MAX-PLANCK-INSTITUT FÜR WISSENSCHAFTSGESCHICHTE
Max Planck Institute for the History of Science

2013

PREPRINT 447

TOPOI – *Towards a Historical Epistemology of Space*

Martin Thiering and Wulf Schiefenhövel

Spatial Concepts in Non-Literate Societies: Language and Practice in Eipo and Dene Chipewyan

Spatial Concepts in Non-Literate Societies: Language and Practice in Eipo and Dene Chipewyan

1 Introduction

This paper focuses on the linguistic representation of spatial concepts in two little known and unrelated languages with a non-written tradition. It explores the degree to which environmental experience and spatial orientation is reflected in language, i.e., it is in line with anthropological linguistic approaches placing language in its social and cultural context, and its cultural practices.[1] As such, spatial knowledge is not only encoded in concepts or categories, but is embodied in the lived histories of human beings, and their cultural and linguistic practices.[2] The unrelated cultures under survey present interesting environmental terrains, one is an alpine region (Eipo), the other are vast prairies (Dene). The mental and perceptual course maintaining in these cultures rely on cognitive maps, i.e., the orientation techniques are processes of inference within the structure of cognitive maps[3] They are structures of spatial reasoning, as is an activity of unconscious inference. The aim is to employ cognitive maps that correspond between the "real world" cues such as objects and places and their symbolic equivalents in the cognitive maps. This paper deviates from the descriptions of landscape features in the sense that it adopts cognitive maps that are referred to in navigation techniques of dead reckoning of orientation, i.e., navigating without instruments. This kind of navigation is based on dynamic cognitive maps and mental triangulation so that the navigator has a spatial conception of their position at any time. It is argued here that this is of special importance also for orienting oneself in the alpine regions of Eipo or the vast prairies extensions of the Dene in Alberta.We adopt the following premise that

> descriptions of space, or allusions to space in language, must rest on two kinds of knowledge. The first appears to be based on models (maps, representations) which people construct to guide *spatial be-*

[1] Foley 1997, Mark et al. 2012.
[2] Foley 1997, 177.
[3] Portugali 1996.

> *havior*. The second appears to consist of a linguistic symbol-system that allows the models to be shared within a community of discourse.[4]

The question is whether there are commonalities between the two unrelated languages, and if differences appear, what are these linguistically and conceptually? The following quote summarizes our point of departure.

> Man, in confronting reality, faces a kaleidoscope of phenomena ranging from the natural to the man-made, to the imaginary, to the totally abstract. Comprehension of such a broad inventory of reality and non-reality requires language, the tool that permits man to take verbal stock of objective and subjective experiences alike. In man's ongoing endeavor to conceptualize and verbalize a world that can never be fully known, language is the vital intermediary.[5]

Our question here concerns the relationship between non-linguistic information and spatial language. The point of departure in our argumentation is that non-linguistic information has its impact upon spatial language and categorization, i.e., reference of space and its relation to semiotic systems. We present language data indicating the influence and constructive process of environmental landmarks and cultural heritage upon shaping of spatial categorization in the two languages. One language, Eipo, is spoken in the central mountains of the Indonesian Province of Papua, formerly the province of Irian Jaya, West-New Guinea. The other language, Dene Chipewyan, is spoken in Cold Lake, Alberta. We assume very fundamentally that Homo Sapiens, like all other animals, is equipped with biological, especially neurobiological disposition enabling orientation in space and thereby ensuring survival and, ultimately, reproductions. The general aim of this paper is to survey some of the very fundamental spatial notions based on environmental or regional landmarks. In this paper landmarks are defined as any kind of environmental reference points. This can be a mountain, a river, a house, or even a tree. Landmarks are point references external to the person. In a city, landmarks may be distant buildings or geographical features that can be seen from many angles and distances, or they may be primarily local such as buildings, signs, trees, storefronts, doorknobs, or other urban details.[6] Landmarks are used here as proximate course-maintaining devices for orientation as known from dead-reckoning systems of navigation. These landmarks shape and determine a detailed topographical cognitive map of the environment as represented via language and various practices.

Siegel & White argue that

[4] Siegel and White 1975, 11.
[5] Malotki 1983, 13.
[6] Miller and Johnson-Laird 1976, 378.

> landmarks are unique configurations of perceptual events (patterns). They identify a specific geographical location. A person's account of his spatial representations generally begins with landmarks, and these landmarks are the strategic foci to and from which the person moves or travels. Landmarks are used as proximate course-maintaining devices. Not only do they identify beginnings and endings, but also serve to maintain course.[7]

We argue that landmarks shape and determine a detailled topographical map of the environment, i.e., a mental model or cognitive map, as represented via language, but also practices.[8] Spatial orientation is, on the other hand, also governed by general geographic principles like "uphill", "downriver" as well as, at least in many cultures, by cardinal directions, prevailing winds, the position of the sun, moon, stars and the like. It should be noted that we do use the term map as a dynamic mental representation, not as a chart-like or coordinate system in a mathematical way. We surely do not impose a coordinate system upon speaker's mental organisation at this point of our research. By landmarks and the environment we refer to the following quote by Fowler and Turner summarizing the function of landmarks or geographic features in particular. This quote also summarizes our point of departure with respect to the function of environmental knowledge and its reflection in language.[9]

> The naming of geographic features as part of territorial marking and orientation is a common occurrence in all cultures topographical names reflect specific cultural interests and historical developments whithin the possibilities given by the morphology of the language.[10]

Fowler and Turner point out that the process of naming geographic and territorial landmarks are crucial for all cultures. More specifically they conclude that topographical names indicate particular cultural interest as represented by the language repertoire or the language-specific affordances (see below). Indeed, data presented here show a dense linguistic network of topographical maps represented, e.g., in place names serving as mental maps for orientation. Furthermore, we will show the rich fabric of terms of spatial deixis in both cultures. Hence, the notion of frames of reference is also crucial here since they profile spatial relationships between the speaker-hearer and the environment. It is argued that human beings instantiate relations between objects relying on various frames of reference

[7] Siegel and White 1975, 23.
[8] Thiering 2012.
[9] Miller and Johnson-Laird 1976, 377.
[10] Fowler and N. Turner 1999, 424.

that, as the name implies, serve as reference. A reference point anchors a specific orientation between objects and the viewer.[11] These linguistic coordinates are important for the description of topographical an, on, and in spatial relations in Dene and Eipo, as they are for the description of projective left-right relations in general.[12] Following Malotki, the term linguistic coordinate here means the division of a spatial configuration into a speaker, a hearer and a third part (a person or a thing the speaker-hearer refer to). Hence, a linguistic coordinate system is not a geographically or mathematically abstract concept, but a means of spatial configuration in the linguistic encoding. The encoding of spatial relations depends on certain spatial (and temporal) parameters that set the linguistic coordinate reference system for the speaker-hearer. In general, spatial marking is based on three different reference frames to be selected from. These are assigned to the objects profiled in the situation.[13] The three frames of reference can be divided into

1. a viewer/ego-centered or relative frame as in the English example *he's to the left of the house* (assuming that from the perspective of the viewer, a person is situated to the left side of the house),
2. an object-centered or intrinsic frame as in *he's in front of the house* (assuming that the front is where the main door is located; the object has an inherent front and back side), and
3. an environment-centered or absolute frame as in *he's north of the house*.

In (a), the viewpoint depends on the location of the perceiver's vantage point and his/her relation to the figure and ground. The intrinsic frame in (b) is an object-centered reference system determined by natural or culture-specific inherent features of the object. Finally, the absolute frame (c) is a fixed direction provided by, e.g., cardinal direction.[14] With respect to the figure/ground asymmetry we follow Talmy's adaptation of the *Gestalt* psychologist approach arguing that certain cognitive categories play an important role in attributing the primary and secondary objects of a scene.[15] These functions are encoded by the figure and ground of a scene the variable element or positive space versus the reference element or negative space.[16] The former is usually the smaller and moveable object whereas the latter is usually the permanently located, larger object.[17] Three basic factors de-

[11] L. Carlson-Radvansky 1993, L. Carlson-Radvansky and G. Carlson-Radvansky 1996, Carlson 1999, Carlson and Logan 2001, Carlson 2003, Levinson 2003,Levinson and Wilkins 2006.
[12] Malotki 1983, 16.
[13] L. Carlson-Radvansky 1993, Carlson 1999, Carlson 2000, Carlson and Logan 2001, Carlson 2003,Levinson 2003, Coventry and Garrod 2004.
[14] For an extensive overview, see Levinson 2003.
[15] Talmy 1983, 230.
[16] Talmy 1978, 627, Hofstadter 1980, Talmy 1983, 232, Talmy 2000.
[17] See Talmy's 20 parameters for the domain of spatial configurations of figure/ground asymmetries; Talmy 1983, 277.

termine the contrast between figure and ground: the size, movement, and position of the figure in relation to the ground in the shared knowledge of the discourse participants. Talmy states that, e.g., adpositional phrases profile relationships such as the location of the figure in relation to the ground, the time of the unfolding event, the manner in which the event unfolds, and the transition, motion and path of the figure.[18] For purposes of the current study, it is primarily the semantic features of location and direction of the figure that are singled out. Besides, the semantic event features in addition to various other imaging parameters will also be described.[19] The Language and Cognition group at the Max Planck Institute in Nijmegen is an exception to standard procedures in armchair linguistics. Elicitation tools developed by the researchers of this group facilitate the gathering of data from actual speakers and their usage of a particular language.[20] We argue that these ascriptions are determined by cultural, environmental and language-specific affordances.[21] These in turn depend on speaker-imposed figure/ground asymmetries (see below) that are attributed to the respective objects.[22] It is assumed in this paper that spatial concepts are constructed on the basis of evolutionary programs for orientation in space and via experience based on the ontogeny of a speaker and common concepts in the speaker's community in a particular culture at a particular time. In the course of our argumentation some fundamental spatial concepts and representations are presented which are based on anthropomorphic spatial knowledge in Eipo and Dene Chipewyan. Knowledge members of both cultures developed on the basis of human phylogenetic adaptations, throughout their ontogenesis in a remote area in West-New Guinea and Western Canada. Since the term *culture* has several meanings and theoretical backgrounds, we adopt the specific idea of *culture* following Clifford Geertz's *Interpretation of Culture*:

> The concept of culture is essentially a semiotic one. Believing that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretative one in search of meaning.[23]

We show such webs of basic spatial categorization in the two cultures, i.e., we present a snapshot of spatial semantics represented by the two languages. Moreover, this paper places its arguments on the basis of species-specific cognitive organization that mature and shape in the course of ontogenesis during sensomotoric

[18] Talmy 2000.
[19] Fillmore 1968, Frawley 1992, Talmy 2000, S. Rice 2002.
[20] Levinson 2003, Levinson and Wilkins 2006.
[21] Whorf 1956, Wygotski 1964, Watzlawick 1981, Hunt and Agnoli 1991, Lucy 1992b, Lucy 1992a.
[22] Talmy 1978, Talmy 1983, Talmy 2000.
[23] Geertz 1999, 5.

action and sociocultural learning.[24] Spatial cognition is externally represented in language as well as in cultural-specific practices.[25] Note that language is understood here as an external representation of mental concepts, or, as Boas puts it, human language is one of the most important manifestations of mental life[26] For the case of the Eipo, data are used from the dictionary of the Eipo language containing actual usages of the recorded words and thereby allows insight into the mental concepts of its speakers as well as published material from Schiefenhövel and Heeschen.[27] Additionally, we rely on a collection of myths, songs, and stories from Eipo speakers.[28] For the case of Dene, first hand data were elicited with Dene Chipewyan speakers based on various elicitation tools by Thiering[29]. and Dene stories told in various interviews. Culture-specific structures and behaviors will be examined that reflect experiences with local environmental conditions, e.g., rivers and mountains in Eipo or rivers and lakes in Dene as natural boundaries or important delimiting features. Fowler and Turner summarize this aspect as follows:

> If peoples choose to orient themselves to coasts or seas, rivers or mountains, the sun's path, or some other feature, some aspect of this will usually show up in their place-names.[30]

Adopting Fowler and Turner's point it will be shown that people in both cultures use indeed place names in their specific environments to construct a linguistically dense topographical reference system for orientation. Hence, environmental experience is also represented via language and language in turn shapes spatial concepts or mental models.[31] Some of these concepts will be represented here in introducing the two languages and cultures mentioned above. Finally, the current paper presents various *ideas of space* or 'Raumbilder' of Eipo and Dene Chipewyan.[32] We argue that such *ideas of space*, i.e., the speaker's basic delimitation of his/her world of experience, are important in Eipo and Dene as in any other language and culture. A selection of such ideas of space are for example the deictic parsing of space into 'here', 'there', and 'over there' or simply 'celestial space' versus the 'earth' as encoded via 'above' and 'down'. We have also *ideas of space* such as the 'left' and 'right' asymmetries, 'in front of' and 'behind', 'up' and

[24] Piaget and Inhelder 1956.
[25] Foley 1997, 169-178.
[26] Boas 1977, 68.
[27] Heeschen and Schiefenhövel 1983.
[28] Heeschen 1990; and film recordings of their daily activities (IWF webpage http://www.iwf.de/IWF).
[29] Thiering 2006, Thiering 2009a,Thiering 2010; field notes by Thiering
[30] Fowler and N. Turner 1999, 424.
[31] Thiering 2012.
[32] Malotki 1979.

'down', 'near' and 'far away', 'inside' and 'outside', 'in' and 'on', the cardinal directions 'North', 'South', 'West', and 'East', 'back' and 'forward', man-made places such as a 'house' and 'geographic places' or 'surfaces'.[33] Note that in contrast to Hopi, the Eipo language does not have true terms for cardinal directions, yet, we believe that expressions such as 'downstream' and 'upstream' have a similar semantic function. Hence, it may be stated that Eipo also evokes a tripartite system of deictic reference. Note also that this three way separation is similar to, e.g., German *hier* 'here', *da* 'there', *dort* 'over there' differentiating between proximal, and distal distances taking the speaker as the anchor of her/his perspective. Malotki's survey presents various facets of Hopi encoding spatial relations and demonstrates a 'degree of specificity'.[34] This linguistic phenomenon of the figure's location with respect to the ground is related to the amount of detailed expressive content with which spatial relations are described in various languages[35] It is claimed that, for example, the English prepositional phrase 'on the door' has a lower degree of specificity compared to 'on the left side of the door'[36]for an example in Ewe. The latter specification encodes further partitions of the door into smaller regions. In chapter 5 of his analysis, Malotki[37] gives a detailed account including various illustrations of the different representations of space and spatial semantics as linguistically summarized in a total of 43 locational morpheme markers specifying space in Hopi;[38] the alphabetically ordered spatial morphemes are described in terms of content or semantic fields in Malotki's concluding remarks.[39] He states that Hopi uses a fine-grained linguistic system to encode spatial relations and, as we would add, spatial concepts that also differ, to a certain degree, from most other languages.[40] This should be of no surprise since every language presents language-specific affordances, i.e., the semantic content hard-wired into specific morphosyntactic devices or morphosyntactic patterns. As such, spatial concepts are linguistically represented in different forms which are based in the respective language system. Malotki concludes that

> die Hopi-Sprache auf Grund ihrer differenzierten Gestaltung des Lokativs mit seinen punktiven und diffusen Subsystemen sowie des Lokativs und Destinativs mit ihren extremen bzw. nicht-extremen Untergliederungen ihre Sprecher zu einer schärferen Beachtung gewisser

[33]Malotki 1979, 294,297.
[34]Svorou 1993, Thiering 2013.
[35]Svorou 1993.
[36]Svorou 1993, 6-8, Langacker 2008, 19, 43, 55-57, Ameka 2006, 371
[37]Malotki 1979, 144,261.
[38]Malotki 1979, 145.
[39]Malotki 1979, 295,298.
[40]Malotki 1979, 293.

> Bereiche der räumlichen Realität zwingt, als dies die meisten SAE[41]-Sprachen tun.[42]

Thus, Malotki claims that Hopi-speakers are forced by their language, and, as we assume, by the environment, to pay more attention to spatial reality. He does not claim any difference to other languages in terms of encoding space and does not assume that the Hopi's 'Weltbild' is unique.[43] He points out the idea of a Hopi's 'Raumbild' or *idea of space* that might be cultural and language specific. Indeed, Malotki believes that a difference in focusing on particular aspects of spatial relations might lead to differences in thinking of space, i.e., a linguistic relativity principle in its modest form appears to be his conclusion.[44] A verification of this assumption is possible, but a direct proof seems rather difficult to obtain. It could be argued that spatial deixis terms used, e.g., by peoples in the Alpine regions of Europe, are similarily reflecting a very precise relationship between the environment and language as in the case of Hopi.[45] Obviously Eipo and Dene Chipewyan present crucial environment-dependent encoding patterns mirrored in the languages. The mountains and rivers as important limitations in Eipo or Cold Lake, lakes, rocks, trees and rivers in the Dene culture, show their repercussions in the language patterns and the carving-up of spatial concepts on the language level. Malotki concludes for Hopi that language uses a fine-grained linguistic system to encode spatial relations. We would add that language aditionaly uses spatial concepts that also differ from most other languages.[46] The paper is structured as follows: we first present some theoretical fundamentals of cognitive linguistics, followed by anthropological outlines of Dene Chipewyan and Eipo. We then present some selected examples of spatial concepts in Eipo (center and periphery and natural limitations, distance, and orientation in Eipo) followed by spatial concepts in Dene. Finally, we compare representations of spaces in Dene and Eipo based on a variety of data sets. We conclude the paper with some general comments.

2 Theoretical Frame

A long-standing tradition in philosophy argues that language must be grounded in reality.[47] This idea of language as a mirror of reality is called linguistic realism

[41] Standard Average European; M.T. & W.S.
[42] Malotki 1979, 299.
[43] Malotki 1979, 301.
[44] Malotki 1979, 301.
[45] Berthele 2006.
[46] Malotki 1979, 293.
[47] Davis 2003, Hershenson 1999, Marr 1982.

or naive realism.[48] Wittgenstein rejects this view, as have others.[49] He claims that in acquiring language humans also acquire the objects of the projected external world.[50] Following this, we survey the idea that most cognitive linguists subscribe to that language is not anchored in an objective reality only. Hence, the question is whether it is in direct contact with cognition through sense perception. Indeed, it is only our language as a semiotic system that presents an essential way of the external representation and cognitive apparatus influencing the kind of contact and interpretation we have with/of reality.[51] Hence, cognition or more specifically mental spaces are understood here as mediator[52] through which we perceive the outside world, even when the objects and their spatial location seem stable and 'real'.[53] We will see that indeed environmental aspects play a crucial role in language and cognition, at least in the surveyed languages and cultures presented. Most classical approaches to modelling cognitive processes as human information mechanisms are based on the Turing machine analogy.[54] When such a serial computer metaphor is invoked, the brain is regarded as an input/output device having both long-term and working-memory capacity.[55] Such an approach is based on the idea of an information transmission device.[56] This implies that representational units are stored in the brain isomorphic to events in the real world.[57] Within such a model, language serves only as a code, transmitting information between cognition and the outside world.[58] We argue that language has a constructive character in that it serves as a device to develop and maintain mental spaces. These, in turn, are influenced by cultural, social, historical, phylogenetic, ontogenetic etc. aspects of a community. The dominant philosophical tradition in the cognitive sciences has long claimed that all languages share the same underlying universal grammar and, therefore, by logical extension, the same conceptual structure.[59] According to this view, the conceptual structure is based on perception, and visual perception of space in particular is regarded as an ex-

[48] Lehar 2003.
[49] Wittgenstein 2001, Monk 1994, Mulhall 1990, Rundle 1990, Sluga and Stern 1996, Tyler and Evans 2003, Vohra 1986.
[50] Piaget 1976, Piaget 1992, Piaget and Inhelder 1956, Heidegger 1985, S. Schmidt 1994, S. Schmidt 1996, S. Schmidt 1998, Watzlawick 1981.
[51] Svorou 1993, 32.
[52] Fauconnier 1994, Fauconnier 1997.
[53] Fauconnier 1997, 34.
[54] Penrose 1991, 28-71, Strube 1996.
[55] Anderson 1983, Anderson 1996, Arbib, Caplan, and Marshall 1982, Baddeley 1990.
[56] Anderson 1983, Anderson 1996, Baddeley 1990, Gathercole and Baddeley 1993, Penrose 1991.
[57] Aitchison 1997, Emmorey and Fromkin 1988, Rumelhart and McClelland 1986, Schreuder and Flores d'Arcais 1989, Tergan 1989, Wissenschaft 1994.
[58] Penrose 1991.
[59] Chomsky 1965, Fodor 1983, Fodor 1998, Hillert 1987, Fodor and Katz 1964, Wierzbicka 1972, Wierzbicka 1992, Wierzbicka 1996.

ternally cued input system that transmits information via our senses. Cognition is considered to be the interface between the world out there and the internal mental representations we have of it.[60] These representations are supposed to have developed out of physiological factors and to be genetically determined structures of the brain.[61] In other words, the brain as the organ in which all human activity is located has been the focus, whereas the issue of embodiment the idea that the human body serves as the anchor for all experiences has remained less explored.[62] In conclusion, perception is not assumed to be affected by language or culture only, but also the individual affordances that depend on one's experience with mediated reality.[63] We argue in line with Slobin that perception and language are related and that the way human beings ‚perceive the world is affected by the way they talk about it,[64]

> [W]e can only talk and understand one another in terms of a particular language. The language of languages we learn in childhood is a subjective orientation to the world of human experience, and this orientation affects the ways in which we think while we are speaking.[65]

Furthermore, it is claimed here that not only the brain, but the whole human body serves as an anchor for human experience. Hence, the interaction between semiotic systems such as language, gestures etc. and perception is a basic process of mediation achieved by and based on the human body.[66] Some of the main features of cognitive linguistics were introduced in the early 80s by George Lakoff, Ron Langacker, and Len Talmy.[67] They envision spatial meaning at the center of language and cognition, hence, it is only natural to refer to this framework in line with this paper. In addition, proponents of cognitive linguistics refer specifically to the semiotic tradition as outlined by Ferdinand de Saussure and others. Langacker specifically bases his framework in the semiotic tradition of the arbitrary sign and the different binary systems like langue versus parole, siginifier versus signified, and synchronic versus diachronic. A crucial aspect here is that

---

[60] Anderson 1983, A. Damasio and H. Damasio 1994, Dunbar 1991, Dutke 1994, Engelkamp 1991, Engelkamp 1994, Engelkamp 1995, Fauconnier and M. Turner 2002, Gillett 1992, Hershenson 1999, Jackendoff 1983, Jackendoff 1987.
[61] Schnelle 1994, Wissenschaft 1994, Sucharowski 1996, Strohner 1995, Spitzer 1996, Tergan 1989.
[62] Dunbar 1991, Ender 1994, Engelkamp and Pechmann 1988.
[63] Allwood and Gärdenfors 1998, Neisser 1987.
[64] Miller and Johnson-Laird 1976, 2.
[65] Slobin 1996, 91.
[66] Johnson 1987, Zlatev 1997, Zlatev 2010.
[67] Lakoff 1987, Langacker 1987, Langacker 1988, Langacker 1990, Langacker 1991, Langacker 2000, Talmy 1978, Talmy 1983, Talmy 2000.

