hunter-gatherers do not share specific strategies of representing motion, but individual languages offer examples of remarkable and diverse semantic and pragmatic solutions in the domain. It does not seem unreasonable to assume that mobility itself has some role to play in generating this diversity.

Similarly, we are probably ill-advised to expect hunter-gatherer communities to share semantic strategies for categorising the geophysical and biotic space, distinct from those of non-hunter-gatherers. Yet the semantic construal of landscapes and their properties offers an interesting domain of comparison where core hunter-gatherer pursuits such as movement and foraging are likely to play some role. For example, as mentioned above, motion representation can be closely intertwined with topographical categories (Burenhult & Purves, 2020). Landforms and land types may also form conventionalised cues in orientation and navigation (Cialone, 2020). The lexical distinguishing and potential representational prominence of ecotopes and biomes may be closely linked to patterns and categories of foraging (Johnson & Hunn 2010). In their contribution to this special issue, Mamontova, Klyachko & Thornton explore such terminology among the Ewenki. This is a particularly intriguing case since their vast territory encompasses several distinct ecosystems, and the authors

show that the same set of terms for landforms and biomes is flexibly employed to characterise diverse environments.

Similar questions arise in relation to the notion of 'sense of place' and the representation of individual spatial settings in the landscape. What types of environmental features are determined by a particular community to be individually significant, and why? Does a community's way of interacting with the landscape determine how places are 'made' and 'maintained'? Landscape descriptions, narratives and even more generally myths such as creation stories, are fruitful genres for exploring such issues. Sercombe (2020) examines in situ landscape narratives among the Eastern Penan, demonstrating the complex interplay between landscape and placehood and the explicit significance of sentiments, memories and social relations in expressing this relationship. The documentation of such genres on the move using mobile recording technology opens up a new analytical arena of naturalistic communication that is likely to deepen our understanding of spatial conceptualisation in highly mobile communities. The pioneering studies by both Cialone and Sercombe in this issue bear witness to the potential of this development.

However, the single most prominent linguistic expression of spatial individuation is place names. Acknowledging that place names are significant indicators of a community's conventions of 'place-making' and 'place-nurturing', should we presume that the principles of place naming in hunter-gatherer communities are different from those of non-hunter-gatherers? For example, should we expect hunter-gatherer place names to be more widely and evenly distributed over a territory, given the distributed characteristics of resource procurement? Should we expect a connection to resources at all, or perhaps rather to patterns of habitual residential movement? Hunn (1996) identifies a relationship between place name density and population density, which in the case of hunter-gatherer societies results in a predicted correlation between low population density (over typically large areas) and low place name density among hunter-gatherers, in comparison with farmers. In terms of what types of features place names refer to, we can hypothesise that residentially mobile communities will be less concerned with naming settlements than are, say, village-based communities. On the other hand, favoured camp sites may well be associated with specific names. In fact, available evidence points to considerable diversity in how different hunter-gatherer communities name spatial settings, and in what the underlying motivating principle for naming is. One pattern that emerges in some communities is the existence of place name 'templates' in which networks of names are reinstated to individuate places in distinct but physically similar environments. For example, Kari (2008) describes for

Ahtna, an Athabaskan community in Alaska, such a generative geographic capacity for naming places that makes use of place names combining with generic terms (eg river, glacier, camp) and forming a system which is reinstated across major watersheds. This principle for naming places is described as assisting in the learning and functionality of place name systems applied to extensive areas. Equivalent strategies can apply in vastly different ecologies. For example, speakers of Seri, a language isolate spoken in northern Mexico, have a similar strategy of using a name to generate clusters of associated names drawing on generic landscape terms (eg bay, point, estuary) (O'Meara & Henzi in press). Jahai offers yet another example on the same theme (Burenhult 2008b). Here, however, place names refer to subterranean mythical creation beings connected through kinship relations that coincide with watershed hierarchy. The names do not include generic landscape terms and are referentially detached from actual topography, but the spatial principle of naming is well-suited to productive application to every corner of the Jahai territory. What these systems have in common is a capacity to individuate spatial settings evenly over large areas according to some general principle of economy and affordance for reference in memory and communication. Although named places may very well have specific significance as settings of repose, habitation, ownership, foraging, ritual, commemoration or myth, the underlying logic of the system as a whole rather seems geared to maximal spatial coverage. Such a solution would seem to be advantageous for highly mobile communities. Indeed, in some sedentary hunter-gatherer communities systems rather are tailored more closely to specific expressions of economic or cultural affordance. For example, Thornton (1997, 2008) describes for the Tlingit of the Pacific Northwest a fundamental connection between place names and settings favourable to resource procurement. Among the Bardi, semi-sedentary coastal hunter-gatherers and fishers of Western Australia, clusters of locality names are centred on *booroo* names for settings associated with family-based ownership (Bowern 2009). Taken together, these examples hint at a complex interplay of environmental, social and cultural factors that produces diverse solutions to the individuation of spatial settings within the hunter-gatherer category.

