The encoding of BAD and EVIL:
A cross-linguistic study using a parallel Bible corpus

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Abstract

This study investigates the cross-linguistic encoding of BAD and EVIL expressions. Using parallel data from the Bible corpus consisting of translations of the New Testament into 30 languages, probabilistic semantic maps have been created using Multi-Dimensional scaling. Special attention has been paid to the presence of morphological and syntactic negation within the domain. The results show that languages either have one broader expression that is used within the entire domain, or they have at least two expressions of which one is broader, i.e. expresses a bad state, action or character flaw, and the other one narrower, i.e. is restricted to the most evil actions or characters which require a moral agent. Languages with several expressions vary largely in how broad or restricted the expressions are within the domain. Therefore, a scalar view of the domain has been proposed, rather than dividing the domain into discrete semantic categories. In the languages where negation marking was present within the domain, it only occurred in the broader expressions.

Keywords

bad, evil, negative adjectives, lexical typology, semantic maps, negation, broad evil, narrow evil

Sammanfattning

I denna studie undersöks den tvärspråkliga kodningen av uttryck med DÅLIG och OND. Probabilistiska semantiska kartor har skapats med hjälp av Multi-Dimensional scaling genom att använda paralleldata från Bibelkorpusen som består av 30 översättningar av Nya Testamentet. Förekomsten av eventuell morfologisk och syntaktisk negation inom domänen har tillägnats särskild uppmärksamhet. Resultaten visar att de flesta språken antingen har ett bredare uttryck som används inom hela domänen, eller har minst två uttryck varav ett är bredare, dvs används för dåliga tillstånd, handlingar eller karaktärsdrag, och det andra är mer begränsad, dvs används endast för de mest onda handlingar och karaktärer som kräver en moralisk agent. Språk med flera uttryck varierar mycktet i hur breda eller begränsade uttrycken är. En representation av den semantiska domänen som en skala föreslås därför, snarare än att dela upp domänen i diskreta semantiska kategorier. I de språken där negation förekom inom domänen fanns det endast i de bredare uttrycken.

Nyckelord

dålig, ond, negativa adjektiv, lexikal typologi, semantiska kartor, negation, broad evil, narrow evil

Contents

Abbreviations and presentation conventions

The linguistic examples that are provided in this thesis have been glossed according to the Leipzig Glossing rules (Department of Linguistics of the Max Planck Institute for Evolutionary Anthropology and the Department of Linguistics of the University of Leipzig, 2008). Glosses that are not included in this set of rules are provided below:

NEUTRAL	neutral
PARTITIVE	partitive case
ELATIVE	elative case
ESSIVE	essive case
INE	inessive case
?	gloss unclear/not known

The glossing is, for the most part, kept rather simple because either a detailed glossing was not relevant for a specific example, or in the case of lesser documented languages it was not possible to gloss every word. All examples, unless indicated otherwise, have been taken from the Bible corpus (Mayer and Cysouw, 2014) and are marked with an 8-digit verse number. The first two digits denote the the number of the book, the next three digits the chapter, and the last three digits the verse number (see Mayer and Cysouw 2014: §4.1 for examples). If another 3-digit number is given, that number refers to the context number provided in Appendix B.

Small caps are consequently used whenever a semantic prime is meant, and italics are used for linguistic examples. The words "negative" and "negation" occur quite frequently in the text, and since they can easily be confused, it should be noted that "negative" generally refers to "semantically negative", whereas "negation" usually refers to morphological or syntactic negation marking.

In the probabilistic semantic maps, diacritics had to be removed due to the fact that R cannot handle diacritics in plots. Otherwise, all language examples are written in the orthography that is used in the Bible corpus.

1 Introduction

Value, which can be subdivided into positive and negative value, is considered one of the core domains of words with modifying function (Dixon, 2004; Hallonsten Halling, 2018) and adjectives such as *bad* or *evil* are an important part of our vocabulary. However, languages can vary largely in how they express the domain of semantically negative property words. In English, for example, *bad* and *evil* are used in different contexts: *bad* often describes a negative value, something that is "not good", whereas *evil* is more restricted in the sense that it is often used to describe a person or an action done by a person, often something that is morally wrong or done with the intention to harm someone. Examples 1a and b, which are taken from a parallel subtitles corpus, illustrate this difference in English:

(1) English [eng] examples of *bad* and *evil* (Open subtitles corpus, Tiedemann, 2012)

a. Listen, I'm starting to get a **bad** feeling up here. (Die Hard, movie 760, sub 18761)

b. Only, two **evil** burglars have crept in my window … and snatched it before she could get here. (The Rundown, movie 174, sub 117362)

It would be possible to exchange *evil* in 1b for *bad*, but it is not possible to exchange *bad* in 1a by *evil*.

In the Turkish translations, however, both situations are expressed with the word *kötü* 'bad, evil' as examples 2a and b show, suggesting that the difference between English *bad* and *evil* is not encoded in the Turkish word *kötü*.

(2) Turkish [tur] examples of *kötü* (Open subtitles corpus, Tiedemann 2012)

a. *dinle, kendimi burda **kötü** hissetmeye başladım.*
listen, myself here bad feel started

'Listen, I'm starting to get a bad feeling up here.' (Die Hard, movie 760, sub 18761)

b. *Ama iki **kötü** hırsız camdan girip … peri gelmeden onu çaldılar.*
but two evil thief through.glass enter fairy before.coming she stole

'Only, two evil burglars have crept in my window … and snatched it before she could get here.' (The Rundown, movie 174, sub 117362)

In this thesis, the differences in the encoding of *bad* and *evil* in different languages are investigated using parallel data from the Bible corpus. This is done by comparing translations of sentences that contain the words *bad* or *evil* in English. The Bible corpus was chosen as the preferred data source for this study, since it is the only parallel corpus that allows to select a geographically and genealogically diverse sample from the available languages.

In some languages, semantically negative expressions contain some form of morphological or syntactic negation, i.e. by negating the positive antonym *good*. In Mbuko (Afro-Asiatic, Chadic), for example, the word *lelibay* 'bad' consists of the word *lele* 'good' and *bay* 'not' (Gravina et al., 2003). Although negated forms of adjectives have been studied previously, especially regarding in which way negated positive forms such as 'not good' differ in meaning from the non-negated form 'bad' (Colston, 1999; Paradis and Willners, 2006), the focus has almost exclusively been on selected Indo-European languages. Therefore, a special focus for the investigation is on the presence of negation in expressions of *bad* and *evil* in a world-wide sample of languages.

1.1 Aims and research questions

The aim of this thesis is to study how semantically negative adjectives and adverbs for 'bad' and 'evil' are expressed cross-linguistically, and to which extent morphological or syntactic negation is present in these expressions. A world-wide sample of 30 genealogically and geographically diverse languages has been selected for this purpose. The study relies heavily on data from a massively parallel text, the Bible corpus (Mayer and Cysouw, 2012), but grammars and other data from the languages under study are used as a supplement. Multidimensional scaling is used to prepare probabilistic semantic maps that serve as the starting point for an analysis of the encoding of the domain under study. The research questions can be formulated as follows:

1. How are expressions for 'bad' and 'evil' encoded in the languages of the world?

2. To which extent, and where, is morphological or syntactic negation present within this domain?

The results are related to philosophical literature about the concept of evil by e.g. Calder (2019) and Formosa (2008) to allow for a further discussion of how 'bad' and 'evil' are encoded.

2 Background

This section provides an overview of the theoretical background for this study. Section 2.1 introduces semantic and lexical typology, in particular its methodology and possible difficulties. In Section 2.2, typological studies of adjectives and adverbs are presented, mainly focusing on their function and semantic contents. Semantically negative adjectives are then discussed in Section 2.3, starting out with a review of philosophical literature about the concept of evil (2.3.1), followed by previous typological studies about semantically negative adjectives (2.3.2). Finally, antonymy and negation is discussed in Section 2.4, as it is relevant for the second research question.

2.1 Lexical typology and multidimensional scaling

Koptjevskaja-Tamm et al. (2015: 434) defines lexical typology as "the systematic study of cross-linguistic variation in words and vocabularies" (see also Koptjevskaja-Tamm, 2008), or as Lehrer (1992: 249) phrases it "the characteristic ways in which language [...] packages semantic material into words". Meaning can thus be studied in two different ways, either by focusing on the vocabulary and a comparison of which words exist in different languages, or by focusing on the semantic components that make up a particular word or expression. The main goals of lexical typology are to find universal lexical meanings and to describe how they are combined in different languages – just like grammatical typology is concerned with finding universal grammatical meanings and the strategies in which languages combine them (Rakhilina and Reznikova, 2016: 99). In grammatical typology, the common ground for the comparison between different languages are grammatical meanings and categories. In lexical typology, a number of different ways to establish such a common ground for comparison have been proposed, which Rakhilina and Reznikova (2016: 96-97) mention three of. The first one are extra linguistic stimuli such as pictures, objects or videos, as for example Berlin and Kay's (1991) study of basic color terms, where the stimuli consisted of 329 colour chips that were shown to the participants. Secondly, Rakhilina and Reznikova (2016) mention the use of semantic primes, closely connected to the idea of a natural semantic metalanguage that has been put forward by Goddard and Wierzbicka (1994). Semantic primes are considered a universal vocabulary that can be used to express any meaning in any language – all other meanings can be expressed by combinations of those. Hence, different languages can be compared according to the combinations of primes they need to describe the meaning of a certain word. The third method that Rakhilina and Reznikova (2016: 97) present is what they call a "frame method" which is based on the assumption that "lexical meanings can be studied and reconstructed by observing a word's "surroundings", or primarily collocation" and goes back to Fillmore's (1976) frame semantics.

All of these different methodological approaches have their own advantages and difficulties, but they all have in common that it is difficult to find suitable data for a large range of typologically diverse languages, and to ensure that like is compared with like across languages. Connected to that, an issue that often arises is that it is difficult to compare the extreme variation of language-particular lexemes. Wälchli and Cysouw (2012) have proposed an approach to lexical typology that is meant to overcome some of these difficulties by using data from massively parallel texts. The method directly compares contextually embedded examples across languages, without having to make use of semantic primes (Wälchli and Cysouw, 2012: 676). Probabilistic semantic maps are then created, using multidimensional scaling (MDS). This is a two-step procedure: first, a distance matrix of all relevant elements is calculated,

then, using MDS, these elements are arranged in dimensions which will then be used to build semantic maps (Wälchli and Cysouw, 2012: 672). The method has been used for a variety of lexical typological topics, e.g. the domain of motion verbs (Wälchli and Cysouw, 2012), 'As long as', 'before' and 'before' clauses (Wälchli, 2018), as well as the domain of repetition and restitution (Löfgren, 2020).

Semantic maps are a convenient tool to represent grammatical or lexical typological findings, showing what is universal and what is language-specific (Croft, 2002: 133). They typically consist of a (what Croft calls) "conceptual space", which represents all possible distribution patterns within a category. The language-specific distribution is then mapped onto this space (Croft, 2002: 133-134). Georgakopoulos and Polis (2018: 8-9) summarize the advantages of the semantic map model for typology and semantics. To name a few of these advantages, semantic maps can be used in many different frameworks, e.g. with or without making claims about their universality or cognitive reality (Georgakopoulos and Polis, 2018: 8). They are simultaneously "implicational" and "falisifiable", meaning that they represent an implicational hypothesis that is valid as long as it is not falsified (Georgakopoulos and Polis, 2018: 8). However, the semantic map approach has also been challenged by some authors. Cysouw (2001: 609-610) mentions that the model "predicts more that is actually found", or as Georgakopoulos and Polis (2018: 15) put it, the model is "too strong for the data it is based on", and high coverage is favoured over high accuracy. Furthermore, all patterns are represented independent of how frequent or rare they might be (Malchukov, 2010: 176, Georgakopoulos and Polis, 2018: 15), especially when a large amount of data is used. Finally, for a long time semantic maps could not be generated automatically, which made it difficult to build them on large, variable cross-linguistic datasets (Croft and Poole, 2008: 1, Georgakopoulos and Polis, 2018: 15).

Probabilistic semantic maps created with MDS enable us to overcome some of these issues. So how do they differ from "traditional" semantic maps? Probabilistic semantic maps are build directly on corpus data, and do therefore not need an abstract conceptual space to map the language-specific distribution onto. That gives them the advantage to include a large number of elements, and "messy data" is less of an issue (Wälchli and Cysouw, 2012: 672). Since they can be build automatically, they also make the process of creating a semantic map based on a lexical typological analysis much easier, although some manual work is still required for the annotation. (A more detailed description of the exact process of using MDS to create probabilistic semantic maps follows in Section 3.)

In conclusion, probabilistic semantic maps are a good option for creating semantic maps based on parallel data, which is the goal of the current study, and they have several advantages over building semantic maps in the "tradional" way.

2.2 Adjectives and adverbs in typology

In this section, previous typological studies about adjectives and adverbs are presented. Although the focus of the current study is not on the word classes of the expressions of *bad* and *evil* in different languages, it is at least necessary to discuss the semantic content and functions of adjectives and adverbs, since VALUE (and therefore also NEGATIVE VALUE) constitutes one of the core semantic types of both of these word classes. Many of the translations of *bad* and *evil* that are found in the data can therefore be expected to be adjectives or adverbs.