the membership of many grammatical categories is essentially arbitrary from a semantic point of view, thus arguing against traditional truth-conditional semantics based on propositional value.[68] One of the major hypotheses in cognitive psychology (which has been the precursor to cognitive linguistics) is the idea of mental representations as abstract schemas or mental spaces or mental models.[69] As is known from gestalt psychological approaches, such schemas are supposedly universal and not language-specific. Moreover, they are abstract representations of human thoughts or events, i.e., they are non-linguistic. They are extracted from more specific structures and categorize such structures through relations of full or partial schematicity. Language is hence regarded as a cognitive phenomenon represented in the mental lexicon, i.e., a storage metaphor that implies abstract structures is used here.[70] The idea of abstract representations leads more specifically to the general claim in cognitive linguistics that all grammatical structures are symbolic. Additionally, the lexicon, morphology, and syntax form a continuum of symbolic units, each residing in the association of a semantic and a phonological structure or pole.[71] Moreover, the meanings of linguistic expressions are conceptualizations shaped in accordance with the linguistic system. In addition, all facets of our general knowledge of a conceived entity contribute to the meaning of an expression which designates this entity, and by that, any sharp distinction between semantics and pragmatics is gratuitous.[72] Semantics is, in this view, not an autonomous cognitive entity, nor is the linguistic system overall. With respect to semantic structures it is claimed that they are predications that are characterized relative to cognitive domains such as time, space, and color. Most domains of linguistic relevance are non-primitive. That means they are interrelated networks.[73] As such, they involve cognitive structures of indefinite complexity, i.e., we have layers of interrelated networks that can be modeled in a connectionist fashion.[74] Any cognitive structure can function as the domain for a predication.[75] Moreover, meaning is conceived as cognitive processing, and even expressions used to describe a presumably objective situation may differ in meaning, depending on how the situation is construed. This is known from figure-ground reversals.[76] An

[68] Kreitzer 1997.
[69] Gentner and Stevens 1983, Johnson-Laird 1983, Penrose 1991, Ritter, Martinetz, and Schulten 1991, Schade 1992, Schreuder and Flores d'Arcais 1989, Strube 1996.
[70] Aitchison 1997, Ender 1994, Engelkamp 1991, Engelkamp 1994, Engelkamp 1995, Handke 1995, Schwarz 1992, Schwarz 1994, Schwarz 1995.
[71] Langacker 1987.
[72] Nunberg 1978, Sweetser 1990.
[73] Wender 1980, Zell 1994.
[74] Bechtel and Abrahamsen 1991, Birbaumer and R. Schmidt 1993, Edelman 2002, Hillert 1987, Hillert 1992, Kandel and Hawkins 1994, Murre and Goebel 1996.
[75] Langacker 1987, 56.
[76] Thiering 2011.

expression imposes a particular image on its domain. Imagery is used as a technical term for the cognitive capacity to construe a cognitive domain in alternate ways. The prominent cognitive linguist Leonard Talmy introduces the figure-ground asymmetry stating that a physical object is located or moves with respect to another object which serves as a reference point.[77] This asymmetry is embedded in schematization. Schematization is the process involving the profiling of specific aspects of a reference point of a scene representing the whole gestalt.[78] Talmy defines the basic asymmetry in a schematization process as follows:

> The Figure object is a moving or conceptually movable point whose paths or site is conceived as a variable [...]. The Ground object is a reference-point, having a stationary setting within a reference-frame, with respect to which the figure's path or site receives characterization.[79][80]

Talmy presents a list of various characteristics of the figure-ground asymmetry specifying the relationship such as the figure being of greater concern or relevance (more salient) as opposed to the ground being of lesser concern or relevance (more backgrounded).[81] This semantic distribution is clearly different from the gestalt notion which is rather perceptually based on geometric coordinates.[82] Langacker defines the asymmetry similarily as a trajector as the figure in a relational profile; other salient entities are identified as landmarks.[83] He argues furthermore that

> [w]ith a few if any exceptions, relational predications display an inherent asymmetry in the presentation of their participants. This asymmetry is not reducible to semantic roles, i.e. the nature of participants involvement in the profiled relationship. [...] it is observable even for predications that designate symmetrical relationships: X equals Y is not precisely equivalent semantically to Y equals X, nor is X resembles Y equivalent to Y resembles X. [...] In the expression X equals Y [...], X is referred to as a trajector, and Y as a landmark. This terminology reflects the intuitive judgment that Y provides a reference point with respect to which X is evaluated or situated [...].[84]

[77] Talmy 1978, 627.
[78] Talmy 2000, Sinha and Kuteva 1995.
[79] Talmy 1978, 627.
[80] Talmy 2000, 315.
[81] Talmy 2000, 316.
[82] Lewin 1936.
[83] Langacker 1987, 231.
[84] Langacker 1987, 231.

Clearly, the semantic distinction between the two conceptually based categories reflects the fundamental notion in gestalt psychology of figure and ground.[85] It is believed here though that the gestalt psychologist's definition is much more complex and broader than the notions adopted in cognitive semantics. Nevertheless the basic idea of a reference object and an object that needs an anchor is similar. Conceptually, the cognitive semantic notion is very specific in the distribution of meaning components in a sentence. Talmy shows that arguably similar sentences such as (a) The bike is near the house and (b) The house is near the bike are not the same semantically. They present two different (inverse) forms of a symmetric relation[86] In (a) the house is the reference object, and in (b) it is the bike, which seems unlikely naturally. Depending on the real world situation, a speaker might refer to the bike as the reference object for various reasons. Zlatev presents a similar example arguing in favor of construed situations. In the expressions (a) The tree is by the car and (b) The car is by the tree different situations are encoded. These differences indicate different worlds of human experience, i.e., a non-objectivist approach is favored here.[87] Hence, the semantic function chosen by the speaker does not correspond to the world of part-whole partitioning, but language-specific information. This might be due to pragmatics or cultural-specific decisions or biases. This example already reveals that language or rather speakers choose to reverse natural figure-ground asymmetries. The selected empirical evidence presented below supports this observation as well.

2.1 Mental Models as Cognitive Maps

As noted above, descriptions of space are based on internal models of knowledge representation of the environment. Such models are defined in cognitive psychology as *mental models* (or, depending on the authors *scripts*, *slots*, *frame-systems*, *fillers*, *schemas*, *idealized cognitive models*, *mental spaces*). More specifically, the term *cognitive maps* represent the geometric (Euclidean) layout of differentiated topography of a space (via toponyms). By definition, a cognitive map or survey representation of a spatial layout encodes Euclidean relations (straight line distances and directions) among behaviorally relevant landmarks within a coordinate reference system centered on the environment. We use the term rather losely or as an analogy since we do not believe in a mathematical coordinate system represented in the brain, at least with respect to the cultures under review. Still, regarding spatial conceptualization the analogy helps to model and describe the cognitive function of representing environmental frames of reference as a cog-

[85] Koffka 1935, 177-210, Rubin 1921.
[86] Talmy 2000, 314.
[87] Zlatev 2003, 332.

nitive device. Cognitive maps function to support navigation, and, in turn, are created by navigation and exploration of large-scale space. During navigation and exploratory spatial behavior, landmarks are experienced sequentially in space and time (*sequential* vs. *serial scanning processes*[88]). The process of constructing a cognitive map can be thought of as a process that places a mental "copy" of each sequentially experienced landmark into a simultaneous system that preserves metric information about the straight-line distance and direction of landmarks relative to one another. An important, emergent property of a simultaneous system is that the spatial relations between landmarks entered in the system are equally available, even those relations not directly experienced. Cognitive maps express the essential structure of spatial information encoded in our memories through learning processes. Like cartographic maps, cognitive maps can be constructed using many different sources of information and encoding processes. Some cognitive maps may be stored as permanent structures in long-term memory, e.g., a cognitive map of a familiar city, while others may be temporary structures of the current state of a dynamic environment, e.g., parent keeping track of the locations of children as they play in a park. In either case the characteristics of objects are thought to be stored along with their spatial locations. Hence, a cognitive map is, in these simplest terms, the encoding of a structure in our memory of what is where, i.e., they are essentially individualized internal representations or models of the worlds in which we live. The processes used to acquire spatial knowledge appear to have a fundamental impact on the character of a cognitive map. The nature of cognitive maps produced by different encoding processes and the focus on understanding the circumstances that produce cognitive maps with fixed orientations and those that produce cognitive maps that are orientation free is at issue here. Cognitive mapping is

> the process composed of a series of psychological transformations by which an individual acquires, stores, recalls, and decodes information about relative locations and attributes of the phenomena in his everyday spatial environment.[89]

The end product of a cognitive mapping process (or conceptual blending) is a cognitive map.[90] Cognitive mapping is a recording process in memory of the existence of an object and its known location in space. Fauconnier argues with respect to mental spaces in favour of connectors that link two objects based on the pragmatic function.[91] A graphical map of a city uses the cognitive mechanisms

[88] Langacker 1987, 144-145.
[89] Downs and Stea 1973, 7.
[90] Tolman 1948.
[91] Fauconnier 1994, 3.

of visual space to convey information about the large-scale space. Within a given visual image, a large number of landmarks are simultaneously visible, so relative distances and directions are easy to judge.[92] The next section specifies the usage of cognitive maps with respect to landmarks serving as anchorage points to navigate and orient oneself in a known and unknown environment.

2.2 Cognitive Maps of Landmarks for Orientation and Navigation

At focus in the very different environments under review, i.e., alpine vs. prairies, are landmarks as external points of reference. Moreover, in this paper landmarks are defined as any kind of cultural-specific environmental reference points. This can be the above mentioned mountains, rivers, houses, rocks, or even a tree. Landmarks are point references external to the person. In a city, landmarks may be distant buildings or geographical features that can be seen from many angles and distances, or they may be primarily local such as buildings, signs, trees, storefronts, doorknobs, or other urban details.[93] Siegel and White argue that landmarks are unique configurations of perceptual events (patterns). They identify a specific geographical location. A person's account of his spatial representations generally begins with landmarks, and these landmarks are the strategic foci to and from which the person moves or travels. Landmarks are used as proximate course-maintaining devices. Not only do they identify beginnings and endings, but also serve to maintain course.[94] Arguably, landmarks shape and determine a detailed topographical map of the environment as represented via language. By landmarks and the environment the following quote by Fowler and Turner summarizes the function of landmarks or geographic features in particular. This quote also summarizes the point of departure with respect to the function of environmental knowledge and its reflection in language.[95]

> The naming of geographic features as part of territorial marking and orientation is a common occurrence in all cultures […] topographical names reflect specific cultural interests and historical developments within the possibilities given by the morphology of the language.[96]

Fowler and Turner clearly point out that the process of naming geographic and territorial landmarks are crucial in all cultures. More specifically they conclude that topographical names indicate particular cultural interests as represented by the language repertoire, toponyms or the language-specific affordances (see below).

[92] Kuipers 1982, 203.
[93] Miller and Johnson-Laird 1976, 378.
[94] Siegel and White 1975, 23.
[95] Miller and Johnson-Laird 1976, 377.
[96] Fowler and N. Turner 1999, 424.

Indeed, data presented here show a rather dense linguistic system of topographical maps represented, e.g., in place names serving as mental maps for orientation. With respect to environmental information the notion of frames of reference is also crucial here since they profile spatial relationships between the speaker-hearer and the environment. It is argued elsewhere that human beings instantiate relations between objects relying on various frames of reference that, as the name implies, serve as reference points to locate participants (see below). These reference points anchor a specific orientation between objects and the viewer.[97] These linguistic coordinates are important for the description of topographical spatial relations in Dene and Eipo, as they are for the description of projective relations in general.[98] It is believed that travelers locate their current position on the earth's surface symbolically within a cognitive map. For orientation in the environment relying on toponyms implies that the traveler must compare the necessary direction of travel toward the destination with reference orientation of the respective cognitive map. To manage a survey without instruments distance and heading are conceptualized as movement, or change of position within a cognitive map. At any time the traveler can estimate distance and direction to known points such as the starting point. Hence, the difficult aspect is to retain a sense of direction especially when being out of sight of any landmarks as in dead reckoning navigation.[99] Orientation processes on land and on sea are based on some fundamentals in mental triangulation and gestalt theoretic conceptions of spatial relations (figure-ground asymmetries). A prominent example from orientation on water comes from dead reckoning as navigation without instruments.[100] More specifically this method in navigation depends on determining one's position at any time based on the distance and direction travelled since leaving the last known location.[101] The navigator monitors the motion of the boat to determine the displacement from a previous position.[102] This mental computing or mental triangulation, i.e., the transformation and propagation of representational states, is arguably also used on land.[103] Hence, in addition to this method also travellers' reports, stories, symbols, icons, winds, roads or any other kind of representations are surveyed to reconstruct ancient cognitive maps of spatial orientation based on implicit knowledge systems. Cognitive maps underly cognitive information-processing systems

[97] L. Carlson-Radvansky 1993, L. Carlson-Radvansky and G. Carlson-Radvansky 1996, Carlson and Logan 2001, Carlson 2003, Levinson 2003, Levinson and Wilkins 2006.
[98] Malotki 1983, 16.
[99] Gladwin 1974, Hutchins 1996, Sarfert 1911.
[100] Hutchins 1996, 65–93; see alsoHutchins 1983.
[101] Gladwin 1974, 144.
[102] Hutchins 1996, 56.
[103] Hutchins 1996, 49.

of spatial orientation.[104] As is argued here, the specific encoding patterns vary in the orientation reference systems. Moreover, spatial reference frames are surveyed that construe a dense matrix or gestalt-like representation of knowledge systems. As such, course maintaining systems on land and on sea based on different sorts of texts are of specific interest. The rationale behind this is to argue in favour of cognitive maps as gestalt-like representations of environmental cues forming a dynamic mental model/cognitive map. What might be common to all culture and hence universal is the gestalt-like constructive process of cognitive maps (see below). These cognitive maps function as implicit knowledge systems that enable people to explicitly navigate in a specific environment at a given time and space. With this description of some basic theoretical features at hand we shall now move to the two cultures at focus here. Some of the just mentioned notions are important for the analysis of the following language examples.

3 Anthropological and Linguistic Background: Dene Chipewyan

This section presents anthropological background information of the Dene culture and linguistic knowledge speakers of Dene relied on in their daily interaction with the environment.[105] Information on the cultural backgrounds is provided as well as language examples of spatial orientation. The Eipo language and culture is then presented in section three.

3.1 Contact History and Recent Acculturation

Dene Chipewyan presents a rather interesting status quo in terms of the actual cultural heritage and the influence of the Western culture.[106] Dene Chipewyan belongs to the Northern branch of the Athapaskan language family (spoken primarily in northwestern Canada). The Dene territory extends (or rather extended) from the southern shore of the Great Slave Lake (Northwest Territories) east to Churchill, Manitoba and south to central Alberta/Saskatchewan.[107] Perhaps partly due to this geographic isolation similar to Hopi, the Cold Lake dialect is rather conservative with a particularly rich morphology.[108] Only about 2.000 speakers are left in Cold Lake, and only 10 % if at all, speak Dene fluently and on a daily basis. The Cold Lake First Nations Dene Suline live near Cold Lake, Alberta, approximately 300 kilometres northeast of Edmonton on the Alberta

[104] Marr 1982.
[105] The past tense indicates the drastic change the Dene culture underwent the past decades.
[106] Eipo, by contrast, has been very isolated until the 1970s.
[107] Sarsi, Beaver, Slavey, Dogrib and all the languages northeast of these also belong to the Northern Athapaskan phylum; see map.
[108] Malotki 1979, Malotki 1983.

and Saskatchewan border. Genetically, the Dene language is related to Bearlake, Beaver, Carrier, Chilcotin, Dogrib, Eyak[109], Hare, Kutchin, Sarsi, Sekani, Slave, Tahltan, Tsetsaut, Tutchone and presumably all the languages northeast of these also belong to the Northern Athapaskan phylum.[110] Sapir hypothesized that the Athapaskan language family is part of a larger language phylum that he called Na-Dene.[111] The history of First Nation people in North America has been highly influenced by the arrival of the White people. It is fair to state that the initial clash between the native people and White people has had a devastating often lethal effect for most of the aboriginal cultures. European colonialists killed about 50 million indigenous people between 1795 to 1945 world-wide.[112] Bodley also claims rightfully that the colonial encounter was not only a human but also a cultural disaster:

> Colonialism was the first phase of a dramatic world-wide cultural transformation that produced a single global-scale culture based on the commercial market economy.[113]

Nevertheless, the arrival of Europeans in the subartic region brought also new technology, schools and economic opportunities. The native First Nation of the subarctic region Canada's were traditionally caribou hunters. The caribou was the most important source for food, clothing etc. The Dene people followed the caribou's travel routes. This is exemplified by the term *edagha* 'a narrow place or area in the lake where the caribous are accustomed to cross and where people sit a little way above (referring to the current) to wait for them'. Moreover and importantly, following the caribou determined and structured the seasonal cycle and socioterritorial organization.[114] The Dene Chipewyan culture has been influenced severely by the Canadian Hudson Bay company[115] and the widespread settlement of White people during the gold rush years. Historically, the Dene people lived in family groups on lands encompassing roughly 150.000 square kilometres. They were apparently a mobile people of hunter-gatherers who maintained both summer (*-sine, ziné* 'summer') and winter (*háye*) camps, travelling between them by foot or dog team. This aspect is important since building a tent (*bét'asi* 'outside of the house, tent') or trap while travelling or following big game (see below)

---

[109] Assumed to belong between Athapaskan and Tlingit; Hoijer 1946, 11.
[110] Hoijer 1946; K. Rice 1989, 11.
[111] Including also Tlingit and Haida; Sapir 1915, 12, Hoijer 1946.
[112] Bodley 1999, 465.
[113] Bodley 1999, 465.
[114] Smith 1981, 273.
[115] One of the oldest companies in the world, established in 1670; mainly trading fur in the british colonized North-America; cf. the Hudson Bay Company Archive for further information; http://www.gov.mb.ca/chc/ archives/hbca/.

depended on the actual material sources of the particular place. After the signing of Treaty or Contract Six in 1876, many families worked on their reserve farms in summer raising cattle and horses. In winter, they continued to travel north to hunt, trap, and fish. In the early 1950s, the Federal Government turned the traditional Dene Suline territory into an air weapons range.[116] It is important to note that the people lost access to their lands and hunting and fishing grounds. Moreover, they have been relocated to three small reserves near Cold Lake totalling approximately 18.720 hectares in size (as opposed to 150.000 hectares before). Although the Dene people live partly in their original habitat (around Cold Lake), the historical hunting grounds are off limits. The Canadian government bases its largest air military base on the former hunting territory of the Dene. This simply means that Dene people can no longer use their old hunting and spiritual grounds, or family locations of the ancestors. A map the size of approximately 3x4 meters at the Cold Lake reserve (band house) actually shows the degree and dimension of the former grounds. This map indicates every band member, band family etc. and their origin, i.e., every place or location in Cold Lake has had a human place holder once. This topology of names is similar to the topology of names that the Eipo have in their mountaineous environment (see below). Additionally to the military base, the world's second largest oil sand field is situated around Cold Lake meaning also that the territory is off limits for the Dene people. Not much is visually left in terms of native traditions in Cold Lake and the village is similar to most other West Canadian villages or small cities, i.e., the village is dominated by fast food stores such as 'Subway', 'McDonald's', grocery stores, and shopping malls etc. typically for North American villages, towns and cities. Hence, Cold Lake is merely a Western Canadian town placed in Alberta far away from the next larger city (Edmonton) and dominated by the Western culture. Dene people speak primarily English and the effort of especially the younger people is to simply assimilate to the white Canadian people in terms of job opportunities or education. The idea of language and hence cultural preservation might be a rather less profound daily interest of the Dene. A general problem with elder speakers of Dene is that some of them simply refuse speaking Dene even though their language is not officially discriminated against today. This is due to the harmful past with respect to their treatment in the residential schools. This led also to the complete reluctance to speak Dene at home. The result is that the next generation (age 45 to 55) shows already crucial language attrition effects not to mention the young generation today.[117] As such, Dene presents an interesting, but difficult language and culture where one has to dig deep getting an idea of the culture and the prac-

[116]Named the 'Canadian Forces Cold Lake', hence, the reserve lands that they now inhabit represent less than one percent of their original traditional territory.
[117]Thiering 2009b.

tices of the speakers in terms of traditional habits and their history. Through oral history some of those traditional habits have survived. In particular elders remember various hunting techniques or the different functions of traps. On a daily basis this knowledge is not important anymore since their traditional way of life has changed so drastically. This paper indeed is an attempt of a first glimpse into the intricacies of the interplay of culture, rituals, habits, and language in Eipo and Dene. It is also an attempt to capture some of the spatial knowledge as long as it is available.

3.2 Material Culture and Subsistence Techniques

> The aboriginal inhabitants of what is now northeast British Columbia are the inheritors of one of the purest forms of hunting economy; purest in the sense that they are peoples who are flexible in the face of every changing circumstance, to whom material possessions are more of a hindrance than a help, and whose skills and mobility secured (as long as their hunts were successful) a life of relative affluence and good health.[118]

The introductory quote indicates the importance of flexibility in the Dene culture in which hunting was the main source to survive. Dene Chipewyan people were mainly Caribou hunters and the most important food animals were the caribou *etthén* of the northern transitional forest and the tundra. Also moose and woodland caribou were important for survival. Generally, caribou were concentrated during their migrations between winter and summer, and in other times scattered in small groups. These behavioral characteristics often determined the manner in which the animals were hunted by the hunters. A linguistic example is indicated by the classificatory verb stem for the caribou arriving, i.e., *etthén níltah* 'arrive' as opposed to *-tl'ah* which is the verb stem used for caribou only as in *The caribou arrived*. The semantic difference is in the momentaneous resultative act of arriving as opposed to the telic end result of the arrival indicated by the perfective form. Another specification is the process of the caribou's return as in *etthén nahéltah* 'return' (only used of caribou) *The caribou returned*. It is apparent that knowledge of the caribou's location has been vital for the Dene since the caribou migration structured the Dene people seasonal distribution, socioterritorial organization, and technology.[119] The caribou were also at focus of religious beliefs and oral literature. During migration phase chute and pound were used. The Dene people circularly enclosed (up to a mile or more in circumference) the caribou herd by a number of people and dogs using a variety of snares

[118] Brody 1982, 85.
[119] Smith 1981, 273.