We have so far only made brief reference to representation in the visual modality, in the context of deictic gestures. Visual communication such as sign languages and co-speech gestures are of interest because they are inherently spatial in nature and therefore particularly informative about how space may be conceptualised (Emmorey & Reilly 1995). Languages spoken by hunter-gatherer communities have provided interesting information in this regard. For example, allocentric descriptions of spatial relationships in spoken Guugu

Yimithirr have been shown to be closely shadowed by similarly allocentric co-speech gestures (Haviland 1998). A close connection between spoken and gestured spatial deixis is also described for Arrernte (Wilkins 1999). Australian settings also offer intriguing examples of spatial distinctions in sign languages, that is, the full-blown, visual-manual communication systems developed, for example, in deaf communities, or, as is the case in some Australian Aboriginal communities, as a parallel language for individuals who are subject to a taboo on spoken language (Kendon 1989). Warlpiri sign language is a notable example: although grammatically stripped down in comparison to the spoken language, this signed system expresses spatial distinctions which are not encoded in the spoken system (Kendon 1988). For indigenous sign languages in the North American setting, see Davis (2006).

Gestures and sign languages are as ephemeral as spoken language, leaving no tangible traces. But in the visual modality it is not a far step from such systems to those which take material (if sometimes only temporary) manifestations. Sand drawings here form a fascinating medium between fleeting and lasting forms of representation. Green's (2014) description of Arandic sand stories – a traditional form of storytelling which involves co-speech graphics – includes an in-depth analysis of their spatial properties and categories, showing for example how the dominant allocentric system of spatial reference provides an ever-present frame for the layout of the drawings and their components. Temporary material representation may also serve more practical purposes, sometimes distinctly spatial ones, such as tracking signs left behind along a travel route to convey directions and other messages to people following. In-depth descriptions of the properties of such conventionalised systems of tracking signs are surprisingly scarce in the ethnographic literature. Rothstein (2020) discusses one of the most famous examples from a hunter-gatherer context, namely the elaborate stick signs made by the Penan called *oro'o'* (see also Arnold 1958; Lye 2016; Zaman & Winschiers-Theophilus 2015). The semantic parameters of this system have yet to be understood in detail but the overview by Zaman & Winschiers-Theophilus (2015) suggests the signs are packed with meanings which go far beyond direction-giving (such as number of travellers, animals encountered, urgency and resources available). Specifically, spatial encodings include at least direction and distance (duration) to the goal, and possibly referents in the form of features of the landscape (such as rivers). Semantically more streamlined systems have been documented among the Semang of the Malay Peninsula (see Lye 2016 for Batek and Burenhult, field notes 2018 for Jahai). For example, the Jahai use sticks to indicate the absolute direction of travelling, and three distinctions of stick length represent distance of travel as proximal, medial and distal, respectively.

For highly mobile communities such systems of visual communication may have particular functional value, and, although semantically limited in scope, they distil the very distinctions that matter in communicating movement.

We have so far been mostly concerned with spatial representation as it is manifested in basic communicative modalities, such as spoken and visual language. How do patterns in these modalities relate to perhaps less explicit spatial representation in other facets of culture? This is a relationship that has so far received very little attention. Some aspects of spatial representation are less mundane in nature, but rather serve a more abstract purpose in the larger social structure of a group, such as the case of some ritual practices among hunter-gatherers. Rituals and ritual artefacts may be linked to a specific place or specific kinds of places, serving to 'mark' locations and features of the landscape with actions and material expressions (Lovis & Whallon 2016). For example, culturally significant artefacts of some spatial permanence may serve as loci of specific ritual practices, as is the case with Chipewyan fur traps, where the placing of the bait in the trap involves a ritual that replicates the behaviour of individuals with supernatural powers, and at the same time was thought to help improve the efficacy of luring animals to the trap (Jarvenpa & Brumbach 2016:26). Although of course not specific to hunter-gatherers, such ritual marking of the landscape may have interesting connections to the categories involved in conceptualisations of landforms and places as they emerge in language, for example.

Rituals marking the landscape may also revolve around movement, as in Blackfoot pilgrimages across their territory, during which community leaders would recite narratives that described how the land was created and the sacred powers linked to the places nearby. During the patterned movement they performed rituals in a particular order at particular places in order to benefit the community's well-being and to ensure renewal of the land and its natural resources (Oetelaar 2016:62). Rituals and associated narratives such as these represent a systematic form of cultural 'tagging' of spatial settings, providing a network of direct links between the community and the land that is likely to have a great influence on how community members memorise and communicate about space.