2.2.1 Adjectives in typology

A large part of typological work about adjectives is concerned with distinguishing adjectives from other word classes such as nouns, verbs, or adverbs. Dixon (2004: 2-3) proposes that word classes can be described in terms of their "prototypical conceptual basis" and "prototypical grammatical functions", e.g. nouns are always heads of noun phrases (which can function as predicate argument) and they are always words with concrete reference. Adjectives can be described in similar terms, although the recognition of a separate adjective class as a language universal has been challenged by some authors (e.g. Chafe, 2012). Dixon himself argues in his influential work "Where have all the adjectives gone?" (Dixon, 1982: 2) that there are some languages that do not have an adjective class, but has later hypothesized that all languages have an adjective class, but their recognition might be the problem, as "sometimes the criteria for distinguishing adjectives from nouns, or adjectives from verbs, are rather subtle" (Dixon, 2004: 12).

According to Dixon (2004: 10-11), adjectives mainly have two functions in grammar: describing a property of something and providing "a specification that helps focus on the referent of the head noun in an NP that relates to a predicate argument". Furthermore, in those languages that have comparative constructions, adjectives always function as the "parameter of comparison" (Dixon, 2004: 11). In few cases, adjectives can also modify verbs, and adverbs can modify adjectives (although here Dixon only provides examples from English) (Dixon, 2004: 11).

Table 1: Semantic types that are typically contained in adjective classes of different sizes according to Dixon (2004: 3-5).

Size of adjective class	Semantic types	Examples
Small to large	DIMENSION	*big, small, long, tall*
	AGE	*new, young, old*
	VALUE	*good, bad, lovely*
	COLOUR	*black, white, red*
Medium to large	PHYSICAL PROPERTY	*hard, soft, heavy*
	HUMAN PROPENSITY	*jealous, happy, kind*
	SPEED	*fast, quick, slow*
Large	DIFFICULTY	*easy, difficult, tough*
	SIMILARITY	*like, unlike, similar*
	QUALIFICATION	*definite, true, correct*
	QUANTIFICATION	*all, many, some*
	POSITION	*high, low, near*
	CARDINAL NUMBERS	*one, two*, etc., but also *first, last* and ordinal numbers

The size of the adjective class can vary significantly across languages, unlike the noun class, and often also (but not always) the verb class. Furthermore, even when the adjective class is a large, open class, it is usually still smaller than the noun and verb class (Dixon, 2004: 9-10). The typical semantic content of the adjective class depends on its size. Dixon (2004: 3-5) describes a number of semantic types that are typically associated with the adjective classes of different sizes (see Table 1). This would, for example, mean that we can expect that even

languages with a small adjective class would have at least one adjective to express the type VALUE. Other concepts such as *evil* or *wrong* might only occur as adjectives in languages with a medium or large adjective class. However, it should also be noted that semantic types can of course be members of several word classes (see Dixon, 1982, 2004).

Regarding their grammatical properties, adjectives vary much more than nouns and verbs, making them more difficult to recognize and define in some languages, and to find generalizations across languages (Dixon, 2004: 9). Dixon (2004: 14-15) primarily distinguishes between:

- adjectives that can function as an intransitive predicate ("verb-like adjectives") or that function as a copula complement ("non-verb-like adjectives")
- adjectives that modify a noun within a NP (which can be further divided into "noun-like adjectives" that take some (or all) of the morphological processes of the noun, and "non-noun like adjectives" which do not)

Instead of talking about "noun-like", "verb-like" etc. adjectives, it is also common to distinguish between "attributive" and "predicative" adjectives. Attributive adjectives modify a noun within a NP (corresponding to Dixon's "noun-like adjectives" and "non-noun-like adjectives") and predicative adjectives correspond to "verb-like adjectives" and "non-verb-like adjectives".

Example 3 shows the German adjective *groß* 'big' as a modifier of the noun *Hund* 'dog' within the NP.

(3) Example of adjective that modifies a noun in a NP in German [deu] (own example)
Der *groß-e* *Hund* *renn-t.*
DET.MSG big-DEF dog run-PRS.3SG

'The big dog runs.'

Verb-like and non-verb-like adjectives have also been discussed by Stassen (2013) as predicative adjectives with either verbal or non-verbal encoding. Bororo [bor] is one of the languages where predicative adjectives are encoded in the same way as predicative verbs, i.e. they function as intransitive predicates, as Examples 4a and b show. In English, and many other Indo-European languages, this type of verbal encoding is not possible, example 5c is not valid. Instead, the adjective *tall* has to function as a copula complement, as in Example 5b. Some languages also allow both verbal and non-verbal encoding of predicative adjectives an represent therefore a mixed type.

(4) Example of adjective functioning as intransitive predicate in Bororo [bor] (Crowell, 1979: 26,50)

a. *i-mago-re*
1sg-speak-NEUTRAL

'I speak/spoke.'

b. *i-kure-re*
1sg-tall-NEUTRAL

'I am/was tall.'

(5) Example of adjective functioning as copula complement in English [eng] (Stassen, 2013)

a. John sleep-s.

b. John is tall.

c. *John tall-s.

2.2.2 Adverbs in typology

Just like adjectives, adverbs show little, possibly less, coherence within their class. As Hallonsten Halling (2018) puts it: adverbs "are less frequent than other parts of speech cross-linguistically, they seldom inflect, and they are rarely used as a source for derivation to other categories". Manner adverbs often describe properties, but instead of adjectives, which function as modifiers in referring expressions, adverbs are modifiers in predicating expressions (Hallonsten Halling, 2018). The majority of property words (i.e. adjectives and adverbs) are adjectives, and when used as adverbs they often "shift meaning towards various characteristics of the event that they describe" (Hallonsten Halling, 2018: 176). Hallonsten Halling's (2018) analysis is made in a similar way as Dixon (2004) has done for adjectives. For simple adverbs, i.e. monomorphemic lexems, she found that the core semantic type is SPEED, but VALUE, NOISE and CARE also occur among the simple adverbs in many languages. VALUE is considered a core type for "general modifiers", i.e. words that are used in the function of both adjectives and adverbs. This is relevant for the current study in the way that we can expect that if a sample language has adjectives and adverbs, it is not only likely that VALUE is present in both word classes, but often also expressed by the same "general modifier". It can be considered to include certain adverbs (e.g. *worse*) and not only adjectives in the data, if this is necessary to get a higher number of sufficient examples.

2.3 Semantically negative adjectives

After the more general topics presented in the previous sections, this section now focuses on defining semantically adjectives and presenting relevant studies. Section 2.3.1 starts with an excursion into philosophical literature about the concepts bad and evil. Section 2.3 then turns back to semantically negative adjectives in typology.

2.3.1 The concept of bad and evil in philosophy

The concept of evil has been the subject of many philosophical texts, where the focus has often been on words such as *bad*, *evil*, and sometimes *wrong*, since they can be used in contexts with many different meanings. A main focus of this philosophical literature has been to distinguish between different types of evil, which is particularly relevant for the present study in order to be able to discuss which types of evil are present in the data, and which are not.

In the history of philosophy, there have been many influential works about the concept of evil, ranging from Immanuel Kant's theory of evil in *Religion Within the Limits of Reason Alone* (1793), over to Hanna Arendt's *Origins of Totalitarianism* (1951), to more contemporary theories. The theories that are described in the following, are based on these works. Calder (2019) distinguishes between "broad evil" and "narrow evil". The broad type of evil includes "any bad state of affairs, wrongful action, or character flaw", and can be divided into two subcategories: "natural evil", i.e. a general bad state that has originated unintentionally, and "moral evil", i.e. which is the (intentional) result from an action done by a moral agent. The

narrow type of evil, however, includes "only the most morally despicable sorts of actions, characters, events, etc." which only moral agents can do/have. A moral agent in this context is a person that can tell apart right from wrong and that can be held accountable for their actions. A distinction similar to Calder (2019)'s broad and narrow evil has been made by Formosa (2008: 1), who differs between evil in the "axiological sense", "trivial moral sense" and a more "restricted sense". Evil in the axiological sense is often synonymous to *bad* i.e. "the opposite or lack of good". Evil in the trivial moral sense can be seen as synonymous to *wrong*. Evil with a more restricted sense includes anything that is more evil than simple wrongdoing.

Formosa's (2008) and Calder's (2019) accounts have in common that, even though they are described as such, it is not always easy to sort any given expression into discrete categories of different types of evil. Distinguishing between what Calder (2019) calls "broad moral evil" and "narrow evil", and Formosa (2008) calls "evil in the trivial moral sense" and "evil in a restricted sense", is not always simple. The view that evil (in the narrow sense) is qualitatively distinct from "simple wroingdoing" (i.e. broad moral evil) has for example been challenged by Russell (2007), who argues that evil is simply something very wrong, often connected to extreme harms.

Regardless of which approach is considered, there appears to be a consensus that there are different types of evil (or badness/wrongdoing) ranging from general bad states that do not originate from any intentional action to extreme evil that is intentional and the result of an action from a moral agent (often human).

2.3.2 Semantically negative adjectives in typology

For the purpose of this study, a "semantically negative adjective" is defined as an adjective with an inherently negative meaning. It is important to distinguish semantically negative adjectives from words that have a negative meaning depending on the context they are used in. *Young* or *old* can, for example, in some contexts be perceived as something negative, but these words are not inherently negative, unlike *bad*, *evil*, *wrong*, *mean* etc. Inherently negative adjectives typically have a positive antonym, e.g. *good - bad* or *right - wrong*.

Turning back to Dixon's (2004) semantic types presented in Section 2.2.1, the question arises as to which of them can contain inherently negative adjectives? VALUE would be the most prototypical, with *good* representing positive value, and *bad* representing negative value. However, even HUMAN PROPENSITY (*evil, mean*) or QUALIFICATION (*wrong, false*) fall into this category. Ideally, all of these words would have been included in the scope of the current study, but some had to be excluded because they were not frequent enough in the Bible corpus.

How are these inherently negative adjectives treated in the natural semantic metalanguage (NSM) framework? BAD is one of the core semantic primes of this framework (Goddard, 2010), which indicates that English words such as *evil* or *wrong* would likely need to be described by combining the prime BAD with other primes. Related to that, the natural semantic metalanguage approach, and in particular the prime BAD has been challenged by e.g. Vanhatalo et al. (2014) with a view through Finnish. The two main candidates for the prime BAD in Finnish are *paha* 'evil, immoral' and *huono* 'low in quality' (Vanhatalo et al., 2014: 75). The question arises as to whether BAD is better captured by *huono* or *paha*, or even another word. Vanhatalo et al. (2014: 75) also point out that one should be careful with equating *paha* with the english words *evil* and *immoral*, since they do not capture the nature of the word entirely. In addition, Vanhatalo et al. (2014: 76) show that is it for example possible to contrast *huono* and *paha*, as in shown in 6.

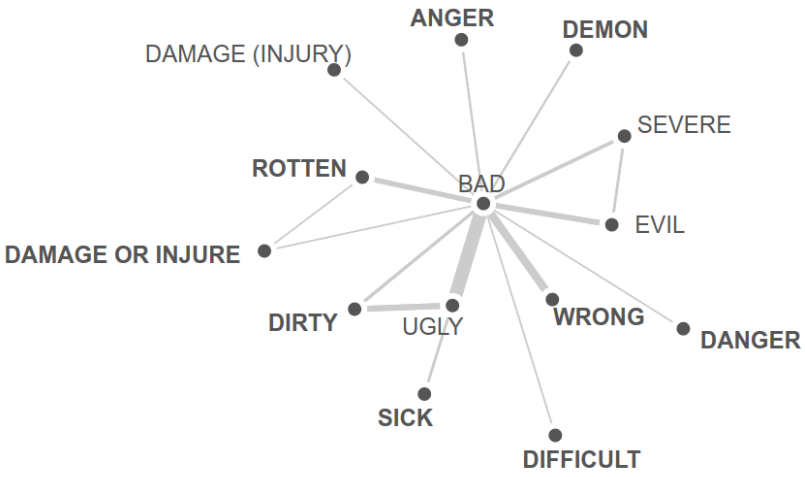
(6) Example of contrasting *huono* and *paha* in Finnish [fin] (Vanhatalo et al., 2014: 76, glosses added).

hän	*on*	*huono*	*ihminen,*	*mutta*	*ei*	*hän*	*paha*	*ole*
3SG	be.PRS.3SG	bad	person	but	not	3SG	evil	be

'S/he is a bad (not good) person, but s/he is not bad (evil)'

Similar issues with the prime BAD arise for other languages as well, as Vanhatalo et al. (2014: 76-77) mention. In Russian, for example, *ploxoj, durnoj, zloj* and *nexorošij* are the available varieties (Gladkova 2007: 58, cited in Vanhatalo et al. 2014: 76). For Mandarin Chinese, it has been shown that the primes GOOD and BAD are asymmetrical in the sense that BAD is narrower than GOOD (Chappell, 1994: 142). Here, Valentine (2001: 76) mentions that Mandarin *huài* shows some similarity to Finnish *paha*, although Wierzbicka (1994: 497) argues that this variation is not semantic, but cultural.

In the CLICS database [1], cross-linguistic colexifications (both polysemies and homophones), mainly based on data from word-lists and dictionaries are collected (Rzymski et al., 2020). Here, not only the concept BAD is recognized, but also EVIL, WRONG, DIFFICULT and others. BAD is defined as "not good", "unfavorable" or "negative", and EVIL as "intending to harm or being" or "acting ethically wrong" (Rzymski et al., 2020). The colexifications of the concept BAD based on data from CLICS are presented in Figure 1. The thicker the line, the more languages colexify the two concepts connected by that line. The absolute number of colexifications of bad with other concepts is provided in the table next to it. The graph shows that BAD is most commonly expressed with the same word as for UGLY, EVIL, SEVERE, ROTTEN and WRONG. It should, however, be noted that in CLICS, each concept equals only one word in a particular language, so synonyms or near-synonyms within each concept are not considered. Since the current study focuses on BAD and EVIL in particular, a closer look at the frequency of colexifications of these two concepts is of interest. Of the 160 languages where both concepts were present in the data, 52 colexify BAD and EVIL, which equals 32.5%. The sample in CLICS is not balanced and instead governed by whatever data is available, but it still gives an indication that we can expect the occurrence of languages that use the same expression for BAD and EVIL in the data.