(traps) fastened to poles or tree stumps.[120] The construction of a snare or a deadfall is a highly sophisticated technology, but it does not require a sound understanding of fundamental principles of physics and the behavioral characteristics of the particular species. Indeed, it is practical knowledge transmitted from one generation to the next that enables such techniques. Their material components are largely comprised of materials which can be found littered about the boreal forest landscape. Dene deadfalls were used mainly for *tha* 'marten', *thachogh* 'fisher', *thelchuzi* 'mink', *nágídhi* 'fox', *sas* 'bear' (*dlézí*'grizzly bear', *sas delgai* 'polar bear', *sas delzeni* 'black bear'), *nábie* 'otter', *dzen* 'muskrat', *tsá* 'beaver', and *nághai* 'wolverine'. Snares were set chiefly for grouse, hare, fox, bear, caribou, and moose. Hence, different techniques were required for different animals. Since the most important animal was indeed caribou, the methods of hunting them will be specified to exemplify at least one of the hunting methods. Once a caribou heard was detected the caribou were manoeuvered into the mouth of a prepared chute and driven to the pound. Being inside the pound the caribou were entangled by snares or traps. In addition, single caribou were hunted with spears or shot with arrows. Knowing the caribou tracks, another option was simply spearing them while they crossed the rivers and lakes. Hence, it was important to know the specific water conditions or the respective river as linguistically represented in expressions such as *des dánét?á* 'the river is full' or *des héli náltthah* 'the river is flowing fast'. Both expressions were important for fishing reasons and for locating caribou. Hunting techniques were adapted with respect to the behavioral characteristics of the animals. Big game use rivers or lakes for there water supply. Of course, since the arrival of White men rifles were used more frequently. Moose do not gather in larger herds as opposed to caribou, they live rather solitary. When finishing eating the moose turns back on its trail to the windward to rest. Hunters adapted to this technique. They followed the trail to one side and windward, checking every once in a while whether the animal had returned. When this was the case, the hunter knew exactly the moose's location. Beside caribou and moose, also bears were hunted, but only occasionally. Beaver on the other hand was an important food source. Usually they were caught during winter when their homes could easily be located. The ice conditions limited the beaver's movements. The idea catching beaver was simple, it was sufficient to block the entrance and then breaking into their lodge. A variety of traps were used such as tossing-pole, springpole, stationary snare, deadfalls of various sizes and

[120] See also Eipo films on the construction of traps; the IWF (http://www.iwf.de/iwf) houses 104 films about Eipo and various activities; *Bau und Demonstration von Gewichts- und Schwippgalgenfallen* (E 2761); *Bauen einer Gewichtfalle* (E 2659); see also the ethnozoological description in Blum 1983, Koch 1984, Eibl-Eibesfeldt 1995.

trigger mechanisms, bows[121] and arrows.[122] Snares were used to catching hare. Only after European contact small mammals were hunted or trapped for their fur only. The dog was the only domesticated animal used for hunting moose, bear, beaver, and geese. Fishing has been only an important food source for some clans. In general big game like caribou was sufficient. Seasonal climatic conditions in conjunction with the behavioral characteristics of the fish, indicated the appropriate seasons of exploitation and the techniques to be employed to hunt them. Trout were taken by hook in open water or through ice holes in late winter. Also fish spears were used. Fishnets were usually made of willow or babiche prehistorically, industrially produced twines and nets after contact. With the approach of fall, people left the summer gathering centers to seek food in preparation for the long and rather cold winter. People carried little with them, because many things could be made relatively quickly with local materials at hand. Although the land required unique skills to survive, these skills did not require a highly specialized manufactured technology in order to act within the environment (the exception was making traps). This is not to say that indigenous technology was not sophisticated, quite the opposite it was extremely complex only that its production did not require specialized labour to produce it. Most people could make most things used in the society. Indigenous people of the North accommodated to the sense of balanced needs with respect to what was available to them locally within their environment. They did not need many things in order to make a living. Their inventory of plants used for food and other material purposes was extensive.

3.3 Social Structures

Regional bands ranged in size from about 200 to 300 people. Local bands varied from 30 to 100 people and their movements were again based on the migration of the herds. Shift of families was common and hence the bands became amalgamed and heterogenous. It can be assumed also that dialects changed or mixed up.[123] Most families were related to each other. Band membership was known as being fluid, i.e., bilateral kinship and marriage provided avenues for new affiliations.[124] Due to European-introduced diseases, substantial social realignments happened. Smallpox, tuberculosis and influence affected the Dene people in the 1920s.[125] After 1945, most children were sent to Catholic residential schools off the reserve to receive a Euro-Canadian education. The entire community was adversely affected by the almost total separation of the family unit, which was

[121] Made of birch; strings were of twisted babiche, rawhide, or sinew.
[122] Made of straight-grained spruce or birch.
[123] As in Eipo; see below.
[124] Smith 1981, 276.
[125] Smith 1981, 274.

maintained except for the few weeks each year when children returned to their families. Elders and children lost the ability to communicate with one another. These schools had an especially devastating effect on the Dene language[126] and way of life not only because children were discouraged from or actively punished for speaking their native tongue in these schools, but because normal linguistic and cultural transmission between the generations was vastly disrupted. This is quite different from the Eipo situation, as will be outlined below. In Eipo, a strong family and community bondage is maintained and hence a detailed topography of their environment is still known. Parallel to the linguistic loss in Dene went the loss of songs, games, rituals, stories, techniques, e.g., practical knowledge of how to built the highly complicated traps, and ceremonies, we propose a loss of community and culture. The last 50 years have seen a steady decline in the numbers of Dene Suline at Cold Lake able to fully communicate in their heritage language.[127] A 1998 survey carried out in accordance with the Department of Indian and Northern Affairs Registration System identified 285. At present the number is down to about 200 speakers[128]; fluent or conversant speakers of Dene Suline out of an official band membership of 1.908. Thus, less than 10 to15% of all band members speak an Aboriginal language to some degree of competency (a small proportion of the band population is Cree). The 1960s must have been traumatic for the Caribou Eater Chipewyan people since their contact-traditional way of life changed drastically and suddenly. The different bands were relocated, e.g., to a Subarctic town being know as one of Canada's worst slums.[129] The result of this relocation had a devastating effect on the people and left them disoriented and demoralized.[130] The imposed village life changed profoundly the traditional living habits of the hunting-and-gatherer culture. Men were supposed to leave families behind while hunting, i.e., the former division of labor was interrupted. The distance from the village to the hunting grounds made it difficult to kill a large number of animals simply because only a limited number of meat could be transported by a dog team.[131]

---

[126] Thiering 2009b; Thiering 2010

[127] Thiering 2009a.

[128] See Smith's table of Chipewyan population in 1970: Smith 1981, 75.

[129] Five regional bands named after geographic areas:

- Duck Lake/Churchill band ('east people'),
- Barren Lands band ('flat-area-dwelling people'),
- Hatchet Lake band ('hatchet-lake people'),
- Black Lake band ('upland or western people'), and
- Fond du Lac band ('pine-house people').

[130] Smith 1981, 282.

[131] Smith 1981, 282.

3.4 Traditional Religion

Myths about places, rituals and used objects, powers, spiritual and medical knowledge, stories, dances and music were religious.[132] Hunting and gathering were the most important activities for survival, spirituality was linked to finding food and was important to survive in the harsh climate conditions. Hence, spirits were thanked for when finding food. If this was not the case the Dene people tried to appease the spirits with offerings. One important spiritual creature was the *Kakhani*, a supernatural being, half-man and half-monster. It was believed to steal children. As opposed to the Eipo who did not decorate most of their tools, not even objects like the holy digging-stick (see below), Dene people decorated their snowshoes with paint, strings of shells, and amulets woven into the snowshoe to keep the wearer safe from unfriendly spirits.

3.5 Physical Environment

The environment of the Dene Chipewyan people is made up of tundra, forest (black spruce, white spruce, birch, aspen; called also the 'land of the little sticks'), and boreal forest. The seasons are basically two-cycles: long and severe winters, short and moderately warm summers. The severe winters limited activities and required maximal exertions for survival. Variation in snow conditions affected the behavior of the fauna (providing food and clothing) and hence affected native techniques for its exploitation. During summer travelling was on foot, following water courses or by canoe on open water. Around late autumn (September/ October) water began to freeze which limited traveling. In winter, dog sleds and snow shoes were used. Game animals provided most of the raw materials, e.g., bones, antlers, hide (skin) to produce beamers, needles, spear, arrow points, fishhooks, bowstrings, lines, bags, lodge coverings. The forest (forest-tundra) provided most of the remaining raw materials for bows, arrows and spear shafts, containers, dishes, net gauges, snowshoe, and canoe frames, snow shovels, toboggans, bark for making dishes, boxes, and coverings for lodges and canoes. Generally, the climate was a dominant and active element in the subarctic environment. This region is known as the cold snow forest category affecting the life circle of the Dene people. Rivers and lakes played an important role in transportation and communication. The drainage patterns and water surfaces were important movement and communication routes and therefore focuses for settlement and other activities during both winter and summer. Also, knowing the games routes, e.g., along rivers, helped finding enough food for the band. The richness

[132] The following short outline is based on the Canada's First Nation webpage, a joined project between the University of Calgary and the Red Deer College (http://.ucalgary.ca/applied_history/tutor/firstnations/home.html).

of fish, lumber, and wood pulp attracted the White enterprises namely the Hudson Bay Company. This, of course, changed also the life habits of the Dene people as well.

3.6 Relationships to Neighbouring Groups

Generally, the marginal location to the transportation and trade routes, the dependence on caribou, and the low interest in European trade goods led to a rather slow and limited sociocultural change.[133] Only in the 1960s changes happened rapidly. Hence, there were no relationships established with Europeans until the 1960s. The only known enemies were the Cree to the south and the Inuit to the north.

3.7 Linguistic Overview

It should be noted that for reasons of history and migration, the Dene band is the most southern of all Dene Suline-speaking communities in Canada and is geographically isolated from other Dene Suline speech communities. Consequently, the dialect spoken at Cold Lake is particularly conservative and rich in phonological and lexical contrasts that have been lost in more northern dialects. Indeed, many Cold Lake Dene speakers regard their dialect with pride as the purest form of Dene Suline (whatever is left of their language). Dene features a polysynthetic linguistic system, i.e., bound morphemes constitute complex words or even sentences and the syntactic object of the sentence is incorporated. The general encoding pattern in Dene indicates that the language features a predominant and consistent classificatory verb system including directional prefixes as well as a postpositional inventory creating relational predication cohorts or constructions.[134] Such verbs have different morphological forms depending on the object to be encoded. Cook argues that Dene has about 36 postpositions that morphologically behave like nouns. They inflect with pronominal prefixes.[135] Cook also highlights the fact that the determination of a postposition's meaning is as notoriously difficult as in English or any other language, hence, it is often impossible to determine the precise meaning out of context. However, these postpositional prefixes are widely acknowledged as modifying the meaning of the verb stem.[136] Their stems change depending on shape, animacy, and/or physical features of the object being

[133] Smith 1981, 282.
[134] See Li 1946, Kari 1979, Cook 2004b, K. Rice 1989, McDonough 2000, S. Rice 2002 on the general structure of the Athapaskan verb stem system.
[135] Cook 2004a, 92.
[136] S. Rice 1996.

located or handled.[137] The general focus is on the formation of certain semantic construction types and the encoding of the figure-ground asymmetry as modified by the linguistic construction.

> The choice of a particular verb stem from the appropriate set of verb stems has the effect of assigning to the noun of the sentence certain qualities of number, shape, texture, or purpose. If these qualities are semantically inappropriate to the noun, another verb stem must be used.[138]

> All the Athapaskan languages exhibit an alternation of verb themes that is traditionally called classificatory. The classificatory themes describe the nature of an object handled with respect to parameters such as extension and dimension. The verb theme indicates the nature of the object handled while the type of activity involved is expressed in the prefixes.[139]

Clearly, the language features a predominant classificatory verb system as do all of the other languages of the same phylum. These stems profile existential situations or actions of certain categories of objects.[140] The following Table summarizes the four main classificatory verb types used in Dene.[141]

Posture or locative verbs	no movement involved: e.g., 'sit', 'stand', 'lie', 'be in position/ location'
Verbs of handling, manipulation, continuing manual contact	e.g., 'give', 'hand', 'take', 'put', 'handle', 'bring', 'carry'
Verbs of partially controlled action (+ agent)	e.g., 'toss', 'throw', 'hang up', 'set down', 'drop', 'lose', 'push over'
Verbs of free movement, independent of agent	e.g., 'fall/tip over'

Table 1: The different classificatory verb types

According to traditional accounts, the Dene verb consists of a verb theme (the basic lexical entry made up of a stem and one or more thematic prefixes; a

[137] S. Rice 2002, 69.
[138] Carter 1976, 24.
[139] K. Rice 1989, 779.
[140] Davidson, Elford, and Hoijer 1963; see Senft 2000 on a collection of papers on classification.
[141] Davidson, Elford, and Hoijer 1963, K. Rice 1989, S. Rice 1997, S. Rice 2002, Cook 2004a.

unit including a verb base plus other morphemes combining to a specific meaning construction) and additional prefixes.[142] The Dene verb construction can be described as a composite construction similar to Navajo.[143] It is claimed here that the Dene verb system is compiled via a string of distinctive elements fused or agglutinated together to form a lexical unit or word, or a sentence. The verb stem is the basic entry or atom derived from a verbal root. The theme profiles the verb base (classifier plus stem construction), i.e., a skeleton of a meaningful lexical unit.[144] The verb stem is assumed to be the content part of the verb, and entails rich semantic information. Clearly, the Dene verb shows polysynthetic and fusional characteristics in its morphology and with its rich prefix system.[145] Subject and object prefixes are fused within the verb.[146] These prefixes encode also five modes[147], and three aspectual forms[148], person, and number.[149] The neuter verb refers to the state or the position of the figure. The momentaneous profiles a rapid action or transition from one state to another as in 'to sit down', 'to handle a round solid object' or 'to lie down'. The continuative verb profiles and activity that lasts in time such as 'to stay' or 'to own'. The customary verb encodes a repeated action and the progressive encodes an ongoing action.[150] Themes occur as free and bound lexical units. Free themes profile nouns and modifiers, bound themes are verbs and pronouns.[151] To show the verb stem changes according to the figure to be encoded, an example of stem variation is given below. It is evident that different objects to be handed over or handled effect and change the verb stem, i.e., the morphology.

[142] Li 1946, Hoijer 1951, Young and Morgan 1987, K. Rice 1989.
[143] Young and Morgan 1987, Young and Morgan 1992.
[144] Young and Morgan 1987, 99.
[145] Buschmann 1855, Morice 1890, Li 1946, Boas 1977.
[146] S. Rice 2002, 66 ff. Cook 2004a.
[147] The five modes are: the neuter, momentaneous, continuative, customary, and the progressive mode.
[148] The three aspectual forms are: the imperfective, perfective, and future aspect.
[149] Li 1946, 404, 409.
[150] Li 1946, 405.
[151] Hoijer 1946, 297.

Template		of	the	Dene	Verb		Prefixes		+	Stem
pp	adv	iter	incorp	pron 3s	object	mode	aspect	1st/ 2nds	class	stem
1	2	3	4	5	6	7	8	9	10	11

be(3sg.)-gha(to)-n(mom)-i(1sg.S)-l(class)-ti(stem)	'I gave animate being to him/her.'
be-gha-n-i- ?a	'I gave round/hard object to him/her.'
be-gha-n-i- ta	'I gave sticklike object to him/her.'
be-gha-n-i-l-chudh	'I gave flat object to him/her.'
be-gha-n-i-la	'I gave plural objects to him/her.'
be-gha-n-i-ka	'I gave open container to him/her.'
be-gha-n-i-chu	'I gave unspecified object to him/her.'

Table 2: Variations on the theme 'I transferred **X** to him/her'

Obviously, the Dene verb stem changes according to the quality of the figure, i.e., different shape, size, animacy of the objects to be encoded determine the choice of a verbs stem. A general schema of the Dene verb stem pattern plus potential affixes is given in Table 1.3.[152]

In the Athapaskan literature it is common to use rather idealised templates as presented above. The number of prefixes vary significantly, e.g., Athna has 23 prefix positions[153], Slave 14[154] and Navajo 10.[155] McDonough divides the verbal complex into a bipartite structure: Positions 1 to 4 are the satellites, and positions 5 to 10 are defined as the pre-stem position[156] The positions (1 to 4) (= disjunctive prefixes) and (5 and 6) (= pronominal subjects/objects) are part of the disjunct or lexical zone and largely have a derivational function, positions (7 to 10) are called conjunct or grammatical zone and include obligatory inflectional categories such as tense, aspect, modality, subject agreement, or valency.[157] Valency classifiers in position 10 indicate the transitivity and voice of the verb, i.e., whether the subject takes a direct object or not. These classifiers mark the valency of the verb. With

[152] McDonough 2000.
[153] Kari 1979.
[154] K. Rice 1989.
[155] Young and Morgan 1987 Young and Morgan 1992.
[156] McDonough 2000.
[157] Li 1946, 409.

regard to the data description, the stem plus the positions 8 to 10 as well as 1 are of primary importance. We have seen some important aspects of the Dene culture and language. The next section presents some background on the anthropological and linguistic aspects in Eipo.

4 Anthropological and Linguistic Background: Eipo

The Eipo are members of the Mek group of Trans-New-Guinea-Highland Papuan languages[158] and cultures and live at the northern slope of the central cordillera in the valley of the Eipomek river,[159] approximately on the 140 eastern longitude and 27' southern latitude in what is now called *Kabupaten Pegunungan Bintang*, 'Star Mountains District' of the Indonesian Province of Papua (formerly Irian Jaya). Thus, Eipo belongs to an estimated number of 760 Papuan languages of about 4 to 5 million speakers divided up into sixty language families.[160] Foley presents a comprehensive overview of the Papuan phylum, its location and its historical background.[161] An important aspect as Foley points out is that according to his analysis Papuan languages are not genetically related, i.e., they do not trace their origin back to a single ancestral language.[162] Again, the Eipo live at the northern slope of the central cordillera in the valley of the Eipomek river (*mek* is the term for water and river, in other dialects of the Mek language also *mak, me*). Their territory is located in the central Mek region. Quite different from the Dene the typical Eipo community consisted, until about 1980, of hamlets of 35 to 200 people that are settled in about 1.300 to 2.000 m above sea level, but the Eipo hunting area extends up to 4.000 m above sea level. Foley points out that New Guinea societies are small based on hamlets between 100 and 300 people.[163] His argument for the small size is that ecological conditions, especially the difficult terrain prevent people to move across barriers (see below). However, a number of Eipo men report to have climbed 2.000 m altitude in darkness, leaving their village by dusk and arriving at the pass (3.700 m above sea level) by dawn. These extraordinary feats usually happened in clear nights with a good moon, but are still a most remarkable performance given that the path is often hardly visible even in bright daylight and that many sections have to be mastered which are deadly dangerous in case one makes a wrong step. These reports and

[158] Wurm 1982.
[159] Schiefenhövel 1976, Schiefenhövel 1979, Heeschen and Schiefenhövel 1983, Heeschen 1990, Eibl-Eibesfeldt, Schiefenhövel, and Heeschen 1991, Schiefenhövel 1991, Heeschen 1998.
[160] Wurm 1982, Foley 1986, Bußmann 2008.
[161] Wurm 1982, Foley 1986.
[162] Foley 1986, 3; but see Heeschen 1992 who argues in favor of genetic relatedness of all Highland Papuan languages.
[163] Foley 1986, 14.

own experiences (Wulf Schiefenhövel) of walking long distance in high altitude with Eipo friends demonstrate that they, as other highland Papuans, are adapted to their environment with a perfection we foreigners can hardly fathom. The Mek share some cultural features with their neighbors in the east[164] and in the west[165]. The Term *mek*, as mentioned above, stands for 'water', 'river', 'brook', also for 'sweat' and other semantic units, generally for watery liquids (cf. 3894). Note that the arabic numbers in parenthesis refer to the entry in the unpublished File Maker corpus of Eipoe at the Max Planck Institute for the History of Science. It is based on the dictionary of Eipo which does not only contain words and their translations into German and English, but additionally features quotes of actually spoken phrases, sections of legends, songs etc.[166] Those entries exemplify the Eipo terms so that the monograph is more an ethnographic wordbook than a mere dictionary. These entries were transformed into the mentioned electronic data file. Additionally, examples of Heeschen's substantial *Ethnographic Grammar of the Eipo Language*[167] and field notes of Wulf Schiefenhövel are used in this paper. Mek*Mek* was a logical local word to be used as ethnonym to designate the cultures and languages in the Mek area. The relationships between the groups in this region and their linguistic and cultural unity were, until 1975, unknown to the local people.[168] The Eipo River or Eipomek is the main river of the area where Eipo was spoken by approximately 800 people at the beginning of fieldwork in 1974, the total of Mek speakers north and south the central range may have numbered about 15.000 then. The number of speakers has risen to at least double this figure in 2009. Other dialects in the Eipo area were spoken by about another 700 persons, so that, at the begin of research in 1974, about 1.500 speakers of Eipo and related dialects lived in the area. As noted above, the villages had between 35 to 200 inhabitants. Also this figure has risen very much due to the dramatic population growth typical for the highlands as well as for the other regions in Papua Province and, at the other side of the border, in Papua New Guinea.[169] In the past, village communities and political alliances were rather small, following a pattern which was found in many New Guinea Highland Societies[170], except where wide valleys had brought about a different settlement pattern, e.g., the Balim valley in the Province of Papua and the Whagi Valley of Papua New Guinea, where much larger populations lived. The following phrases present the importance of the rivers and similar features *(mek)* as landmarks and origin of mental concepts

[164] The Mountain Ok; cf. Pouwer 1964.
[165] The Yali/Jali/Jalí who are a subgroup of the Dani; Koch 1984.
[166] Heeschen and Schiefenhövel 1983.
[167] Heeschen 1998.
[168] Schiefenhövel 1976.
[169] UN 2010, internet source.
[170] Cf. quotation Foley above.

and metaphors in the Eipo language; numerous other semantic usages of *mek,* not referring to spatial deixis, have been left out here.

mek burwe	’head water region’
mek youkwetam	’downstream’ (3894/31), ’towards the foothills’, ’north’
mek bongbong	’(narrow) valley’
mek arum	’water surface’ (191/1)
mek lu	’water surface’ (3623/2) (*lu* = ’even’, ’flat’, ’down’, ’low’)
mek amwe	’bed/bottom of a river, a lake’
meke ebrarik	’water’, ’rivers split up/join’, ’river junction’
mek bene	’stagnant water’, ’swamp’
sisilya arang mek	’reddish brown water (e.g. coming from swamps)’
mek kwen	’lake’, ’pond’
mek bun	’bridge’ (936)
mek dala	’river bank’ (3894)
mek denemna	’border of a brook’
mek duman	’the river shore, along the river’
	cp. *Eipodumanang* ’we are the ones who live at the shore of the Eipo River (the Eipo)’
mek irikna	’river bank’ or ’edge of a river’ (2220/1)
mek deya	’hollowed out river bank’ (3894/6)
mek dorobna	’small spring’
mek lum	’waterfall’, lit.: ’water veil’ (3894/8)
mek ib	’to dam a water’ (3894/10)
mek kate	’ice’, lit.: ’hard water’ (2427/9)
mek loktena	’hollow/cavity made by the water’ (3575)
mek-arye	’that which is caused by water’, ’steam’
mek burbur anmal	’the river swells up’
moke wik meke bo’lunmak	’when there is a lot of rain the rivers swell up’
wakna mek	’actual course of the water’ (3446/2) (as opposed to wakal
kwoten mek	’old river bed’ (5439))

Table 3: Semantic variation of ’river’ in Eipo

mekin bal	’(mythological) snake (which created the land by damming and derouting the water’
basam mek	’water from sacred ponds which pigs should drink to grow faster’
beta mekduman mereklamuk	’(the ancestor) walked the whole way along the river’
mek aleng	’the stringbag which people put over their eyes when they commit suicide by jumping into the river’

Table 4: Semantic variation of ’river’ in Eipo

Eipo speakers differentiate between various kinds of water and base their directional system on the river stream system.[171] The spatial terms *ou* 'down the river', *or* 'across the river on same level or below own position', *ei* 'up the river', *er* 'across the river above own position', and others are river based. Also, as indicated in the list above, many metaphors use river and water as *tertium comperationis*, as in *mek-arye* 'steam' and *mek kate* 'ice'. Also, some shape forms are based on the morphem *mek*, e.g., the bowl-shaped form as a result from water washing out a certain spot or a cavity made by water *(mek loktena)*. With respect to natural boundaries it has to be mentioned that it is difficult, but usually possible to find ways through the rainforest adjacent to the inhabited areas like those in the Mek region, as well in the montane and alpine regions of New Guinea. The swampland present in some lower altitudes poses greater problems for human mobility and has probably contributed to the very marked cultural and linguistic diversity for which New Guinea is known. As Foley states, the terrain thus poses some genuine barriers to human social interactions and would certainly favor linguistic diversity.[172] It seems likely that the extraordinary variety of languages and cultures in this part of the world is also the product of an aggressive (warrior-like) attitude of one group against the other, even inhabitants of one valley towards the neighboring one. Intergroup warfare increases intragroup cohesion and is very likely to have led, in a process of character enhancement, to the very fragmented cultural and linguistic scene typical for mainland and island New Guinea.[173] These arguments are contradicting the Sapir-Whorf linguistic relativity hypothesis, i.e., that diverse languages influence the thought of those who speak them[174] and thus lead

[171] See Brown 1983.
[172] Foley 1986, 9; for another explanation of this striking linguistic and cultural diversity in Melanesia as the effect of intergroup aggression favoring pseudospeciation see Schiefenhövel 2001.
[173] Schiefenhövel 2001.
[174] Lucy 1992b; Gumperz and Levinson 1996; Levinson 2003; Levinson and Wilkins 2006.

to cultural variance and societies which have little in common with each other. The data from New Guinea rather suggest that the process of pseudospecification is set in motion by biopsychological factors. Linguistic markers of ethnic identity and the dynamism of languages developing away from a common origin play, of course, an important role in this process as well. Foley's hypothesis may, as was mentioned, be true for the inundated or swampy sections of the lowlands, but one can safely say that neither very high mountain ranges of close to 4.000 m altitude nor large rivers (like the Idenburg-Mamberamo system north of the Mek area) have kept people from moving across those 'borders'. This is in contrast to what Europeans would assume in view of these formidable barriers. Our species is an extremely mobile one, as proven by the fact that the ancestors for todays Papuans have, after crossing the open ocean at the Wallace line between Bali and Lombok, arrived at the New Guinea coast some 50 to 60.000 years ago[175] and have settled in all the inland. Much later, Papuans, probably first on the islands and coasts of the Bird's Head area in the westernmost part of New Guinea, mixed with people arriving from Southern China and/or Taiwan (the Protoaustronesians) and as Austronesian seafarers made their homes on almost all the islands in Melanesia, Micronesia and in the vast Polynesian Pacific long before James Cook arrived is a truely extraordinary feat of spatial orientation and human expansion across the inhospitable vastness of the Pacific Ocean.