Another interesting and underexplored aspect is how spatial resources in language are employed in reference to imagined supernatural entities and environments. In a world populated by continually encountered spirits and deities, spatial reference and notions of place and motion have a constant supernatural dimension. Exploring the interplay between spatial expressions and such imagined interactants and bystanders is certain to enrich our

comprehension of hunter-gatherer spatial perception and conceptualisation. A related area relevant in the hunter-gatherer context is the role of landscape and movement in shamanistic practices and other forms of spiritual dreaming and soul travelling. Such practices frequently represent movement, for example along hunting trails in search of animals to be hunted (see eg Brody 2001 for Dane-zaa; Jordan 2001 for Khanty). They are a source of knowledge that can aid communities in making difficult and potentially risky decisions of when to move camp, where and when to go hunting, which animals to pursue, etc. Shamanistic traditions are well-described from an ethnographic point of view but a big gap remains in our knowledge of how their spatial manifestations find expression in the language and cognition of their practitioners.

Aside from their location in the landscape, rituals themselves may have inherent spatial meaning and expression. Rothstein (2020) describes a Penan ritual designed to remedy the dreaded state of having lost one's bearings, whereby the person makes a hoop from a vine and moves through it (see also Rothstein 2016:293–297). Not only does this ritual serve to solve a spatial conundrum in large-scale space – it also, in a highly symbolic way, involves the concrete spatial act of bodily motion across a tangible boundary. Employment of spatial phenomena in the form of change of location, boundaries, bodily movement and orientation in conventionalised ritual performance is likely to represent spatial distinctions of great cultural significance, and such conventions are worthy of in-depth exploration from a linguistic and cognitive point of view (eg in light of the work of Haun & Rapold 2009 cited in section 2).

Let us return to the question that started this section: is hunter-gatherer space special? The evidence adduced here suggests the answer is both yes and no. While previous studies have made it clear that hunter-gatherer languages do not generally illustrate systematic structural differences from languages spoken by non-hunter-gatherers, the spatial domain does provide indications of areas of linguistic representation where hunter-gatherer languages may display specific patterns. The clearest tendency is perhaps to be found in the area of angular description and memorisation (spatial frames of reference) where we can see that hunter-gatherers prefer allocentric (basically non-egocentric) strategies. This is a family of strategies which may be well-suited to cultural contexts characterised by high mobility and spatially diverse resource procurement. But such strategies are not unique to hunter-gatherer societies. In the case of strategies used to name places, we tentatively observe patterns of reference which appear to be similarly linked to the spatial distribution of activities and to the degree of mobility characteristic of a community. Thus, highly mobile communities tend to employ principles of place naming geared to covering

extensive areas of land. Strategies of lexicalisation of geophysical and biotic features of the environment may be subject to similar tendencies. In the domain of motion we see ample diversity in terms of how hunter-gatherer languages lexicalise movement, and mobility as such does not associate with specific semantic patterns. But it seems probable that unusual solutions to motion representation found in the grammars and lexica of some hunter-gatherers are indeed grounded in the mobile ecologies and ideologies of those particular communities. This brings us to the most evident conclusion to be drawn from the literature, and from the contributions to this special issue: high degrees of mobility and of spatial distribution of resource procurement are potent forces to be reckoned with in the shaping of human representations of space. Hunter-gatherer solutions, frequently developed in settings of exceptional spatial flexibility, thus have a key role to play in our understanding of linguistic and cognitive diversity in the domain.

4. Conclusions and looking ahead

The work presented in this special issue is concerned with the representation of space as manifested in observable categories and distinctions used by hunter-gatherer communities to express meaning in spatial domains. The contributions reflect a variety of disciplinary approaches and target areas such as language, cognition, ritual and material culture, and each contribution typically bridges two or more of these areas. Some contributions focus on larger pieces of discourse and landscape narratives to explore different ways hunter-gatherers perceive and construe movement in their territories. Others address ritual practices and sense of place, using language and behaviour as windows into the ways communities perceive the places they inhabit and move through. Yet others combine methods of geography and language documentation, exploring the relationship between language and motion through the landscape by employing innovative techniques of audio-visual and spatial recording. These latter approaches are significant as they allow for a more comprehensive framework for documenting and understanding hunter-gatherer spatial experience on the move.

The disciplines involved in hunter-gatherer research have in recent decades adhered to a strict division of labour. Our aim with this special issue has been to call attention to a dimension of hunter-gatherer research that shows promise of being a rewarding area for closer integration of research paradigms. By re-situating linguistic, cognitive and other behavioural expressions of space

within the larger and more abstract sociocultural contexts of communities, and by dovetailing this inquiry with the rapidly developing paradigms of biophysical and geospatial investigation, we will likely be in a much better position to amplify our understanding of diversity and commonalities in how hunter-gatherers apprehend and interact with their environment. The contributions to this special issue all take steps towards such interdisciplinary integration – thematically, theoretically or methodologically – and they serve as inspiring examples of how it can be achieved and what intellectual rewards it can offer. This development of the field is a matter of great urgency and importance, as our chances of working together with hunter-gatherer communities are rapidly diminishing.

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