

# **Locative Constructions in Lakota: Evidence for/against “universal conceptual categories” in spatial topology**

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Although languages use a variety of methods to express spatial topological relations, it has generally been assumed that the underlying conceptual categories are universal. However, recent cross-linguistic research has challenged the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis on a variety of levels. The goals of this paper are two-fold: First, to analyze and describe the basic locative construction in Lakota, a Siouan language. Second, since Lakota is often thought to break other typological universals, the Lakota data are evaluated against three versions of the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis. The preliminary results seem to indicate that neither the strong view nor its successively weaker versions can account for the Lakota data described here.

## **1. Introduction**

When we use language to describe spatial topological relations, it may appear as if the language maps directly to fundamental physical distinctions that exist in the world. For example, the English terms “in” and “on” seem to correspond to clear distinctions in spatial relations. We use “in” to describe containment relationships like, “a letter in an envelope” and “an apple in a bowl.” On the other hand, we use “on” for contact relationships like, “a cup on the table” and “the cap on the pen.” However, languages can differ considerably in the ways they partition the same semantic domain. Korean, for example, uses the term *kkita* to describe both “a letter in an envelope” and “a cap on a pen,” but *nohta* for “a cup on the table” and *nehta* for “an apple in a bowl” (Bowerman & Choi 2001). A crucial question that arises from this kind of cross-linguistic comparison is whether or not the underlying conceptual categories for spatial topological relations are universal.

The objective of this study is two fold. The primary goal is to analyze and describe locative constructions in Lakhota.<sup>1</sup> Although little has been written to date on this particular construction, it appears that the language does not have a simple locative and instead describes spatial configurations by using a more complex system. The secondary goal is to determine, in at least a preliminary sense, how Lakhota expressions of spatial topology might contribute to recent cross-linguistic research on universal conceptual categories in the spatial topological domain. Since Lakhota is often thought to break other typological universals (Rood & Taylor 1996; Van Valin 2001), the locative construction may provide specific evidence against the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis (Landau & Jackendoff 1993; Li & Gleitman 2002; cf. Levinson & Meira 2003). Three variations of this hypothesis will be discussed below.

### 1.1. Overview of the Lakhota locative construction

In general, Lakhota appears to describe spatial configurations by combining two different kinds of elements in an adverbial phrase:

1. A small contrastive set of “posture/positional verbs” (e.g. *'he* ‘exist’; *'nāži* ‘stand’; *'jāke* ‘sit’; *'jūke* ‘lie’)<sup>2</sup>
2. An elaborate adpositional system (e.g. *a'kāl* ‘on top of’; *ma'hel* ‘inside’; *i'sak<sup>h</sup>ib* ‘beside’)

For example, the following utterance describes the spatial relationship between a cup and table via a combination of the general positional verb *'he* (‘exist’) and the adpostion *a'kāl* (‘on top of’):

- (1)    *wi'jatke ki 'waglijutapi (kĩ) el a'kāl 'he*  
          cup    the table            (the) there on top of exists  
          NP<sub>FIGURE</sub>            NP<sub>GROUND</sub>  
          *The cup is on the table*
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<sup>1</sup> Lakhota (also known as Teton Sioux) is one of five closely related dialects of the Siouan language family, and is spoken on the plains of the northern United States and central Canada. Lakhota can be further divided into regional or reservation-based subdialects: Southwest – Pine Ridge and Rosebud; Missouri River area – Cheyenne River, Lower Brule, Standing Rock (Rood & Taylor 1996).

<sup>2</sup> Lakhota utterances are transcribed using the International Phonetic Alphabet, with the following modifications: ʃ, ʒ, and ʧ are transcribed as š, ž, and č, respectively.

The system is complex in that speakers must select from both categories based on some interaction of multiple variables, including:

1. The spatial relationship between the *FIGURE* (the object being described) and the *GROUND* (the reference point)<sup>3</sup>
2. The physical characteristics of the *FIGURE*
3. The physical characteristics of the *GROUND*
4. Animacy of the *FIGURE* and/or *GROUND*
5. Relative distance of the *FIGURE* from speaker
6. Whether or not the speaker identifies him- or herself as being “at” the *FIGURE*

## 1.2. Overview of the universal conceptual categories hypothesis<sup>4</sup>

Generally speaking, studies of spatial language tend to assume that simple Piagetian spatial conceptions are both topological and universal. In other words, concepts like *containment*, *contiguity*, and *proximity* are thought to be represented cognitively by semantic primitives like *IN*, *ON*, and *NEAR*. Furthermore, it is generally assumed that individual languages then directly code these primitive concepts in small, closed classes like adpositions.

If this UNIVERSAL CONCEPTUAL CATEGORIES hypothesis is correct, cross-linguistic comparisons of spatial adpositions should provide important evidence linking semantic categories to conceptual categories in a way that is relatively uniform across languages. However, several studies done since the mid-90s have begun to challenge certain aspects of the hypothesis, leading to subsequently weaker and weaker formulations (Brown 1994; Levinson 1994; Bowerman 1996 and 2003; Ameka & Levinson 2003). In a groundbreaking multi-language study, Levinson and Meira (2003) compared nine unrelated languages and found that there are significant cross-linguistic differences in how the semantic space is partitioned. Although Levinson and Meira acknowledge that their study is more exploratory than conclusive, they state:

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<sup>3</sup> Throughout the paper, I will use italic capitals to represent the *FIGURE* and simple capitals for the *GROUND*.

<sup>4</sup> This overview is drawn largely from Levinson and Meira (2003).

The differences between the languages turn out to be so significant as to be incompatible with stronger versions of the universal conceptual categories hypothesis. Rather, the language-specific spatial adposition meanings seem to emerge as compact subsets of an underlying semantic space, with certain areas being statistical attractors or foci. (2003: 485)

Clearly, this is not an outright refutation of the universal conceptual categories hypothesis. Instead, Levinson and Meira suggest that spatial conceptions may best be treated as hierarchical divisions of semantic space, similar to recent models used to describe the variation seen in basic color terms across languages (see Kay & Maffi 1999 for more on this model).

Levinson and Meira convincingly argue that cross-linguistic research in semantic typology would be better served by utilizing a consistent set of stimuli depicting a variety of spatial topological relations (see *Appendix A* and *Appendix B*). Since Lakhota has been argued to challenge several theories of typological universals (Rood & Taylor 1996; Van Valin 2001), the data from Lakhota locative constructions may offer evidence for or against Levinson and Meira's new hypothesis. Therefore, I have adopted much of Levinson and Meira's methodology for the current study.

As will be shown below, the preliminary results described here indicate that neither the strong view nor its successively weaker versions can account for the Lakhota data analyzed in this paper.

## **2. Data Analyzed and Methods Used**

### **2.1. Elicitation Method**

In order to elicit data for this project, I followed the general methodology used by Levinson and Meira (2003). Over a period of several months, I showed my consultant, Della BadWound<sup>5</sup>, a series of line-drawings from Melissa Bowerman's Topological Relations Picture Series,<sup>6</sup> each depicting a topological

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<sup>5</sup> I am indebted to Della BadWound, a native speaker of both Lakhota (Pine Ridge dialect) and English, for providing the data that made this study possible.

<sup>6</sup> The drawings are originally from Bowerman and Pederson (2003). Through the assistance of Dr. David Rood, I was able to receive a complete set of drawings from Dr. Stephen Levinson at the

spatial relation with a designated *FIGURE* (marked with an arrow) and *GROUND* (see *Appendix A*). The set of drawings includes a range of relations that are coded in English by a variety of prepositions like *on*, *in*, *above*, *under*, and *beside*, as well as complex prepositions such as *inside of*, *on top of*, and *on the side of*.

For each drawing, I asked BadWound in English: ‘Where is the [*FIGURE*]?’ She then responded in Lakhotá. Variations were often volunteered by BadWound, while others I actively probed for. For example, several of the images represent prototypically Western cultural objects which lack Lakhotá translations (or at least BadWound did not know of their translations in Lakhotá). In such cases, we verbally sketched a parallel scenario using other well-known elements. In addition, I often explored variations of images by replacing either the *FIGURE*, the *GROUND*, and/or the spatial configuration, in an attempt to tease out some of the significant patterns. All of our sessions were recorded in digital audio (MP3 format) and transcribed.

## 2.2. Operational Definitions

Languages not only vary in the kinds of markers they use to code topical relations, but also in the way in which they combine different types of markers into more complex systems. For example, certain languages rely strictly on adpositions (e.g. Tiriyo), others also use spatial nouns to varying degrees, with or without locative case markers (e.g. Basque, Trumai), while some incorporate positional verbs (e.g. Dutch, Ewe, Yéli) (Levinson & Meira 2003: 492). Finding ways to compare these kinds of forms and their combinations across languages can be quite problematic.

To further complicate the matter, there does not seem to be much consensus in the literature for characterizing many of these markers. Ayano (2001) notes that adpositions have not been clearly defined in part-of-speech research. Baker (2003) even goes so far as to say that there is a fundamental disagreement in whether adpositions should be considered functional or lexical categories. Therefore, before diving into the details of this paper, I will establish some operational definitions.

The Lakhotá locative construction appears to use a combination of two distinct kinds of markers. For the purposes of this study, I have adopted two of Levinson and Meira’s working definitions to refer to these two kinds of elements:

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Language and Cognition Group of the Max Planck Institute for Psycholinguistics. Although the full set includes 71 drawings, this project only covered 47 scenes.

First, I will use the term ADPOSITION as a combination of both semantic and syntactic criteria such that “a spatial adposition is any expression that heads an adverbial phrase of location in the BASIC LOCATIVE CONSTRUCTION (answers to *where*-questions)” (Levinson & Meira 2003: 486).