4.1 Contact History and Recent Acculturation

The Eipo were first contacted by members of the heroic crossing of West-New Guinea, from the south to the north coast, by members of the expedition of Pierre Gaisseau (1961) in 1959, and in 1969 by a group of Indonesian military personnel including Gaisseau, who parachuted into the southern Eipomek valley[176], and stayed some weeks in this and the adjacent area in the east. They produced a small amount of good ethnographic and linguistic data and are well remembered by the local people. A few missionaries of the Unevangelized Fields Mission (UFM) walked, in the early 70s through the Tanime, Eipomek and Nalcemak valleys to check possibilities to build mission stations. When fieldwork of the interdisciplinary German research team[177] began in 1974 the Eipomek Valley did not have an airfield and a mission station. At that time, the Eipo therefore lived in marked isolation. Moreover, very few metal tools (bushknives, axes) and a few new plants (e.g. *Zea mays, Sechium edule*) had found their way into this area. Fieldwork of W. Schiefenhövel[178] was mainly carried out in the village of Munggona, the cul-

[175] Swadling 1981.
[176] *Laporan expedisi ilmiah lembah-X.* 1969.
[177] Funded by Deutsche Forschungsgemeinschaft.
[178] First period from 1974 to 1976; follow-up visits in 1979, 1980 2008, 2009, 2010 and 2012.

tural and religious center of the southern Eipomek valley, but also included the neighboring valleys east and west, the Heime Valley south of the central range and regions at the northern fringe of the Mek culture near the Idenburgh river as well as the In valley around Kosarek (where the westernmost Mek speakers live) and the hitherto uncontacted area inhabited by the Lauenang north of Kosarek. In 1979 the inhabitants of the Eipomek valley accepted Christianity. It is important to notice that this acceptance was basically a political, not a religious decision. The Eipo had realized that they had lived separated from the rest of the world with its stunning superiority in material goods and technologies and wanted to become part of this world. As in other regions of Melanesia the new religion was seen to hold the promise to connect them to the hitherto almost completely unknown way of life. Until now (2012), the strategy to accept Christianity as an avenue to the modern world, has worked out well for them. Many children go to school and are doing very well, some of the young people are students of Cenderawasih University in the provincial capital of Jayapura or in other academic institutions of the Indonesian Republic, even in the capital Jakarta. All this remarkable change was managed in one generation. This radical change had and still has repercussions on the Eipo culture and language. Moves for a religious revival, including the classic cargo-cult type millenian prophecies, have not affected the Eipo yet. They have, indeed, so far opposed such utopic ideas. It seems they have understood that the only way forward, also for their survival as a cultural and political group, is to become as educated as possible. Many elements of their traditional lives have changed, but others have remained much the same as in 1974 partly due to the fact that there is no road for any type of vehicle connecting their region with any of the centers of the province. Walking and the plane will, for a long time to come, be the only means of transport. One of the most dramatic changes in the political field concerns the fact that the Eipo and their neighbors have understood that they form a larger single ethnic group with the same Mek language and very similar cultural traditions and that they should cooperate on the stage of provincial politics. They have thus developed a new spatial-political concept, which is paralleled by their new, much widened horizon: quite a few of them travel by plane to Jayapura, the provincial capital at the north coast (about 200 km direct line or one and a half hour flight), and other cities, e.g. Wamena, the main hub of the highlands of Papua Province. Walking beyond the formerly rather confined borders of areas where relatives lived is also common now. Quite a number of Eipo, also middle-aged persons, walk to Oksibil, the government center in the east of the Mek region not far from the border with Papua New Guinea, and live there for a while, despite the fact that people in this region speak the Ok language which they do not understand, the lingua franca is Bahasa Indonesia which is

well mastered by many Eipo.[179] Most administrational posts are filled with persons of Papuan origin, including the governor of the province and the rector of the University in Jayapura-Abepura. Eipomek, the name of the airfield and the administrational seat of the upper Eipomek valley, has a number of offices for public servants, but no one is working there yet.

4.2 Material Culture and Subsistence Techniques

Traditional tools were the *ya* 'stone adze', *kape* 'stone knife', *fa* 'bamboo knife', *kama* 'wooden digging stick', *yin* 'large bow', *mal* 'arrow', *aleng* 'string bags' (of various sizes), *towar* 'ratan liana' for binding and fire-sawing and some other, smaller tools plus a range of body decorations.[180] Subsistence techniques were a mix between horticulture, hunting and gathering. Highland New Guinea is the homeland of some important domesticated food plants and thereby one of the worldwide very few centers of early agriculture. Some of the main plants are the *am* 'taro' (*Colocasia esculenta*), *kuye* sugar cane (*Saccharum officinarum*), *bace* a related plant eaten as vegetable (*Saccharum edule; pitpit* in Neomelanesian Pidgin), some protein-rich leafy greens *(mula, Rungia klossii; towa, Abelmoschus manihot)* and probably also *kwalye* 'banana' (*Musa paradisiaca*) belong to these autochthonous foods. Various cultivars of sweet potatoe (*kwaning*, *Ipomoea batatas*), the arrival of which (either after the conquista or through early Polynesian transpacific contacts) in New Guinea is still debated, provide the bulk of carbohydrate energy and are thus representing the staple diet. Hunting[181] is not very efficient as the local species of marsupials[182] are small, yet it played an important role in providing essential amino acids and was held in high esteem by the men. Hunted game is still ritually important (to host special groups of guests, as part of the bride-price etc.). *Basam* 'pig' (*Sus scrofa*) and *kam* 'dog' (*Canis familiaris*) are placental, i.e. non-marsupial human imports and foreign to the ex-Sahul fauna typical for New Guinea and Australia with kangaroos, wallabies and the like. Dogs are not eaten by the Eipo, whereas the pig was and still is, a very important source of protein and fat. As pigs are not able to find enough food themselves they are fed, usually sweet potato, and thus represent a luxury food reserved for special occasions. They continue to be also very important for ceremonial exchange. Horticulture provides the staple foods of the Eipo. Gardens *(wa)* were usually made in areas which had been cultivated before and allowed to lie fallow for approximately 15 years. This period was determined via a bioindicator: the growth of the *urye*-tree (*Trema tomentosa*), when it had

[179] *Ok* is the term for water and river in this part of the New Guinea highlands.
[180] For a complete inventory of their material culture, see Koch 1984.
[181] With bow and arrow, often assisted by specially trained dogs or with snares and traps.
[182] Mice, rats, opossum-type animals of the *Phalangeridae* family.

reached a certain height and diameter the soil was seen to have recovered and to be ready for a new round of planting and harvesting. Fallow periods are shortened since some years due to the marked population increase and the need for more food. The garden land is owned by the patrilineal families. Some clans, the ones who are said to have come later in the history of settlement, do not formally own land in the Eipomek valley but are given plots to grow their food. In this way, there was, in normal situations, neither shortage of suitable land nor of garden produce. Everyone who was physically able to work in the garden could do so and feed him/herself and the family. Garden land is sacrosanct. The individual plots are clearly identifiable: at the corners or other crucial spots of the garden's border the sacred *yurye* (*Cordyline terminalis*) is planted. This is a small tree with often reddish, lancet-shaped leaves, of which several cultivars are known and also planted at other critical places, e.g. near the sacred men's house, at meeting places or at the head of the long canebridges spanning across roaring rivers. Interestingly, this very plant signifies religiously relevant places throughout the Pacific, e.g. the entrance of temples in Bali and holy sites in Polynesia.[183] The visual line connecting the *yurye* is the border (*wa wiliba,* literally: 'the garden work-stopper') in Eipo gardens. Not respecting this border by clandestinely or openly transgressing and planting or harvesting in the land of one's neighbor led to serious conflict: verbal aggression and, possibly, physical fight. Everyone knows this law and usually respects it. There is, thus, family owned not communally owned garden land. The geometry of the gardens, their general shape, slope, geological condition and suitability for particular crops is common knowledge as is the closer and wider area around the village which is represented by a rich network of place names. When one walks on a path leading away from the village towards the periphery one crosses from zone to zone, all with defined borders, specific place names with their specific history of what happened there in mythic, remembered, and recent times. Known space is, thereby, meaningful territory, a carpet of culturally encoded signals, enriched with one's own experience, with emotionally and cognitively relevant contexts. Arguably, this might have been similar for people in a rural environment and daily encounter with its spatial and other features. It is at least similar to the Dene Chipewyan tradition.

4.3 Social Structures

Patrilinear descent and virilocal residence, i.e., the wife moves to the husbands village, are still in place. The marked division of the society into female and male spheres (with men's houses and women's houses, both religiously meaningful, and

[183] At this point it remains an open question whether the surprisingly wide distribution of this plant as a religious symbol is pure coincidence or effect of cultural exchange.

other cultural institutions), which was present in the Eipo culture like that of other Papuan groups in the New Guinea highlands, has been reduced in recent years. Similar to other Papuan societies the leading roles in the public arena were, in the past, taken by the big men (*sisinang*, literally: 'the ones who speak'). They got these positions through a mix of personal characteristics, among which intelligence, vitality, rhetoric and social skills were most important. In this meritocratic system without heritable chieftainship all public affairs were managed, including the decision whether to wage war or make peace with the main enemy in the adjacent western Famek valley. Today, new leading positions have become available, among them those of church leaders and teachers; incipient forms of election are becoming institutionalized. Clan exogamy was and still is the guiding principle for marriage. In the past 12% of all men were, at one time of their lives, married to more than one, usually two, exceptionally three wives; this optional polygyny has been given up with the acceptance of Christianity. Divorce was common, the woman usually took the smaller children of the couple with her and went back to her own family; usually, she was married again soon.

4.4 Traditional Religion

In this section some notions on the former animistic religion of the Eipo are provided. Like that of the other highland New Guinean, in fact, Melanesian religions in general, it was based on the belief that the visible and invisible world is filled with beings, i.e., *isa* 'spirits' of various kinds similar to the Dene Chipewyan tradition. Most important were creator spirits, e.g., the *Yaleenye*. Similarly powerful were the sacred pig and several female beings like the *kwaning fatane kil*, the 'spirit woman who is always hungry for food'. Some of them were thought to be still existing and active by interfering in the life of people. *Yaleenye* (literally: 'the one coming from the east') and other 'creator gods', as one may call them, had shaped the earth, making its formerly swampy surface inhabitable by wedging stones into it and by planting sacred trees. Thereby, they created the kind of earth in which plants, especially the food plants, can grow and on which people can live. They also formed the beds of the large and the small rivers and instructed the early people how to lead a proper life. They showed them how to make stone adzes from rocks in the Heime valley, to establish men's and women's houses and how to carry out ritual ceremonies. One mythical account tells how the first humans dug their way from underground to the surface with their foreheads. *Yaleenye* taught them how to change their ugly, dirty faces by cleaning them with leaves and pig fat and decorating them with ochre, thus, how to become real humans with beautiful faces. Other *isa* were those of the animals (wild and domesticated), of rivers, conspicuous rocks, trees, certain places (like that

of the sacred pig *kwemdina basam*), and of all the dead persons (*ise dib* 'the true spirits'). These agencies dwelling in the different spheres further or closer away from the abode of people were able to influence the life of humans, the fertility of their gardens and other important aspects of livelihood. Diseases were thought to be caused either by one of these spirits or by harmful black magic (*kire*). Specific ceremonies (*kwetena*) were carried out by male or female healers (*kwetenenang*) thought to be able to communicate with the spirit world, to improve the condition of the sick person. Sorcerers believed to have killed somebody were sometimes 'divined' by a seer (*asing ketenenang,* literally: 'someone whose eyes are sharpened') and then killed by the family of the deceased person. Religion and secular life were not distinct, but essentially intertwined. Before dancers of the Heime Valley descended, from the mountain pass to the village of their hosts, where they would carry out their rather spectacular dance performance[184], they prayed to *Murkonye*, one of the powerful creator spirits, to make them shiny and radiating with beauty and vitality. Also during everyday acts, religious ceremonies were interconnected with what people did. If one were to chop down a tree with one's stone adze, one would first carry out a ceremony designed to safeguard this procedure: the adze should not become damaged, oneself should not become injured and the tree should fall quickly into the right direction. When one approached a rock shelter in the high mountains one would address the spirit believed to dwell there to receive the human visitors well and to protect them from the harsh and dangerous surrounding.

4.5 Physical Environment

This section presents some information with respect to the local topography, and hence spatial coordinates as defined above that are of particular importance in this chapter. The Jayawijaya Mountains, the stretch of the central cordillera separating the northern and southern Mek groups are, as the rest of the Trans-New Guinea mountain chain, a formidable alpine massive. The lowest passes to cross from north to south or vice-versa are at about 3.700 m altitude; the highest summit of the Province, the Puncak Jaya or Carstensz Top, reaches 5.000 m, the highest peaks in the country of the Eipo (e.g. Abom, Mt. Juliana, Gunung Mandala) are about 4.700 m high. The geological situation is such that the northern slope is much more gradual than the one on the southern side, where often very steep cliffs are making human access very difficult. Still, these high ranges with their threatening cold temperatures and lack of food are commonly traversed by the local people. Their survival then depends on finding suitable rock shelters where one can build, in the narrow, rain-protected margin under overhanging rocks, a

[184] See the film *mote*, visiting feast, Simon & Schiefenhövel 1989.

fire and a makeshift windshield of branches, grass and bushes. The Eipo and their neighbors did and do these potentially dangerous trips for a number of reasons, mostly for visiting trade and marriage partners on the other side of the range or for snaring or otherwise hunting the small marsupial rats and mice which live in this altitude. People actually die up there, the most feared form of death, *moke baybubuk* 'he/she died out there in the rain without protection'. The loneliness and the being exposed to the forces of nature is perceived as horrible in such cases not death as such, which was and is usually accepted in a fatalism produced by the normative power of the factual: around oneself, there is a lot of dying: plants, animals and humans die and there were (apart from religious, i.e. psychosomatic forms of medical treatment) no chances to do anything about this. Besides hunting and trapping, the region of the mountain forest above the regularly inhabited areas was utilized to cut building material for the houses and collect wild foods. Of them, *Pandanus brosimos* was especially important; the nut-like seeds of the large compound fruits contain a high amount of fat, otherwise very rare in the Eipo diet. Also other edible plants, like berries and mushrooms, were gathered in this region. The radius of firsthand geographic knowledge of the Eipo (and the other peoples in this part of highland West-New Guinea) was about three days (fast) walking. They did not venture any further as there were no relatives on whose assistance one could count for food and protection. Walking was and is the only form of getting from one point to another. Today, a small number of airstrips facilitate (some) travel(s), provided one has the money for the ticket. Small children very soon acquire amazing skills in mastering difficult terrain with bare feet. It is impressive to see the relative ease with which everyone, including old persons, walks on slippery narrow logs, wades through deep swamp and finds a footing in stretches of vertical walls. None of the informants ever complained about the necessity to walk to far away gardens, hunting grounds or villages.

4.6 Relationship to Neighbouring Groups

The Heime River is running south in a kind of mirror image of the Eipomek River which runs to the north.[185] Here, near the village of Langda, right in the valley of the Heime, is a quarry of Andesit stones, the material of which high quality stone adze blades can be knapped. The next such place is about 150 km away (Balim Valley). The relationship of the Eipo to the Heime was, therefore, of vital importance: without stone adzes, neolithic life is impossible. Apart from this trade-relationship (the Eipo paid for the unpolished stone adze blades with stringbags and food stuffs less frequent in the Heime valley) marriage partners

[185]Note that *mek* is the term for river or water in this Una-dialect group of the Mek languages; see Louwerse 1978, Louwerse 1988.

were often found in the two valleys across the dividing range. It is, therefore, not surprising that such trips were regularly made, either in larger groups invited to dance and feast[186] or in smaller groups of a few family members, despite the fact that one has to climb from 1.700 m (the altitude of Munggona, the central village of the upper Eipomek valley) to 3.700 m (the pass) and then approximately 2.000 m down again to Langda and the other villages on the southern side. Sometimes this 4.000 m feat was performed by the locals in one single day. The mountain range was therefore, as mentioned above, no 'natural border' for these Papuan groups. To the neighbors in the Tanime Valley east of Eipomek the relationship was not as close, but good, whereas the neighbors in the Famek valley to the west were the traditional enemies. Warfare *(ise mal, male fey bin-)* was common (11 months during the time of first fieldwork from 1974 to 1976) and caused many deaths as did intragroup fighting *(abala)* in the village or political alliance: 25% of the men were victims of armed conflict.[187] There was no conflict resolution involving a third party, therefore revenge and a thus spiraling escalation of aggression were the cause for the high blood toll, and, as mentioned above for the high degree of cultural pseudospeciation so typical for New Guinea. Cannibalism *(ninye dina)* occurred exclusively in the course of warfare; when an enemy had been killed in a situation where his body could not be defended by his own group, it would be cut up, carried to the village of the enemy and prepared there, in the traditional earth oven, for a ritual meal. It is interesting that some persons declined to participate in these ceremonies which were, as the informants said, designed to destroy, with one's teeth, the slain enemy in utter totality.[188] Since 1979 the pax christiana has so far stopped warfare between the Eipomek and the Famek valley and drastically reduced intragroup homicide.

4.7 Linguistic Overview

The Eipo language features predominantly a subject-object-verb order.[189] Note that Heeschen claims also that Eipo is a noun plus verb language implying that another noun is basically treated as a free unit, i.e., associated constituents are freely moved around this basic unit.[190] The subject role is filled by a human agent.[191] Also object-subject-verb structures are frequently used. Compounding is the main source to denote or construe word meaning. Nouns are not inflected

[186] Simon & Schiefenhövel, op. cit. (Eipo (West-Neuguinea, Zentrales Hochland) ‚Sonnertanz sang mote als Kinderspielfilm, E 2686); see also IWF Göttingen: http://www.iwf.de/IWF.
[187] Schiefenhövel 2001.
[188] Heeschen 1990.
[189] Heeschen 1998, 286.
[190] Heeschen 1998, 286.
[191] Heeschen 1998, 286.

and not morphologically marked.[192] They are morphologically simple and case marking is pragmatically handled, i.e., the actual discourse marks subject and object of a sentence or situation. In transitive propositions the noun is profiled as the direct object, things and living beings are acted upon, they undergo actions, manipulation and creation by human beings.[193] Gender is profiled by ways of compounding and derivation, e.g., using *yim* for 'male' or *kil* for 'female' to classify, if needed for particular reasons, the noun[194], in normal speech gender is not specified in verb conjugation. Number is expressed either by context or via the verb morphology. Nouns are modified by adjectives.[195] More specifically, adjectives denote dimension, distance, and position in geographical and social space.[196] They also denote color, age, value, and properties of human beings, animals, plants, and objects. The class of adverbs profile verbs, adjectives, pronouns, adverbs, and sentences.[197] Eipo differentiate between various adverb types such as temporal ('day', 'time') local ('down there', 'in the middle', 'into the direction of', see list of terms for spatial deixis below), and modal adverbs, degree adverbs ('very'), and focus or conjunctional adverbs ('also', 'too'). Verbs denote actions and processes.[198] As opposed to nouns, which prototypically profile landmarks and objects located in space, verbs denote motion events between such landmarks, actions, processes, or conditions.[199] Verbs designate a process unfolding in conceived time.[200] Langacker calls a verb a 'symbolic expression' whose semantic pole (a symbolic structure consists of a semantic and a phonological pole) profiles a process.[201] The quote below summarizes the idea of a process in connection to the verb as a symbolic expression unfolding in time.

> A process is defined as a sequence of configurations (states) conceived as being distributed over a continuous series of points in time. Usually the separate configurations are distinct, i.e. a verb typically designates a change through time; a normal verbal predication is therefore highly complex, for it incorporates as many separate conceptual situations as there are recognizable different states in the designated process.[202]

---

[192]Heeschen 1998, 197.
[193]Heeschen 1998, 197.
[194]Heeschen 1998, 200.
[195]Heeschen 1998, 210.
[196]Heeschen 1998, 211.
[197]Heeschen 1998, 215.
[198]Heeschen 1998, 223.
[199]Bußmann 2008, 773.
[200]Langacker 1987, 244.
[201]Langacker 1987, 244.
[202]Langacker 1987, 143,144.