Concept	Links
UGLY	54
EVIL	52
SEVERE	43
ROTTEN	35
WRONG	27
DIRTY	7
DEMON	7
SICK	6
DAMAGE (INJURY)	6
ANGER	4
DIFFICULT	3
DAMAGE OR INJURE	3
DANGER	3

Figure 1: Colexifications of the concept BAD in the CLICS database (Rzymski et al., 2020). Available online at `https://clics.clld.org/graphs/subgraph_1292`

[1] `https://clics.clld.org/`

To summarize, previous studies have pursued different approaches for exploring the conceptualizaion of BAD and EVIL. In NSM, EVIL is not recognized as a separate prime, which has been shown to be problematic for languages that have words with different meanings for the prime BAD (Vanhatalo et al., 2014: 75-76). Data from the CLICS database (Rzymski et al., 2020), as well as Dixon (2004)'s semantic types, indicate that there are languages with the same expression for BAD and EVIL, and languages with separate expressions for these concepts.

2.4 Antonymy and negation

For the discussion of semantically negative expressions, in particular adjectives, the topic of antonymy is important to consider, since negative adjectives often have a positive counterpart. In addition, morphological and syntactic negation is relevant to discuss in this context since the meaning of a semantically negative adjective can also be expressed by negating its positive antonym (e.g. *bad* → *not good*), and in some languages the negated form might even be the only available way to express the negative meaning. Languages that only, or primarily, use a negated form have received little or no attention in previous research. Earlier studies have mostly focused on languages where both an inherently negative form, and a syntactically or morphologically negated form are available.

Antonyms are defined by Paradis and Willners (2011: 382) as "meanings that are used in binary opposition through a construal of comparison". Antonym pairs can be better or worse: one could, for example, argue that *good - bad* is a better, or more clear, antonym pair than *good - evil*. In fact, complete antonyms are very rare. Herrmann et al. (1986: 134-135, cited in Paradis and Willners 2011) have identified three criteria for the "goodness" of an antonym pair: First, "the clarity of the dimensions on which the pairs of antonyms are based". *Good - bad* is a better antonym pair than *holy - bad*, since the first pair only contains the component GOODNESS, whereas *holy* not only contains GOODNESS, but also MORAL CORRECTNESS (Paradis and Willners, 2011: 381). This also explains why *good - evil* is a less clear antonym pair than *good - bad*, since *evil* also includes other components than just GOODNESS. Second, a pair of antonyms is much clearer if the dimension it is based on is mostly denotative, and not connotative (Paradis and Willners, 2011: 381), i.e. the words are the main meanings of this dimension. *Good* and *bad* can, for example, be regareded the main expressions of the (what Paradis calls) GOODNESS dimension. Lastly, the words should be of equal distance from the midpoint of the scale/dimension they are compared on: *hot - cold* are a good example of that, whereas *cool - cold* would rather appear on the same side of this scale. One could argue that *good - bad* are equally far away from the midpoint of the scale, whereas *good - evil* are not, because *evil* might be further away from the middle of the scale than *good*, considering that *bad* and *evil* can be opposed in some contexts as well (consider for example 7, repeated and translated from 6).

(7) She is a bad person, but she is not evil.

Another clue for the explanation of clear and less clear oppositions comes from philosophy and traditional logic, namely the "Square of opposition" which collects logical oppositions in a diagram. Two propositions are contraries if they cannot both be true at the same time, but they can both be false. If the truth of one proposition, implies the falsity of the other (and vice versa) the two propositions are contradictory (Parsons, 2017). This relates to different degrees of antonymy in the sense that strong antonym pairs contradict each other, whereas weaker pairs only represent contraries. Consider the following examples:

(8) Different types of antonymy in English [eng] (De Clercq and Vanden Wyngaerd, 2018: 1-2)

a. Linus is tall.

b. Linus is short.

c. Linus is not tall.

8a and b cannot be true at the same time, but both can be false at the same time – Linus could be neither tall nor short since both adjectives represent the ends of a scale. They are contraries. 8a and c, on the other hand, can neither be true at the same time, nor false at the same time, they are contradictories (De Clercq and Vanden Wyngaerd, 2018: 1-3).

The above examples indicate that morphological and syntactic negation plays an important role for the discussion of antonymy. The main question that comes up here is why would the negated form, e.g. *not good* be preferred over the semantically negative form *bad* (in languages where both forms are available)? Previous research about word-level and sentence-level negation of adjectives and its relation to antonymy, has often only focused on English and a restricted number of other Indo-European languages (e.g. Zimmer 1964 and Horn 1989). Affixes such as *un-* or *dis-* cannot be used with any adjective, but only with those that are unmarked, positive and gradable (Horn, 1989: 286). [2] *Unkind* is, for example possible, but not **unmean*. However, negation with *not* would be possible for both *kind* and *mean*, so this restriction does not seem to hold for clause-level negation. Verhagen (2005) relates the difference between morphological and sentential negation to the notion of contrary and contradictory. Sententially negated adjectives, such as *not happy* in 9a, project an alternative mental space where the opposite is true, i.e. *Mary is happy*. Therefore, they can be contradicted in the following sentence. Inherently negative adjectives, such as *sad* in 9b, as well as morphologically negated adjectives such as *unhappy* in 9c, do not project such a second mental space where the opposite is true, and can therefore not be negated in the following sentence. Combining both morphological and sentential negation in constructions such as *not unhappy* is possible because contraries and contradictories do not cancel each other and instead represent a "neutral" zone, according to Verhagen (2005: 33).

(9) Test for contraries and contradictories in English [eng] (Verhagen, 2005: 31-32)

a. Mary is not happy. On the contrary, she is feeling really depressed.

b. *Mary is a bit sad. On the contrary, she is feeling really depressed.

c. *Mary is unhappy. On the contrary, she is feeling really depressed.

The question whether a semantically negative adjective means the same, or is used in the same contexts as its morphologically or syntactically negated antonym (e.g. *bad* and *not good*) has been the topic of many experimental and theoretical studies (Colston, 1999; Sassoon, 2010; Seuren, 1978; Fraenkel and Schul, 2008; Paradis and Willners, 2006). Fraenkel and Schul (2008) conclude that negated adjectives are usually used instead of the antonym to convey a mitigated meaning, and the results by Colston (1999) have shown that a direct negative term (e.g. *bad*) has the same meaning as its negated, positive antonym (e.g. *not good*), whereas that is not the case for the opposite (i.e. *good* and *not bad*). The expectation whether an event will turn out positvely or negatively also plays an important role here. Paradis and Willners (2006)

[2] Couturier Kaijser (2016) found that this also holds for Swedish, where the majority of most frequent words with *o-* in her data have a positive value and almost half of them belong to the HUMAN PROPENSITY type. It is, however, unclear to which extent this feature is present in other, non-Indo-European languages.

found in an experimental study of Swedish that there is also a difference between gradable ("unbounded") adjectives, and adjectives that are not gradable ("bounded" adjectives). Some bounded adjectives and their negated antonyms were interpreted as synonyms (e.g. *not alive = dead*), which was not the case for unbounded adjectives.

To summarize, there is a consensus in previous studies that, if both morphologically or syntactically negated and inherently negative forms are available in a language, which is the case for English and many other Indo-European languages, the negated form often has a slightly different meaning or usage compared to the semantically negative one. There is still a gap in research about which position the morphologically/syntactically negated form takes in languages that do not have a semantically negative form available, probably due to the fact that previous research has mostly focused on selected Indo-European languages, which usually have both forms.

2.5 Summary

This section has provided an overview of previous research that is related to the topic of the current study. Different lexical typological methodologies have been outlined to compare them to and outline the advantages of MDS and probabilistic semantic maps. Furthermore, the core semantic types of adjectives and adverbs have been discussed, concluding that VALUE is a core type in both of these word classes, meaning that we can expect mostly adjectives and adverbs among the language particular expressions of *bad* and *evil* in the data. Semantically negative adjectives have been defined as adjectives with an inherently negative meaning for the purpose of this study. *Bad* and *evil* have been discussed from a philosophical perspective, concluding that in philosophy, there is a consensus that there are different types of badness/evil, ranging from general bad states to extreme (intentional) evil. BAD and EVIL are often considered two different semantic types, which languages either express with different lexemes, or the same. In NSM, however, instances of *bad* and *evil* would be included in the prime BAD, which has been proven problematic for several languages as it is not possible to capture the difference between theses instances within the NSM framework. Finally, the relation of antonymy and morphological/syntactic negation has been discussed. Criteria for clear and less clear antonym pairs have been outlined. Previous studies have also shown that if a language has morphologically/syntactically negated and inherently negative forms available, these forms are often used in different ways and they behave differently in terms of antonymy relations.

3 Method

In this section, the methodology of the present study is presented. In Section 3.1 the data sources are presented, and in Section 3.2, the sample and sampling method. The procedure pursued for the analysis is described in Section 3.3, including the data extraction from the corpus, annotation, and analysis using probabilistic semantic maps that were created using MDS (Multidimensional scaling) and clustering.

3.1 Data

The primary data for the current study consists of translations of the New Testament into 30 languages (or "doculects"), that were retrieved from a corpus that is often referred to as the Bible corpus (Mayer and Cysouw, 2014). A doculect, or "documented lect" is "a linguistic variety as it is documented in a given resource" (Good and Cysouw, 2013: 342). The entire Bible corpus consists of 1774 translations (doculects) of the New Testament into 1347 languages, with their verses aligned across translations.

Massively parallel texts (MPT) are parallel texts that have been translated into a large number of languages (Cysouw and Wälchli, 2007). Besides the Bible corpus, other commonly used parallel texts are translations of the UN Declaration of Human Rights or the EUROPARL corpus (consisting of proceedings of the European Parliament translated into 21 languages), as well as literary translations of e.g. Le petit prince or Harry Potter (Cysouw and Wälchli, 2007: 1). However, these texts are often only available for a smaller set of closely related languages (with a strong Indo-European bias), not all of them are freely available, or in the case of the UN declaration of human rights, the text is very short and from a very marked register. Since the Bible corpus is one of the few parallel text that allows for selecting a balanced, world-wide sample, and since it is freely available, it has been the preferred source of data for typological studies using MPT in recent years, including for example Wälchli and Cysouw (2012), Wälchli (2018), and Löfgren (2020).

Using MPT, and the Bible corpus in particular, as data source also comes with a number of biases one needs to be aware of. One obvious issue is the translation process itself, in that the source language can create a bias in the data (Cysouw and Wälchli, 2007: 5). Although it is difficult to identify the source language for each doculect, there has been an attempt to account for this issue by comparing the results to possible source languages. It is for example likely that South American languages have been translated from a Spanish or Portuguese text, some African languages from a French text, or languages in New Guinea from Indonesian or Tok Pisin. The results were also compared to the Latin translation, since it has likely been the source for many translations as well. The fact that all data consists of written (and often standardized) language is another possible source for bias, however, less of an issue since general linguistic theory should account for a variety of different lects (Cysouw and Wälchli, 2007: 5). Further discussion of how the data might have influenced the results is provided in 5.2.

The secondary data used in the annotation process consists of grammars, grammar sketches and dictionaries of the 30 sample languages. A list of those has been compiled in Appendix A.

3.2 Sample

The procedure used to create the sample for this study is a version of the Diversity Value Method by Rijkhoff et al. (1993) that has been adapted by Sjöberg (2021) for the purpose of using it to sample languages from the Bible corpus. The main objective of the original method

Figure 2: The sample. (Map created with lingtypology: Moroz, 2017)

was to maximize the genealogical distance between the sample languages, but Sjöberg (2021) attributes additional weight to the geographical distance between languages by, among other things, considering Dryer's (1989; 1992) division of languages into five macro-areas.

In the Diversity Value method, each language family is assigned a "Diversity value" depending on the number of branches within the family. Branching levels are also weighted (i.e. assuming that higher levels also have greater time depth). Sjöberg's (2021) procedure then works as follows. First, using the Glottolog language catalogue (Hammarström et al., 2021), all languages are divided into five macro-areas, following Dryer (1989, 1992) (Papunesia and Australia are combined into Oceania). However, instead of language families or genera, the languages' physical locations (coordinates as provided in glottolog) are used for this division. Pidgins, Creoles, mixed languages and sign languages are excluded. For each area separately, the 1.5 base logarithm of the Diversity Value of each family is calculated. The modification of calculating the 1.5 base logarithm is a weighting procedure, so that small families get more weight, but at the same time size and time depth are retained, which gives less dominance to large families. 1.5 is also the Diversity Value that is assigned to isolates and minimal families. The next step is then to calculate the so called "In-sample" value, i.e. the number of languages from this specific family that would be included in the final sample. If the rounded In-Sample value > 1, i.e. the family would be represented with more than one language in the sample, the method is applied again to the subgroupings of that family. If the In-Sample value is < 1, the families are grouped geographically, and their In-sample values added. Here, Sjöberg (2021) also diverged from the original method, in order to give a higher chance to smaller families to be represented in the sample as well. In the original method, Rijkhoff et al. (1993) recommend to choose a sample size large enough to include each family with at least one language, but especially considering the restricted size of the Bible corpus, this is difficult to do in practice. The final result of the procedure, which Sjöberg (2021) has automatized with a Python script, are then 99 sample groups (18 or 19 groups from each macro-area), so

that one language can be choosen manually from each group, based on whatever criteria are necessary. For the current study, the availability of Bible translations was of course the main criterion, but it was also very important to choose languages that were documented well, with at least one grammar, grammar sketch or dictionary available, in order to aid the annotation process. Since 99 languages would have exceeded the scope of this study, the total number of languages decided upon was 30, i.e. 6 languages in each macro-area, all from different sample groups. An overview of the sample can be found in Appendix A, as well as in Figure 2.