Second, the term LOCATIVE/POSITIONAL VERB (LPV) will be used to refer to a relatively small set of contrasting verbs of location or position. Like many other languages, Lakhota makes use of verbs like *sit* (*'jāke*), *stand* (*'nāži*), and *lie* (*'jūke*) to express something about the spatial relation between *FIGURE* and *GROUND*. As can be seen from these examples, LPVs are often derived from posture verbs.

Both of these definitions will be fleshed out in *Section 3*.

### 2.3. Extensional Map

Finally, elicitation drawings that BadWound described using a particular ADPOSITION were mapped onto a fixed arrangement of the complete set of drawings used in this study (see *Section 3.2*). This method is helpful in two ways. First, it provides a general idea of how Lakhota partitions the conceptual realm of spatial topology. A key assumption here is that a set of drawings referred to by a particular ADPOSITION represents the extensional category for that ADPOSITION. Second, the Lakhota mappings can then be compared to the mappings of other languages to see where their boundaries converge or diverge. The fixed arrangement of drawings used in this paper is based on one utilized by Levinson and Meira (2003).<sup>7</sup> However, Levinson and Meira’s array contains 71 drawings. Since this study could not cover all of the scenes, I removed the images that did not appear in the data and left the remaining drawings in their original fixed positions. Therefore, a comparison of the Lakhota pattern to patterns established for other languages may only give us a rough idea of any cross-linguistic similarities or differences in extensional categories.

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<sup>7</sup> This method was originally used by Bowerman (1996).

### 3. Results of the Analysis

#### 3.1. Lakota Locative Construction

Lakhotā expresses spatial configurations with a combination of ADPOSITIONS and LOCATIVE/POSITIONAL VERBS (LPVs). Based on the utterances that were collected in this study, the basic structure of the locative construction is as follows:

**(NP) (NP) (NP) (D-ADV) (ADPOSITION(s)) LPV/Pred**

The parentheses indicate that certain elements can be omitted — only the LPV/Pred element is obligatory. The (s) indicates that there is no limit (at least in theory) to the number of ADPOSITIONS. Evidence for this basic ordering will be given throughout *Section 3.1*. Some possible variations and exceptions to this order will be discussed in *Section 3.1.5*. The following sections look at each of the elements in detail.

##### 3.1.1. The Noun Phrase (NP) in the Locative Construction<sup>8</sup>

Due to the very specific way in which the data were elicited, the vast majority of utterances contained two noun phrases. For example, for *Drawing 1* I asked BadWound, *Where is the CUP?* She responded with:

- (1) wi'jatke ki 'waglijutapi (kĩ) el a'kāl 'he  
 cup the table (the) there on top of exists  
 NP<sub>FIGURE</sub> NP<sub>GROUND</sub>  
*The cup is on the table*

Here, both the NP representing the *FIGURE* as well as the NP representing the *GROUND* are present. On the other hand, several examples show that the NP that refers to the *GROUND* may be omitted:

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<sup>8</sup> For an in-depth description of Lakhotā nouns and noun phrases, see Rood and Taylor (1996).

- (2) 'wowapi wā a'kāl 'he  
 book a on top of exists  
 NP<sub>FIGURE</sub>  
*A book is up there (on the shelf)*
- (3) 'wowapi ki č<sup>h</sup>ā'blaska wā a'kāl 'he  
 book the shelf/board a on top of exists  
 NP<sub>FIGURE</sub> NP<sub>GROUND</sub>  
*The book is up there on a shelf*

Although both (2) and (3) are grammatically correct, the GROUND (SHELF) is assumed in the former while explicitly stated in the later.

The following examples, in contrast, require that the GROUND be omitted:

- (4) 'ogle ki o'tke  
 coat the hangs  
*The coat is hanging*
- (5) 'wowapi 'eja i'p<sup>h</sup>axlog 'he  
 paper some pierced through exist  
*Some sheets are stuck/pierced there*

In English, the likely constructions would be, *The coat is hanging on the wall* and *Some sheets are stuck on the spike*. However, it appears as if the Lakhota LPVs *o'tke* ('hangs') and *i'p<sup>h</sup>axlog* ('pierced through'), are incompatible with an explicitly stated GROUND.

In a later example using *o'tke*, I attempted to get BadWound to express the GROUND explicitly:

- (6) 'hapi 'eja o'tke  
 clothes some hang  
*Some clothes are hanging (on a line)*
- (7) 'hapi 'eja tã'kāl o'tke  
 clothes some outside hang  
*Some clothes are hanging outside*
- (8) ? 'hapi 'eja wĩ'ka el o'tke  
 ? clothes some rope/line there hang  
 ? *Some clothes are hanging there on a line*

First BadWound gave a GROUND-less expression in (6), but when pressed she inserted a location (*tã'kāl*, 'outside') in (7). We might call 'outside' a pseudo-GROUND, but it was not the GROUND depicted in the drawing. Finally, I asked her if it was possible to say (8), a literal translation of the English *Some clothes are hanging there on a line*. Her feeling was that it may be "grammatically correct,"



but it “sounded funny” because the “line is a given.” In other words, a native speaker would not describe the scene that way.<sup>9</sup>

The following set of examples shows how the particular spatial relation of an item being worn by someone can be expressed via one, two, or three NPs:

- (9) peʔi'juskiča ki 'ũ  
 headband the (she is) wearing (using)  
 NP<sub>FIGURE</sub>  
*(She is) wearing a headband*
- (10) 'wi'čičala ki peʔi'juskiča wā na'ta el 'ũ  
 girl the headband a head there wearing (using)  
 NP NP<sub>FIGURE</sub> NP<sub>GROUND</sub>  
*The girl is wearing a headband on her head*
- (11) 'wipiaka ki pa'ye el 'ũ  
 belt the waist/abdomen there worn (used)  
*The belt is worn on the waist*

The 'ũ-construction seems to be the preferred way to express the concept of items being worn.<sup>10</sup> (9) shows the prototypical form, using only a single NP. A better translation might be ‘The headband is worn,’ because both the *wearer* and the *GROUND* are assumed. However, with some coaxing I was able to get BadWound to explicitly state the *FIGURE*, *GROUND*, and *wearer* in (10). Finally, (11) shows that both the *FIGURE* and *GROUND* can be used without expressing the *wearer*.

Clearly, there is a range of acceptable variation, although within certain constraints, as demonstrated by (4) and (5). Rood and Taylor state that the only obligatory slot in a Lakhotā sentence is the verb (1996: 453). However, since there were no instances in this dataset where all the NPs were omitted, I cannot say for certain whether or not the locative construction requires at least one NP.

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<sup>9</sup> See *Section 4.1* for limitations of this study, including the possibility that this elicitation tool is the linguistic equivalent of forcing a square peg into a round hole.

<sup>10</sup> See *Non-Spatial Predicates* in *Section 3.1.4* for more on why Lakhotā does not describe certain scenes using the basic locative construction.

### 3.1.2. Deictic Adverbs (D-ADV)

It appears that the locative construction can use the deictic adverb slot to express the spatial relationship that exists between the speaker and the scene she is describing. For example, when I asked BadWound to describe *Drawing 7*, she first said:

- (12) ɽ'ktomi wā tičē (el) i'jaje  
 spider a ceiling/roof (there) going/moving  
*A spider is going along on the ceiling*

The deictic adverb BadWound originally used was 'el, ('there'). However, when she repeated the sentence, she omitted the 'el. In trying to tease out the meaning of this word, I asked her to imagine that the spider was further and further away from her (I also physically moved the drawing up and away). BadWound then answered using different D-ADVS:

- (13) ɽ'ktomi wā tičē hel i'jaje  
 spider a ceiling/roof over there going/moving  
*A spider is going along up there on the ceiling*
- (14) ɽ'ktomi wā tičē 'kak<sup>h</sup>ja i'jaje  
 spider a ceiling/roof to way over there going/moving  
*A spider is going along to (a place) way up there on the ceiling*

The only element that changes between these utterances is the D-ADV. Since the spatial relationship between the *FIGURE* and *GROUND* did *not* change, I assume that it was BadWound's perception of her position in relation to the *FIGURE* that prompted her to use the different D-ADVS. Although this is a relatively simple example, the implications for the role of introspection in locative constructions may be much more complex.<sup>11</sup>

Four D-ADVS appeared in the data:

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<sup>11</sup> Rood (2003) outlines a hypothesis wherein the choice of certain ADPOSITIONS is dependent on whether the speaker imagines the scene to be at the speaker's own location or someplace away from it, giving rise to complex variations.

<i>lel</i>	‘here’
<i>'el</i>	‘there’ (neutral, default term)
<i>'hel</i>	‘over there’ (further away than <i>'el</i> )
<i>'kak<sup>h</sup>ja</i>	‘to (a place) way over there’ (telic; further away than both <i>'el</i> and <i>'hel</i> )

Of these, the most common by far was *'el*, which appears to be a general default term in addition to simply meaning ‘there.’ This is not particularly surprising if we consider the roots of D-ADVS, which are formed by adding a demonstrative to an adverb or ADPOSITION. Lakhot has three demonstrative roots:

<i>'le</i>	‘this’
<i>'he</i>	‘that’ (a general, default term)
<i>'ka</i>	‘that over there’ (further away than <i>'he</i> )

According to Rood and Taylor, *'he* is the most semantically neutral of these roots, and is the general term that is used once the location of an NP has been identified — either by gesture, by using one of the three demonstratives, or periphrastically (1996: 456). Therefore, it seems likely that the D-ADVS work in much the same way as demonstratives. Once the spatial relationship between the speaker and the scene has been established, the speaker can default to *'el*, or even omit it completely.

### 3.1.3. Adpositions

Lakhot has no prepositions or circumpositions, only postpositions. However, in keeping with the operational definitions outlined in *Section 2.2.*, I will continue to call the category by the more general term ADPOSITION.