In Eipo, verbs are bound morphemes profiling various processes such as aspect and tense, but also person, number, and mood.[203] The morphemes are suffixed to the verb. Syntactically, verbs profile predicates, and person-number suffixes agree with the subject noun phrase (NP). Note that NPs in Eipo can be constructed out of a noun or a pronoun.[204] The grammatical suffixization is parallel to Eipo proper nouns which can take suffixes for human beings indicating gender.[205] It is also important here to mention that number of nouns is inferred from either the context, or profiled by the verb's morphology and its respective suffix. As seen in the above section with Dene and the template indicating various slots left of the verb stem, also Eipo motivates a sequence of bound morphemes: + stem +/-tense/ aspect +/- object pronouns + tense/ mood/ person/ number.[206] The stem without a final consonant is called a root.[207] Such roots can take the above listed slots such as tense, person, or number suffixes. More interestingly is the lexicalization process of compound verbs. This process of the formation of lexical units (as opposed to grammar) is a characteristic typological feature of Mek languages.[208] Heeschen argues that in Eipo most of the (last order) stems are verbs profiling movement in space, e.g., positions 'to sit' or 'to stand/stay', i.e., they behave like posture verbs.[209] The Eipo language consists of six tense-aspect suffixes and six sets of tense-mood-person-number suffixes.[210] With respect to tense-aspect the Eipo language distinguishes today's past (past.i), near (past.ii) and remote past (past.iii). The same with the future aspect, i.e., immediate (fut.i), near (fut.ii), and far future (fut.iii).[211] A typical structure for Papuan languages in general is the classification system, i.e., the object-dependent grammatical marking via the verb.[212] It is argued here that the Eipo language does not feature a classificatory noun/ verb system.[213] The nominal system encodes not only gender, but relies heavily on the different verb roots encoding particular features of the object. Foley gives an example from Waris, a Papuan language spoken in Sandaun Province, Papua New Guinea in which morphemes are prefixed to the verbs encoding objects found inside a container (*vela*), spherical objects (*put*-), food cooked and distribute in leaf wrappers (*ninge*-), leaf-like objects with soft or no stem (*lé*),

[203] Heeschen 1998, 223.
[204] Heeschen 1998, 265.
[205] Heeschen 1998, 200.
[206] Heeschen 1998, 223.
[207] Young and Morgan 1987.
[208] Heeschen 1998, 231.
[209] Heeschen 1998, 231,234.
[210] Heeschen 1998, 246.
[211] Heeschen 1998, 257; Table 47 for an overview of the tense-mood-person-number suffixes.
[212] Heeschen 1998, Wurm 1982.
[213] Heeschen (p.c.) argues that also Eipo has a tendency for classification, but only a weak one not comparable to the other Papuan languages or Dene.

leaf-like objects with hard stem (*pola*-) etc.[214] In Dene Chipewyan various verbs encode different characteristics of the handled objects, i.e., verbs of handling, manipulation, continuing manual contact, e.g., 'give', 'hand', 'take', 'put', 'handle', 'bring', 'carry'. Foley calls these verbs transfer control/position of something.[215] Verbs of partially controlled action including an agent (e.g., 'toss', 'throw', 'hang up', 'set down', 'drop', 'lose'), and verbs of free movement that are independent of an agent (e.g., 'fall' or 'tip over' in Dene).[216] This system enables the language user to profile exactly the semantic features of the object to be encoded. This is also interesting with respect to spatial morphemes used in the delimitation of spatial relations. In Eipo and Dene specifically, not only the spatial dimension is important to be carefully singled out, but also the aspectual point of view. It should be noted that an independent verb is in final position in Eipo and is inflected for person, tense and number of the subject. It has been noted that Papuan languages have a complex morphology especially in the verb. Moreover, the morphology features agglutinative patterns. The complexity of the verb makes the language interesting especially in comparing with First Nation languages of the Americas such as Dene Chipewyan[217], Hopi[218], Navajo[219], Slavey[220] All supposedly polysynthetic languages, i.e., words are based on bounded morphemes that have concrete meaning[221], and especially with Upper Necaxa Totonac spoken in Mexico.[222] Boas indeed claims that:

> a large number of distinct ideas are amalgamated by grammatical processes and form a single word, without any morphological distinction between the formal elements in the sentence and the contents of the sentence.[223]

Cook notes that a verb stem cannot alone constitute a word as opposed to a noun stem.[224] He claims that the internal structure of a verb is equivalent to a full sentence in English.[225] The next example from Eipo presents the fine-grained

[214]Foley 1986, 95.
[215]Foley 1986, 115.
[216]Cook 2004a, Thiering 2006, Thiering 2009a.
[217]Thiering 2009b.
[218]Malotki 1979, Malotki 1983.
[219]Young and Morgan 1987.
[220]K. Rice 1989.
[221]Boas 1977, 74,79.
[222]Beck 2004.
[223]Boas 1977, 74.
[224]Cook 2004a, 85.
[225]Cook 2004a, 86.

aik	*a-bu-lam-se*,	*bai a-ba-lam-se*.
hut	here-sit-hab-1sg.pastiii, outside from/ here-go-hab-1sg.pastiii	

'I lived in this hut, I was going from here into the forest.'

structure of aspectual marking.[226] It presents a typical deictic construction using the deictic morpheme *a-* 'here'.

In Eipo, as mentioned above, the past tense is divided into three stages: past i = today's past, past ii = near past, past iii = remote past.[227] Clearly, the speaker of the quoted phrase, first person singular, explains that s/he lived in a specific house serving also as the point of departure for several trips into the garden land and the forest. The deictic marker relies on the speaker's intended orientation in which 'here' means a close proximity. The next section presents some fundamental cultural concepts, especially in Eipo, showing some interesting culture-specific practices such as building a house. Also some environment-based topographies will be presented.

5 Excursus: Center and Periphery in Eipo

This section presents specific spatial concepts of Eipo only. This is due to the fact that the data are much more comprehensive then in Dene at this point. Center and periphery depend, among other things, on a concept of distance.

5.1 Building an Eipo House

Building an Eipo house is an interesting example in which an old tradition, an old practice becomes visible. A tradition based on joint action rather than orally transmitted knowledge. The community's center of life was, as mentioned above, the men's house (*yoek aik*), a most important point of reference. Sometimes two or three of those sacred houses existed in a community. All socially meaningful structures were usually situated concentrically around the sacred men's house, radiating away from that center. Hamlet, garden, and forest created quasi circular rings around the *yoek aik* and the sacred village ground, *asik kata*. Every place or location in the garden area is owned by someone, be it a hillside, or a knoll.

[226] Heeschen 1998, 143.
[227] Heeschen 1998, 12.

There is a fine grained network of place names represented in mental maps which are very well developed already in children and juveniles who give accurate accounts of this aspect of local geography. The mountains above the garden land, used for collecting and hunting, are connected to specific clans, but can be utilized by others as well. Sacred places can be found all around the living space, i.e., there is a sacred matrix or topology of exactly determined locations based on sacred arrays in the area. One of the major points of departure in orienting oneself in Eipo culture was the house, either the men's house or the women's house (*bary eik*) or one of the family houses (*dib aik*). The men's house signified the center, the women's house was at the periphery of the village. In fact, the house as a general concept as shelter is perceived as a universal place for human beings to be protected from the environment, and as a place of safety and comfort, a place in which the family unit functions as a small-scale community in itself. It is interesting to survey more specifically the various usages in which 'house' appears as a point of location, either as a point of departure or as a place of an event in the life of the Eipo (cf. the entries under *aik* in the dictionary[228]). The house has crucial locational functions in other cultures, e.g., Hopi as well. This should be of no surprise as it is shelter and place of ritual habits also in Western cultures. Moreover, the concept of 'house', signifying the place where a family or similar group lives, is primarily psychological, not architectural. The following summary is based on Koch's work, specifically the section on building family and men's houses.[229] It introduces not only the technique and the different steps for building a house in the Eipo culture, but also the central significance of houses, including the various sacred objects. Moreover, several semantic structures extracted from the Eipo dictionary will be presented, and if possible with its language context. The noun *aik* encodes 'house' and various usages imply its importance or significance for the Eipo community. The alphabetically first entry in the above mentioned Eipo corpus beside *aik* itself is *ninye aik bun berekilbin* 'people are meeting in the core of the house'. The entry for *aik* contains a number of related expressions specifying the function and importance of the house. First and foremost *aik asin* which means the 'fireplace in the house' (*aiktam* 'in the house', 'inside'; note the locational construction N + suffix to encode 'inside' based on the interior of the house). The way home or to the house is encoded as *aik bisik*. The stem *aik* is also used for a sickness caused by a spirit as in *aika* or *aik mek dikmal* 'a sickness caused by a spirit': a severely sick person does not leave the house anymore, often until he or she dies. The basic form of an Eipo house was round with a cone roof, less well built houses were rectangular, with a ridge roof; today quite a large variety of shapes and sizes are found in the Eipo villages. The average diameter of a family

[228]Heeschen and Schiefenhövel 1983.
[229]Koch 1984, 38,56.

house was between 2 meters and 3 meters and the height about 2 meters. The average men's house (*yoek aik*) had a diameter between 5 meters and 6 meters with a height of about 4 meters.[230] Most of the houses had an elevated ground floor of about 40 cm to 100 cm height from the actual ground. The space underneath was sometimes used as hog house, to store firewood, and to keep the ashes. Hence, it was a kind of a stockyard for all sorts of things in general. The living space was about 1 to 2 square meters per person.[231] This confinement has not been perceived as a disadvantage by the Eipo, but as a welcome means to literally stay in direct contact to each other. Building a house is primarily men's business and the process of building a house is classic group and assembly work. All the necessary construction material, including the planks for the walls which are hewn where the specific trees grow in the mountain forest, has been gathered weeks beforehand, i.e., the actual process of building the house is similar to an assembly on a construction site. Women participated, even when a sacred men's house was built, in carrying building material to the storage places or the actual building site. They continue to do that also today. Reusable material from old houses was and is incorporated into the new building.[232] The Eipo used mainly one universal tool, the adze *ya* with a blade made of stone. This specific kind of well-made hatchet was used to fell trees, to split up logs, to shape posts, and other building material, including rattan for binding. One could say that the stone adze was some kind of 'leatherman' or 'swiss knife' for the Eipo in terms of a universal tool. The different stages in constructing and building a house will be exemplified below with respect to the former tradition of building a men's house, *yoek aik*. This socially, politically and religiously most meaningful building, as stated above, was the most important anchor in the Eipo community. Its continuity was granted by keeping the same location, the same sacred objects and by using parts of the old building material. Koch and Schiefenhövel 2009 documented the reconstruction of the old men's house of the village of Munggona. The Binalgekebnaik had a diameter of approximately 6 meters. Planning took place far in advance and some of the sacred rituals were already carried out in the forest. To start off, the men removed the sacred *kwemdina kama* (a relic from mythical times, the begin of creation) and placed it against another men's house during reconstruction work. Normal digging sticks, *kama*, (a) were used as tool, e.g., to dig, to harvest, to weed, and also to level the ground.[233] The *kwendina kama* was the most important sacred object in the southern Eipomek Valley, a holy grail, so to speak. Then the men took off the cone roof and placed it beside the building site. The follow-

[230] This difference in size already indicates the significance of the men's house.
[231] Röll and Zimmermann 1979.
[232] Usually the roof of an old house is used again, also planks for the walls and other pieces which are still of good quality.
[233] Michel 1983, 66.

ing demolition of the old house was accompanied by sorting out usable material; phrases descibing this are *aik nonge ulobuka dobnab* 'we take away/pull down the house (except the roof)', *aik nonge duk'namab* 'we will take the house apart', *aik kolubrabuk* 'one broke down the house/the house is destroyed'. In this process the spirit houses *isa aik* became visible. They were usually hidden under the ground floor, e.g., *ambonga* 'space underneath the house'. As stated earlier, the ground floor was between 40 cm and 100 cm above the ground. After leveling the ground the men brought *ayukumna,* long house posts which provided the main structure of the house. This stage was orchestrated like a procession and performed in an ecstatic, rhythmic dance, accompanied by the typical inspiratory whistling which provides the basic rhythm during Eipo dance feasts. The *ayukumna* were driven into the ground about 40 cm deep. Roles of bark from a specific confer were brought into the circle of posts to check whether they fitted the diameter of the house. This was the only type of measurement taking place, all other pieces were placed intuitively. The bark would later cover the floor and thereby provide a soft, even top layer (*amsona*). The next step is to set the four slim poles *ateka* to delimit the fire place (*ukwe asin* 'fire place in the house'). Two of these are called *mem ateka* (taboo poles) having sacred meaning. They were covered with fern leaves to protect the hands of the men from being burnt by their hot property. When the men brought them, they again danced and chanted rhythmically. Several layers of circular transverse strutts *afanya* were then carefully bound to the *ayukumna*. They held the house posts in place and provided a horizontal rim supporting the floor. Later another ring of *afanya* was fixed at the upper end of the posts stabilising them there and providing support for the roof. In building a men's house or other houses the next step was to place, in a criss-cross fashion, long flexible sticks, slightly exceeding the diameter of the house, on the horizontal rim provided by the *afanya.* Thereby, a flexible floor was created which slightly slanted towards the middle as an interesting feature which helps utilise the heat of the central fireplace more efficiently. To give more stability (30 or more men may, at a given time, be inside the men's house) to the floor layers, crossbeams *wanun yo* were squeezed horizontally underneath. For family houses sometimes reed *(Miscanthus floridulus, fina)* was used instead of wooden sticks as it is easier to come by. Short planks *abelenga,* reaching from the ground to the level of the floor, were fixed with rattan, the classic material for all bindings. This first circle of short planks typical for men's houses blocked the view of the space below the floor where new little spirit houses were been built in the meantime. The planks forming the wall of the men's house above the floor and reaching to the roof were gradually fixed as well. These planks are, also today, cut from a tree (*Galbulimima belgraveana, lue)* which easily splits so that flat, even boards can be produced. The Eipo, even now, where Christianity has superseeded their belief

in spirits, try to seal the walls of their houses as well as possible: Little openings, cracks etc. could provide an entrance for spirits or other harmful agents, in former times also for arrows. The following language examples present the importance of spirits in the former Eipo tradition: *aika* 'sickness' (caused by house spirits); *isa kum angnulamak* 'the spirits come up to the neck (i.e. they eat the person, make him fall sick)', *aik mek dikmal* 'water is stuck to the house/(metaphorically) the spirits are catching them (the inhabitants)', *isenang* 'the spirits, (met.) the enemies', *kingkin bisik keniklamak* 'they are caulking the clefts (between the boards of the wall of the house as protection against arrows and spirits)'. Especially the last example indicates how important it was to protect the house from the spirits. In the small, roughly built houses underneath the ground floor of the men's houses they had an official abode and, at the same time, were contained so that they did not come into direct contact with people. The most devastating events, believed to have been caused by a giant spirit *(Memnye)* living deep down underground, were the two earthquakes in June and October 1976, both measuring above 7 on the Richter scale. Hence, throughout the whole ritual which was connected to building a men's house various kinds of sacred ritual practices were thought to be necessary to calm down or appease the ghosts. It should be repeated here that for the Eipo earthquakes as well as sickness, accident or other mishap were thought to be punishment for broken taboos or disrespect towards the spirits. The massive earthquakes, in the course of which several Eipo died and which completely destroyed the whole village of Munggona and its sacred men's houses, including the sacred objects, had a deep impact on the people. It facilitated the transition to Christianity and thereby initiated the very fast process of acculturation. In its consequence, the transmission of cultural knowledge passed on orally via myths, i.e., through spoken language, was partly interrupted.[234] Returning to building the sacred Binalgekebnaik men's house, the next step was to construct the support to hold the conical roof, the main weight of which was resting on a short central pole which was attached to the four poles, *ateka*, delineating the fireplace. The outer rim of the roof was resting on the upper end of the *ayukumna* house posts stabilised by the top ring of *afanya*. Finally, the old roof was carefully put in place; many men, and sometimes women even, were participating in this last climax of sacred actions.

5.2 Natural Limitations in Eipo

Mountains and the sky mark the limits of the Eipo world. The place where the mountain and the sky meet is called *motokwe ime ebrarik* 'mountain (or land)

[234] Heeschen 1990, 143.

and sky, the two meet'.[235] Beside the sky as an obvious visible limitation, the mountainous region has its repercussions on the Eipo culture and language in terms of places, and natural limitations. See the following examples in all of which indicate the importance of environmental landmarks such as mountains and its function in the Eipo culture. The next tables present various semantic differentiations of the concept 'mountain' in Eipo.

motokwe aryuk-	’(myth.) to pile up’ or ’create the mountain’ (194)
motokwe berengne	’a world of emptiness’ or ’solitude, i.e., without any plants’ (475)
motokwe akonum bereksingibuk	’the land lay bare, nothing grew’(476)
motokwe cange wik	’mountain is spacious’ or ’big’ (1050)
motokwe dandoble	’the mountain’ or ’the area is uninhabited’ (1176)
motokwe kon dinib’mak	’they go round the ridge of the mountain (in order to avoid to climb it)’ (1442)
motokwe dok	’flank of a mountain’ (1502)
motokwe dub	’top of a mountain’ (1592/2) (*bebengdina, bebengdin* = mountain top (a mountain range is often the border between two regions, e.g., between the Eipo and the Marikla, who were enemies; the same metaphor is used for the border between the world of man and the world of the spirits)
motokwe seringsarang fabminyak	’(mag.) the empty earth shall bear flowers’ (1797)
motokwe filibable	’the mountain becomes smooth’ or ’flat (met. for ’to faint’, ’to become unconscious’) (1962/1)
motokwe kwakwa lakabdanamle	’the world will be transformed into a butterfly (when praying to the ancestors it is asked, that the leaves of all food plants should move in the wind like the wings of a butterfly)’ (3102/1)

Table 5: Semantic variation of mountain as landmark in Eipo

[235] Which might be translated as the concept of a ’horizon’; 1692.

doa motokwe-dam lelelamle	’the clouds are piling up at the mountain there’ (3425/7)
loun motokwe	’an area or a mountain not tabooed where everybody is allowed to go’ (3620/1)
marman, motokwe marman	’transverse (path) under a cliff’ (3867)
motokwe kon	’mountain top ridge’ (4087/4) (*sin* ’mountain top’, ’high plateau’
motokwe tob-nang	’those who know about the world, are able to explain the world’ (4087/6) (*toba* = ’it is there’; ’is/are present’, ’continous’)
motokwe yim	’mountain (ridge edge’) (4087/7) (*bisik wamumna* ’ridge’)
tarekna motokwe	’(lit.) cold mountains’ or ’high mountains’ (4087/9)
motokwe erelamle nun gum ob	’the mountains rose at a time when we weren’t yet there’ (4448/2)
sik motokwe	’(this is) their mountain’ or ’area or hunting ground’ (4708/2)
motokwe tilibak	’places or areas where the trees grow dense or where there is a lot of growth’ (5181)
motokwe yupa	’pass’ (5920) (*Tekiltakalyan-* ’to climb up and meet’, ’to meet on a mountain top, a pass’ (5103)

Table 6: Semantic variation of mountain as landmark in Eipo

Clearly and not surprisingly, the mountainous region has cultural-specific and central meaning in the Eipo language and culture, as it has in any other region with such environmental specificities. Hence, mountains have several functions in Eipo. Beside the above meanings, some related concepts follow below. The Dakul and the Lyene, are particular mountains, formerly believed to be the 'mythical abode of sun and moon' (1143, 3732). The direct connection between the moon and the Eipo region is expressed in the term *Yaburye* 'mythical river attributed to moon and sun' (5683). Both the sun and the moon have specific cultural values as in *ketinge-ton wale-ton Dukuramduweik a-kururak* 'sun and moon, the two of them created the Dukuramduweik-men's house here' (3038) in the village of Dingerkon, or *im maka* 'secretion of the sky (code for: sun and moon)' (3776/4). Here are some descriptions of the various stages and some metaphorical expression regarding the various positions of the moon which is not surprisingly also

connotated as female *wale are kil* 'the moon is a woman' (2641/1). The examples present various metaphors of the moon in its different stages in Eipo.

wal su eleklamle	'the moon is wrapped in leaves/can no longer be seen' (5450/6)
wal yulamle	'the moon is cooking (in the earth-oven)', 'new moon' (5450/7)
wale yang kelamle	'the moon is or becomes like a tusk', 'crescent moon' (5775/2)

Table 7: Moon in Eipo

As is apparent, the moon in its different stages is encoded via figurative usages that intuitively make sense to a Western speaker as well. The general importance of the moon for fertility is evident also in Eipo. The Eipo interpreted the waning and waxing of the moon as transitions from menstruation, i.e., residing in the women's (menstruation/birthing) house to the reappearance at the end of menstruation and leaving this special and sacred place. The moon marks, additionally, the connection between a mythical spirit and the bare landscape, in particular the high surrounding mountains.

5.3 Distance in Eipo

The data from the dictionary and Heeschen's grammar[236], the various ethnographic films[237], and the myths suggest that the Eipo do not possess abstract terms for distance and volume. In one instance, an interesting observation was made. Work at the airstrip, carried out by the local people under supervision of Wulf Schiefenhoevel and an assistant from Ilu, a mission station in Dani country west of the Mek area, had been going on for many weeks. The general shape of the landing field was visible. It was delineated by the longitudinal ditches which were dug to drain off the substantial amount of daily rain water at its side. The width was thus determined, as well as the lower and upper end. When it was announced that Wulf and Grete Schiefenhoevel would walk to Bime, the nearest mission station which had been opened two years previously and from where the advance group of the German Research Team had started its five-day walk to Eipomek, several men and boys said they would like to come along. As soon as the group had arrived in Bime, some men looked for string, i.e., long sections of bast and other fibres and similar material. They connected many pieces by knots and when

[236] Heeschen 1998.
[237] See film archive at the IWF Göttingen.

the string was long enough, measured the width of Bime airstrip, marking its size before the string was rolled up and stored in a bag of one of the men. Schiefenhövel was quite surprised by this activity and asked what they were doing. We are comparing (*kiklib-*) the 'axillary wing' (*ke fol)* of the airplane. We know that the plane can land here and we want to check, whether the *ke fol* of the airstrip we are building, with so much effort, in Eipomek has the same size so that the plane can also land there. "Stone-age" Eipo were checking the job of the white fieldworker as they wanted to be sure that the engineering was done according to standard. This is quite a scientific procedure. They were happy when, on return from Bime, the *ke fol* of their future landing field had the proper width. This measuring was not done by counting steps or feet, but by a quasi holistic act of comparing, i.e., a gestalt-like mental map is used. In a somewhat similar way garden land, *wa,* (usually old gardens reused after approximately 15 years of lying fallow, sometimes newly cleared primary forest) is divided into individual plots without employing fixed units of distance. The borders of the plots are commonly marked by small trees *(yurye, Cordyline terminalis*, a sacred plant in many regions of the Pacific) in such way that the line connecting the *yurye* is defining the end of one and the beginning of another plot owned by families and passed on in the patriline. To encroach into the land of another family is considered a serious offence and leads to open conflict. Some morphemes indirectly represent ideas of distances such as 'in between', i.e., a specific distance between two landmarks. Hence, distance and other spatial and geometrical concepts are used by the Eipo, and are presented.

boltak-, boltakab-	’to keep distance from someone or something’ (732)
yanyane faye bin-	’to leave foot-prints (song and dance texts for) to walk long distances’ (1874)
inib-, enib-	’(to make see) to search, to invite over a long distance’ (2190)
karen, karin	’unoccupied, keeping distance’ (2395)
karenkaren balamak	’they go separately, keep distance’ (2395/2)
aik kwakne bisik	’the path through / in between the houses’ (3098)
lukfara ban-	’to look out, to look out into the distance’ (3647)

Table 8: Various expressions of distance in Eipo

nisin diberen-	’to look into the distance’ (4395)
onob-	’to refuse, to turn down, to keep at a distance’ (4527)
yan onolbin-	’to make a big step (on the day when the sacred men’s-house is built one is not allowed to walk a long distance. The taboo is apparently taken away by making a big step over a puddle or a small pond.)’ (4528/1)
tamublabdongo	’to gain a greater distance to someone who is following, to keep a distance when walking’ (5000)
tekisib-	’to keep a distance’ (5107)
tekisibnin balamak	’the women keep a distance (to the men while walking)’ (5107/1)
usamkila	’clouds rising in the distance’ (5411)
webrongob-	’to follow in close distance, to be attracted’ (5526)
winilkidik-	’to wander about, to walk big distances (said of the ancestors)’ (5627)
bisik	’way, path, direction’ (612)
bisik dukuble	’the path/entrance is just wide enough (to be able to carry s.th. through)’ (612/5)
bisik kwangdanya	’fork in the road’
bisik lebarikna	’the moving around’ or ’avoiding of a steep part of the path’

Table 9: Various expressions of distance in Eipo

The most common word to express distance is *fera, fere* = 'distant', 'far away', requiring a long walk. The term *fera* as well as the various phrases presented above do not, of course, entail a specific, precise measure of distance, as steps, miles or kilometer. But for an adult member of the Eipo society, who knows her or his territory extremely well and has also walked to further away places, this term is sufficient. The problems arise when foreigners, like white researchers, hope they can extract some metric or time measurement from their informants: *fera* can be quite close, but also terribly distant. Hence, it can be stated that there is no technical term for distance in Eipo, but a variety of context-dependent phrases and words, for which one can use the term 'distance' as a translation. Nevertheless, with respect to building houses, traps or bridges the Eipo are able to conceptualize the exact structure and architecture and order of actions necessary to assemble various materials to build the different types of houses, the technically advanced traps (as in Dene Chipewyan) or a bridge. It is apparently not necessary to have

an explicit and abstract measure to construct buildings or even the rather sophisticated cane bridges spanning across wide rivers, examples of neolithic high-tech. Similarly, no abstract terms for distance are necessary to apply static and other principles of physics; they are implicitly used. It is not necessary to know, e.g., the abstract concept of pi, i.e., it is not important to know and apply the idea of a circle in a strictly geometrical sense. The Eipo and other traditional peoples have developed certain forms and principles which were functionally and economically better than others and, thereby, became part of their culture.