3.3 Procedure

3.3.1 Extracting contexts and annotation

The choice of verses from the Bible corpus was primarily based on three criteria:

- adjectives/adverbs with inherent negative meaning (i.e. negative meaning that does not depend on the context)
- common colexifications of the concept BAD in the CLICS database (Rzymski et al., 2020)
- availability of expressions in the Bible corpus (e.g. "ugly" or "rotten" were not present in the data and could therefore not be studied)

The chosen contexts from the Lexham English Bible contain expressions with *bad, worse, evil* and *wicked* used as attributive or predicative adjectives (and in the case of *worse* also as an adverb in constructions such as *become worse*). Metaphorical expressions or sentences that turned out to be problematic (e.g. were often translated with something else than an adjective) in the majority of the sample languages were excluded. Here, a comparison with the original texts in Latin and Koine Greek was also useful, as e.g. Example 10 shows: the Latin word *tempestate* 'storm.ABL' had been translated into *bad weather* in the Lexham English Bible, but in many of the sample languages, this particular verse also included an expression for 'storm' rather than 'bad weather', which is why this verse was excluded from the data. A full list of the English verses can be found in Appendix B.

(10) English and Latin sentence with deviating translation. (44027020)

a. But when neither sun nor stars appeared for many days, and with not a little **bad weather** confronting us, finally all hope was abandoned that we would be saved.

b. Neque sole autem neque sideribus apparentibus per plures dies, et **tempestate** non exigua imminente, iam auferebatur spes omnis salutis nostrae.

The verses were then extracted for all 30 sample languages and annotated with lemma of the translation equivalents of *bad, worse, evil* and *wicked*, as well as whether any type of negation is present. The influence of suppletion was minimized by replacing the suppletive forms with the underlying forms. In French, for example, *mal* (adverbial suppletive form of *mauvais*) and *pire* (comparative suppletive form of *mauvais*) have been replaced by *mauvais* during the annotation process. The annotation was aided by a number of secondary data sources such as grammars, grammar sketches or dictionaries. However, since their quality varied from language to language, the annotation of languages with fewer available resources was also aided by a script that creates a simple frequency-based dictionary from the corpus data, and another script that extracts the most likely translation for each negative adjective in

the English text, using Bayesian word alignments that were applied to the entire Bible corpus (Östling, 2014). A small number of expressions in certain languages could therefore not be verified by secondary sources. Furthermore, if a translation equivalent only occurred in one or two contexts in a certain language, it was often excluded in order to save time during the annotation process (but was kept if it was easy to verify).

3.3.2 Creating probabilistic semantic maps and clustering

The method used to create the probabilistic semantic maps and clustering is largely the same as in Löfgren (2020) and Wälchli (2018). Multidimensional scaling algorithms are a way to visualize the similarity of instances in a dataset. In this particular case, these "instances" are contextually embedded situations, i.e. the word for *bad/evil/worse/wicked* in any language. The similarity between each two of these contextually embedded situations is measured based on how many languages express them with the same word. The starting point is a matrix that contains the language-specific lexemes for each context. Then, a distance matrix is computed by calculating, for each two contexts, the Hamming distance [3] divided by the the total number of languages. If we, for example, want to calculate the value for two contexts that are expressed with the same word in 3 languages, but in 1 language they are expressed differently, the Hamming distance for this context would be 1, divided by 4 (the number of languages), makes 0.25. If two contexts are encoded in exactly the same way in all languages, they get the value 1 in the matrix (i.e. they are maximally similar), and if they are encoded in different ways in all languages they get the value 0 (i.e. they are maximally different).

Using the distance matrix and an R-script with an MDS algorithm (`cmdscale()` to be particular), probabilistic semantic maps are created with MDS for each of the sample languages. Each dot on the map represents one context, and the closer two dots are on the map, the more similar the two contexts they represent are in meaning (i.e. the more languages express these two contexts with the same lexeme). If two contexts are always expressed with exactly the same lexeme in each language, and therefore are maximally similar in meaning, their data points appear in the exact same place on the map.

The distance matrix has also been used to identify clusters in the data, using the `pam()` algorithm ("Partitioning (clustering) Around Medoids") from the R cluster library (Maechler et al., 2021). The Partitioning Around Medoids algorithm is used to search for k optimal clusters (or "medoids") in a dataset, to then assign each data point its closest medoid. With this algorithm, we can identify clusters of contexts in the probabilistic semantic maps that are maximally similar in meaning.

3.4 Analysis

Once the probabilistic semantic maps have been created for each language and optimal clusters had been identified, any cross-linguistic patterns in the encoding of negative adjectives became visible, as well as how the specific doculects/languages are mapped onto this distribution. That means that the position of contexts on the map (which is the same for all languages) shows how similar the contexts across the sample, whereas the colour coding on each language-specific map shows the language particular patterns, i.e. which context is expressed by which lexeme. The MDS algorithm creates $n-1$ Dimensions, where n is the total number of contexts.

[3] Note that Hamming distance here does not refer to the number of different characters between to words, but rather the number of different words in when comparing two strings of words. Each word is treated as an individual unit.

For the purpose of this study, the focus was entirely on Dimension 1, since it contained the most relevant information. Exactly how to interpret the results from the probabilistic semantic maps is explained in Section 4.1, since an explanation with examples is more straightforward.

Regarding the second research question about the presence of negation, an entirely manual analysis was required in order to find out whether negation was present in the translation equivalent in a certain language or not. The main issue with this part of the analysis was that negation can sometimes be difficult to discover, especially when only dictionaries are used, since they do not necessarily provide a gloss or historical analysis of the word. For that reason, the annotated words were compared to expressions for possible antonyms such as 'good' or 'nice', as well as negation markers, to check whether they occur in any of the words. Often, the number of syllables in a word could also provide an indication of whether a negation marker could be present. For example, a comparison of the word *lelibay* in Mbuko with the word *lele* 'good' showed that there could be some kind of morphological negation present, in this case the suffix *-bay* 'not'. In some cases, negation was more difficult to find since for example more semantically complex words than *good* were negated. In Hindi [hin] the negation in *nikamma* 'useless' was difficult to detect – *ni-* comes from Sanskrit *nih* 'without', and *kamma* from Sanskrit *karmá* 'work'. Due to the difficulty of detecting negation in some languages, the negated words, the negated expressions have in a later stage been separated into "dominant" and "marginal" negation. One criteria for that was which word was negated – if a word that is more semantically complex than e.g. *good* is negated, then the expression is coded as marginal (e.g. *nikamma* in Hindi). Also, if the negated form was not present in one of the main expressions for *bad/evil/worse/wicked* in a language, i.e. only occurred very infrequently, it was coded as marginal as well.

3.5 Summary

The procedure of the present study can be summarized as follows: First, a number of contexts that contain *bad, worse, evil* and *wicked* are decided upon in an English Bible text (here the Lexham English bible). Then, a world-wide, balanced, sample of 30 languages is selected using Sjöberg's (2021) adapted version of the Diversity value method and the verses decided upon in the first step are extracted from the corpus for each language. During the annotation step, each context is annotated with the (lemmatized) translational eqivalent of *bad/worse/evil/wicked* for each language. In addition, morphological/syntactic negation is identified, if present. Finally, a distance matrix that shows how similar each context is to each of the other contexts in terms of the annotated lemma in each language is calculated. The distance matrix is then used to create the probablistic semantic map with a MDS algorithm, as well as to identify the number of optimal clusters with the `pam()` function.

4 Results

In this section, the results from the analysis are presented. In Section 4.1, general patterns in the probabilistic semantic maps and the results from clustering with `pam()` are discussed, in order to lay the groundwork for a further analysis of the encoding of negative adjectives and adverbs in the sample. In Section 4.2, patterns in the encoding of BAD and EVIL are discussed. Section 4.3 focuses on how negation relates to the patterns introduced in the previous sections.

The probabilistic semantic maps for the entire sample are presented in Appendix C. Appendix D contains tables that summarize some of the results.

4.1 General patterns and clustering

Figure 3 shows the placement of verses on the probabilistic semantic maps, each number refers to a verse number provided in Appendix B. The closer two verses are on the map, the more frequently they are expressed by the same word or phrase in the sample. Through this representation, we can get a first impression of which types of expressions tend to cluster in certain part of the map and can therefore be assumed to have similar meanings across the sample languages. Different dimensions can represent different aspects of shared traits between the contexts, but for the purpose of this study, the focus will be on Dimension 1 (x-axis), as it was deemed the most relevant.

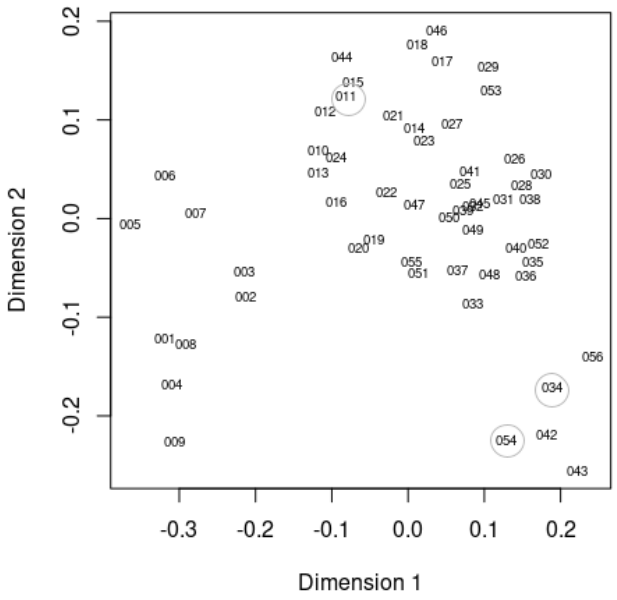


Figure 3: Underlying probabilistic semantic map showing where each context appears.

Although English was not included in the sample, and we therefore do not have a probabilistic semantic map for it, we will start with looking at the English contexts to get a better understanding of the structure of the maps. As an example we can compare context 034 and 054, which appear relatively close to each other in the map in Figure 3 and, in English, both contain the word *evil*:

(11) English examples of *evil* in the Bible corpus.

a. In that hour he healed many people of diseases and suffering and **evil** spirits, and he granted sight to many blind people. (42007021, 034)

b. But **evil** people and imposters will progress to the worse, deceiving and being deceived. (55003013, 054)

Context 011, however, appears much further away on the map, and is expressed with the word *bad* in English:

(11) English example of *bad* in the Bible corpus.

c. For rulers are not a cause of terror for a good deed, but for **bad** conduct. So do you want not to be afraid of authority? Do what is good, and you will have praise from it, (45013003, 011)

A sample language that expresses these 3 selected contexts in a similar way as English is Somali. In Figure 4, context 011 contains the adjective *xun*, whereas context 034 and 054 contain the adjective *sharka*. However, if we now look at the equivalent contexts in Turkish, we can see that here, *kötü* is used for all three contexts (see Figure 5), meaning that whatever the difference between *bad* and *evil* in English is, it is likely not relevant in Turkish, or is at least not represented in the word *kötü*. According to a Somali-English dictionary (Zorc and Osman, 1993), *shar* is a loan from Arabic and can be translated with 'evil', whereas *xun* is translated with 'bad, evil, worthless', i.e. has a much broader meaning. The Turkish word *kötü* also appears to have a broader meaning, as it is translated with 'bad (low quality)' and 'evil' (Cambridge English-Turkish dictionary, 2021).

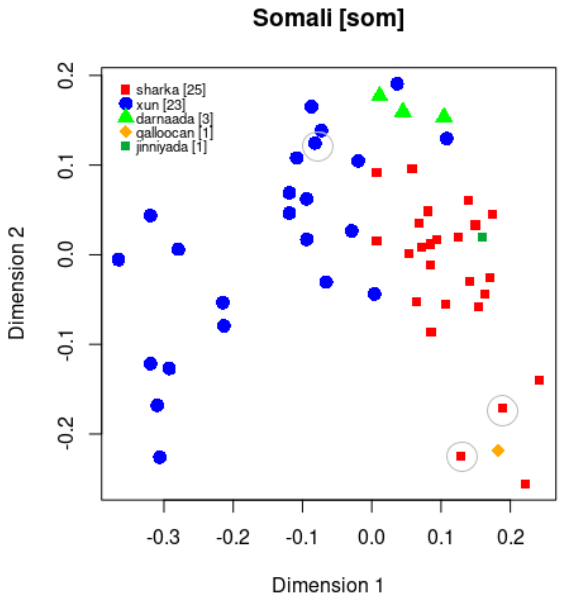


Figure 4: Probabilistic semantic map of Somali.

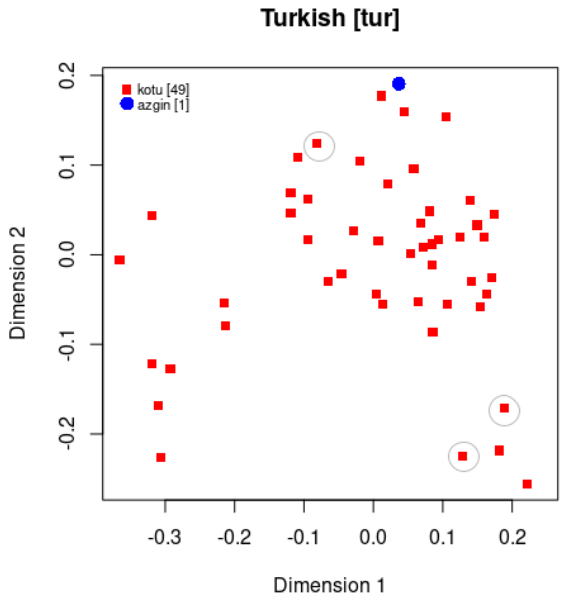


Figure 5: Probabilistic semantic map of Turkish.