Although some scholars distinguish between spatial nominals, spatial adverbials, basic adpositions, and derived adpositions, I have chosen to group them all together for two reasons. First, as mentioned in *Section 2.2.*, the cross-linguistic boundaries of these categories are quite fuzzy. Levinson and Meira make a point of including SPATIAL NOMINALS (e.g. ‘top,’ ‘bottom,’ ‘side’) because even though *on top of* can be separated from the more complex locative adpositional *on the top of*, the general spatial relation they both express can tell us something about an underlying concept they may share (2003: 486). The second reason I group all spatial-relation terms under the category of ADPOSITION is specific to Lakhot itself. Many of its adpositions are derived from verbal stems. An even larger number are derived from an adverb with a related meaning, by simply prefixing an *i-*. Ingham states, “In a sense this type of postposition is infinitely derivable, since potentially any adverb, especially one relating to time or space, can form a postposition by means of the prefix *i-*” (2003: 41).

Furthermore, Rood and Taylor write, “The line between adverbs and postpositions is sometimes difficult to draw, chiefly because the same words are often used both ways” (1996: 452).

In short, for the purposes of this paper, ADPOSTION will be used to describe markers for specific spatial relationships that exist between the *FIGURE* and *GROUND*. This is not to say, however, that subtle distinctions between ADPOSITIONS are not important for this study. As we shall see, we may be able to establish some taxonomic relationships (at least in a preliminary way) among ADPOSITIONS (see *Section 3.2.3*).

The majority of ADPOSITIONS that appeared in the data are listed below, organized into broad conceptual categories (e.g. IN, ON, OVER):

IN	<i>ma'hel</i>	‘inside,’ ‘within’
ON	<i>a'kāl</i>	‘on top of’
	<i>a'kaxpa</i>	‘covers’
OVER	<i>i'wākab</i>	‘above’ (above “head level,” but not necessarily above a GROUND)
UNDER	<i>o'xlat<sup>he</sup></i>	‘under’ (contact not allowed)
	<i>i'oxlat<sup>he</sup></i>	‘under,’ ‘right under’ (contact ok)
	<i>i'huk<sup>hul</sup></i>	‘down there’ (below “head level,” not necessarily beneath a GROUND)
NEAR	<i>k<sup>h</sup>i'jela</i>	‘near’
	<i>i'sak<sup>hib</sup></i>	‘beside,’ ‘next to’
AROUND	<i>o'homni</i>	‘around’
ATTACHED	<i>i'p<sup>h</sup>axlog</i>	‘pierced through’
	<i>e'tā</i>	‘from there’

In an attempt to delineate the boundaries of each term, let’s look at some of the more common and/or interesting examples of how Lakhota ADPOSITIONS describe certain spatial relations.

IN · *ma'hel*. The adposition *ma'hel* is used in two somewhat different ways:

- (15) t<sup>h</sup>a'spā wā 'wijatke ma'hel 'he  
 apple a cup/bowl inside exists  
*An apple is in the cup*
- (16) 'šūka ti ma'hel 'xpaje  
 dog house inside lies  
*A dog is lying inside the house*

- (17) čī'ska wā wa'kšiča-p<sup>h</sup>a'xīte ma'hel 'ū  
 spoon a dish- towel inside exists  
*A spoon is under the towel*

Examples (15) and (16) show the ADPOSITION being used in a way that is quite similar to English. Both the apple and the dog are described as being within some container (GROUND). Sentence (17), on the other hand, uses ‘inside’ where English would prefer ‘under’ (Lakhotā can also use ‘under.’ See next section). Perhaps one can think of the Lakhotā term *ma'hel* as covering a broader semantic space than the English term *in*. We will come back to this notion in *Section 3.2*.

**UNDER · o'xlate, i'oxlate, i'hukul.** The following example shows that the same spatial arrangement shown in *Drawing 24* can be expressed with only two of the three ADPOSITIONS that can be glossed as *under*:

- (18) čī'ska wā wa'kšiča-p<sup>h</sup>a'xīte i'oxlate 'ū  
 spoon a dish- towel under exists  
*A spoon is under the towel*
- (19) čī'ska wā wa'kšiča-p<sup>h</sup>a'xīte i'huk<sup>h</sup>ul 'ū  
 spoon a dish- towel down there exists  
*A spoon is under the towel*
- (20) \*čī'ska wā wa'kšiča-p<sup>h</sup>a'xīte o'xlate 'ū  
 \*spoon a dish- towel under exists  
 \* *A spoon is under the towel*

Note that *o'xlate* cannot be used here. What is particularly interesting is that the two constructions that are most similar in form are the least compatible. I was unable to determine why this was so until I compared these utterances to another set of ‘under’ sentences. BadWound used all three adpositional forms in describing *Drawing 16*<sup>12</sup>:

- (21) t<sup>h</sup>a'p<sup>h</sup>a wā 'waglijutapi o'xlate 'he  
 ball a table under exists  
*A ball is under the table*

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<sup>12</sup> BadWound had trouble recalling the Lakhotā word for ‘chair’ so we substituted ‘table.’

- (22) t<sup>h</sup>a'p<sup>h</sup>a wā 'waglijutapi i'oxlate 'he  
 ball a table under exists  
*A ball is under the table*
- (23) t<sup>h</sup>a'p<sup>h</sup>a wā 'waglijutapi i'huk<sup>h</sup>ul 'he  
 ball a table down there exists  
*A ball is down there (under) the table*

According to BadWound, there is no difference in meaning between (21) and (22), and both are grammatical. Perhaps this can be explained as the effect of the adposition-derivation chain mentioned above. However, there may be another explanation that also accounts for the examples that describe *Drawing 24*. I recalled that BadWound made certain hand gestures while describing *Drawing 16* which gave the impression that *i'oxlate* was somehow “closer” to her than *o'xlate*. It did not make sense to me at the time, but later reflection lead me to reinterpret *i'oxlate* as referring to something that might better be translated as ‘right under the table.’ This explanation would also solve the puzzle of sentence (20). Since the TOWEL makes contacts with the SPOON, ‘right under the towel’ would make perfect sense. An implication of this solution is that *o'xlate* cannot be used if there is contact between FIGURE and GROUND. Although I have not been able to test this prediction, the notion of contact will become an important feature in *Section 3.2.3*.

According to BadWound, *o'xlate* and *i'hukul* are not perfect synonyms either. When comparing examples (22) and (23), BadWound said that the latter does not necessarily imply that the FIGURE is beneath any kind of GROUND, while the former does. I interpret BadWound’s description as meaning that the utterance in (23) sets up the scene almost as a list: “There’s a ball and a table, and the ball is down there (in relation to the speaker, rather than in relation to the TABLE).” On the other hand, (22) seems to specifically describe the fact that the BALL is beneath the TABLE.

**ON · a'kāl, a'kaxpa.** The Lakhota ADPOSITION for ‘on top of’ is used to describe a FIGURE in contact with a flat horizontal GROUND. Again, the notion of contact is significant (see *Section 3.2.3*). The following example is representative of a great many sentences in the data:

- (24) 'wowapi ki č<sup>h</sup>ā'blaska wā a'kāl 'he  
 book the shelf/board a on top of exists  
*The book is on a shelf*

A variation, however, can occur by adding a second ADPOSITION in series with *a'kāl* to express the concept of ‘covering’:

- (25) mni'huha wā 'waglijutapi a'kāl 'he  
 linen/cloth a table on top of exists  
*A tablecloth is on the table*
- (26) mni'huha wā 'waglijutapi a'kāl a'kaxpa 'he  
 linen/cloth a table on top of covers exists  
*A tablecloth covers the table*

Although we may be tempted to label the term *a'kaxpa* in (26) as simply an adverb, there is some evidence in support of grouping it with ADPOSTIONS. Rood and Taylor note:

The line between adverbs and postpositions is sometimes difficult to draw, chiefly because the same words are often used both ways. English adverbs and prepositions show the same kind of interchangeability. ‘Come on out from down in under there!’ has six adverb/prepositions in this kind of ambiguous function. (1996: 452)

It seems that *a'kaxpa* in (26) acts as a serial ADPOSITION in the same way as the English *down in under there*, and carries additional spatial information — namely, that the *FIGURE* completely covers the top of the *GROUND*.

We have seen that *a'kāl* can be used to express the relationship between a *FIGURE* and a flat horizontal *GROUND*, but it can also describe other types of *GROUNDS* as well:

- (27) zī'tkala wā 'wik<sup>h</sup>ā (el) a'kāl 'jāke  
 bird a rope (there) on top of sits  
*A bird is sitting on the line*
- (28) wi'č<sup>h</sup>aša wā ti'-akāl 'naži  
 man a roof-on top of stands  
*A man stands on the rooftop*
- (29) wi'č<sup>h</sup>aša wā ti'č<sup>h</sup>e a'kāl 'naži  
 man a roof on top of stands  
*A man stands on top of a roof*

Sentence (27) shows *a'kāl* being used with a linear (rather than planar) *GROUND*, and (28) and (29) show a flat but angled *GROUND*.

Another notable phenomenon in this set of examples is how ADPOSITIONS can often combine with nouns to form compounds. The form *tī'akāl* (‘roof-on top of’) in (28) is such a compound.