6 Representations of Spaces in Eipo and Dene Chipewyan

The two languages under survey are compared with respect to their spatial concepts and categorization, i.e., linguistic spatial markers of environmental landmarks as represented. As stated in the introduction, our interpretation of Eipo and Dene spatial concepts is guided by the fine-grained analysis of Hopi space or rather the Hopi ideas of space, i.e., 'Raumvorstellungen'[238]. Malotki's survey seeks to present the various facets of this language in their function to encode spatial relations in a detailed degree of specificity.[239] Eipo and Dene Chipewyan present specific environment-dependent encoding patterns mirrored in the languages. The mountains and rivers as important limitations in Eipo or Cold Lake in the Dene culture show their repercussions in the language patterns and the carving-up of spatial concepts on the language level. In the following sections we will show a variety of examples from Eipo and Dene showing various ideas of space.

6.1 Orientation in Eipomek

The following summary on Eipo structures presents some first hand data.[240] As has been described above, in the Eipo religious tradition humans appeared on earth from underground and gathered in groups. Their most important place became the men's house (*yoek aik*, see below). It was a crucial place securing life and prosperity of the hamlet. It was hence the center both as a real location and as a spiritual place. From the center to the periphery extended a network of paths and additionally of arrangements and limitations starting already inside the men's house, e.g., with a specific seating arrangement and placing of the sacred objects. It has to be added that each Eipo village had one or two women's houses, which

[238] Malotki 1979.
[239] Svorou 1993.
[240] Heeschen 1990, Koch 1984, Koch and Schiefenhövel 2009, fieldnotes Schiefenhövel 2008, 2009, 2010

a-kame	*ara*	*lulukene*	*mem*.
here-stick	theme	shake/make(vb)	forbidden

'As to this sacred digging-stick, it is forbidden to cause it to be shaken.'

am	*bob-m-ik-ine*,	*ou-Dek*	bob-ik.
Taro	carry-dur.-3pl./pa.iii-sc.	down/there-Dek	carry-3pl./pa.iii

'They were carrying the taro, and then they carried them to the Dek river down there.'

were also sacred and taboo for the men, as were in some respects the equivalent of the men's houses for the women. This social organization following a marked gender dichotomy and the specific environmental conditions are well established in language structure and religion, i.e., many points to orient one self are semantically filled with cultural-specific entities or landmarks. In the following data sets (next page) some examples are presented that show the specificity.

The examples present some important and relevant objects in Eipo, e.g., the sacred digging-stick *kama,* sometimes pronounced *kame*, which was kept as the most important religious item, and the ritually important ancient food plant *am* 'taro', or specifically meaningful places, e.g., the Dek river, or the Northern lowland area. Moreover, the examples indicate the importance of cultural-specific habits relying on specific practices, e.g., the digging-stick as a sacred object is responsible also for a certain order or ritual as in *kama bukwotebnin yanamuk* which can be translated as the 'primeval digging-stick came putting everything in order and smoothing everything'. As the stick of creation it was kept in a specific place, some kind of shrine of the men's house.[241] Interestingly, in all cases a deictic marker is used to indicate the exact position of the place, the direction or the event (a). Eipo speakers orient themselves in their mountainous environment by a fine-grained network of names for mountains, hills, slopes, rivers, and plains.[242] Heeschen states about this environmental topology:

> Eipo speakers mainly use the spatial deictics as a condensed and abbreviated structure in face-to-face-communication: here the deictics are accompanied by a pointing gesture.[243]

[241] Koch and Schiefenhövel 2009; Heeschen 1990, 85.
[242] Foley 1986; Heeschen 1998, 143.
[243] Heeschen 1998, 143.

Basic orientation in space for the Eipo is, as has been mentioned above, provided by five deictic points of reference based on the ego's position, 'here', 'there', 'up-valley', 'down-valley' (note that both valley-related orientations function just like cardinal directions in Eipo), 'across', i.e., a so-called relative frame of reference.[244] The basic set of deictic markers consists of the following morphemes, taken from the dictionary and Heeschen 1998 and Schiefenhövel's field notes.

a-	’here’
ei-	’up there’ (see below for some more examples)
ou-. u-	’down there’
or-	’accross here’, ’across the valley’, ’on the other side’, ’the other slope (but not upwards)’ (4536)
or-asik	’the hamlet over there’ (4536/1)
or-deibsilyam	’put it there (on the same height)’
ortiba	’it s over there’, ’across the valley, spot across the river’
er-	’across the valley/the river’, ’upward of own position’

Table 10: Here and there: General Deixis in Eipo

These examples exemplify the various usages of the dual distinction between 'here' and 'there', i.e., the horizontal distance and place of a speaker being 'here' and the vertical 'up' and 'down' distinction. All of the usages are rather unspecific in terms of metrical distance between the speaker and a potential hearer. We also see the importance of orientation depending on the environment, e.g., 'river' and 'valley'. The prefix *d-* is added to deictic morphemes to form longer distances or sharper contrast. The above data set presents a more detailed semantics of the basic deictic markers. The added prefix increases the spatial semantic detail in the encoding of proximal, medial and distal distances. Also, vertical specification or specification of altitude is given that goes in its detail beyond the examples above.[245]

[244] Levinson 2003, Levinson and Wilkins 2006.
[245] Heeschen 1998, 144.

Marikle-nang	*lukenyan*	*or-yan-ma-se-ak,*	*a-mab-ma-lam-buk.*
Marikle-people	night from/ across-come-dur-us-3pl.pres,	here-sleep-dur-2sg.pres-when(different.subject)	

’During the night the Marikle people come to us from across (the valley) there.’

da-	’here’ (in a wider area around the speaker and hearer, here and there)
dei-	’very far up there’ (across the mountains) vs. *fera* = ’far way’, as opposed to *dam*)’; *dam* = ’close by’, ’short (way)’
dam banmarak	’the two of them are coming closer’, ’they are approaching’
dou-	’very far down there’ (’very far down I the valley’)
dor-	’very far across the ridges in the next valley’; ’at same level or lower than own position’
der-	’very far across the ridge in the next valley’; ’higher than own position’

Table 11: Here, there and far across: Specified Deixis in Eipo

These examples indicate that Eipo rely on a topographical system which includes, in these last cases, distances in various metric situations, i.e., proximal, medial and distal. Syntactically the deictic markers are bound morphemes that combine with other parts of speech such as verbs, nouns, postpositions, and predicativizing suffixes.[246] In the example below the deictic marker refers to a distance between ego and another group of people.

'During the night the Marikle people come to us from across (the valley) there, while you are asleep here.' Here, the deictic marker encodes the trajectory of the figure (the Marikla people, i.e., the enemy living across the valley, are coming) and their transition from their home place (the unspecific 'from across the valley') to an implied speaker or vantage point ('us'). An interesting example in terms of a location that is imagined or transformed.[248]

[246]Heeschen 1998, 143.
[248]Heeschen 1998, 144.

a-kil	*ara,*	*a-yanga-lam-lye-ak-da*	*a-tek-am-lul.*
Here-woman	theme	here-come-hab-3sg.med-at-but	here-stand-perf-3sg.hort

‚A-ei-am-ki-n! winyab-lul
here-see-perf-you-1sg-past.i say-3sg.hort
‘As to the woman here, she may have come to the place where he might have been standing.’

Aike	*irikna*	*a-ub-ma-le-to-ak,*	*ou-tonun li-am-ik-ye-ak*
hut	edge	here-be-dur-3sg.pres-as-at	down-as put.into-perf-3pl.med-and-at
aik	*dike*	*ou-deli-lam-ak.*	
hut	food (ritual)	down-put-hab-3pl.pres	

’They put away ritual the food at one edge of the hut, at a place which is similar to this one here.’

'As to the woman here, she may have come to the place where he might have been standing. I have seen you here (or there)! she may have said.' The deictic marker *a-* used in the above example encodes an imagined or abstract space that is removed from the speaker to a distance in which 'here' (depending on the ego) is not the location of the speaker in a real context. The locational marker removes the scene from the actual speaker/ discourse. Heeschen argues that a place is imagined the Eipo speakers do not know. From a morphosyntactic point of view it is interesting that the deictic marker is used repeatedly. Every possible location is marked for each location of the figure and the ground. The example below gives a flavor in the encoding of imagined things that a speaker describes to a hearer who does not know the spatial landmarks.[249]

'They put away ritual the food at one edge of the hut, at a place which is similar to this one here (the speaker points to something), in a similar way they have put down there (things into a stringbag).' It is apparent that this last example can only be understood in its real speech act context since the speaker is actually pointing

[249] Heeschen 1998, 144.

An	*yuk*	*asik*	*a-ub-na-lyam,*	*nun-da*	*der-motokwe*
you	alone	hamlet	here-be-fut.ii-2sg.hort	we-but	very/ far/ across/ up/ there-mountain

bi-nam-ab.
go-fut.iii-1pl.
'You alone should stay in this hamlet here, but we will go to the mountain very far across there.'

at some place. As outlined above, another interesting aspect is the delimination via mountains and thus a seemingly unspecific distance.[250]

Note, as mentioned above, that the future tense in *aubnalyam* is divided into three stages: future i = immediate future; future ii = near future; future iii = far future.[251] The idea of 'very far across there' seems rather unspecific for an unfamiliar speaker of the environment, but for the Eipo speaker the distance to the central range in the south is very well known. Also, it seems evident that the future tense marker encodes a distance in space as well. The hortative (modus of the verb specifying an act of collective action) construction *lyam* encodes the modus of the verb to a collective action, i.e., the English translation introduced by 'You should stay and ending with we will go. Both utterances are related to specific places, i.e., the 'hamlet' and the 'mountain'. The opposite of *asik* 'village' or 'hamlet' is *bay* meaning 'outside' and thereby carrying the notion of 'wilderness', 'uncontrolled', 'dangerous' (cf. *bure, budu* 'outside'; *bure ketib-* 'someone who stays outside, comes back to the village late'; *bure* is purely deictic, i.e., not used metaphorically to signify danger, threat etc.). *Motokwe* has several additional meanings such as 'land', 'landscape', 'region', 'place', and 'world'. The prefixed bound morpheme *a-* has, as already shown, several meanings depending on the context such as summarized below.

[250] Heeschen 1998, 144.
[251] Heeschen 1998, 12.

a-	'here', 'there' (as opposed to 'over there')
a-tam	'here', 'this way' (indicating direction and place; *-tam* = 'side') (cf. *u-tam* = 'down there', 'down the valley' (indicating direction); *u-tiba* = 'it is down there', 'down the valley/the river')
a-teba	'here it is' (*-teba* = predicative particle with deictic pronouns)
a-tebuk	'here', 'this here' (*-tebuk* = predicative particle with deictic pronouns, pointing to something which is past or which had been mentioned before; what has been mentioned in the past or in the preceding conversation and is thus known to the speaker)
a-binmal	'here'/'there he/she/it comes'
a-bisik	'this way', 'along here'
a-motokwe (lit:)	'this mountain here', but also: 'here', 'with us', 'in our place'
a-nirya	'all this'
a-yo	'the wood'/'the tree here', 'this tree'/'this wood'

Table 12: Deictic Expressions n Eipo

The prefixed deictic marker *a-* encodes two possible locations depending on the speaker's intention to indicate a specific direction, i.e., 'here' and 'there'. Note that the morpheme *ortam (or-tam)* encodes, as mentioned above, 'over there'; 'across the valley'; 'across the river (indicating direction)' (4544). The next section presents some general considerations about the Dene delimitations and limits that are mirrored in their language.

6.2 Orientation in Dene Chipewyan

The former section provided some basic spatial concepts in Eipo based primarily on environmental landmarks. This section presents some data from Dene Chipewyan. It is based on Martin Thiering's field work.[252] This language has interesting spatial concepts such as 'up above' (*yudaghe* 'above, at a certain place above'; *betthiye* 'above it (current, wind)', 'down below', 'upstream' or 'up river' (north), 'downstream' (south), 'up from shore', 'down toward shore', 'out to sea or forward' (into or out to open sea), 'inside', 'outside' these terms are very similar to the corresponding ones in Eipo. Most of the concepts are related and oriented to lakes or rivers, more precisely, particularly those around Cold Lake. Related languages such as Carrier, Eyak, Hupa, Koyukon, Navajo, Slave, or Tlingit clearly

[252] Li 1946, Cook 2004a.

encode spatial concepts based on the immediate environment, too, like rivers they travelled to go, e.g., for fishing.[253] It can be assumed that Dene behaves similar to its neighbour cousins, as will be presented below. The next data sets in the following tables present some of the affiliated languages, Tlingit, Carrier, Koyukon, Hupa and Navajo and some of their spatial concepts that are similar to Dene.[254] Note that it is not necessary to present a detailed analysis of every spatial morpheme in the different languages here. What is evident and striking with respect to the subject of this paper is that in all languages above (beside Navajo in these examples) spatial marking is aligned to some environmental landmark, i.e., house ('toward or back to the house'), water or river (*des* in Dene) (up- or downstream). In addition, the direction of the water is paralleled with cardinal directions as in Hupa.

The examples indicate a striking similarity to the Dene data. Dene bases like the affiliated languages its orientation also on environmental landmarks, but additionally uses the cardinal system (*sayesi* 'East from under the sun'; *-da, yethda* 'The Great Bear constellation'). For example, the North *yatthé* profiled also 'up' (cf. *tthi* 'in the north'; *yatthi*'to the north'; *ghadhe* 'West'; *dási* 'west', 'from down river', 'to the West of'). The direction of the wind (*betthiye* [up current], above it (current, wind)) is also marked by the cardinal direction, i.e., *tthísníltsi* is 'wind from North' (concept of the North pole *yatthé néné laghil*) versus *nasniltsi* encodes the 'wind from the South' (concept of the South pole *níl holaghe*). More precisely, the Dene Chipewyan territory was strictly limited by the water systems, i.e., large streams and numerous lakes, but also by extensive swamps, prairies, barrens, and forest.[255] The main limitations were the water systems as can be seen in the following expressions in Dene delimiting the territory. *Kechaghahotínne* 'down-stream they-dwell' is placed west and southwest of Great Slave lake, near the mouth of Hay river along Mackenzie river, and the lower course of Liard river.[256] The expression *Kaí-theli-ke-hotínne* means something like 'willow flat-country up they-dwell'. This region is centering about the western end of Athabaska lake at Fort Chipewyan and extending northward to Fort Smith on Slave river and southward to Fort McMurray on Athapaskan river.[257] *Kes-yehotínne* 'aspen house they dwell' encodes a place near the head of the Churchill

[253]Leer 1989.
[254]Leer 1989, 613, 622; the following abbreviations are used: all = allative; loc = locative; abl = ablative case, suf = suffix
[255]Curtis 1976, 3.
[256]Curtis 1976, 5.
[257]Curtis 1976, 3.

Tlingit	Carrier		all	loc	abl
up above	*ké-*	up above, over	*-do*	*-doh*	*-des*
down below	*ye-, ya-*	down, underneath	*yo-*	*-yoh*	*-yes*
upstream (no)	*naka*(n)	upstream, away up (from the outlet of a lake)	*-nu?*	*-nud*	*-nuz*
downstream (s)	*-?ix-ka*	downstream	*-da?*	*-dad*	*-daz*
up from shore, interior	*-dag*	north	*-no*	*-noh*	*-nes*
down toward shore	*yeg, ? ig*	down towards a body of water	*-cen*	*-cid*	*-ciz*
out to sea, out into open	*de-ka*	forward	*-nes*	*-nes*	
across, on the other side (of water)	*yan*	behind, in the rear, away from a body of water	*-ni?*	*-nid*	*-niz*
Inside	*-nel*	on the opposite side (of the water)	*-yan*	*-yad*	*-yaz*
Outside	*gán* (n)	away, off	*-?en*	*-?ad*	*-?az*
Back	*-qux*				

Koyukon	all	areal	Hupa	loc	suf	Navajoloc	suf
up above	*-dege*	*-degu*	up	*-dah*	*-de*		
down below	*-yege*	*-yegu*	down	*-yah*	*-ya*		
upstream, back behind, to the rear	*-na'e*	*-nuye*	upstream (se)	*-nage*	*-nah-*	behind -ne	*-ne*
downstream	*–do'*	*-duye*	downstream (nw)	*-de?*	*-da-*		
up from shore, up on or above shore (from water), toward back (of house)	*-nege*	*-negu*	away from the stream (ne)	*-dage*	*-dah*		
down to shore, toward front (of house)	*-ene*	*-uye*	towards the stream, downhill (sw)	*-ce? ne*	*-sen-*		
ahead, out on open water	*-nela*	*-nelye*					
across, on the other side (of the water)	*-nane*	across the stream (sw)	*-mane*	*-?an-*	across	*-na*	*-na*
off to the side, away	*-?ene*	*-?uye*	beyond, on the other side	*-?a*	*-?a*		

river system (Lac Isle la Crosse, Portage la Loche, Cold lake, Heart lake, Onion lake). *Háthé-hotínne* 'lowland they-dwell' which is the region of Reindeer lake draining southward into Churchill river. *Sa-yísí-dene* 'sun under (the eastern) people' which is in the barrens between Reindeer lake, Hudson bay, and Chesterfield inlet. *Tandzán-hotínne* is on the northern shore of Great Slave lake along Yellowknife river (*Dení-nu-eke-tówe* 'moose island up lake-on'). The *Hli-chá-dene* are the 'dog flank people' (Dogrib) between Great Slave, Great Bear lake, and La Martre and Copperimine river. With respect to deictic information as seen for Eipo above, Hopi as a very distant language cousin presents for all three distances 'here', 'there', 'over there' in the example below, but expands the deictic system into a more refined pattern including medial information (which is known from Dene as well).[258] Note that the basic space structure in Hopi is threefold based on the following case system: a locative, destinative, and an ablative determine the place or site, destination, and point of origin.[259] Hence, a clear linguistic carving up via spatial deixis markers and general orientation is encoded as in Eipo and Dene Chipewyan. This is clearly an indication of a high degree of specificity in spatial semantics.[260] Hopi separates this deictic space into a four-way matrix such as *ya-ng* 'here' (proximal), *a-* (medial), *e-p/pa-* 'there' (distal), and *ay* 'over there' (extreme-distal).[261] Note that the morpheme *da-* means something like close to the respective 'here', but not as far away as 'there', (poss.) 'here and there' (cf. *deira, doro, doura* in Eipo).

> Central to any analysis of spatial configuration are the linguistic coordinates that dissect the area taken up by the speaker (first person), the hearer (second person), and the persons or things other than the speaker and hearer (third person). English basically structure the terrain occupied by these entities into 'here' and 'there'. Formally adverbs, the semantic thrust of 'here' and 'there' is deictic, with 'here' indicating a point in the immediate vicinity of the speaker and 'there' selecting one further removed from him.[262]

A more detailed account of Dene will show the interaction between environmental landmarks and its representation in language even more as just seen above in Eipo. The following examples present vary basic directional locative markers in Dene Chipewyan.

---

[258] Thiering 2006.
[259] Malotki 1979, 23,84.
[260] Thiering 2013.
[261] Malotki 1979, 27,59,145.
[262] Malotki 1983, 16.

?i? *ya-ng* *nepni* *pas* *kwangw-?eway*
this eatible.herb intns good-seem
here.dif
'The herbs in this region look very fresh.' [263]

?e-p *kwusu-?u*
there-pkt pick.up-imp
'Pick it (this one there) up!' [264]

(ne)ja	'here'
	(ne)ja nanidá
	here 3sg.impf.sit.down.again
	'Sit down here again.'[265]
?eyer	'there'
yughé	'over there'
	li yuwé/yughé theda li
	dog over.there 3sg.impf.ao.sit
	'A dog used to sit over there.'[266]
ekozi	'near there'
hoch'a zi	'away from there/it (time, place)'
-k'ezi	'over'; 'out on' (lake, hill, prairie, flat surface)
nizi	'in presence of' (close proximity)
yuwé nigha	'go (over there)' (verb) 'You go over there.'
-thethe	'above', 'over'
nadaghe	'in front of'

Table 13: Basic Directional Locatives in Dene Chipewyan

náhésja	’go’ (start across) ’I started across’
náhédel	’go’ (start across) ’They (plural) started across.’
nnáhélgé	’go’ (start across) (animal) ’He has started across.’
nalé	’in sight of’ (person, at a distance)
nidhá	’far’; ’It is far.’
nidháile	’near’, ’close by’
nu tedhe	’over us’ (dual and plural)
-thethe	’above’, ’over’
ho tedhe	’geographic’
be tedhe	’person’; ’thing over a person or something’
se tedhe	’over me’; ’above’, ’over my head’, (met.) ’I do not understand.’
nu tedhe	’over us’ (dual and plural)
ni dúe	’standing close together’
-gáh	’close’, ’near’ (beside physically)
hube tedhe	’over them’ (plural)
t’ázi	’behind’ (’going the other way’); ’leaning against’; *ne-t’azi* ’behind your back’
tanizi	’centre’, ’middle’
tajáhai	’In the middle of the lake.’
t’ababel	’near the shore line’

Table 14: Basic Directional Locatives in Dene Chipewyan

These selected examples indicate that Dene Chipewyan (and also Hopi) exhausts a large range of spatial concepts, depending also on environmental landmarks, e.g., lakes in these examples. Additionally, distances are specified, as mentioned before, in a threefold system encoding proximal, medial, and distal relationships between the figure and ground. Those are only approximate distances not relying on exact geometrical or mathematical concepts. Beside these obvious spatial concepts profiling certain spatial configurations, the next data set presents a case in which truly environmental landmarks are at focus. An initial word count in the Elford dictionary of the noun 'water' and related constructions presents 199 hits for water only. The aggregate 'ice' gives about 70 hits.[267]

[267] See also ’river’ = 22, ’lake’ = 31 (as opposed to ’mountain’ = 3), ’land’ = 37; ’shore’ = 6; ’fish’, ’fishing’ = 106.

ten	'ice'
ten deteni	'ice' (thick) (noun/verb) 'The ice is thick.'
ten déch'el	'cracked ice' (verb) 'The ice is cracked (with one big crack).'
ten dzíré líi	'ice' (drifting) (noun)
ten elt'ť'aghidzeghi	'iceberg' (noun)
ten héltál	'cracked ice' (verb)'The ice is cracked (with one small crack).'
ten hóeni	'dangerous' (verb) 'The ice is dangerous.'
ten húlár	'float' (verb) 'Ice floated past.' *ten nádhilteni* 'icicle' (noun)
ten nádénitthel	'chop ice (to make a way)' (verb) 'He chopped ice away.'
ten nágheltal	'crack (ice)' (verb) 'The ice is cracked (with many small cracks).'
ten náthelá	'float' (verb) 'Ice lifted or floated up.'
ten nithelár	'float (verb) 'Ice (large pan) floated to shore & out again.'
ten táthedzegh	'float' (verb) 'Ice floated to shore.'
táthela; ten táthelar	'float' (verb) & 'Ice (large pan) floated to shore.'
ten táthelár	'float' (verb) 'Ice lifted or floated up.'
ten táthi	'float' (verb) & 'Ice is floating (to shore).'
ten ts'et'ani	'ice (thin)' (noun) no entry available
ten tsele	'ice (fall)' (noun) no entry available
ten ts'íli	'ice (spring)' (noun) no entry available

Table 15: Variation of Ice in Dene Chipewyan

This above set of examples of various linguistic constructions encoding different qualities of 'ice' complements nicely the Eipo data on 'river' as an important landmark. During fishing season, the Dene needed to know the specific qualities of ice, e.g., thickness of it. Ice fishing necessitated the exact knowledge of a location where the ice was thin enough to drill a hole and which was at the same time above the fish grounds. Note that in Dene most of the above quoted linguistic constructions are, nowadays, used only by a few fluent elders. It can be assumed that in a generation from now, most of the constructions will be gone.[268]

[268] Thiering 2009a, Thiering 2010.