If we now take all contexts into account, we can see that in Turkish, almost all contexts contain *kötü*. In Somali, however, the contexts are split between *xun* and *sharka*, where *xun*

is used for contexts towards the negative pole of the x-axis (Dimension 1), and *sharka* for contexts towards the positive pole of the x-axis. When making the connection between the placement of contexts on the semantic map, and what each contect expresses, it becomes apparent that *xun* is mainly used in the contexts that express a general negative value, often modifying something inanimate (or non-human), whereas *sharka* often modifies something human or actions done by humans. When taking more languages into account, it is then possible to identify patterns in the encoding of contexts along Dimension 1, which will be the focus of section 4.2.

A way to identify the optimal number of clusters in the data – "optimal" meaning the number of clusters with the smallest sum of dissimilarities within each cluster – is to use the `pam()` algorithm. In the current data, the optimal number of clusters is 2. The algorithm also assigns each context to one of the clusters, which results in the distribution that can be seen in Figure 6. Comparing this to the verses that are contained in each cluster, it becomes apparent that Cluster 1 mainly contains contexts with *bad fruit* or *bad tree*, whereas Cluster 2 contains all the remaining contexts with a variety of expressions about *bad or evil things, persons, actions* or a general bad state.

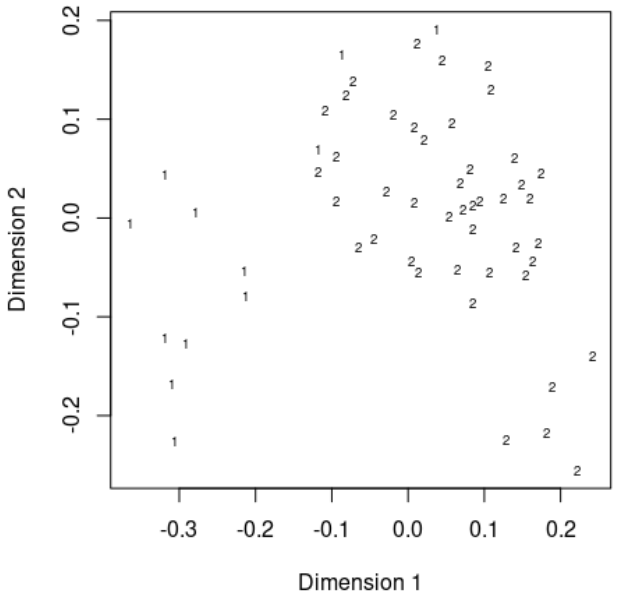


Figure 6: Two clusters extracted with `pam()`

10 of the 30 sample languages share an expression for Cluster 1 and 2. One language, Tacana, has exacly one expression for each cluster. Most languages, however, are intermediate types, i.e. they are a mix of the aforementioned types. Within the intermediate types (19 languages), the most frequent one (11 languages) is the one with languages that have one expression that stretches across both clusters (i.e. one cluster-transcending expression, to use Löfgren's (2020: 26) terminology), and at least one expression that is exclusive to Cluster 2. The distribution of the different types across the sample is presented in Table 2.

For each possible type (again following Löfgren's (2020: 26) naming of patterns as "cluster-transcending" and "cluster-exclusive"), an example is provided in Table 3 and the expressions for each cluster in all sample languages can be found in Table 10 in Appendix D.

Table 2: Encoding of `pam()` clusters in the sample.

Cluster 1 = 2	Cluster 1 exclusive	Cluster 2 exclusive	Number of languages
+	-	-	10
-	+	+	1
+	+	+	5
+	+	-	3
+	-	+	11

Table 3: Examples of language-specific expressions for each `pam()` cluster

Type	Example language	Cluster 1	Cluster 2
Cluster-transcending	Kuot [kto]	kiro [12]	kiro [37]
Cluster-exclusive	Tacana [tna]	saida mahue [10]	madhade [32]
Cluster transcending + Cluster 1 exclusive	Algonquin [alq]	madji [3] ka mino [6]	madji [3]
Cluster-transcending + Cluster 2 exclusive	Mbuko [mqb]	lelibay [8]	lelibay [18] huwan 11 setene [3]
Cluster-transcending + cluster-exclusive	Maasima Fulfulde [ffm]	bon [8] moyaa [2]	bon [32] ndesari [2]

The results presented in Table 2 show that a further, more detailed analysis of the distribution of contexts in the probabilistic semantic maps would provide a better insight into the encoding of BAD and EVIL in the sample languages, especially when considering that Cluster 2 is quite large and semantically diverse. The main issue for the classification is that in the majority of languages that have at least two different expressions within the domain, the expressions do not correspond exactly to the clusters. Instead, it is for example common that the most frequent expression in Cluster 1 also "stretches" over to Cluster 2, and then there is an additional expression in Cluster 2, towards the positive pole of Dimension 1. Compare for example the probabilistic semantic maps in Figure 7 and 8, where *saida mahue* in Tacana corresponds almost exactly to Cluster 1, and *madhada* to Cluster 2, but in Mbuko, *lelibay* is used across Cluster 1 and large parts of Cluster 2, but then towards the positive pole of Dimension 1, *huwan* is used instead. Describing which expressions are used in which cluster is therefore not the optimal way to describe the variation in the data (although extracting the `pam()` clusters is a useful way to reveal first patterns in the data, and might have been more helpful with a larger amount of data).

In addition, it would be useful to only consider the dominant expressions in each cluster. In most cases, it is enough to consider the most frequent expression within each cluster as the dominant one. However, in some cases, this would give more weight to very specific expressions such as *gaté* 'rotten' in French, which is the most frequent expression in Cluster 1, but is too specific to be regarded as one of the representative expressions for the domain under study. Such expressions will therefore be excluded as well, and the further analysis in 4.2 will only consider the dominant expressions for each language.

For the purpose of this further analysis, the main focus will be on Dimension 1, as it was

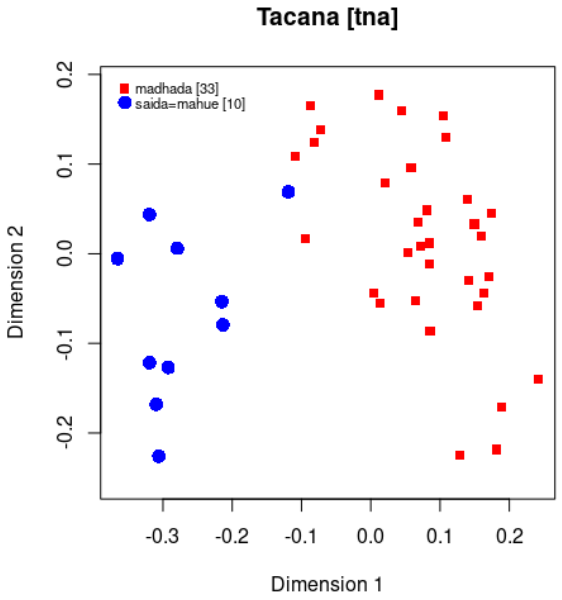


Figure 7: Probabilistic semantic map of Tacana.

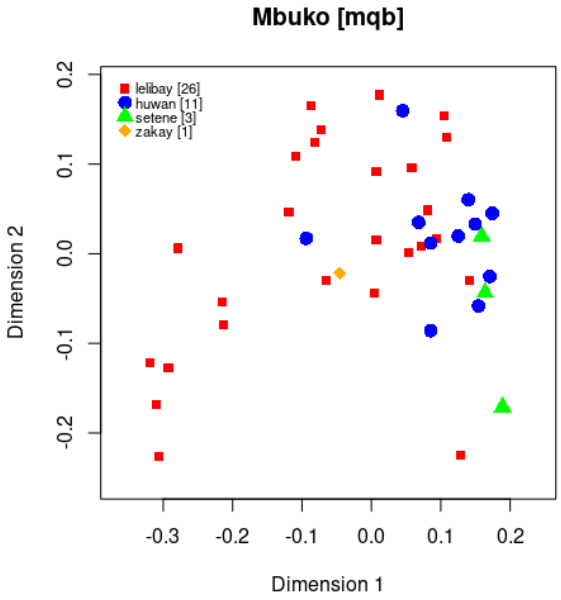


Figure 8: Probabilistic semantic map of Mbuko.

deemed the most meaningful in this context, since it reflects the most information. Dimensions 2 - 4 were also considered, but dimensions 3 and 4 did not yield any interpretable semantic features, i.e. no useful patterns were found when plotting the probabilistic semantic maps for these dimensions instead. For Dimension 2 only guesses can be made about its content – it could be related to the distinction between adjectives and adverbs, or it could contain comparatives, but there is not enough data to verify.

4.2 Encoding of BAD and EVIL in the sample

In this section, the encoding of BAD and EVIL in the sample languages is discussed further in the context of philosophical accounts of different types of evil, to identify patterns in the encoding of the domain. The observation from Section 4.1 in that only 2 clusters is not the optimal way to account for the variation across languages is considered as well by proposing a scalar view of the domain.

4.2.1 BROAD EVIL and NARROW EVIL

As introduced in Section 2.3.1, in philosophical literature, the concept of EVIL (or BADNESS/ WRONGDOING) is often divided into two or more types (or degrees of evilness). Calder (2019), for example, denotes these types "broad" and "narrow" evil. Broad evil is described as a general bad state, a character flaw or a wrongful action and can be divided into two sub-types, "natural" and "moral evil". Natural broad evil refers to the type of bad state that one cannot do much about, that is unintentional, whereas moral broad evil refers to a bad state or action that has been caused by a moral agent. Narrow evil has a more restricted meaning, and is reserved for the worst type of things a moral agent can do. Based on these definitions, each context in the data has been coded according to whether BROAD NATURAL EVIL, BROAD MORAL EVIL, or NARROW EVIL is present (based on the original English sentences from the Lexham English

Bible). The criteria for the coding, although not as precise as one would ideally wish for, are presented in Table 4.

Table 4: Criteria for coding of examples according to type of evil, with examples.

Type of evil	Criteria	Example
BROAD NATURAL EVIL	adjective modifies something inanimate, does not describe action, "general bad state" that no one can control	*which when it was filled they pulled to shore and sat down and collected the good fish into containers, but the [bad] they threw out.* (40013048, 007)
BROAD MORAL EVIL	bad/evil action/state that has been caused by moral agent and that is not extremely evil	*For rulers are not a cause of terror for a good deed, but for [bad] conduct…* (45013003, 011)
NARROW EVIL	(intentional action by) evil people/ spirits/ generation (animate, moral agent is modified)	*Watch out, brothers, lest there be in some of you an [evil], unbelieving heart, with the result that you fall away from the living God.* (58003012, 047)

However, it should be noted that this "coding" process is not particularly exact, and should rather be seen as an approximation, since the definitions of "broad" and "narrow" evil are also not particularly exact, and can depend on a variety of factors, including the translator's and reader's own interpretations of the text. Especially distinguishing between broad moral evil narrow evil can be quite subjective, both of them include actions done by moral agents. In some cases the only difference can be the degree of severity of an evil action, which can be very subjective and depend a lot on the context.

To visualize the results from the coding process, the coded types where then mapped onto the semantic map, as presented in Figure 9. Based on the distribution of contexts on the semantic map, it is possible to view Dimension 1 as a scale ranging from maximally BROAD NATURAL EVIL over BROAD MORAL EVIL, to maximally NARROW EVIL. This equation is of course not entirely unproblematic, due to the aforementioned issues with the coding process, but can be used as a way to represent the language-specific encoding of BROAD EVIL and NARROW EVIL. For the following discussion of cross-linguistic patterns, this scale will be referred to as the "broad-narrow evil scale".

There is no clear way to classify languages as to whether they have several expressions for different parts of the scale, draw the line between BROAD EVIL or NARROW EVIL expressions. However, it is possible to group the sample languages according to how many expressions they have along the scale, which will be the topic of the following section.

4.2.2 Cross-linguistic patterns

Since languages "split" the broad-narrow evil scale in different places (if they have two or more expressions within the domain, that is), we cannot explicitly state that a certain language expresses BROAD EVIL with one word, and NARROW EVIL with another. Such a representation would be an oversimplification. However, what we can state is whether a certain expression is broader or narrower, depending on where and how far it is spread along Dimension 1, i.e. the broad-narrow evil scale. In that way, the issue with having to equate Cluster 1 with BROAD EVIL and Cluster 2 with NARROW EVIL is avoided.

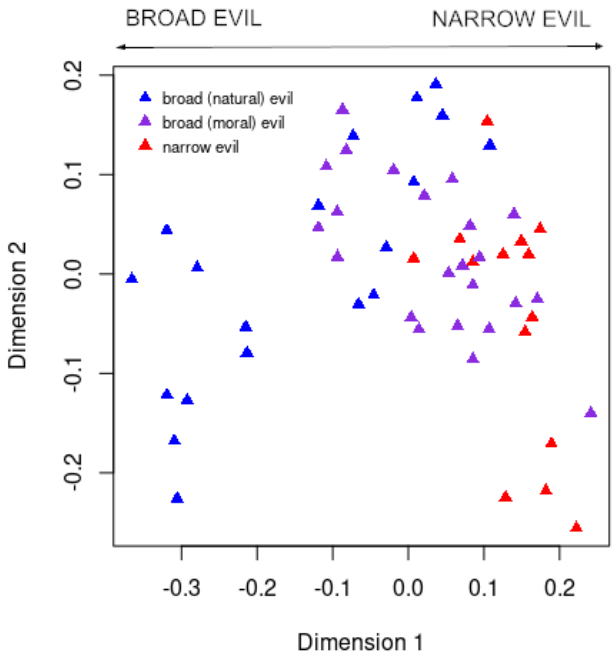


Figure 9: Semantic map of contexts coded according to BROAD NATURAL EVIL, BROAD MORAL EVIL and NARROW EVIL.