**AROUND · o'homni.** At first glance, it may appear that the ADPOSITION *o'homni* is used in the same way that *around* is used in English:

- (30) mni'huha wi'jakpa p<sup>h</sup>e'tižāžā wā o'homni i'jakaškab  
 material shiny lamp/fire a around they tied around  
*They tied a ribbon around the candle*
- (31) 'č<sup>h</sup>ūkaške ti o'homni 'he  
 fence house around exists  
*The fence is around the house*
- (32) 'wipiaka ki pa'ye o'homni 'ū  
 belt the waist/abdomen around worn (used)  
*The belt is worn around the waist*

The three examples above show a wide variation in kinds of GROUND, from small and large inanimate objects (CANDLE, HOUSE) to animates (a woman's WAIST). In fact, *o'homni* was the only ADPOSITION that appeared in the 'ū-construction (the preferred way to express the concept of items being worn) in this dataset. On the other hand, *o'homni* is not used in certain situations where English uses *around*:

- (33) nū'psioxli wā 'nāpe el 'ū  
 ring a hand/finger there (she is) wearing (using)  
*She is wearing a ring on her finger*
- (34) \* nū'psioxli wā 'nāpe o'homni 'ū  
 \* ring a hand/finger around (she is) wearing (using)  
 \* *She is wearing a ring around her finger*

Sentences (33) and (34) show that while one can say 'She is wearing a ring on her finger' in Lakota, it is ungrammatical to say 'She is wearing a ring *around* her finger.' What is the rationale behind this categorization?

According to BadWound, sentences (30), (31), and (32) are all grammatical because the *FIGURE* "goes around" the GROUND in each. I interpret this as meaning that each of the *FIGURES* has two ends, one of which traverses space around the GROUND to meet the opposite end. Even the 'fence' in (31) can be thought of in this way (as we can also do in English). Conversely, a *RING* is a solid object that does not have this same property. Therefore, corresponding English and Lakota ADPOSITIONS clearly carve out different areas of spatial conceptualization.

**ATTACHED · i'p<sup>h</sup>axlog, e'tā.** There are two Lakota ADPOSITIONS that carry the concept of attachment. The first is *i'p<sup>h</sup>axlog*:



- (35) 'wowapi 'eja i'p<sup>h</sup>axlog 'he  
 paper some pierced through exists  
*Some sheets are stuck/pierced there*
- (36) wa'hīkpe wā t<sup>h</sup>a'spā wā i'p<sup>h</sup>axlog jā'ke  
 arrow an apple an bore through sits (and is still there)  
*An arrow bore through an apple and is still there*
- (37) wa'hīkpe wā t<sup>h</sup>a'spā wā i'p<sup>h</sup>axlog i'jaje  
 arrow an apple an bore through going (and left a hole)  
*An arrow bore through an apple and left a hole*

*i'p<sup>h</sup>axlog* may best be translated as ‘pierced,’ but can be used in two slightly different senses (as can ‘pierce’ in English). In (35) and (36), the *FIGURES* were pierced and remain stuck to/on the *GROUND*.<sup>13</sup> *i'p<sup>h</sup>axlog* in this sense can be thought of as having a feature of +ATTACHMENT. On the other hand, the sense of *i'p<sup>h</sup>axlog* in (37) is not one of attachment. Instead, the *FIGURE* pierced the *GROUND*, passed on through, and left only a hole. This sense of the ADPOSITION does not share the feature of ATTACHMENT.

Another ADPOSITION that implies ATTACHMENT is *e'tā* (‘from’). It is particularly interesting because (at least in this dataset) it is only found in association with animate *FIGURES* that grow from a particular *GROUND*:

- (38) č<sup>h</sup>ā wā pa'ha e'tā i'č<sup>h</sup>aye  
 tree a hill from grows  
*A tree is growing from the hill*
- (39) t<sup>h</sup>a'spā wā č<sup>h</sup>ā e'tā o'tke  
 apple an tree from hanging  
*An apple is hanging from a tree*
- (40) t<sup>h</sup>a'spā wā č<sup>h</sup>ā e'tā i'č<sup>h</sup>aye  
 apple an tree from growing  
*An apple is growing from a tree*

APPLE and TREE in the above examples both ‘grow from’ and are ‘attached at’ a particular place on the *GROUND*.

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<sup>13</sup> The word order difference does not seem to be relevant, perhaps because the INSTRUMENT and UNDERGOER are obvious from the context.

Let's now turn to the final element in the basic locative construction, the predicate.

### 3.1.4. LPV/Predicate

Levinson and Meira note that many languages can encode topological relations with a contrastive set of locative predicates (2003: 486). Lakhota appears to be such a language — it uses various kinds of verbs to express something about the spatial relationship, with or without utilizing the ADPOSITIONS discussed above. A wide range of predicate types appeared in the data: posture verbs, default verbs of existence, positional verbs, and non-spatial predicates. Let's look at each of these in turn.

**Posture verbs.** A subset of the verbs that appeared in the data can be categorized as *posture verbs*:

*'jāke* 'sit'

*'nāži* 'stand'

*'jūke* 'lie' (used with animate FIGURES only)

*'xpaje* 'lie' (used with both animate and inanimate FIGURES)

*o'tke* 'hang'

Although many languages use grammaticalized posture verbs to express something about the axial geometry between the *FIGURE* and *GROUND*, they can be utilized in different ways. For example, Germanic languages appear to exhibit a continuum: At one end, Dutch and German require posture verbs to express the location of an entity, while at the other end, English rarely utilizes posture verbs (see Lemmens 2006).

Before looking at any specific examples, let's first identify another type of verb.

**Default verbs of existence.** Lakhota is similar to English in that the posture verb is not usually a required element and can often be replaced with a more general predicate of existence. Lakhota speakers, however, must chose between two general predicates depending on the animacy of the *FIGURE*:

- 'he<sup>14</sup> 'exist' (a general default term, used with inanimate *FIGURE*)  
 'ū<sup>15</sup> 'exist' (a general default term, used with animate *FIGURE*)

Some examples of how the posture and animacy of *FIGURES* interact in the locative construction can be seen in the following set of utterances:

- (41) 'mni 'ognake ki 'waglijutapi a'kāl 'he  
 water bottle the table on top exists  
*The water bottle is on the table*
- (42) 'mni 'ognake ki 'waglijutapi a'kāl 'nāži  
 water bottle the table on top stands  
*The water bottle is standing on the table*
- (43) 'mni 'ognake ki 'waglijutapi a'kāl 'jāke  
 water bottle the table on top sits  
*The water bottle is sitting on the table*
- (44) 'mni 'ognake ki 'waglijutapi a'kāl 'xpaje  
 water bottle the table on top lies  
*The water bottle is lying on the table*
- (45) \* 'mni 'ognake ki 'waglijutapi a'kāl 'jūke  
 \* water bottle the table on top lies  
 \* *The water bottle is lying on the table*
- (46) \* 'mni 'ki 'waglijutapi a'kāl 'xpaje  
 \* water the table on top lies  
 \* *The water is lying on the table*

Example (41) shows that 'he can be used as the general default term for inanimate objects. Sentences (42-44) show some of the various posture verbs that can be used with 'mni 'ognake ('water bottle'), depending on what axial geometry it has in relation to the GROUND (e.g. standing on its base, lying on its side). However, the ungrammaticality of (45) indicates that 'jūke ('lies') cannot be used with inanimate objects.

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<sup>14</sup> Not to be confused with its homonym, the demonstrative root 'he ('that')

<sup>15</sup> Not to be confused with its homonym, the LPV 'ū ('wear,' 'use')

Example (46) is ungrammatical for a different reason. It appears that Lakota differs from English in that it cannot use a posture verb to describe a situation where water has been spilled on a table. In contrast, compare the English sentence *Be careful, there's (pooled) water standing on that table*. According to BadWound, liquids that are not in some kind of container must be expressed as “running or flowing,” even if it is just pooled on a table.

Animate objects require a slightly different pattern. None of the following FIGURES allows the use of *'he* as a general default term:

- (47) \* ha'xā wā mni (el) 'he  
 \* fish a water (there) exists  
 \* *A fish is (there) in the water*
- (48) \* zī'tkala wā 'wik<sup>h</sup>a (el) a'kāl 'he  
 \* bird a rope (there) on top of exists  
 \* *A bird is standing on the line*
- (49) \* ho'kšila ki 'p<sup>h</sup>eta (el) i'sak<sup>h</sup>ib 'he  
 \* boy the fire (there) beside exists  
 \* *The boy is beside a fire*
- (50) \* i'gmu wā o'wīža a'kāl 'he  
 \* cat a material/rug on top of exists  
 \* *A cat is sitting on the material/rug*

On the other hand, compare the above examples with the following set:

- (51) zu'zeča wā č<sup>h</sup>ā el 'ū  
 snake a stump/wood there exists  
*There is a snake on the stump*
- (52) zu'zeča wā č<sup>h</sup>ā el akāl 'jāke  
 snake a stump/wood there on top of sits  
*A snake is sitting there on top of the stump*
- (53) zu'zeča wā č<sup>h</sup>ā el akāl 'jūke  
 snake a stump/wood there on top of lies  
*A snake is lying there on top of the stump*
- (54) zu'zeča wā č<sup>h</sup>ā el akāl 'xpaje  
 snake a stump/wood there on top of lies  
*A snake is lying there on top of the stump*
- (55) \* zu'zeča wā č<sup>h</sup>ā el 'he  
 \* snake a stump/wood there exists  
 \* *A snake is there on the stump*
- (56) \* zu'zeča wā č<sup>h</sup>ā el akāl 'he  
 \* snake a stump/wood there on top of exists  
 \* *A snake is there on top of the stump*

The direct contrast between (51) and (55-56) indicates that animate *FIGURES* must take *'ū* rather than *'he* as a general default verb.

Another animacy criteria can be seen by comparing sentences (53) and (54). In contrast with an inanimate object like *WATER BOTTLE*, here we can see that animate objects like *SNAKE* can take either *'jūke* ('lies') or *'xpaje* ('lies') and still be grammatical.