7 Conclusion

This paper has shown certain aspects of spatial cognition and or rather mental models in two unrelated languages. Clearly, some aspects of spatial cognition are culture specific, being shaped, for instance, by culture-specific practices of spatial orientation and organization. Siegel & White quote Kaplan (1973) and his evolutionary analysis of cognitive maps[269] arguing

> that the cooperative hunting of big game required a cognitive map. Perception, prediction, evaluation, and possible courses of future action can be represented in a map. Spatial representations provide frames of reference for understanding information for which locus is or could be an issue.[270]

Arguably, language here plays a double role as an external representation or semiotic system, on the one hand throwing light on structures of cognition and on the other shaping cognition and influencing its structure. On the basis of the study of a sample of two unrelated cultures and utterances in their languages, the paper attempted to distinguish aspects of spatial cognition. Some might be candidates for universals although they may find different expressions in different languages. We are aware of the fact that argueing in favor of universals relying on only two different cultures and languages is premature and even careless, but in light of this joint book project we have shed some additional light into this intricate question. Aspects of spatial topography have been shown that are truly culture specific in the sense that different cultures develop different cognitive structures. Examples have been provided by deixis and other references to and conceptualizations of space. Moreover, the current paper presented cultural and language specific *ideas of space* of Eipo and Dene Chipewyan (and some selected from other languages such as Hopi). Such spatial concepts have shown to be of crucial importance in the two ethnic groups and related language cousins. People in both cultures lived in complex environments, travelled long distances into dangerous terrain and usually made their way back safely. Survival in their habitats depended on evolved capacities typical for our species to efficiently manage orientation in space. Moreover, it depended on ontogenetic learning about the geography with its many specific features and on a culturally transmitted, linguistically encoded spatial reference system sufficiently precise to foster the process of forming mental maps of their land. We have provided linguistic information about the encoding of such spatial concepts. These concepts are topography-based and related to

[269] Siegel and White 1975, 22.
[270] Siegel and White 1975, 22.

environmental landmarks. Such as mountains or rivers and lakes, on own experience when walking to and returning from various distant places. As well as on culture-specific practices and techniques, e.g., the making of gardens, the hunting and snaring in high altitude and the partly ritualised process of building a men's house in the society of the Eipo or hunting in the society of the Dene. Heeschen cites Konrad Lorenz who states that human thinking is nothing but movement in space, that is, moving on probation in imagined spaces.[271] For the Eipo and Dene spatial classification implies locating the objects i.e., defining places is basically deliminating, based on the environment. Speakers parse up their environment into an important and necessary topography or spatial matrix which is represented in the language via a vast matrix of mountain, river or place names. Eipo and Dene traditional myths function as a chronological topology of places. The description of such components, as Malotki rightfully points out, should include anthropological and cultural aspects of the language.[272] The interrelation of culture, environment, and language has been shown in this paper for Dene Chipewyan and Eipo. As a result, we can state for these two languages that the environment acts upon species typical mental concepts which have, during the evolutionary process leading to *Homo sapiens*, proven to be functioning and hence upon language and action which in turn influence the mental construction of space. This should be of no surprise since every language presents language-specific affordances, i.e., the semantic content hard-wired into specific morphosyntactic devices or morphosyntactic patterns. As such, spatial concepts are linguistically represented and differently based on the respective language system. Malotki points out the idea of a Hopi 'Raumbild' or *idea of space* that might be cultural and language specific. We have shown that such ideas of space are also crucial for Dene and Eipo. This paper has also shown the rich linguistic inventory of detailled spatial concepts encoded in the two cultures. Finally, one can conceive (linguistic) meaning and the understanding of an utterance as the concrete manifestation of a semantic horizon which generally already exists prior to the heard utterance.

> it is certainly space, which forms such a 'Sinn-Horizont' or, in other words, a principle which has a determining influence upon the semantic layer of language.[273]

Our goal was to show the influence from culture upon language (and vice versa) and cognition. Questions such as what is cultural or language-specific and what

[271] Heeschen 1998, 198.
[272] Malotki 1979, 301.
[273] Heeschen's translation of the German original: ‚Konkretisierung eines allgemein schon vor der gehörten Äußerung vorhandenen Sinn-Horizontes. Hörmann (1978, 394), cited and translated in Heeschen 1998, 29.

might be candidates for universals framed our interest in the different languages and cultures under review. These questions, of course, mirror discussions starting with Aristotle arguing that language expresses thoughts that are a priori given (as Kant highlighted as well). Moreover, Gottlieb Frege and the early Ludwig Wittgenstein argue that all cognitive activity is linguistic. This culminates Wittgenstein's Tractatus where he claims that the limits of my language mean the limits of my world.[274] We have shown that this view does not hold for the languages under review. Certain practices, habits, and environmental landmarks clearly show repercussions upon language (as shown in some selected linguistic examples). Hence, our research on Amerindian and Mek languages mirrors some insights from early 19th and 20th century scholars such as Franz Boas, Edward Sapir, and Benjamin Lee Whorf (and contemporary scholars such as Helmut Gipper and Ekkehart Malotki). Those insights were built on Humboldt's idea of Weltansichten 'world perspectives', i.e., the idea that the structure of language influences the thought process. In North-America, this concept is known as the linguistic relativity principle or Sapir-Whorf theory. We subscribe to the idea that languages differ in the way they shape our world perspectives, but believe that non-linguistic information has its impact upon spatial language and categorization. Hence, our current research aimed to show the ideas of space 'Raumbilder' as a web of intertwined interaction of language, culture, and cognition. The following quote by Heeschen summarizes the function of non-linguistic, e.g., environmental, cultural etc., information upon language, in this case the Mek language.

> The importance of reference to space, the social context of giving and taking, and references to non-verbal communication shape the content of the vocabulary. The characteristics and peculiarities of everyday interaction and speech follow from the fact that speech is complemented by, and related to, other semiotic systems.[275]

We subscribed to Heeschen's point of view with respect to the reference of space and its relation to semiotic systems. We presented language data showing the influence and constructive process of environmental landmarks and cultural heritage upon shaping of spatial categorization in the two languages. Finally, it should be pointed out that the future of Dene or rather the Cold Lake dialect seems very bleak. There are hardly 180 speakers left who still master their language, not to speak about its complex spatial vocabulary.[276] One of many once rich and viable cultures with its complex traditions and meaningful concepts of the world in general and of the spatial environment in particular will have died out soon. A

[274] Wittgenstein 2001.
[275] Malotki 1983, 381.
[276] Thiering 2009a, Thiering 2010.

pale shadow of it will survive in dictionaries and ethnographic accounts. How the Eipo will fare in future, will have to be seen. The Eipo are opening their society, which was almost completely isolated and based on a neolithic toolkit only one generation ago, to Indonesian and Western ideas with breathtaking speed. Many villagers including women speak Bahasa Indonesia which is invading, via loanwords etc., their traditional vocabulary (as English did for the Dene). Yet, their own Eipo language does not seem to have suffered from neologisms and other linguistic imports yet. Eipo is spoken in all homes and people are proud of their language. Due to the complete lack of roads they will remain isolated for some time to come. This will limit outside influence. The Eipo are part of the rather large group of Mek cultures and mutually intelligible languages and have become aware of the necessity to be politically united and active, therefore they probably stand a good chance to keep their cultural identity and survive as one of the populations of Mountain Papua. Finally,we hope to have shown that spatial knowledge is embedded in cultural and linguistic practices. This has been outlined above as our guiding principle, i.e., that spatial knowledge is not only encoded in mental concepts, but also embodied in the lived histories of human beings. These histories are represented by cultural and linguistic practices. Hence, our notion in the beginning of this paper arguing in favor of an influence of non-linguistic information upon spatial language and categorization has been shown. The selected empirical data points indicate indeed the influence and even constructive process of environmental landmarks and cultural heritage upon shaping of spatial categorization in the two languages.

Bibliography

Aitchison, Jean (1997). *Wörter im Kopf. Eine Einführung in das mentale Lexikon*. 56. Konzepte der Sprach- und Literaturwissenschaft. Tübingen: Max Niemeyer.

Allwood, Jens and Peter Gärdenfors, eds. (1998). *Cognitive Semantics: Meaning and Cognition*. Philadelphia, PA: J. Benjamins.

Ameka, F. (2006). *Grammars of Space*. In: ed. by D. Wilkins S. Levinson. Cambridge University Press. Chap. Elements of the grammar of space in Ewe. 359–399.

Anderson, John R. (1983). *The Architecture of Cognition*. Cambridge: Cambridge University Press.

— (1996). *Kognitive Psychologie*. Heidelberg: Spektrum Akademischer Verlag.

Arbib, Michael A., David Caplan, and John C. Marshall, eds. (1982). *Neural Models of Language Processes*. New York: Academic Press.

Baddeley, Alan D. (1990). *Human Memory. Theory and Practice*. Hove: Erlbaum.

Bechtel, William and Adele Abrahamsen (1991). *Connectionism and the Mind: An Introduction to Parallel Processing in Networks*. Cambridge, MA / Oxford: Blackwell.

Beck, David (2004). *Upper Necaxa Totonac*. München: Lincom Europa.

Berthele, Raphael (2006). *Ort und Weg. Die sprachlichen Raumreferenzen in Varietäten des Deutschen, Rätoromanischen und Französischen*. Berlin: de Gruyter.

Birbaumer, Niels and Robert Schmidt, eds. (1993). *Lernen und Gedächtnis. Neuro- und Sinnesphysiologie*. Springer Verlag.

Blum, Paul (1983). *Eipo (West-Neuguinea, Zentrales Hochland) - Bau einer Gewichtfalle*. Produktionsjahr 1976 IWF Bestellnumer/Bandzählung: 2659.

Boas, Franz (1977). *Handbook of American Indian Languages, Part I*. reprint of the 1911. 1. London: Routledge/Thoemmes Press.

Bodley, John H. (1999). Hunter-gatherers and the colonial encounter. In: *The Cambridge Encyclopedia of Hunters and Gatherers*. Ed. by Richard B. Lee and Richard Daly. Cambridge, U.K.: Cambridge University Press. 465–472.

Brody, Hugh (1982). *Maps and Dreams*. New York: Pantheon.

Brown, Cecil H. (1983). Where Do Cardinal Direction Terms Come From? *Anthropological Linguistics* 25(2):121–161.

Buschmann, J. C. E. (1855). Der athapaskische Sprachstamm. In: *Königliche Akademie der Wissenschaften zu Berlin, Abhandlungen aus dem Jahre 1855*. 144–319.

Bußmann, Hadumod (2008). *Lexikon der Sprachwissenschaft*. 4th. Stuttgart: Kröner.

Carlson, Laura (1999). Selecting a reference frame. *Spatial Cognition and Computation* 1(4):365–379.

— (2000). Object use and object location. The effect of function on spatial relations. In: *Cognitive Interfaces Constraints On Linking Cognitive Inform*. Ed. by Emile Van Der Zee and Urpo Nikanne. Oxford/New York: Oxford University Press. 94–115.

— (2003). Using spatial language. In: *Psychology of Motivation: Advances in Research and Theory*. Ed. by Aaron S. Benjamin and Brian H. Ross. San Diego, CA: Academic Press. 127–161.

Carlson, Laura and Gordon Logan (2001). Using spatial terms to select an object. *Memory and Cognition* 29:883–892.

Carlson-Radvansky, Laura (1993). Frames of reference in vision and language: Where is above? *Cognition* 46:223–244.

Carlson-Radvansky, Laura and Gabriel Carlson-Radvansky (1996). The influence of functional relations on spatial term selection. *Psychological Science* 7:56–60.

Carter, Robin M. (1976). Chipewyan Classificatory Verbs. *International Journal of American Linguistics* 42(1):24–30.

Chomsky, Noam (1965). *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.

Cook, Eung-Do (2004a). *A Grammar of Dene Suline (Chipewyan)*. Algonquian and Iroquoian Linguistics. Winnepeg, Manitoba: Algonquian and Irquoian Linguistics.

— (2004b). Athapaskan classificatory verbs. *Amerindia, Revue d'Ethno-linguistique amérindienne*(11):11–24.

Coventry, Kenny R. and Simon C. Garrod (2004). *Saying, Seeing and Acting. The Psychological Semantics of Spatial Prepositions*. Hove/New York: Psychology Press.

Curtis, Edward S. (1976). *The North American Indian. Vol. 18, The Chipewyan. The Western Woods Cree. The Sarsi.* reprint. 18. New York et al.: Johnson.

Damasio, A.R. and H. Damasio (1994). *Sprache und Gehirn.* In: . 58–66.

Davidson, William L., William Elford, and Harry Hoijer (1963). Athapaskan classificatory verbs. In: *Studies in the Athapaskan Languages*. Ed. by Harry Hoijer and et al. Berkeley: University of California Press. 30–41.

Davis, Wayne A. (2003). *Meaning, Expression, and Thought*. Cambridge: Cambridge University Press.

Downs, Roger and David Stea (1973). *Image and Environment: Cognitive Mapping and Spatial Behavior*. Ed. by Roger Downs and David Stea. Aldine.

Dunbar, Georg (1991). *The Cognitive Lexicon*. Narr.

Dutke, Stephan (1994). *Mentale Modelle: Konstrukte des Wissens und Verstehens*. Göttingen: Hogrefe.

Edelman, Shimon (2002). Constraining the neural representation of the visual world. *Trends in Cognitive Science* 6:125–131.

Eibl-Eibesfeldt, Irenäus (1995). *Eipo (West-Neuguinea, Zentrales Hochland)- Bau- und Demonstration von Gewichts- und Schwippgalgenfallen*. Produktionsjahr: 1979 IWF Bestellnumer/Bandzählung: 2761.

Eibl-Eibesfeldt, Irenäus, Wulf Schiefenhövel, and Volker Heeschen (1991). Film- und Tonaufnahmen bei den Eipo, Neuguinea. Zur Methodik der Datenerhebung und Auswertung. *Wissenschaftlicher Film* 42.

Emmorey, Karen D. and Victoria A. Fromkin (1988). The mental lexicon. In: *Linguistics: The Cambridge Survey. Vol. 3: Language: Psychological and Biological Aspects*. Ed. by Frederick J. Newmeyer. Cambridge: Cambridge University Press. 124–149.

Ender, Uwe F. (1994). *Sprache und Gehirn: Darstellung und Untersuchung der linguistischen Aspekte des Verhältnisses von Sprache und Gehirn unter beson-*

derer Berücksichtigung der Hemisphären-Zeichenasymmetrien. München: Wilhelm Fink.

Engelkamp, Johannes (1991). *Das menschliche Gedächtnis*. Göttingen: Hogrefe.

— (1994). Mentale Repräsentationen im Kontext verschiedener Aufgaben. In: *Sprache und Kognition. Perspektiven moderner Sprachpsychologie*. Ed. by Hans-Joachim Kornadt, Joachim Grabowski, and Roland Mangold-Allwinn. Heidelberg et al.: Spektrum Akad. Verlag. 37–54.

— (1995). *Die Ordnung der Wörter: Kognitive und lexikalische Strukturen*. In: ed. by G. Harras. Mouton de Gruyter. Chap. Mentales Lexikon: Struktur und Zugriff. 99–119.

Engelkamp, Johannes and Thomas Pechmann (1988). Kritische Anmerkungen zum Begriff der mentalen Repräsentation. *Sprache und Kognition* 7:2–11.

Fauconnier, Gilles (1994). *Mental Spaces*. Cambridge, MA: MIT Press.

— (1997). *Mappings in Thought and Language*. New York: Cambridge University Press.

Fauconnier, Gilles and Mark Turner (2002). *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities*. New York: Basic Books.

Fillmore, Charles (1968). The case of case. In: *Universals in Linguistic Theory*. Ed. by Emmon Bach and Robert Thomas Harms. New York: Holt, Rinehart and Winston. 1–88.

Fodor, Jerry A. (1983). *The Modularity of Mind. An Essay on Faculty Psychology*. Cambridge, MA: MIT Press.

— (1998). *Concepts. Where Cognitive Science Went Wrong*. Oxford: Clarendon Press.

Fodor, Jerry A. and Jerrold J. Katz, eds. (1964). *The Structure of Language*. Englewood Cliffs, NJ: Prentice Hall.

Foley, William A. (1986). *The Papuan Languages of New Guinea*. New York: Cambridge University Press.

— (1997). *Anthropological Linguistics: An Introduction*. Blackwell.

Fowler, Catherine and Nancy Turner (1999). Ecological/Cosmological Knowledge and Land Management among Hunter-Gatherers. In: *The Cambridge Encyclopedia of Hunters and Gatherers*. Ed. by Richard B. Lee and Richard Daly. Cambridge U. K.: Cambridge University Press. 419–425.

Frawley, William (1992). *Linguistic Semantics*. Hillsdale, NJ: Erlbaum.

Gathercole, Susan E. and Alan D. Baddeley (1993). *Working Memory and Language*. Hove: Erlbaum.

Geertz, Clifford (1999). *The Interpretation of Cultures. Selected Essays*. New York: Basic Books.

Gentner, Dedre and Albert Stevens, eds. (1983). *Mental Models*. Hillsdale/London: Lawrence Erlbaum Associates.

Gillett, Grant R. (1992). *Representation, Meaning, and Thought*. Oxford: Clarendon Press.

Gladwin, Thomas (1974). *East is a Big Bird. Navigation & Logic on Puluwat Atoll*. 2nd proof. Camebridge, Massachusetts: Harvard University Press.

Gumperz, John J. and Stephen C. Levinson, eds. (1996). *Rethinking Linguistic Relativity*. 17. Studies in the Social and Cultural Foundations of Language. Cambridge: Cambridge University Press.

Handke, Jürgen (1995). *The Structure of the Lexicon: Human versus Machine*. Berlin et al.: Mouton de Gruyter.

Heeschen, Volker (1990). *Ninye bún. Mythen, Erzählungen, Lieder und Märchen der Eipo (im zentralen Bergland von Irian Jaya, West-Neuguinea, Indonesien)*. Mensch, Kultur und Umwelt im Zentralen Bergland von West-Neuguinea 20. Berlin: Reimer.

— (1992). The Position of the Mek Languages of Irian Jaya among the Papuan Languages: History, Typology, and Speech. *Bijdragen tot de Taal-, Land- en Volkenkunde* 148(3):465–488.

— (1998). *An Ethnographic Grammar of the Eipo Language. Spoken in the Central Mountains of Irian Jaya (West New Guinea), Indonesia*. Berlin: Dietrich Reimer.

Heeschen, Volker and Wulf Schiefenhövel (1983). *Wörterbuch der Eipo-Sprache. Eipo-Deutsch-Englisch*. Mensch, Kultur und Umwelt im zentralen Bergland von West-Neuguinea 6. Berlin: Reimer.

Heidegger, Martin (1985). *Unterwegs zur Sprache*. In: Klostermann. Chap. Der Weg zur Sprache. 241–257.

Hershenson, Maurice (1999). *Visual Space Perception: A Primer*. Cambridge, MA: MIT Press.

Hillert, Dieter (1987). *Zur mentalen Repräsentation von Wortbedeutungen. Neuro- und psycholinguistische Überlegungen*. Tübingen: Narr.

— (1992). *Sprachprozesse und Wissensstrukturen*. Opladen: Westdeutscher Verlag.

Hofstadter, Douglas R. (1980). *Gödel, Escher, Bach: an Eternal Golden Braid*. New York: Vintage Book.

Hoijer, Harry (1946). Introduction. In: *Linguistic Structures of Native America*. Ed. by Cornelius Osgood. 6. Viking Fund Publications in Anthropology. New York: Viking Fund. 9–29.

— (1951). Cultural implications of some Navaho linguistic categories. *Language* 27(2):111–120.

Hunt, Earl and Franca Agnoli (1991). The Whorfian hypothesis. A cognitive psychology perspective. *Psychological Review* 98(3):377–389.

Hutchins, Edwin (1983). Understanding Micronesian Navigation. In: *Mental Models*. Ed. by Erlbaum. Hillsdale, N.J./London: Gentner, Dedre Stevens, Albert L. 191–225.

— (1996). *Cognition in the Wild*. MIT Press.

Jackendoff, Ray (1983). *Semantics and Cognition*. Cambridge, MA: MIT Press.

— (1987). *Consciousness and the Computational Mind*. Cambridge, MA: MIT Press.

Johnson-Laird, Philip Nicholas (1983). *Mental Models. Towards a Cognitive Science of Language, Inference, and Consciousness*. Cambridge, MA: Harvard University Press.

Johnson, Mark (1987). *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*. Chicago: University of Chicago Press.

Kandel, Eric and Richard Hawkins (1994). *Gehirn und Bewußtsein*. In: Spektrum der Wissenschaft. Spektrum Akademischer Verlag. Chap. Molekulare Grundlagen des Lernens. 114–124.

Kari, James M. (1979). *Athabaskan Verb Theme Categories. Ahtna*. 2. Alaska Native Language Center Research Papers. Fairbanks, AK: University of Alaska.

Koch, Gerd (1984). *Maligdam. Ethnographische Notizen über einen Siedlungsbereich im oberen Eipomek-Tal, zentrales Bergland von Irian Jaya, West-Neuguinea, Indonesien.* Mensch, Kultur und Umwelt im Zentralen Bergland von West-Neuguinea 15. Berlin: Reimer.

Koch, Gerd and Wulf Schiefenhövel (2009). *Eipo (West-Neuguinea, Zentrales Hochland) - Neubau des sakralen Männerhauses in Munggona*. DVD. IWF ord. no. E 2475; produced in 1974, first published in 1979; Göttingen: IWF.

