The Socio-Topographic Model: 
Socioculturally Mediated Responses to Environment Shaping 
Universals and Diversity in Spatial Reference

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Considerable diversity in spatial reference across languages is well attested (Levinson 2003; Levinson & Wilkins 2006; Pederson et al. 1998). Nonetheless, universal tendencies can be detected within this diversity, and salient landscape and other external-world features seem to play a role in the detail of systems involving absolute Frame of Reference (FoR) (Palmer 2002, 2015), and even in FoR choice (see Majid et al. 2004; Bohnemeyer et al. 2014). However, those aspects of the environment that are perceived as salient vary across cultures, and the nature of the interaction between humans and their environment plays a crucial role, as seen in demographic variation within individual languages in tendencies in FoR choice (e.g. Pederson 1993), and in geocentric versus egocentric strategies more generally (Palmer et al. 2016).

Spatial relations of any type can be expressed using language. However, in perhaps all languages some spatial concepts are lexicalised or expressed in a grammaticized way, while others are relegated to periphrastic expression. These lexicalized and grammaticized expressions are key to understanding the extent to which spatial reference displays universal tendencies, and the extent to which variation is systematic.

Geocentric spatial reference, including the use of absolute FoR, invokes aspects of the external world, suggesting that linguistic systems are responsive to the environment in which a language is spoken (Palmer 2002). This in turn predicts that aspects of systems of spatial reference will correlate with salient aspects of the physical environment. Palmer (2015) formulates this as the Topographic Correspondence Hypothesis (TCH), a tool to test the extent to which linguistic spatial systems correlate to environment in ways that can account for aspects of spatial reference that are universal or vary in systematic ways. To test TCH, Palmer (2015) proposes the Environment Variable Method (EVM), an approach that treats environment as a controlled variable. TCH makes predictions along two parameters: (A) that a single language spoken in diverse environments will display commensurate diversity in spatial reference; and (B) that diverse languages spoken in a single environment will display commensurate similarities in spatial reference. EVM tests (A) by holding the language constant and varying the environment. Prediction (B) is harder to test, because while the environment is to be held constant and the language varied, the environment cannot be held constant to the extent of investigating diverse languages in a single location, as it would be impossible to rule out similarities between
languages arising from contact. Instead, language loci that are as similar as possible are to be used.

To test TCH and cast light on the relationship between spatial reference and environment, a research team comprising Palmer, Alice Gaby, Jonathon Lum and Jonathan Schlossberg are investigating spatial reference in languages spoken in the topographic environment of the atoll, in a three-year project funded by the Australian Research Council. Atolls are an unusual environment for human habitation, comprising narrow strips of land around a central lagoon. A field-based preliminary study of spatial reference in atoll-based languages (Palmer 2007) found similarities in spatial systems in four languages, including an atoll-specific lagoonside-oceanside axis. We are testing TCH in atoll-based languages by investigating spatial reference in Marshallese (Oceanic, Marshall Islands) and Dhivehi (Indo-Aryan, Maldives). Following EVM, a baseline language-environment pairing of Marshallese spoken on an atoll is compared: along one parameter with Marshallese spoken on a non-atoll island and in urban Arkansas US; and along the other with Dhivehi spoken on an atoll topographically similar to the Marshallese site. Identical experimental elicitation techniques including several newly devised experiments were used in all locations to ensure comparability of data, and data was subject to quantitative analysis.

The study’s findings weakly support TCH. For example, both languages employ a landward-seaward axis correlating to the boundary between land and sea. However, in Marshallese this is only used at sea, while in Dhivehi it is used on land, with only one term also used at sea. Further, the distinction between an island’s lagoonside and oceanside is lexicalised in both languages, but in Dhivehi these terms cannot participate in grammaticized constructions, while in Marshallese they frequently do. Some of our quantitative findings also support TCH. In atoll Marshallese, for example, 72% of location descriptions were geocentric or cardinal, and only 15% egocentric or intrinsic, while in Dhivehi only 25% of location descriptions were geocentric or cardinal and 35% were intrinsic. Even more significantly, our findings introduced a crucial caveat to TCH: social and cultural factors mediate between language and environment, such that a simple predictable relationship between the two does not exist. Lexicalized and grammaticized systems of spatial reference may correlate to aspects of the environment, but the extent to which they do, and which aspects of the environment are invoked, varies on the basis of both affordance, and degree and nature of cultural interaction with the environment. For example, in Dhivehi fishing communities, 77% of orientation descriptions were geocentric or cardinal, while in non-fishing communities, engaged primarily in white collar work, only 35% were. Significant variation was also observed on the basis of gender and age.
In response to these findings we have formulated the Socio-Topographic Model (STM) (Palmer et al. 2016). Major environmental features tend to be salient to humans and appear to play a role in constructing conceptual representations of space that then interact with linguistic spatial expressions. However, cultural and social factors, as well as the affordances of the environment itself, mediate in the relationship between humans and landscape. STM models the interplay of the physical environment of the language locus, sociocultural interaction with the environment, and the linguistic repertoire available to speakers (Figure 1). Socio-Topography is defined in terms of: natural topography (broadly construed, including path of sun, prevailing winds etc); the built environment; affordance; and sociocultural interaction with the natural and built environment. Socio-Topography is culturally “constructed”: Humans modify their environment, and conceptualise existing topography in terms of use, associations and meanings attached to it. Consequently, elements of the local landscape that are not attended to by some cultures will be prominent to others, and factors such as scale may be attended to by some cultures but less so by others.

Figure 1: The Socio-Topographic Model

References