Some lexical items also seem to have specific constraints on which posture verb they can select. The constraint appears to have something to do with the physical dimensions of the figure. For example:

- (57) *ĩ'ktomi wā tičē* (el) *'jāke*  
 spider a ceiling/roof (there) sits (if not moving)  
*A spider is sitting on the ceiling*
- (58) \**ĩ'ktomi wā tičē* (el) *'nāži*  
 \* spider a ceiling/roof (there) stands (if not moving)  
 \* *A spider is standing on the ceiling*
- (59) *t<sup>h</sup>a'p<sup>h</sup>a wā 'waglijutapi* (el) *i'huk<sup>h</sup>ul 'jāke*  
 ball a table (there) down there sits  
*A ball is sitting down there (under) the table*
- (60) \**t<sup>h</sup>a'p<sup>h</sup>a wā 'waglijutapi* (el) *i'huk<sup>h</sup>ul 'nāži*  
 \* ball a table (there) down there stands  
 \* *A ball is standing down there (under) the table*

It appears that both *ĩ'ktomi* ('spider') and *t<sup>h</sup>a'p<sup>h</sup>a* ('ball') can take *'jāke* ('sit') but not *'nāži* ('stand'). Comparing these examples to the data for *WATER BOTTLE* on TABLE, *SNAKE* on STUMP (*Drawing 23*), and *BOY* beside FIRE (*Drawing 38*), paints the following picture:

	<i>sit</i>	<i>stand</i>	<i>lie</i>
water bottle	x	x	x
snake	x	--	x
boy	x	x	x
spider	x	--	--
ball	x	--	--

One possible conclusion that can be drawn from this is that the height-to-width dimension of a *FIGURE* combines with the "natural" spatial orientations it tends to take in the real world. It appears that this combination plays a key role in which posture verbs can be selected. *FIGURES* that are long and thin, but have a multiple natural orientations to GROUND (i.e. *WATER BOTTLES* and *BOYS* can often be found upright or on their sides), appear to be able to take any of the posture verbs. *SNAKES*, on the other hand, are also long and thin but are rarely found completely upright. *SPIDERS* and *BALLS* seem to form another class of objects that can be

thought of as having approximately equal height and width. Furthermore, their orientation does not tend to change much in relation to GROUND. Therefore, this combination may preclude the use of either ‘standing’ or ‘lying.’

**Positional verbs.** Some of the predicates that appeared in the data provide important spatial or positional information, but cannot be categorized as posture verbs:

- i'jaskape* ‘sticks (to/on something)’
- o'kawīye* ‘floats (on water)’
- ka'xwoke* ‘floats (in/on air)’
- o'wapi* ‘imprinted (on something)’
- i'kwæke* ‘tie (to something)’, ‘attached (to something)’
- i'jakaškab* ‘tie around (something)’

The following comparison shows how scenes that we can describe in English using a single positional verb (floats), require two different verbs in Lakota:

- (61) t<sup>h</sup>a'spā wā 'wijatke el o'kawīye  
 apple a cup/bowl there floats<sup>16</sup>  
*An apple is floating inside the cup*
- (62) ma'xpija wā pa'žola (el) i'wākab ka'xwoke  
 cloud a pointed little hill (there) above floats  
*A cloud is floating (there) above the pointed little hill*

**Non-spatial predicates.** Levinson and Meira note that several languages in their sample (e.g. Lao, Yukatek) did not use locative constructions when describing certain kinds of scenes. Instead, they express these relationships in some other way (either utilizing the resultative or some other descriptive mode) “suggesting that languages perhaps differ in what they consider a fundamentally spatial arrangement” (2003: 495).

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<sup>16</sup> Alternate translations include ‘floating, ‘sailing,’ and/or ‘bobbing up and down (in some liquid)’

Similarly, Lakota appears to prefer non-spatial constructions for several scenes. Since these expressions evoke a construction other than the basic locative, I will only list the verbs here and indicate which scenes they described:

<i>i'jaje</i>	‘goes’	7, 11, 19, 30
<i>i'č<sup>h</sup>aye</i>	‘grows’	17, 27, 41
<i>o'nuwe</i>	‘swims’	32
<i>'ū</i>	‘wears’ (‘uses’)	5, 10, 21, 42, 46
<i>'ošta</i>	‘put on (clothing)’	21
<i>i'jut<sup>h</sup>e</i>	‘tried on (clothing)’	21
<i>č<sup>h</sup>ā'nūpe</i>	‘smokes a cigarette’	39
<i>'ūpe</i>	‘smokes’	39
<i>wa'je</i>	‘I did’	9

As we shall see in the following section, all of the predicates discussed here in *Section 3.1.4* seem to be able to fill the same slot in the locative construction; therefore I have labeled the slot *LPV/Pred* for locational, postural, and positional verbs (LPVs), as well as other predicates.

### 3.1.5. Ordering of Elements

Clearly, much more data from multiple speakers will eventually be required to get a more complete picture of the overall patterns that Lakota allows. However, we can make a preliminary summary of the basic locative construction as seen in this data:

**(NP) (NP) (NP) (D-ADV) (ADPOSITION(s)) LPV/Pred**

Throughout *Section 3.1* we have explored the multiple patterns that are represented in the formula above. We have looked at each of the elements in detail, as well as identified which are optional and which are obligatory. We have also noted the acceptable combinations of ADPOSITION + LPV, acceptable orderings, and identified multiple animacy criteria.

A couple of questions still remain, however. For example, the set of responses for *Drawing 17* (*TREE* on HILL) show an interesting variation on the basic pattern. The default verb *'he* (‘exists’) appears to be able to fill either the ADPOSITION slot or the LPV/Pred slot:

- (63) č<sup>h</sup>ā pa'ha wā 'he 'nažī  
 tree hill a exists stands  
*The tree is standing on a hill*

- (64) č<sup>h</sup>ã pa'ha wã el 'naži  
 tree hill a there stands  
*The tree is standing there on a hill*
- (65) č<sup>h</sup>ã pa'ha wã a'kāl 'he  
 tree hill a on top of exists  
*The tree is there on top of a hill*
- (66) č<sup>h</sup>ã pa'ha wã a'kāl 'naži  
 tree hill a on top of stands  
*The tree is standing there on top of a hill*
- (67) ?? č<sup>h</sup>ã pa'ha wã 'naži 'he  
 ?? tree hill a stands exists  
 ?? *The tree is standing on a hill*

In (63), *'he* ('exists') seems to fill the ADPOSITION slot, while in (65) it appears in its "normal" LPV/Pred position (i.e. where it appears in all the other data). It is almost as if *'he* and *'naži* have switched places in (63). I was unable to elicit a sentence like (67), so I do not know if the variation seen in (63) is simply another ordering possibility, or if there is something more going on. Nevertheless, a possible explanation is that both terms are functioning as LPVs, except they now work in series (similar to the serial ADPOSITIONS discussed above).

Another interesting anomaly in the data can be seen in the following sentences describing *Drawing 28*. BadWound interpreted the image as *PICTURE OF WOMAN* on STAMP<sup>17</sup> and described it as follows:

- (68) 'wījã wã 'wiaskab el i'towapi ('jãke)  
 woman a stamp there picture (sits)  
*A picture of a woman sits on a stamp*
- (69) \* 'wījã wã 'wiaskab el i'towapi ('nãži)  
 \* woman a stamp there picture (stands)  
 \* *A picture of a woman stands on a stamp*
- (70) \* 'wījã wã 'wiaskab el i'towapi ('jũke)  
 \* woman a stamp there picture (lies)  
 \* *A picture of a woman lies on a stamp*

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<sup>17</sup> BadWound did not know the word for 'stamp' and therefore created one.



The first thing that caught my attention is that the LPV appears to be optional. This clearly challenges the notion that the only obligatory element in a Lakhotā sentence is a predicate. However, when I asked BadWound to translate the Lakhotā phrase back to me in English, she said, “It is a picture of a woman that lies on the stamp.” This sounds like an embedded clause construction, so the mystery may simply be the result of a different type of construction.

### 3.2. Results of Lakhotā Data in Relation to the UNIVERSAL CONCEPTUAL CATEGORIES Hypothesis

Several previous studies have challenged the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis at various levels of analysis, including implications that concepts like IN and ON may not be holistic primitives (Brown 1994), that languages may partition the conceptual space in other ways which are learned just as early (Bowerman 1996 and 2003), that precise (rather than general) axial geometry must often be expressed (Levinson 1994), and that some languages code topological relations with (either completely or in combination with) contrastive locative verbs rather than adpositions (Ameka & Levinson 2003).

The Levinson and Meira study approaches the debate by breaking down the overarching UNIVERSAL CONCEPTUAL CATEGORIES hypothesis into three progressively weaker hypotheses:

**Hypothesis 1:** All languages agree on basic categories like IN, ON, UNDER, NEAR, etc., in such a way that these notions form uniform, shared core-meanings for adpositions across languages.

**Hypothesis 2:** Languages may disagree on the ‘cuts’ through this semantic space, but agree on the underlying organization of the space — that is, the conceptual space formed by topological notions is coherent, such that certain notions will have fixed neighborhood relations.

**Hypothesis 3:** The domain of topological relations constitutes a coherent semantic space with a number of strong ATTRACTORS, that is, categories that languages will statistically tend to recognize even if some choose to ignore them. (Levinson & Meira 2003: 495-502)

Let’s see how the Lakhotā data compare to Levinson and Miera’s hypotheses.

#### 3.2.1. Hypothesis 1

This interpretation can be thought of as a “strong version” of the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis. It includes what is sometimes referred to as PROTOTYPE THEORY, where core concepts are considered to be universal but category boundaries can vary to some degree.

Levinson and Meira (2003) quickly refute this strong theory by comparing extensional maps for the multiple languages they studied. They found no evidence of prototype categories in the spatial topological domain. Only a single grouping of three scenes was shared across all the languages they looked at: 53, 16, and 31 (UNDER). Similarly, the Lakhota categorizations seem to cut across boundaries identified for other languages. While Lakhota does categorize 16 and 31 together (*o'xlate*), 53 was not part of the current study, so we cannot make any further inferences about a universal UNDER category.