The sample languages are classified according to how many expressions they have to encode different segments of the broad-narrow evil scale. In Table 5, the distribution of the types across the sample is presented. Note that only the dominant expressions in each language are considered, i.e. the most frequent expressions, excluding too specific meanings such as *gaté* 'rotten' in French, *kelvoton* 'unworthy', or *nikamma* 'useless' in Hindi. In Table 11 in Appendix D, the type and language particular expressions are given for each sample language.

Table 5: Number of languages in the sample grouped according to how many expressions they have along the broad-narrow evil scale.

Type	Number of languages
1	16
2(+)	14
Total	30

Type 1 Almost half of the sample languages do not have different forms that are used along Dimension 1. Instead, they only have one expression that is used in the majority of contexts, ranging from those including inanimate objects, a state, action, or animate/human. Maori is one of these languages, and as example 12 shows, *kino* is used for 'bad tree' and 'bad fruit' (which would be BROAD EVIL), but also for 'evil spirit' (which would be NARROW EVIL). Figure 10 represents *kino* along the broad-narrow evil scale.

(12) Example of BROAD and NARROW evil in Maori [mri]

a. *Waihoki he ataahua nga hua o te rakau pai; he* ***kino*** *ia nga*
likewise ? beautiful breathe? bear.fruit ? ? tree be.good ? be.bad ? ?
hua o te rakau ***kino****.*
bear.fruit ? ? tree be.bad

'In the same way, every good tree produces good fruit, but a [bad] tree produces bad fruit.' (40007017)

b. *I taua wa pu ano he tokomaha te hunga i whakaorangia e ia i nga*
while ? time ? ? ? many ? people ? heal ? ? ? ?
turoro-tanga, i nga mate, i nga wairua ***kino****; he tokomaha nga*
sick-VERB ? ? be.sick ? ? spirit **be.bad/evil** ? many ?
matapo i meinga kia kite.
blind ? ? ? ?

'In that hour he healed many people of diseases and suffering and [evil] spirits, and he granted sight to many blind people.' (42007021)

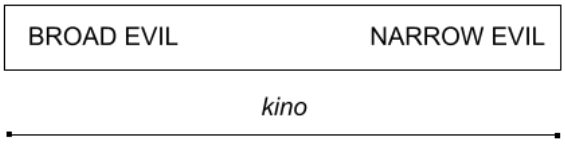


Figure 10: Encoding of the broad-narrow evil scale in Maori.

Type 2(+) Finnish, on the other hand, is one of the languages that uses two forms along Dimension 1: *huono* and *paha*. *huono* is used in the beginning of the scale in the contexts that can be considered BROAD (NATURAL) EVIL, whereas *paha* is used in the remaining contexts that include bad/evil persons or actions (see Example 13). Figure 11 represents *huono* and *paha* along the broad-narrow evil scale.

(13) Example of BROAD and NARROW evil in Finnish [fin]

a. *Jos puu on hyvä, se-n hedelmä-kin on hyvä, mutta jos*
if wood be.PRS.3SG good DEM-GEN fruit-also be.prs.3sg good but if
puu on ***huono****, se-n hedelmä-kin on* ***huono****. […]*
wood be.PRS.3SG bad DEM-GEN fruit-also be.PRS.3SG bad

'Either make the tree good and its fruit is good , or make the tree bad and its fruit is bad, […].' (40012033)

b. *Hyvä ihminen tuo sydämensä hyvyyde-n varasto-sta esiin*
good man bring.3SG.PRS heart.POSS.3 goodness-GEN stock-ELATIVE to.front
hyvä-ä, ***paha*** *ihminen tuo pahuutensa varasto-sta*
good-PARTITIVE, evil man bring.3SG.PRS wickedness stock-ELATIVE
esiin paha-a. Mi-tä sydän on täyn-nä,
to.front evil-PARTITIVE what-PARTITIVE heart be.PRS.3SG full-ESSIVE
si-tä suu puhuu.
DEM-PARTITIVE mouth speak.PRS.3SG

'The good person from his good treasury brings out good things, and the evil person from his evil treasury brings out evil things.' (40012035)

c. *Tekin olitte ennen Jumala-sta vieraantu-ne-i-ta*
2SG.too be.2SG.PST before god-ELATIVE alienate-PCT.PST.PASS.PL-PL-PARTITIVE
ja hän-tä kohtaan viha-mielis-i-ä, kun el-i-tte
and him/her-PARTITIVE towards hate-minded-PL-PARTITIVE when live-PST-2PL
paho-jen *teko-je-nne valla-ssa.*
evil-GEN.PL action-GEN.PL-POSS.2SPL reign-INE

'And, although you were formerly alienated, and enemies in attitude, because of your evil deeds ,' (51001021)

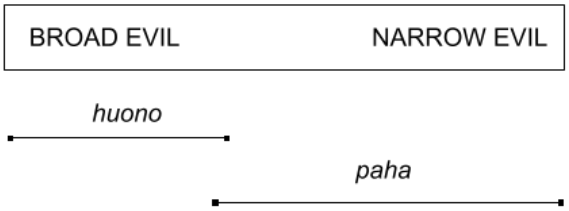


Figure 11: Encoding of the broad-narrow evil scale in Finnish.

Other languages of this 2(+) type can have distributions that differ slightly from the Finnish one. In Hindi (see Figure 12), for example, *bure* has a much larger span than the Finnish word *huono*, whereas *dusht* only occurs at the very end of the scale, indicating that it might me more semantically restricted than the Finnish word *paha*.

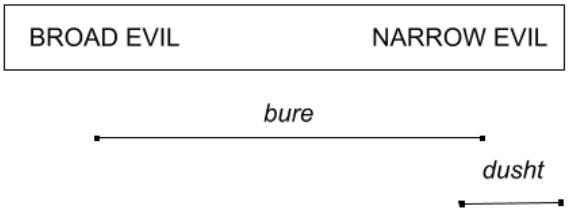


Figure 12: Encoding of the broad-narrow evil scale in Hindi.

A small number of languages, such as Xhosa and Hakka Chinese, have 3 main expressions along the broad-narrow evil scale. In Xhosa, 2 of these expressions (*-ngendawo* and

-khohlakele) occur in the same range along Dimension 1 (see Figure 13), indicating that the relevant difference between those two expressions might not have anything to do with BROAD and NARROW EVIL. In Hakka Chinese, all three dominant expressions occur in different places along the broad-narrow evil scale, as Figure 14 shows.

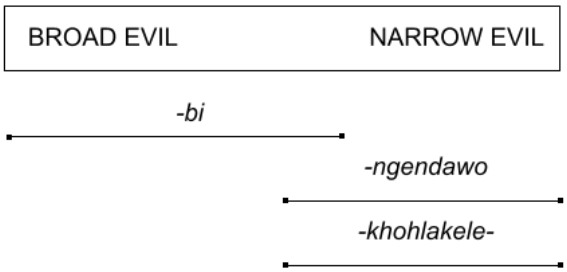


Figure 13: Encoding of the broad-narrow scale in Xhosa.

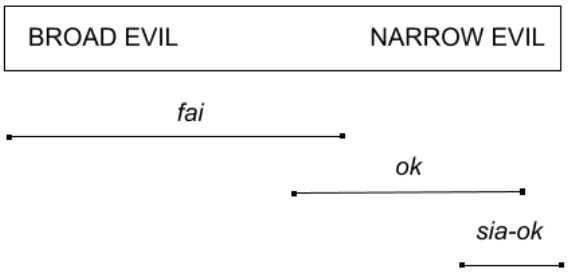


Figure 14: Encoding of the broad-narrow evil scale in Hakka Chinese.

4.2.3 Distribution of types across macro areas

The results for the clustering do not show any particular distribution across most of the macro areas, except for the fact that 5 of the 6 languages in Oceania belong to Type 1. Figure 15 contains a map with the results from clustering. A larger sample would perhaps have revealed some genealogical or geographical patterns, nevertheless, this has to be left to future research.

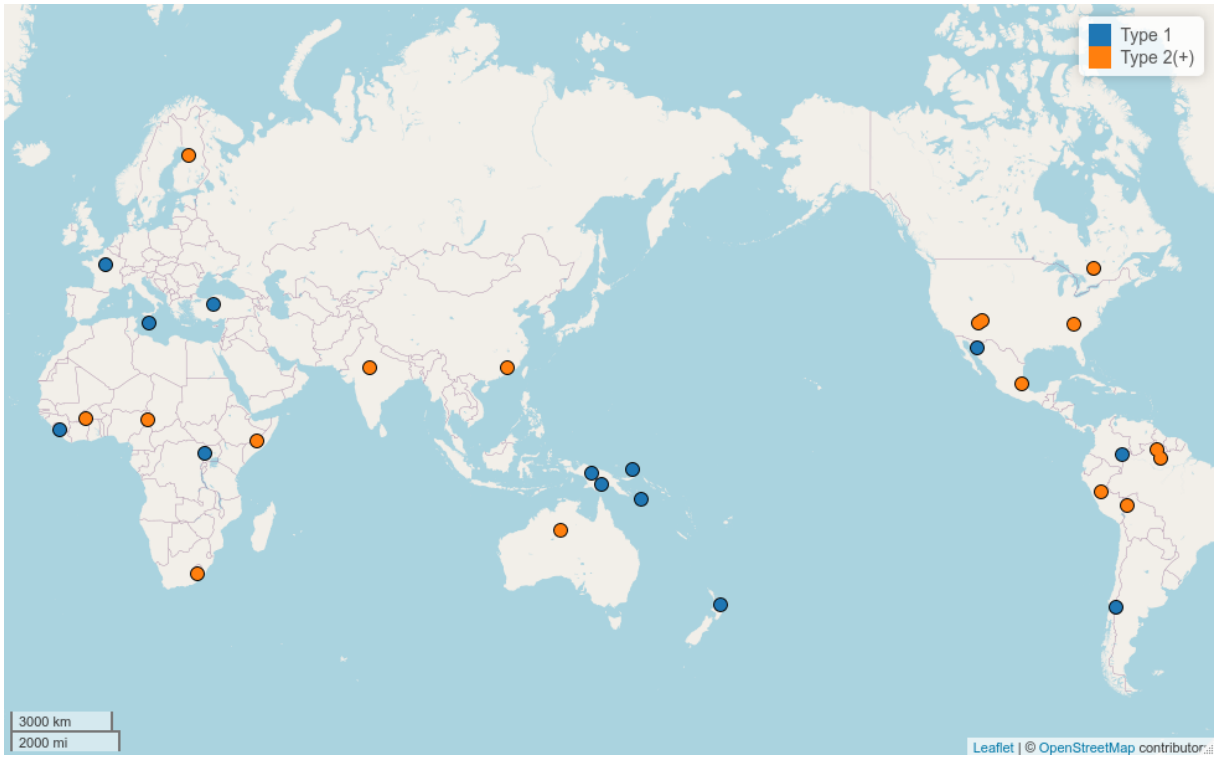


Figure 15: Distribution of types on a map. Created with lingtypology (Moroz, 2017)

4.2.4 Summary

The patterns found in the sample show clearly that languages either have an expression that is used across the entire broad-narrow evil scale, or they have one more BROAD EVIL expression, and one or more NARROW EVIL expressions which are more semantically restricted. In languages that only have one expression along the scale, this expression often has a broader meaning and is then also used for the narrower contexts. It is difficult to state exactly in which way the narrower expressions are restricted in a particular language, however, we can state that they often are restricted to a human (moral) agent, and to only the most evil actions.

4.3 Negation marking

4.3.1 Cross-linguistic patterns

Some form of morphological or syntactic negation marking is present in the semantically negative expressions of 13 of the 30 sample languages. The results are summarized in Table 12 in Appendix D. The languages where negation marking is present were further separated into two types, the ones where negation is dominant , and the ones where negation is marginal. Whether a negated expression was considered "dominant" was based on whether the expression was considered as one of the dominant ones in Section 4.2.2. Almost half of the sample languages have some form of negation present in their negative adjectives, and in 8 of them the negated form is one of the dominant expressions (see Table 6).

Table 6: Presence of negation marking in BAD/EVIL expressions in the sample.

Type	Number of languages
No negation	17
Dominant negation	8
Marginal negation	5
Total	30

The majority of these languages do not exclusively use a negated expression. Instead, the negated forms are only used in some contexts, to be specific the contexts towards BROAD EVIL on the broad-narrow evil scale. In Tacana [tna], for example, *saida mahue* 'good NEG' only occurs towards the left of the scale, while *madhada* 'evil' is used for the remaining contexts. Only in Yaqui and Navajo are negated form(s) used across the entire scale. In none of the languages, negation only occurs towards the NARROW EVIL part of the scale. From these findings, the following implicational universal can be formulated:

(14) The universal of negation marking in negative value expressions:
If a language has negation marking in negative value expressions, negation only occurs in those with a BROAD EVIL meaning.

4.3.2 Distribution of negation marking in semantically negative expressions across macroareas

Figure 16 shows the geographical distribution of languages with and without negation in negative adjectives. The map clearly shows that morphological or syntactic negation in semantically negative expressions is very common in the Americas, although not exclusive to them.