Koffka, Kurt (1935). *Principles of Gestalt Psychology*. New York: Harcourt, Brace and Company.

Kreitzer, Anatol (1997). Multiple levels of schemantization: a study in the conceptualization of space. *Cognitive Linguistics* 8:291–325.

Kuipers, B. (1982). The ”map in the head” metaphor. *Environment and Behaviour* 14:202–220.

Lakoff, George (1987). Cognitive semantics. In: *Meaning and Mental Representations*. Ed. by Umberto Eco, Marco Santambrogio, and Patrizia Violi. Bloomington / Indianapolis: Indiana University Press. 119–154.

Langacker, Ronald W. (1987). *Foundations of Cognitive Grammar. Vol. I: Theoretical Prerequisites*. Stanford, CA: Stanford University Press.

— (1988). An overview of cognitive grammar. In: ed. by Brygida Rudzka-Ostyn. Philadelphia, PA: J. Benjamins. 3–48.

— (1990). *Concept, Image, and Symbol: The Cognitive Basis of Grammar*. Berlin / New York: Mouton de Gruyter.

— (1991). *Foundations of Cognitive Grammar. Vol II: Descriptive Application*. Stanford, Ca: Stanford University Press.
— (2000). *Grammar and Conceptualization*. Berlin / New York: Mouton de Gruyter.
— (2008). *Cognitive Grammar: A Basic Introduction*. Oxford University Press.
Laporan expedisi ilmiah lembah-X. (1969).
Leer, Jeff (1989). Directional systems in Athapaskan and Na-Dene. In: *Athapaskan Linguistics. Current Perspectives on a Language Family*. Ed. by Eung-Do Cook and Keren Rice. Trends in Linguistics: State of the Arts Reports. Berlin: Mouton de Gruyter. 575–622.
Lehar, Steven (2003). *The World in your Head. A Gestalt view of the mechanism of conscious experience*. Mahwah, NJ et al.: Erlbaum.
Levinson, Stephen C. (2003). *Space in Language and Cognition. Exploration in Cognitive Diversity*. Cambridge et al.: Cambridge University Press.
Levinson, Stephen C. and David Wilkins, eds. (2006). *Grammars of Space*. Cambridge: Cambridge University Press.
Lewin, Kurt (1936). *Principles of Topological Psychology*. McGraw Hill. London / New York.
Li, Fang-Kuei (1946). Chipewyan. In: *Linguistic Structures of Native America*. Ed. by Harry Hoijer and et al. New York: Viking Fund Publications in Anthropology. 398–423.
Louwerse, Jan (1978). A tentative Una phonology. *Irian* 7(3):43–90.
— (1988). *The Morphosyntax of Una in Relation to Discourse Structure. A Descriptive Analysis*. 100. Pacific Linguistics. Canberra: Australian National University.
Lucy, John A. (1992a). *Grammatical Categories and Cognition: A Case Study of the Linguistic Relativity Hypothesis*. 13. Studies in the social and cultural foundations of language. Cambridge et al.: Cambridge University Press.
— (1992b). *Language Diversity and Thought: A Reformulation of the Linguistic Relativity Hypothesis*. 12. Studies in the social and cultural foundations of language. Cambridge et al.: Cambridge University Press.
Malotki, Ekkehart (1979). *Hopi-Raum: Eine sprachwissenschaftliche Analyse der Raumvorstellungen in der Hopi-Sprache*. Tübingen: Gunter Narr Verlag.
— (1983). *Hopi Time. A Linguistic Analysis of the Tempral Concepts in the Hopi Language*. Berlin/New York: Mouton de Gruyter.
Mark, D, A. Turk, N. Burenhult, and S. Stea, eds. (2012). *Landscape in Language: Transdisciplinary Perspectives*. 4. Culture and Language Use. Benjamins.
Marr, David (1982). *Vision: A Computational Investigation in the Human Representation of Visual Information*. San Francisco: Freeman.

McDonough, Joyce (2000). On a bipartite model of the Athabaskan verb. In: *The Athabascan Languages*. Ed. by Theodore B. Fernald and Paul R. Platero. Oxford Studies in Anthropological Linguistics. Oxford: Oxford University Press. 139–166.

Michel, Thomas (1983). *Interdependenz von Wirtschaft und Umwelt in der Eipo-Kultur von Moknerkon. Bedingungen für Produktion und Reproduktion bei einer Dorfschaft im zentralen Bergland von Iran Jaya, West-Neugiunea, Indonesien*. Mensch, Kultur und Umwelt im zentralen Bergland von West-Neuguinea 11. Berlin: Reimer.

Miller, George A. and Philip Nicholas Johnson-Laird (1976). *Language and Perception*. Cambridge, MA: The Belknap Press.

Monk, R. (1994). *Wittgenstein. Das Handwerk des Genies.* Klett-Cotta.

Morice, A. G. (1890). The Déné Languages (Considered in Themselves and Incidentall in their Relations to Non-Amercan idioms). In: *Transaction of the Canadian Institute*. 1. 170–212.

Mulhall, Stephen (1990). *On Being in the World. Wittgenstein and Heidegger on Seeing Aspects*. London: Routledge.

Murre, Jacob M.J. and Rainer Goebel (1996). Connectionist modeling. In: *Computational Psycholinguistics*. Ed. by Tom Dijkstra and Konrad De Smedt. London: Taylor and Francis. 49–81.

Neisser, Ulric (1987). *Concepts and Conceptual Development: Ecological and Intellectual Factors in Categorization*. Cambridge: Cambridge University Press.

Nunberg, Geoffrey (1978). *The Pragmatics of Reference*. Bloomington, IN: Indiana University Linguistics Club.

Penrose, Roger (1991). *Computerdenken: Die Debatte um künstliche Intelligenz, Bewußtsein und die Gesetze der Physik*. Heidelberg et al.: Spektrum Akad. Verlag.

Piaget, Jean (1976). *Die Äquilibration der kognitiven Strukturen*. Stuttgart: Klett.

— (1992). *Biologie und Erkenntnis*. Fischer.

Piaget, Jean and Bärbel Inhelder (1956). *The Child's Conception of Space*. London: Routledge & Kegan Paul.

Portugali, J. (1996). *The Construction of Cognitive Maps*. Ed. by J. Portugali. 32. The GeoJournal Library. Kluwer.

Pouwer, J. (1964). Social System in the Star Mountains, towards a Reorientation of the Study of Social Systems. *American Anthropologist* 66(4):133–61.

Rice, Keren (1989). *A Grammar of Slave*. Berlin/New York: Mouton de Gruyter.

Rice, Sally (1996). Prepositional prototypes. In: *The Construal of Space in Language and Thought*. Ed. by Martin Pütz. Berlin / New York: Mouton de Gruyter. 135–165.

— (1997). Giving and taking in Chipewyan. The semantics of THING-marking classificatory verbs. In: *The Linguistics of Giving*. 36. Typological Studies in Language. Philadelphia, PA: J. Benjamins. 97–134.
— (2002). Posture and existence predicates in Dene Suline (Chipewyan). Lexical and semantic density as a function of the 'stand'/'sit'/'lie' continuum. In: *The Linguistics of Sitting, Standing, and Lying*. Ed. by John Newman. 51. Typological Studies in Language. Philadelphia, PA: J. Benjamins. 61–78.
Ritter, H., T. Martinetz, and K. Schulten (1991). *Neuronale Netze. Eine Einführung in die Neuroinformatik selbstorganisierender Netzwerke.* Addison-Wesley.
Röll, Werner and Gerd Zimmermann (1979). *Untersuchungen zur Bevölkerungs-, Siedlungs- und Agrarstruktur im zentralen Bergland von Irian-Jaya, West-Neuguinea, Indonesien*. Beiträge zur interdisziplinären Schwerpunkprogramm der Deutschen Forschungsgemeinschaft. 1. Beitrag zur Schriftenreihe Mensch, Kultur und Umwelt im Zentralen Bergland von West-Neugiunea. Berlin: Reimer.
Rubin, Edgar (1921). *Visuell wahrgenommene Figuren.* Gyldendalske.
Rumelhart, David and James McClelland (1986). *Parallel Distributed Processing: Explorations in the Microstructure of Cognition*. MIT Press.
Rundle, Bede (1990). *Wittgenstein and Contemporary Philosophy of Language*. Blackwell.
Sapir, Edward (1915). The Na-Dene Languages, a Preliminary Report. *American Anthropology* 17(3):534–558.
Sarfert, E. (1911). Zur Kenntnis der Schiffahrtskunde der Karoliner. *Korrenspondenzblatt der Deutschen Gesellschaft für Anthropologie, Ethnologie, und Urgeschichte* 42:131–136.
Schade, Ulrich (1992). *Konnektionismus. Zur Modellierung der Sprachproduktion.* Westdeutscher Verlag.
Schiefenhövel, Wulf (1976). Die Eipo-Leute des Berglands von Indonesisch-Neuguinea. Kurzer Überblick über den Lebensraum und seine Menschen. Einführung zu den Eipo-Filmen des Humanethologischen Filmarchivs der Max-Planck-Gesellschaft. *Homo* 26(4):263–275.
— (1979). The Eipo. Members of the Mek group in the Highlands of Irian Jaya. *Irian, Bulletin of Irian Jaya Development* VII(2):47–67.
— (1991). Die Mek und ihre Nachbarn. Internationale Konferenz über Neuguinea-Forschungen. *Zeitschrift für Wissenschaft und Forschung* 91(1):21–25.
— (2001). Kampf, Krieg und Versöhnung bei den Eipo im Bergland von West-Neuguinea. Zur Evolutionsbiologie und Kulturanthropologie aggressiven Verhaltens. In: *Begegnung und Konflikt eine kulturanthropologische Bestandsaufnahme*. Ed. by Wolfgang Fikentscher. 120. Bayrische Akademie der

Wissenschaften, Philologisch-Historische Klasse, Abhandlungen, Neue Folge. München: Beck. 169–186.
Schmidt, Siegfried (1994). *Kognitive Autonomie und soziale Orientierung: Konstruktivistische Bemerkungen zum Zusammenhang von Kognition, Kommunikation, Medien und Kultur*. Frankfurt Am Main: Suhrkamp.
— (1996). *Der Diskurs des Radikalen Konstruktivismus*. Suhrkamp.
— (1998). *Die Zähmung des Blicks. Konstruktivismus – Empirie – Wissenschaft*. Frankfurt am Main: Suhrkamp.
Schnelle, Helmut (1994). Sprache und Gehirn: Sprachfähigkeit als neuronales Netz. *Kognitionswissenschaft* 4(1):1–16.
Schreuder, R. and G.B. Flores d'Arcais (1989). *Lexical Representation and Process.* In: ed. by W.D. Marslen-Wilson. MIT Press. Chap. Psycholinguistic issues in the lexical representation of meaning.. 409–436.
Schwarz, Monika (1992). *Einführung in die Kognitive Linguistik*. Tübingen: Francke.
— (1994). *Kognitive Semantik/Cognitive Semantics. Ergebnisse, Probleme, Perspektiven*. Tübingen: Narr.
— (1995). Accessing semantic information in the lexicon: the mental lexicon as a semi-module. In: *Current Approaches to the Lexicon. A Selection of Papers Presented at the 18th LAUD Symposium, Duisburg, March 1993*. Ed. by René Dirven and Johan Vanparys. Frankfurt am Main: Lang. 63–72.
Senft, Gunter, ed. (2000). *Systems of Nominal Classification*. Cambridge: Cambridge University Press.
Siegel, A. W. and S. H. White (1975). The Development of Spatial Representation of Large-Scale Environments. In: *Advances in Child Development and Behavior*. Ed. by H. W. Reese. 10. New York: Academic Press.
Sinha, Chris and Tanya Kuteva (1995). Distributed spatial semantics. *Nordic Journal of Linguistics* 18:167–199.
Slobin, Dan (1996). *Rethinking Linguistic Relativity.* In: ed. by J. Gumperz and S. Levinson. Cambridge University Press. Chap. From 'thought to language' to 'thinking for speaking'.. 195–217.
The Cambridge Companion to Wittgenstein. (1996). In: ed. by H. Sluga and D. Stern. Cambridge University Press.
Smith, James G. E. (1981). Chipewyan. In: *Handbook of North American Indians. Subarctic*. Ed. by June Helm. 6. Washington: Smithsonian Institution. 271–284.
Spitzer, Manfred (1996). *Geist im Netz. Modelle für Lernen, Denken und Handeln.* Westdeutscher Verlag.
Strohner, Hans (1995). *Kognitive Systeme. Eine Einführung in die Kognitionswissenschaft*. Opladen: Westdeutscher Verlag.
Strube, Gerhard, ed. (1996). *Wörterbuch der Kognitionswissenschaft.* Klett-Cotta.

Sucharowski, Wolfgang (1996). *Sprache und Kognition: Neuere Perspektiven in der Sprachwissenschaft*. Opladen: Westdeutscher Verlag.
Svorou, Soteria (1993). *The Grammar of Space*. 25. Typological Studies in Language. Philadelphia, PA: J. Benjamins.
Swadling, Pemela (1981). *Papua New Guinea's Prehistory*. Port Moresby: Gordon & Gotch.
Sweetser, Eve (1990). *From Etymology to Pragmatics: Metaphorical and Cultural Aspects of Semantic Structure*. Cambridge: Cambridge University Press.
Talmy, Leonard (1978). Figure and Ground in complex sentences. In: *Universals of Human Language*. Ed. by Joseph Harold Greenberg, Charles A. Ferguson, and Edith A. Moravcsik. Stanford, CA: Stanford University Press. 627–649.
— (1983). How to structure space. In: *Spatial Orientation: Theory, Research, and Application*. Ed. by Jr. Pick Herbert L. and Linda P. Acredolo. New York: Plenum Press. 225–282.
— (2000). *Towards a Cognitive Semantics, Vol. I and II*. Cambridge, MA: MIT Press.
Tergan, Sigmar-Olaf (1989). Psychologische Grundlagen der Erfassung individueller Wissensrepräsentation. Teil 1: Grundlagen der Wissensmodellierung. *Sprache und Kognition* 8:152–165.
Thiering, Martin (2006). *Topological Relations in an Athapaskan Language*. 1. PETL: Papers in Experimental and Theoretical Linguistics (Department of Linguistics Working Papers). Edmonton: University of Alberta.
— (2009a). Language loss in spatial semantics. Dene Suliné. In: *Variation in Indigenous Minority Languages*. Ed. by James N. Stanford and Dennis R. Preston. 25. IMPACT: Studies in Language and Society. Amsterdam/Philadelphia: Benjamins. 485–516.
— (2009b). *Linguistic Categorization of Topological Spatial Relations*. TOPOI: Towards a Historical Epistemology of Space. Berlin: Max-Planck-Institute for the History of Science.
— (2010). Intralingual Variation of Spatial Concepts in an Athapaskan Language. In: *Cognitive Sociolinguistics. Language Variation in its Structural, Conceptual and Cultural Dimensions. 34th International LAUD Symposium*. Ed. by Martin Pütz. Landau, Pfalz: University of Koblenz-Landau. 92–123.
— (2011). Figure-Ground Reversals in Language. *Gestalt Theory* 33(3/4):245–276.
— (Mar. 2012). Topographical coordinates and spatial language. In: *Cognitive Psycholinguistics: Bilingualism, Cognition and Communication*. Ed. by LAUD Linguistic Agency. Linguistic Agency, University of Duisburg-Essen. LAUD. LAUD. 1–58.

Thiering, Martin (2013). Degrees of specificity in spatial semantics. In: *Variation in Language and Language Use. Linguistic, Socio-Cultural and Cognitive Perspectives*. Ed. by Monika Reif, Justyna A. Robinson, and Martin Pütz. 96. Duisburg Papers on Research in Language and Culture. Peter Lang. 367–420.

Tolman, Edward C. (1948). Cognitive Maps in Rats and Men. *The Psychological Review* 55(4). accesed via: Classics in the History of Psychology. An internet resource developed by Christopher D. Green:189–208.

Tyler, Andrea. and Vyvyan Evans (2003). *The Semantics of English Prepositions: Spatial Scenes, Embodied Meaning and Cognition*. Cambridge: Cambridge University Press.

Vohra, A. (1986). *Wittgenstein's Philosophy of Mind.* Croom Helm.

Watzlawick, Paul (1981). *Die erfundene Wirklichkeit: Wie wissen wir, was wir zu wissen glauben? Beiträge zum Konstruktivismus*. München: Piper.

Wender, K.F. (1980). *Modelle des menschlichen Gedächtnisses.* Kohlhammer.

Whorf, Benjamin Lee (1956). *Language, Thought, and Reality. Selected Writings of Benjamin Lee Whorf*. Cambridge, MA: MIT Press.

Wierzbicka, Anna (1972). *Semantic Primitives*. 22. Linguistische Forschungen. Frankfurt am Main: Athenäum.

— (1992). *Semantics, Culture, and Cognition: Universal Human Concepts in Culture-Specific Configurations*. Oxford / New York: Oxford University Press.

— (1996). *Semantics: Primes and Universals*. Oxford / New York: Oxford University Press.

Wissenschaft, Spektrum der (1994). *Gehirn und Bewußtsein*. In: Spektrum Akademischer Verlag.

Wittgenstein, L. (2001). *Philosophische Untersuchungen*. Wissenschaftliche Buchgesellschaft.

Wurm, Stephen A. (1982). *Papuan Languages of Oceania*. Tübingen: Gunter Narr.

Wygotski, Lev S. (1964). *Denken und Sprechen*. Berlin: Akademie Verlag.

Young, Robert and William Morgan (1987). *The Navajo Language: A Grammar and Colloquial Dictionary*. Albuquerque, NM: University of New Mexico Press.

— (1992). *Analytical Lexicon of Navajo*. Albuquerque, NM: University of New Mexico Press.

Zell, A. (1994). *Simulation neuronaler Netze.* Wesley.

Zlatev, Jordan (1997). *Situated Embodiment: Studies in the Emergence of Spatial Meaning*. Gotab.

— (2003). *Cognitive Linguistics and Non-Indo-European Languages*. In: ed. by Eugene H. Cassad and Gary B. Palmer. de Gruyter. Chap. Holistic spatial semantics of Thai.. 305–336.
— (2010). *Handbook of Phenomenology and Cognitive Science*. In: ed. by Shaun Gallagher and Daniel Schmicking. Springer. Chap. Phenomenology and cognitive linguistics. 415–443.

MAX-PLANCK-INSTITUT FÜR WISSENSCHAFTSGESCHICHTE

Max Planck Institute for the History of Science

Preprints since 2011 (a full list can be found at our website)

411 Henning Schmidgen & Urs Schoepflin (eds.) **Hans-Jörg Rheinberger : a Bibliography**

412 Renate Wahsner & Horst-Heino v. Borzeszkowski **Erkenntnis statt Erbauung: Hegel und das naturwissenschaftliche Denken der Moderne**

413 Mirjam Brusius **From photographic science to scientific photography: Photographic experiments at the British Museum around 1850**

414 Viktor J. Frenkel **Professor Friedrich Houtermans – Arbeit, Leben, Schicksal. Biographie eines Physikers des zwanzigsten Jahrhunderts.** Herausgegeben und ergänzt von Dieter Hoffmann, unter Mitwirkung von Mary Beer

415 Ilana Löwy (ed.) **Microscope Slides – Reassessing a Neglected Historical Ressource**

416 André L. Blum, John Michael Krois und Hans-Jörg Rheinberger (Hrsg.) **Verkörperungen**

417 Pietro Daniel Omodeo **Sixteenth Century Professors of Mathematics at the German University of Helmstedt.** A Case Study on Renaissance Scholarly Work and Networks

418 Peter Schöttler & Hans-Jörg Rheinberger (éds.) **Marc Bloch et les crises du savoir**

419 Albert Presas i Puig (ed.) **A Comparative Study of European Nuclear Energy Programs**

420 Mathias Grote & Max Stadler (eds.) **Membranes Surfaces Boundaries** Interstices in the History of Science, Technology and Culture

421 Frank W. Stahnisch **The emergence of *Nervennahrung*: Nerves, mind and metabolism in the long eighteenth century**

422 Pietro Daniel Omodeo, Irina Tupikova **Aristotle and Ptolemy on Geocentrism: Diverging Argumentative Strategies and Epistemologies** (TOPOI – Towards a Historical Epistemology of Space)

423 Han F. Vermeulen **Linguistik und Völkerkunde – der Beitrag der historisch-vergleichenden Linguistik von G.W. Leibniz zur Entstehung der Völkerkunde im 18. Jahrhundert** [Leicht erweiterte Fassung des Working Papers No. 133 aus dem MPI for Social Anthropology]

424 Alfred Gierer **Mit Schiller gegen den „Egoismus der Vernunft".** Zeitübergreifende Gedanken zur Natur des Menschen

425 Annette Vogt **Die Berliner Humboldt–Universität von 1945/1946 bis 1960/1961**

426 Klaus Geus, Martin Thiering (eds.) **Common Sense Geography and Mental Modelling**

427 Renate Wahsner **Kann eine moderne Naturphilosophie auf Hegelsche Prinzipien gegründet werden?** Spekulatives und naturwissenschaftliches Denken

428 Stefano Bordoni **Widening the Scope of Analytical Mechanics** Duhem's third pathway to Thermodynamics

429 Pietro Daniel Omodeo **Copernicus in the Cultural Debates of the Renaissance: Reception, Legacy, Transformation** [Part I & II]

430 Mark Geller & Klaus Geus (eds.) **Productive Errors: Scientific Concepts in Antiquity** (TOPOI – Dahlem Seminar for the History of Ancient Sciences)

431 Klaus Gottstein **The Amaldi Conferences. Their Past and Their Potential Future**

432 Mikuláš Teich **The Scientific Revolution Revisited**

433 Lorraine Daston & Jürgen Renn (Hrsg.) **Festkolloquium für Hans-Jörg Rheinberger** Beiträge zum Symposium am 24. 1. 2011 im Max-Planck-Institut für Wissenschaftsgeschichte

434 Conference **Epistemology and History. From Bachelard and Canguilhem to Today's History of Science**

435 Jens Høyrup **Sanskrit-Prakrit interaction in elementary mathematics as reflected in Arabic and Italian formulations of the rule of three – and something more on the rule elsewhere**

436 Jens Høyrup **A hypothetical history of Old Babylonian mathematics: places, passages, stages, development**

437 Jürgen Renn **Schrödinger and the Genesis of Wave Mechanics**

438 Pietro Daniel Omodeo **L'*iter* europeo del matematico e medico scozzese Duncan Liddel**

439 Irina Tupikova & Klaus Geus **The Circumference of the Earth and Ptolemy's World Map**

440 Pietro Daniel Omodeo und Jürgen Renn **Das Prinzip Kontingenz in der Naturwissenschaft der Renaissance**

441 Horst Kant und Jürgen Renn **Eine utopische Episode – Carl Friedrich von Weizsäcker in den Netzwerken der Max-Planck-Gesellschaft**

442 William G. Boltz and Matthias Schemmel **The Language of 'Knowledge' and 'Space' in the Later Mohist Canon** (TOPOI – Towards a Historical Epistemology of Space)

443 Stefano Bordoni **Looking for a Rational Thermodynamics in the late XIX century**

444 Sonja Brentjes and Jürgen Renn **The Arabic Transmission of Knowledge on the Balance**

445 Horst Nowacki **Archimedes and Ship Design**

446 Matthias Schemmel **Elements of a Historical Epistemology of Space** (TOPOI – Towards a Historical Epistemology of Space)