### 3.2.2. Hypothesis 2

A weaker version of the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis is based on comparative approaches that have been used in cross-linguistic exploration of basic color terms. For example, no language has been found that collapses purple and yellow into a single color category. Instead, languages appear to build their color categories around foci that are “naturally salient” to human perception. Cross-linguistic variations in color categories are explained by a combination of two factors: languages organize their categories around one or more of the six natural foci, and categories all have variable boundaries.

Levinson and Meira state, “If the topological domain has a similar internal coherence, it should be possible to find a single fixed arrangement of the pictures such that those that are grouped together in one language remain contiguous even if they are separated by a category boundary in another language” (2003: 499). Their best solution to such a fixed array is represented in *Figure 1*<sup>18</sup>, however it failed to meet the requirement for the languages they studied. No single arrangement could be found that did not result in some language-discontinuous categories.

While this may seem to refute HYPOTHESIS 2, Levinson and Meira (2003) note that a perfect solution may eventually be found — unfortunately, it is an extremely difficult and computationally intensive problem to solve (71 factorial). Therefore, before discounting this hypothesis, let’s see how the Lakhota-specific extensional map shown in *Figure 2* compares with *Figure 1*.

As we can see, several Lakhota categories seem to map well onto *Figure 1*: *ma'hel* fits into the IN region, *i'wākab* matches with OVER, and *o'xlate* fits within UNDER. Furthermore, *i'sak<sup>h</sup>ib* provides a near match to NEAR. The

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<sup>18</sup> Figures are located in *Appendix B*.

boundary scene (17) is acceptable in this hypothesis because it is still contiguous to the other scenes in the category.

Unfortunately, the remaining categories are not so clean. While the majority of *a'kāl* fits nicely into the category of ON, scenes (33) and (17) are dispersed across the space.

A different kind of problem is presented by the two Lakhotā ADPOSITIONS that code some kind of attachment (i.e. *i'p<sup>h</sup>axlog*, *e'tā*). They both fall completely outside of the ATTACHED region, although along its edges. An interesting solution to this problem is to include three LPVs that also carry attachment connotations (i.e. *o'tke*, *i'kwæke*, *i'jaskape*) (see *Figure 3*). Now we can see that these mappings criss-cross the larger ATTACHED region. It is still discontinuous, but the overall impression is that all the attachment-related means of coding in Lakhotā seem to fall within the ATTACHED region.

Therefore, given the fixed array used by Levinson and Meira (2003), the Lakhotā data are inconsistent with HYPOTHESIS 2 — extensions of Lakhotā ADPOSITIONS do not map onto the optimized fixed array of scenes in a continuous way.

### 3.2.3. Hypothesis 3

The weakest of the three versions of the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis may be the most elegant. If certain topological relations do in fact act as semantic “attractors,”<sup>19</sup> we should be able to see clusters appear on a Euclidean distance model (a two-dimensional representation of multidimensional space). Levinson and Miera claim to have found evidence for such clusters (see *Figure 4*). However, they also state, “A crucial consideration is whether this particular pattern is an artifact of the particular languages we happen to have selected. That is a question that we cannot answer definitively — we can say only that the patterns now showing seem quite stable when further languages are added” (2003: 504).

Since Levinson and Miera’s clusters seem stable over a wide range of languages, it would be extremely interesting to see if the Lakhotā data follows the same pattern or not. Unfortunately, the data analysis methodology required for

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<sup>19</sup> *Attractor* is a term used in DYNAMICAL SYSTEMS THEORY (COMPLEXITY THEORY) to refer to a particular state towards which a complex system will tend to evolve, given enough time (see Gleik, 1987; Lorenz, 1996).

such an analysis (multidimensional scaling and cluster analysis) is beyond the scope of this project. We may, however, be able to get a general idea of how the Lakhota data compares to Levinson and Miera's cluster analysis by checking to see if any of the Lakhota ADPOSITIONS and/or LPVs fall outside of Levinson and Miera's clusters.<sup>20</sup>

For example, *Figure 5* shows an enlargement of the ATTACHMENT cluster region. Of the 13 scenes that Lakhota describes using attachment ADPOSITIONS or LPVs, fully six of them are not represented in any of the clusters (i.e. 9, 20, 27, 30, 44, 41). It is possible that this may be due to including LPVs as well as ADPOSITIONS in order to flesh out the ATTACHMENT category. However, I believe that it instead shows that Lakhota organizes its ATTACHMENT category somewhat differently than the other languages represented in the cluster analysis.

On the other hand, if we look at the two clusters that concern ON (i.e. ON-TOP and ON-OVER), we find the Lakhota organization largely follows the cluster analysis. Lakhota uses a single ADPOSITION (*a'kāl*) for ON, but its meaning can span three of the clusters. Of the nine scenes for which *a'kāl* is used, four fall into the ON-OVER category, three into ON-TOP, and two into ATTACHMENT. Levinson and Miera state, "Note that the 'conflation' of ON/OVER suggests that ON simpliciter is not a primitive (as on the orthodox view) but is composed of superposition plus or minus contact" (2003: 508). Since the use of *a'kāl* requires contact, it is broad enough in meaning to be used in all the scenes represented by the three different clusters.

These two rough comparisons between the Lakhota data and Levinson and Miera's cluster analysis seem to point in different directions. Some aspects of Lakhota data may not fit into their model, while others seem to accord well. Unfortunately, this study does not provide the kind of analysis that would be more conclusive.

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<sup>20</sup> A true cluster analysis of the Lakhota data would plot each scene in the multidimensional space. Any differences noted in this rough estimation may not in fact be significant (see *Section 4.1* for limitations of this study.).

## 4. Discussion of Results

### 4.1. Limitations of the Study

Clearly, a study of this size (utilizing only a single consultant) has many limitations. First and foremost, generalizing from a specific individual's utterances to the structure of a language is a significant leap of faith. Without comparing this dataset to responses from other native speakers, we cannot know to what extent BadWound's patterns indicate preferences of the language itself or are instead idiosyncratic. Further study utilizing a larger subject pool and statistical methodologies will eventually be needed to fully understand the extent of any variability.

Another major limitation of this project concerns cross-linguistic studies in general. Research designs attempting to understand something about "universal" conceptual categories may be inherently problematic. Various types of researcher bias (e.g. linguistic, cultural, philosophical) are difficult if not impossible to avoid, even when they are acknowledged.

Furthermore, human cognition is a socially embodied process rather than the abstract, disembodied form of "reason" proposed by most semantic typologists (Hutchins 1995). Therefore, attempting to abstract purely conceptual information from decontextualized drawings may provide a skewed picture (see Goodwin 1997 for an excellent critique of basic color term studies.) In other words, it is possible that the very methodology used in this project is the linguistic equivalent of forcing a square peg into a round hole.

Finally, I cannot offer any reliable analysis or conclusion for the comparison between the Lakhotá data and Levinson and Miera's HYPOTHESIS 3 because the kind of data analysis required is beyond the scope of this project.

Given these limitations, there are still some observations that we can make.

### 4.2. Conclusion

Although languages use different means to express spatial topological relations, it has been generally assumed that the underlying conceptual categories are universal. Consequently, it was thought that individual languages simply map their particular coding means onto the underlying categories. Recent cross-linguistic research in the spatial topological domain, however, has challenged the assumptions of this UNIVERSAL CONCEPTUAL CATEGORIES hypothesis on a variety of levels.

This project has analyzed and described the basic locative construction in Lakhotá. It has explored each of the elements in detail, identified which are optional and which are obligatory, noted the acceptable combinations and orderings of elements, and identified multiple animacy criteria. Since Lakhotá is a language that has called into question universal theories in other areas of

linguistics, a comparison was made between the Lakhota data and the conclusions from Levinson and Meira's groundbreaking cross-linguistic study (2003).

Levinson and Meira break the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis down into successively weaker hypotheses, and conclude that there is only evidence for the third and weakest version. The Lakhota data analyzed here confirms that HYPOTHESIS 1 (strong view) is unfounded — there is no evidence of prototype categories in the spatial topological domain.

The Lakhota data also confirms that HYPOTHESIS 2 is unsupportable. Extensions of Lakhota ADPOSITIONS do not map onto the optimized fixed array of scenes in a continuous way. Therefore, languages neither agree on the 'cuts' through semantic space, nor their underlying organization.

Finally, Lakhota provides some evidence to challenge Levinson and Meira's proposed solution, HYPOTHESIS 3 (strong ATTRACTORS in semantic space create a tendency for languages to code certain categories in certain ways). Consequently, we may be forced to formulate an even weaker version of the UNIVERSAL CONCEPTUAL CATEGORIES hypothesis, or instead, simply discount the idea of universal categories in the domain of spatial topological relations.