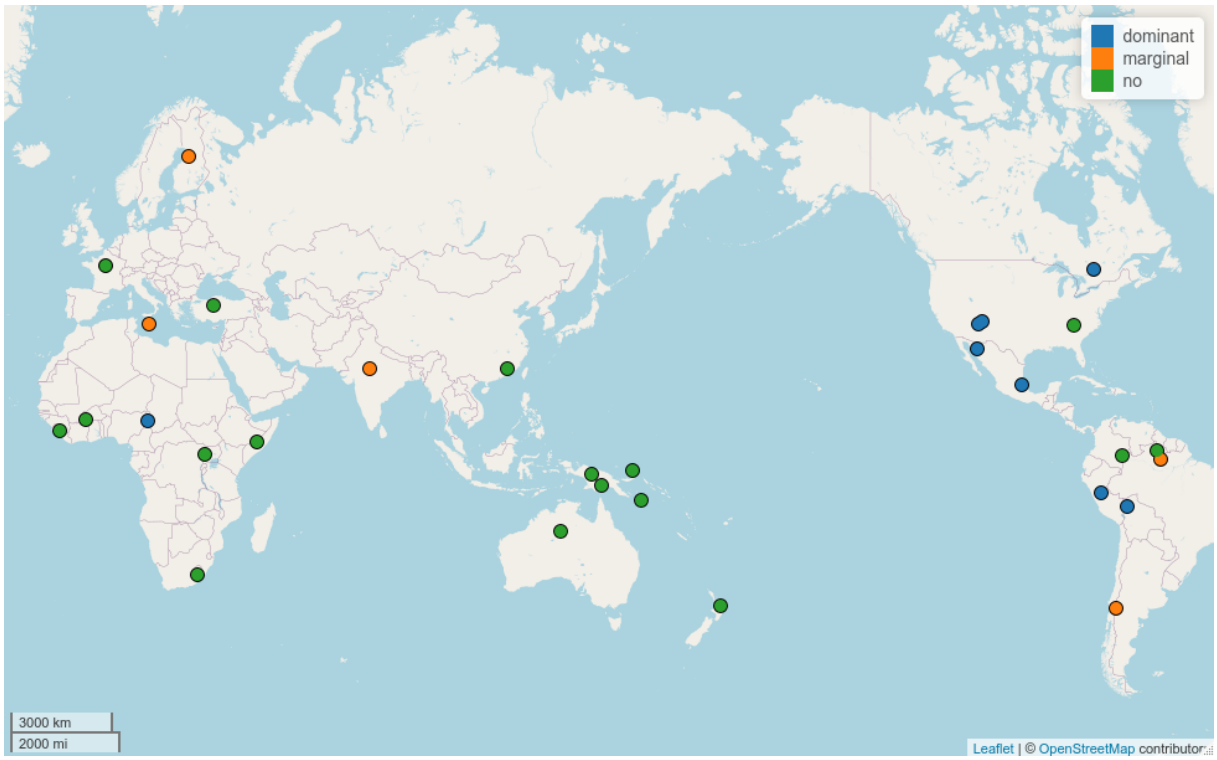


Figure 16: Presence of negation in negative adjectives in the sample. (Map created with lingtypology (Moroz, 2017))

4.4 Summary

The results of the present study show that the domain of negative value expressions should rather be treated as a scale, and not as discrete categories, since different language particular expressions are restricted to different sections of the scale, rather than clearly fitting into the categories BROAD EVIL and NARROW EVIL. All sample languages have either one expression that is used along the entire scale, and that has a BROAD EVIL meaning with little semantic restrictions, or they have two or more expressions that represent different parts of the scale, i.e. with at least one expression that is used for BROAD EVIL contexts, and one that is used for NARROW EVIL contexts and is therefore more semantically restricted.

Morphological or syntactic negation only occurred in expressions with a BROAD EVIL meaning, which can be concluded with the following universal: If a language has negation marking in negative value expressions, negation only occurs in those with a BROAD EVIL meaning.

The results for any areal patterns are only preliminary, since only 6 languages per macroarea are included, however, two things are worth mentioning. First, the languages in Oceania frequently belong to Type 1, i.e. the type that only has one expression along the broad-narrow scale. Second, negation in semantically negative expressions is particularly common in languages in the Americas.

5 Discussion

In Section 5.1, possible explanations for the central findings of this study are discussed, followed by a method discussion in 5.2. Section 5.3 provides some ideas for further research.

5.1 Patterns in the encoding of BAD and EVIL

In this section, the results of the current study are discussed in the context of previous research, starting with the encoding of the broad-narrow evil scale in 5.1.1 and negation in 5.1.2.

5.1.1 Explanations for the broad-narrow evil scale

The results show that a distinction between different types of evil as made by Calder (2019) or Formosa (2008) is not the optimal underlying representation for the domain of BAD and EVIL when treated as distinct categories. Instead, a scalar representation ranging from BROAD EVIL to NARROW EVIL makes more sense, since languages, if they have several expressions along the broad-narrow evil scale, usually "split" the scale in different places. Languages with several BAD/EVIL expressions still have in common that they have at least one expression on one side of the scale that is broader in meaning, and one expression on the other side of the scale that is narrower, i.e. more restricted in meaning, the difference between languages is just how restricted the narrower expression is.

The question is now, why are some of the narrower expressions more restricted in one language than in another? Why is, for example, *dusht* in Hindi more restricted than *paha* in Finnish? Or to put it in another way, why is *bure* in Hindi used more broadly than *huono* in Finnish? One explanation for that would be that it is related to choices that the translator made based on their own interpretations of the text. In languages with little data, i.e. few bible translations, this issue would be hard to avoid, but in languages where several translations are available one could compare the different doculects to see how different the translations are from each other. For Hindi and Finnish, there are 4 translations each included in the corpus, which would allow for a further comparison. However, when comparing dictionary entries of *dusht* and *paha* it also becomes obvious that *dusht* in fact is more restricted in meaning than *paha*. In McGregor et al. (1993: 505), *duṣṭa* is described as "a wicked person', "a villain", or "enemy", clearly restricting it to describing a property of a human agent. *Paha*, on the other hand, can also be used to describe a feeling or action, still restricting it to a human agent, however, not only as a property/character trait of a human agent, but also to describe an action or a feeling (Lingea Finnish-English dictionary, 2021). Related to this issue, Vanhatalo et al. (2014: 76) also point out that is is, for example, not possible to equate *paha* with the English words *evil* or *immoral* since they do not capture the meaning of the word entirely

To conclude, it is likely that the translator's interpretations and choice of words, as well as inherent properties of each language particular expression make up for the differences in how semantically restricted an expression along the broad-narrow evil scale it in a particular language. In order to learn more about that, more data from different translators would be needed, as well as more secondary data sources and native-speaker competence. However, the fact that these different interpretations of the same context are possible also shows that the difference between BROAD and NARROW EVIL is in fact not clear-cut.

How do findings about the encoding of the broad-narrow evil scale relate to findings in previous research? Starting with philosophical accounts of the concept of evil, there is a large body of research discussing the question as to whether evil is qualitatively distinct from "simple wrongdoing" (i.e. Russell 2007, Calder 2013, Liberto and Harrington 2016). The scalar

representation of BAD/EVIL, and the fact that there are many languages that do not make a difference between BROAD EVIL and NARROW EVIL, would support critical philosophical accounts of the distinction between different types of evil, such as Russell (2007) who reaches the conclusion that (narrow) evil is a more severe form of "simple wrongdoing", implying that there is only a quantitative difference between the two concepts, but not a qualitative. Calder (2013: 194), on the other hand, has argued that the two concepts are also qualitatively distinct since "many wrongful actions do not involve an intention to bring about, allow, or witness harm, e.g. lying and cheating are wrong even if these actions are performed without an intention to bring about, allow, or witness harm'. In any way, further typological studies of the BAD/EVIL domain could benefit from paying more attention to philosophical counts of evilness. At the same time, philosophical studies could benefit from taking the encoding of the domain in different languages, and therefore cultures, into account.

Turning back to typological studies, the results from the current study align with previous findings such as Dixon's (2004) account of semantic types that are typically expressed as adjectives in languages with different-sized adjective classes. VALUE is typically found as an adjective in all languages, even those with small adjective classes, and would include BROAD EVIL, i.e. a general bad state. HUMAN PROPENSITY, which includes *evil* in the typical (narrow) sense, is on the other hand only found in languages with a medium to large sized adjective class. This translates directly into the findings of the current study in that some languages only have one expression for BROAD EVIL (= VALUE), and some have at least one more expression for NARROW EVIL (= HUMAN PROPENSITY). However, it should be noted that in the present study, not only adjectives were included in the results. Xhosa [xho], for example, is known to have a small adjective class (Bottoman, 2001) which includes *bi* 'bad, evil, ugly'. In the analysis, *ngendawo* and *khohlakalele* also occurred towards the narrow end of the scale.

5.1.2 Negation marking of BAD and EVIL

The results show that negation in negative adjectives is relatively common in the sample (13 of 30 languages). In languages with several expressions along the broad-narrow evil scale, it only occurs towards the BROAD EVIL side, which has been formulated as the universal of negation marking in negative value expressions.

But why is negation more common with BROAD EVIL adjectives, than with narrow? One explanation would be that it is related to the fact that only the broader type of evil can be negated, since it is the more basic type. NARROW EVIL expressions are more semantically restricted in the sense that they contain more semantic components than just NEGATIVE VALUE, making it more difficult to express them by negating their positive antonym. NARROW EVIL expressions include, for example, often a component that restricts them to a human agent, whereas BROAD EVIL expressions do not.

In addition, the type of antonymy can be relevant for the possibility of negation. As mentioned in Section 2.4, previous studies have found that the possibility of using morphological or sentential negation is restricted by the type of antonymy that is present. Verhagen (2005) found that contradictions, i.e. situations that mutually exclude each other and therefore cannot be true at the same time, although one of them has to be true if the other one is false, only allow for sentential negation. Morphological negation can only be used to express contraries, i.e. situations that cannot be true at the same time, but that allow for the possibility that both are false. Verhagen (2005) does not pay attention to languages that express sentential negation morphologically, and distinguishing between different types of negation has also not been the focus of the present study. However, any type of negation, whether morphological or syntactic was found to only occur towards the BROAD EVIL end of the scale, when present

in one of the dominant expressions of the domain. *Good* and *evil* are contraries – it is possible to neither be *good* nor *evil*, but rather to be something in between. *Good* and *bad* can rather be seen as contradicions, or at least contraries to a lesser extent than *good* and *evil*. It is therefore more likely that *bad* is expressed with the negated form *not good*, rather than *evil*.

Negation within the dominant expressions of the domain under study only occurred in languages in the Americas, and in one African language. In all of these languages, the negated form is the only form that is used for the broader expressions, they do not occur in parallel with another BROAD EVIL form. In these languages, the negated forms could therefore play another role as in Indo-European languages that have been discussed in previous research (where negated and non-negated forms can be used in parallel), if they really are the only available expressions for NEGATIVE VALUE. The fact that many languages in the Americas are morphologically complex, agglutinating languages can be part of the explanation why constructing negative value expressions with negation is more common in these languages. In some languages, for example Algonquin and Tacana, the negated forms are only used for the contexts that contain a direct comparison of good and bad. Consider example 15a, where *saida* 'good' and *saida mahue* 'not good' are opposed, whereas *madhada* in 15b is used on its own.

(15) Example of *saida mahue* 'not good' and *madhade* 'bad/evil' in Tacana [tna]

a. *Beju pamapa equi saida cuana mu ejaja saida eputani. Daja huecha pamapa*
? ? ? good fruit ? ? good tree ? ? ?
equi saida mahue cuana ejaja saida mahue eputani.
? good NEG fruit ? good NEG tree

'In the same way, every good tree produces good fruit, but a bad tree produces bad fruit .' (40007017)

b. *Jesus ja atana huecuana: Beju micuaneda da deja madhada bubeta cuana. [...]*
? ? ? ? ? ? ? ? bad/evil

'But he answered and said to them , " An evil and adulterous generation desires a sign [...]' (40012039)

In languages such as Tacana and Algonquin, the available data does not reveal whether the negated forms are only used for the purpose of expressing contradictions, or whether they are the only expression on the broad evil side of the scale.

5.2 Method discussion

In this section, the methodology used in the present study is discussed further, mainly focusing on methodological issues and how they could be improved in further research. In section 5.2.1 the representativeness of the data is discussed. Section 5.2.1 focuses on MDS and clustering with `pam()` and Section 5.2.3 discusses whether the results could be reproduced for a larger number of languages.

5.2.1 Representativeness of the data

The choice of corpus data, in particular the Bible corpus, as the ideal data source for the present study has been motivated as follows. First and foremost, the Bible is the only parallel text that

has been translated into such a large number of languages that it is useful for typological studies with a world-wide, balanced sample. In addition, lexical typological studies of adjectival domains, such as NEGATIVE VALUE, are difficult to conduct based on grammatical descriptions and dictionaries, since they are often not described there, or are missing information about the context they are used in. Also, for many smaller languages, extensive descriptions and dictionaries are often not available, but sometimes a Bible translation is. Nevertheless, there are a number of issues with this type of data that have to be considered.

The semantic domain that has been investigated in this study is restricted by which contexts, and therefore which types of badness and evil, are available in the New Testament. The domain is more diverse than what is represented in the Bible corpus, which means that a part of it has been excluded from the investigation. When looking at the Swedish translations of the chosen contexts, mostly *dålig* 'bad' och *ond* 'evil' occur, however, one could also expect *elak* or *illa* to be included. The same holds for Russian, where one could expect *ploxoj, zloj, durnoj* and *nexorošij* to occur, but only the former two occur in the chosen contexts. One reason why these expressions are missing would be that the type of badness or evil that they express is not included in the Bible, or at least not in the chosen contexts. The English words *mean* and *severe* were for example also considered, but did not occur frequent enough in the corpus. However, the data is also restricted by the nature of the text itself. The New Testament is, as many other texts about moral and value, tied to a specific ideology. It is therefore likely that the results are a direct representation of the way moral and value is viewed in the New Testament, and that another text would lead to different results. Regardless of which text is used, this issue can never be avoided completely since talking or writing about what is bad or evil always requires a certain moral or ethical stance. However, including texts that are tied to different ideologies can provide a broder view of the domain.