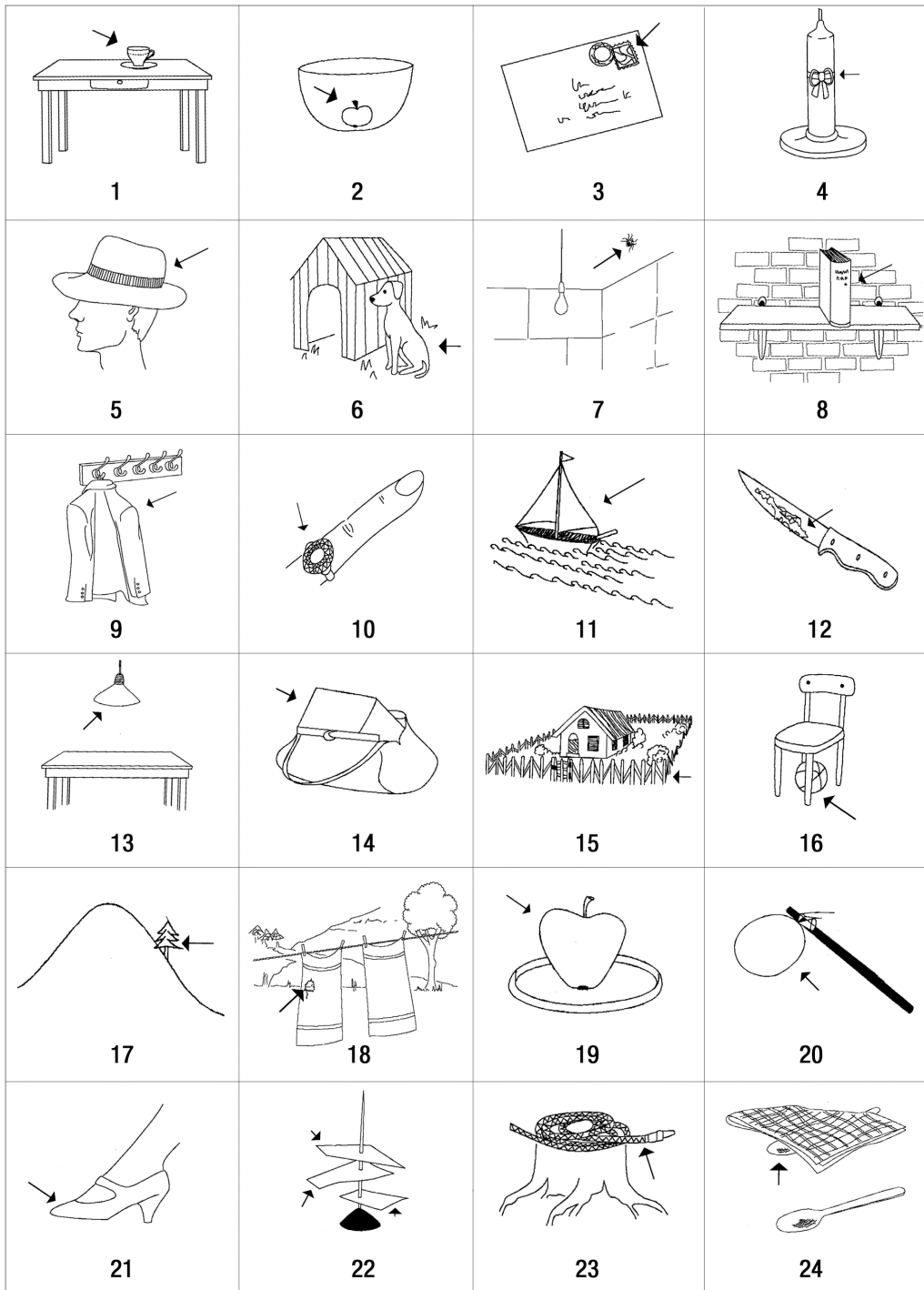
**References**

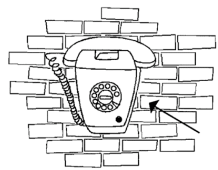

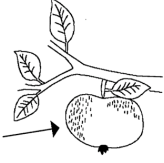

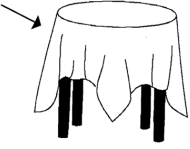
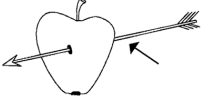
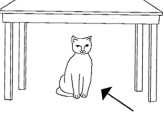

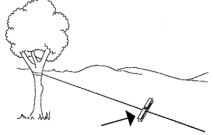

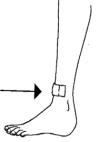

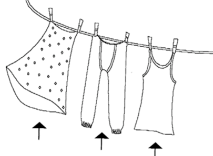

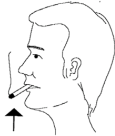
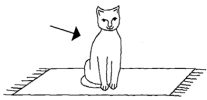
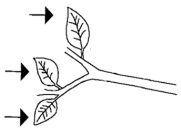


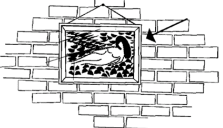


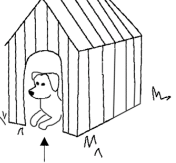
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*Appendix A – Subset of Bowerman’s Topological Relations Picture Series*



 <p>25</p>	 <p>26</p>	 <p>27</p>	 <p>28</p>
 <p>29</p>	 <p>30</p>	 <p>31</p>	 <p>32</p>
 <p>33</p>	 <p>34</p>	 <p>35</p>	 <p>36</p>
 <p>37</p>	 <p>38</p>	 <p>39</p>	 <p>40</p>
 <p>41</p>	 <p>42</p>	 <p>43</p>	 <p>44</p>
 <p>45</p>	 <p>46</p>	 <p>71</p>	

*Appendix B – Figures*

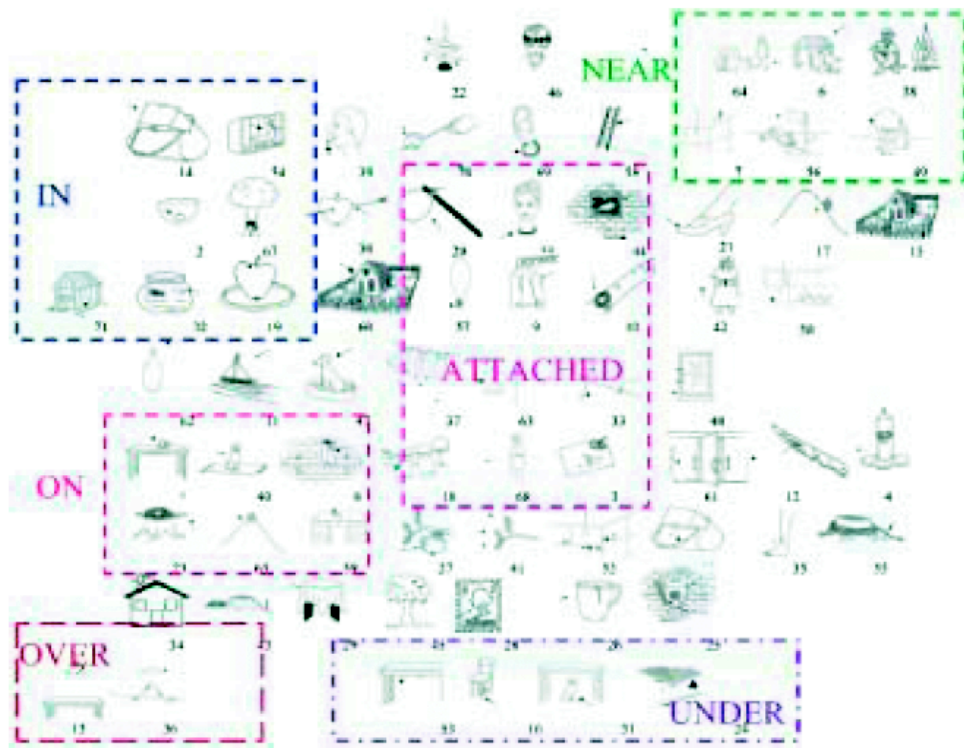


Figure 1. *Notional areas in fixed array* (from Levinson & Meira 2003: 502).

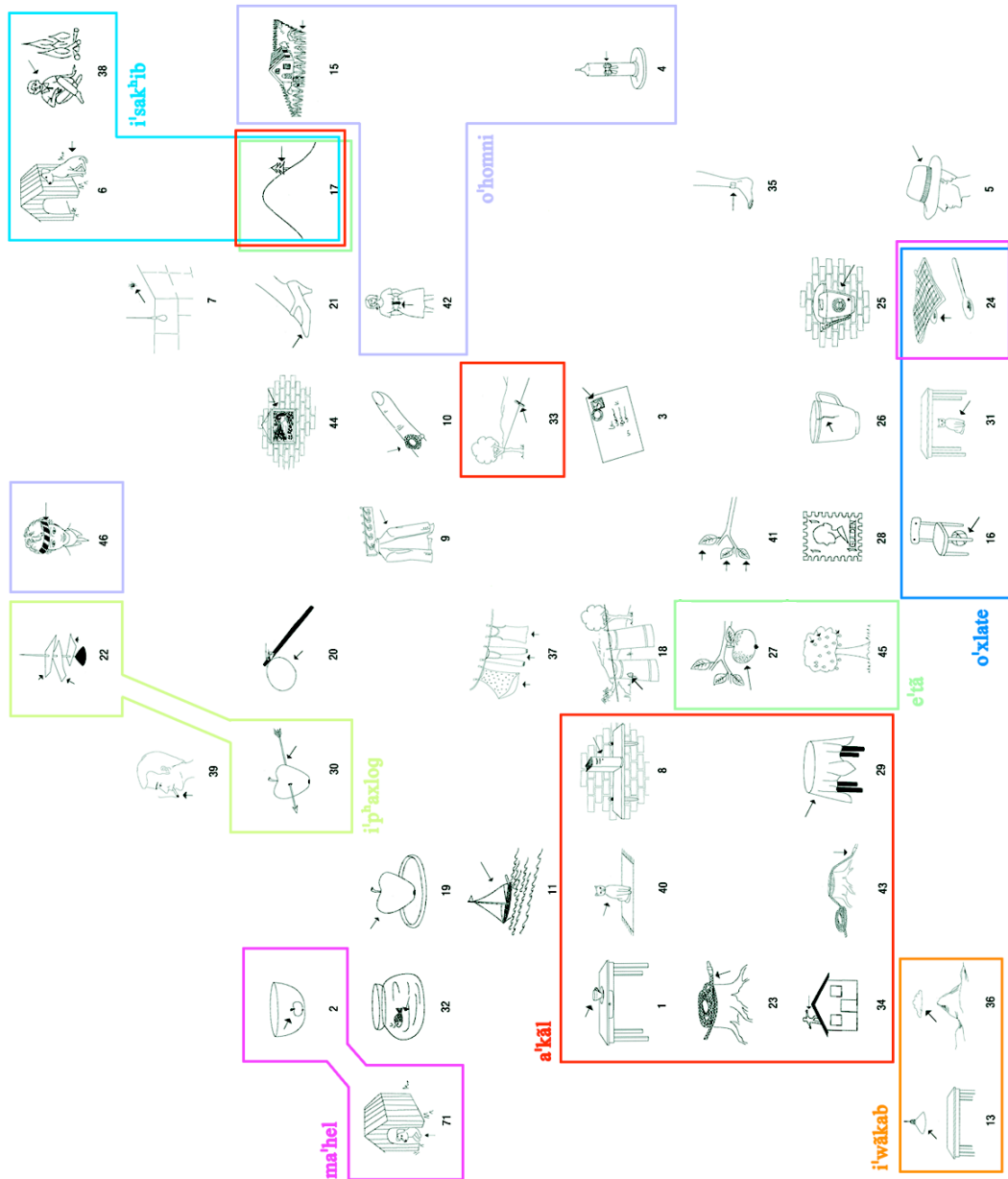


Figure 2. Lakota ADPOSITIONS mapped onto fixed array.

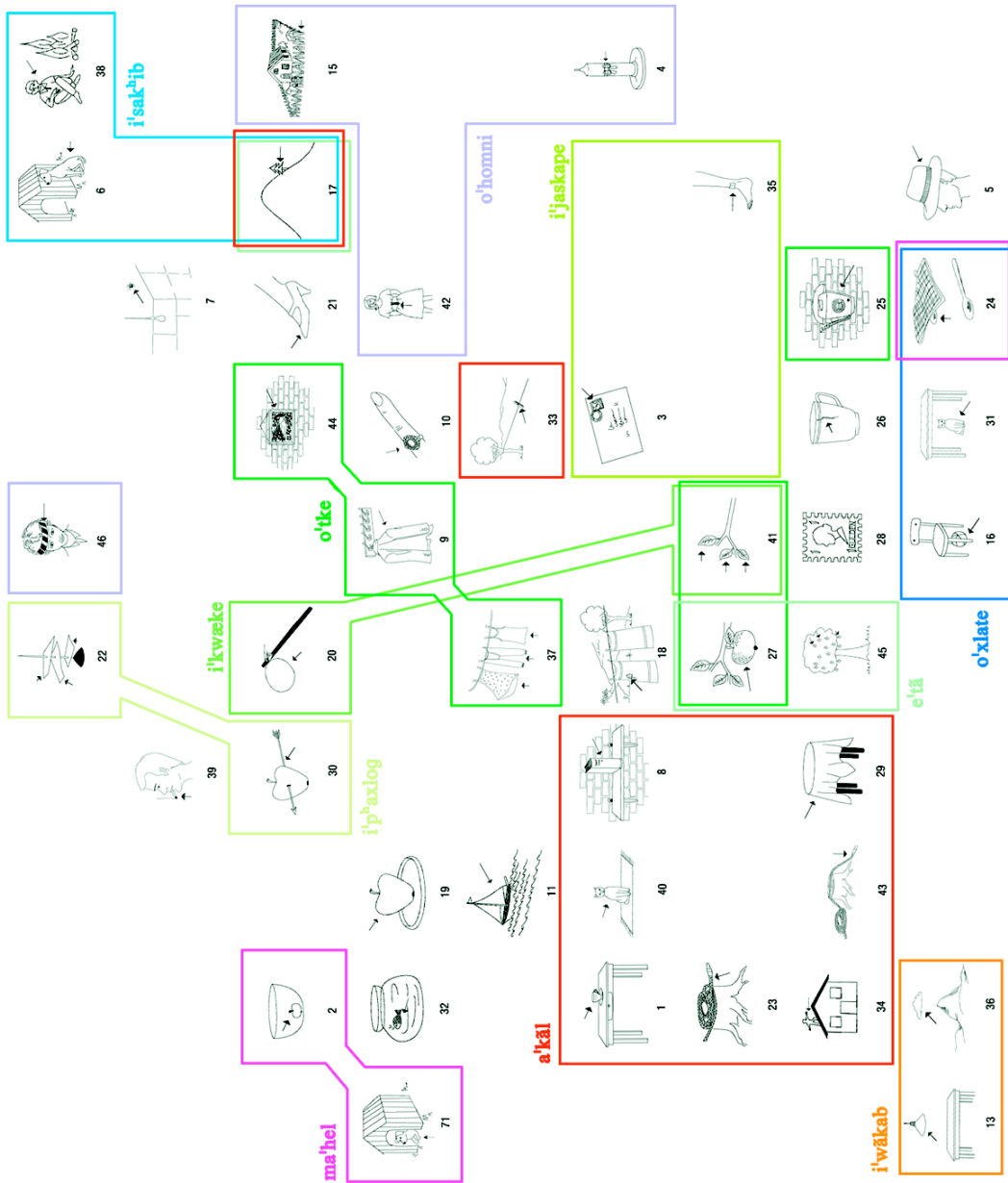


Figure 3. Lakota ADPOSITIONS and LPVs of attachment mapped onto fixed array.

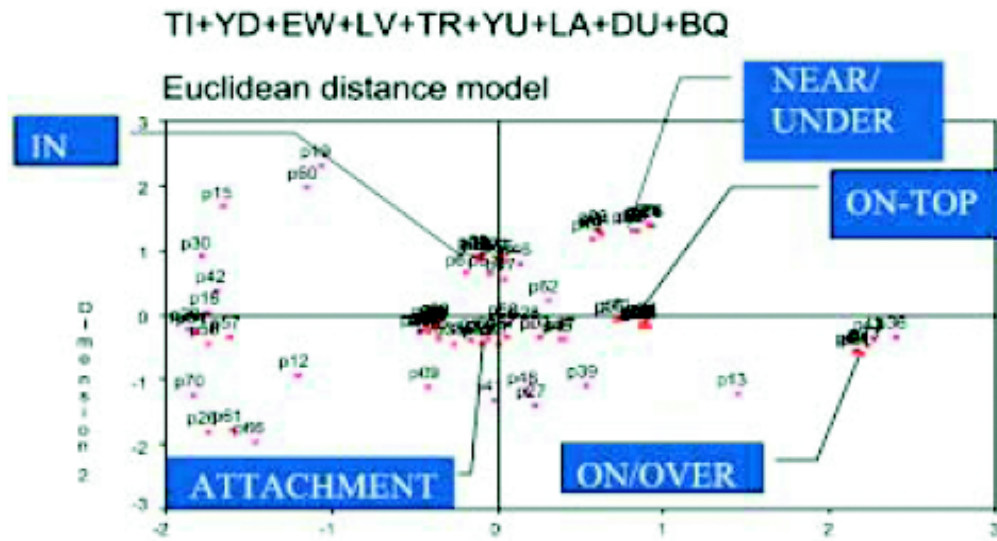


Figure 4. ALSCAL plot for Tiriyó, Yélí, Dnye, Ewe, Lavukaleve, Trumai, Yukatek, Lao, Dutch, and Basque (from Levinson & Meira 2003: 505).

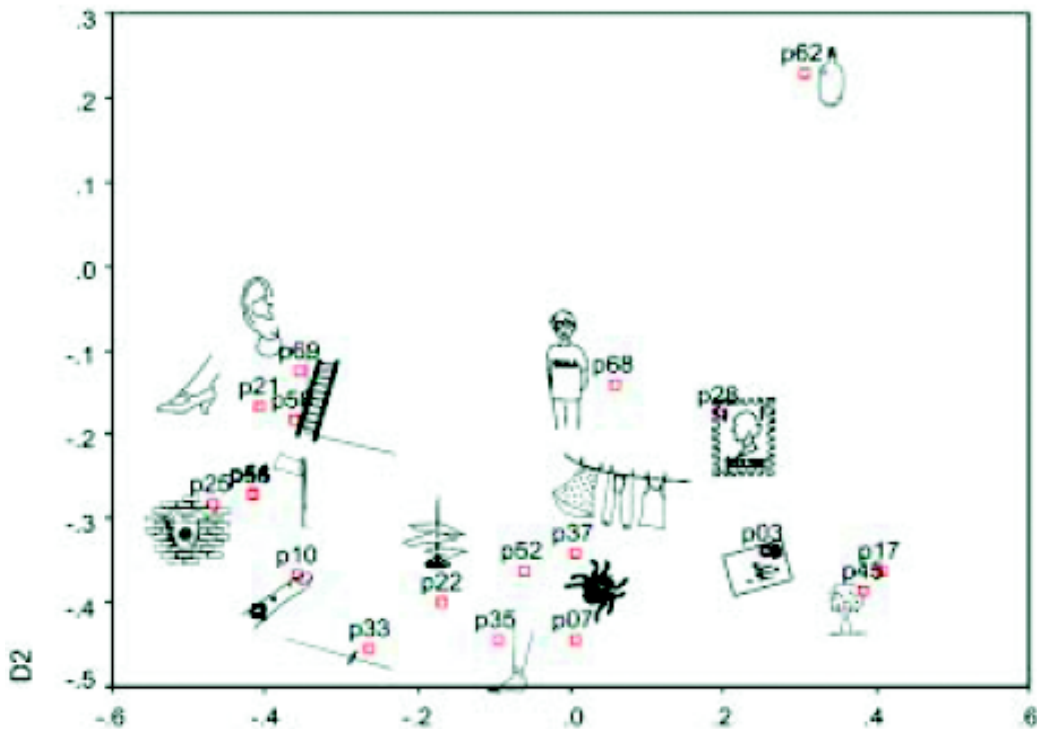


Figure 5. Enlargement of ATTACHMENT cluster region (from Levinson & Meira 2003: 508).