Another issue related to the choice of contexts is the occurrence of metaphorical expressions. When choosing the contexts, metaphorical expressions were mostly excluded, however, due to the fact that metaphors are very frequent in the Bible, and that the number of occurrences of *bad* and *evil* in the English Bible were already limited, some metaphorical expressions had to be included. In sentences such as Example 16, *bad fruit* and *bad tree* are used as metaphors for a bad/evil person, which is especially problematic since a bad tree/fruit would be included on the BROAD EVIL side of the scale, whereas a bad/evil person would rather be classified as NARROW EVIL.

(16) A good tree is not able to produce bad fruit, nor a bad tree to produce good fruit. (40007018)

Other issues with the data are related to the translation process, in the sense that with each translation, new interpretations are added to the text and is often not clear which patterns come from the source language and which from the translation process. In addition, for the Bible itself has a long and rich history and is originally composed of Greek, Hebrew and Aramaic texts dating back to Antiquity (De Vries, 2007: 151), and the Latin translation has for a long time been the base text within the Roman Catholic Church (De Vries, 2007: 153). Finally, adding even more variation to the source languages, many Bible translations have likely not been translated from one of the "original" languages, but from another translation. Here, only guesses can be made. It is, for example, likely that Spanish or Portuguese have been the source languages for the Bible translations from South America, or that French has been the source language for some of the African languages. For Nalca, the source language is likely Indonesian, and for Kuot it is Tok Pisin.

Comparing doculects of the same language shows that there can be significant variation between texts in the same language. In order to analyze this variation further, the most likely expressions for each `pam()` cluster were automatically extracted for additional doculects. When comparing doculects of the same language, it became obvious that, in some cases, there is some significant variation between different doculects. For example, in the French Ostervald 1867 translation, *mauvais* 'bad' (and suppletive adverb *mal* and comparative *pire*) are used across both clusters, whereas in the Darby translation, *méchant* 'evil' occurs in Cluster 2, in addition to *mauvais*. This variation indicates that the translators' choice of words can sometimes have influenced the results significantly. As already mentioned in 5.1.1, a solution for such an issue would be to include several doculects of the same language in the analysis, if available. At the same time, the variation between different doculects indicates that there is little influence from the source language of the translation. In Latin, which has likely been the source language for many translations, almost all of the chosen contexts are expressed with the same word – *malum* 'bad,evil', but still almost half of the sample languages were classified as Type 2(+) languages.

Due to this language-internal variation, why would it still be necessary to select a stratified sample, instead of e.g. including all 17 doculects of French, which also already capture a lot of variation? One reason would be that if e.g. only an Indo-European sample had been used, it would have been more difficult to exclude the influence of suppletion. Adjectival suppletion is especially common in European and American languages, which VALUE adjectives being one of the common types. Comparative suppletion is most common in European languages (Vafaeian, 2013: 126). Also, any pattern that only occurs in another part of the world, as for example the fact that negation in semantically negative expressions is much more common in the Americas, would have been missed otherwise.

5.2.2 MDS and clustering

Creating probabilistic semantic maps using MDS has been a good choice of method for the cross-linguistic analysis of BAD and EVIL. Nevertheless, due to the limited amount of data, the clustering using the Partitioning Around Medoids algorithm was not at meaningful as initially expected, which is why a scalar representation of the domain was proposed, instead of separating it into discrete categories. With more data points, i.e. more contexts, and a more diverse selection of expressions to cover more meanings within the domain, the clustering with `pam()` might become more meaningful and reveal more about the encoding of the domain.

5.2.3 Reproducibility on a larger scale

Is it possible to reproduce the results from the present study for a larger set of languages? Or would it still be favorable to annotate the contexts manually for each language, and run MDS with these new annotations? To answer this question, the most probable lexemes for each of the `pam()` clusters have been extracted automatically for a selected number of Indo-European languages. This has been done in a similar manner as described in Wälchli and Sölling (2013: 81-94). The results can give an indication of which expressions occur in each of the clusters in languages other than the sample languages, however, this types of extraction also comes with number of problems. Table 7 contains the automatically extracted lexemes for two doculects of Swedish and Spanish. Unfortunately, Cluster 1 is too small and contains a lot of similar sentences (revolving around *good/bad tree/fruit* etc.), which causes a lot of irrelevant words such as *frukt* 'fruit' or *träd* 'tree' in Swedish to be wrongfully extracted. Furthermore, the extracted words are not lemmatized, which is problematic since the extraction is based

on getting the most frequent lexeme, not lemma. To make sense of the results, a manual lemmatization is still necessary afterwards. Finally, since only single lexemes are extracted, syntactic negation will be missed, which is not ideal considering that it plays such an important role within the domain of NEGATIVE VALUE.

Table 7: Automatically extracted clusters for Swedish and Spanish.

Language	Cluster 1	Cluster 2
Swedish [swe]	**dåligt**, fin, frukt, träd	**onda|ont|värre**, **ond**|andar
Spanish [spa]	**malo**, árbol, **malos**, bueno, buenos	**malo|peor|malos**, **malas**

To conclude, for now it is not useful to extract clusters automatically in order to reproduce the results for a larger set of languages – a manual annotation of the contexts for new languages would still be favorable. However, which larger set of contexts, the clustering might become better and then it could still be possible to extract more data automatically.

5.3 Further research

As already indicated in the previous sections, conducting a similar analysis in a larger scale would be helpful to further analyze how BAD and EVIL are encoded cross-linguistically. First and foremost, it would be necessary to include more types of badness, evil and wrongdoing in the data. In the present study the domain has been restricted by the types of evil that are present in the New Testament and the results are therefore restricted to a certain view of what is good and bad/evil. Including more data that is tied to different ideologies and different notions of value and moral would allow for a broader investigation of the domain. One possibility for such a text would be the Harry Potter books which contain 48 occurrences of *evil* and 225 occurrences of *bad* [4]. Furthermore, translations of The Master and Margarita could be a useful source, since the novel is concerned with evilness and the devil. It would, however, be difficult, if not impossible, to select a genealogically and geographically balanced sample from these two data sources – the sample would likely have a strong Indo-European bias.

Even when still using the same corpus data, i.e. the New Testament, it would be possible to find more variation in the types of evil that are represented, for example by including more contexts that in English are expressed with words such as *wrong* or *severe*, or by adding more expressions with *evil* since some of them were excluded from the contexts in this study in order to limit its scope. In addition, considering to use another source language to choose the contexts, Latin in particular, could be a benefit, since the Latin text has presumably been the source for many translations.

Future research should also pay further attention to the fact that negation in negative value expressions was particularly common in the sample languages from North and South America. It might be more difficult to find sufficient parallel data for these languages, so other methods for lexical typology would need to be employed here.

[4] `https://www.potter-search.com/`

6 Conclusions

In the present study, the cross-linguistic encoding of BAD and EVIL has been investigated for a world-wide sample of 30 languages. For the analysis, a parallel corpus, the Bible corpus, was used and probabilistic semantic maps were created using Multi-Dimensional scaling. The research questions were formulated as follows:

1. How are expressions for BAD and EVIL encoded in the languages of the world?
2. To which extent, and where, is morphological or syntactic negation present within this domain?

In order to discuss the cross-linguistic encoding of BAD and EVIL, terminology from philosophical literature about the concept of evil has been used (Calder, 2019). BROAD EVIL denotes a general bad state, as well as wrongful actions or character flaws, whereas NARROW EVIL is reserved for "only the most morally despicable sorts of actions, characters, events, etc." (Calder, 2019). The results showed that treating the domain as a scale ranging from BROAD to NARROW EVIL, is a more useful representation that treating them as discrete categories. Most languages, if they have several expressions within the domain, do not "split" this scale in the same place. Instead, the expressions either encode different sections of the scale, with one expression that is broader, and one that is narrower, or the same expression is used along the entire scale. These findings provide the answer to the first research question.

To answer the second research question about the presence of morphological and syntactic negation within the domain, each language particular expression has been annotated for whether any form of negation marking was present or not. The results showed that negation only occurs in the BROAD EVIL expressions, which can also be formulated as an implicational universal:

(17) The universal of negation marking in negative value expressions (repeated from 14):
If a language has negation marking in negative value expressions, negation only occurs in those with a BROAD EVIL meaning.

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Appendix A Sample languages and data sources

Table 8: Sample and data sources.

Macro area	Language	ISO-code	Genealogical affiliation	Sources
Eurasia	Finnish	fin	Uralic	Stora finsk-svenska ordboken (2021), Lingea Finnish-English dictionary (2021)
	Turkish	tur	Turkic	Cambridge English-Turkish dictionary (2021)
	Hindi	hin	Indo-European, Indo-Iranian, Indo-Aryan, Central	Snell and Weightman (2016); McGregor et al. (1993)
	French	fra	Indo-European, Italic, Romance	LEO.org English-French dictionary (2021)
	Maltese	mlt	Afro-Asiatic, Semitic, Arabic, North African	Dizzjunarju tal-Malti - Maltese Dictionary (2021)
	Hakka Chinese	hak	Sino-Tibetan, Sinitic	The English - Hakka Chinese dictionary (2021)
South America	Mapudungun	arn	Araucanian	Golluscio et al. (2009)
	Wapishana	wap	Arawakan	Melville et al. (2015)
	Hixkaryána	hix	Cariban	Derbyshire (1979)
	Huallaga Huánuco Quechua	qub	Quechuan	Weber (1989)
	Kotiria (Wananao)	gvc	Tucanoan, Eastern	Stenzel (2004, 2013)
	Tacana	tna	Pano-Tacanan	Guillaume (2021)
North America	Yaqui	yaq	Uto-Aztecan, Southern	Lindenfeld (1973)
	Hopi	hop	Uto-Aztecan, Northern	Jeanne (1978)
	Algonquin	alq	Algic	Valentine (2001) (closely related dialect)
	Huehuetla Tepehua	tee	Totonacan, Tepehua	Kung (2007)
	Cherokee	chr	Iroquoian	Holmes and Smith (1977)
	Navajo	nav	Athabaskan-Eyak-Tlingit, Apachean	Wall and Morgan (1958), The English - Navajo dictionary (2021)

Table 8 continued from previous page

Macro area	Language	ISO-code	Genealogical affiliation	Sources
Oceania	Maori	mri	Austronesian	Moorfield (2021)
	Warlpiri	wbp	Pama-Nyungan	Nash (1980), Swartz (2012)
	Yele	yle	Yele	Henderson et al. (1995)
	Nalca	nlc	Nuclear Trans New Guinea, Mek	Svärd (2013)
	Kamula	xla	Kamula-Elevala	Routamaa (1994)
	Kuot	kto	Kuot	Lindström (2002)
Africa	Mbuko	mqb	Afro-Asiatic, Chadic	Gravina et al. (2003)
	Mende (Sierra Leone)	men	Mande, Western	Aginsky (1935)
	Somali	som	Afro-Asiatic, Cushitic	English - Somali Dictionary (2021) Zorc and Osman (1993)
	Xhosa	xho	Atlantic-Congo, Bantu	Fischer (1985)
	Nigti	niy	Central Sudanic	Kutsch Lojenga (1994)
	Maasina Fulfulde	ffm	Atlantic-Congo, North Central Atlantic	Osborn et al. (1993)

Appendix B English sentences

Table 9: Sentences in Lexham English Bible

Nr.	Verse	Sentence in Lexham English Bible
1	40007017	In the same way, every good tree produces good fruit, but a [bad] tree produces bad fruit.
2	40007017	In the same way, every good tree produces good fruit, but a bad tree produces [bad] fruit.
3	40007018	A good tree is not able to produce [bad] fruit, nor a bad tree to produce good fruit.
4	40007018	A good tree is not able to produce bad fruit, nor a [bad] tree to produce good fruit.
5	40012033	“Either make the tree good and its fruit is good, or make the tree [bad] and its fruit is bad, for the tree is known by its fruit.
6	40012033	“Either make the tree good and its fruit is good, or make the tree bad and its fruit is [bad], for the tree is known by its fruit.
7	40013048	which when it was filled they pulled to shore and sat down and collected the good fish into containers, but the [bad] they threw out.
8	42006043	“For there is no good tree that produces [bad] fruit, nor on the other hand a bad tree that produces good fruit,
9	42006043	“For there is no good tree that produces bad fruit, nor on the other hand a [bad] tree that produces good fruit,
10	42016025	But Abraham said, ‘Child, remember that you received your good things during your life, and Lazarus likewise [bad] things. But now he is comforted here, but you are suffering pain.
11	45013003	For rulers are not a cause of terror for a good deed, but for [bad] conduct. So do you want not to be afraid of authority? Do what is good, and you will have praise from it,
12	45013004	for it is God’s servant to you for what is good. But if you do what is [bad], be afraid, because it does not bear the sword to no purpose. For it is God’s servant, the one who avenges for punishment on the one who does what is bad.
13	45013004	for it is God’s servant to you for what is good. But if you do what is bad, be afraid, because it does not bear the sword to no purpose. For it is God’s servant, the one who avenges for punishment on the one who does what is [bad].
14	47005010	For we must all appear before the judgment seat of Christ, in order that each one may receive back the things through the body according to what he has done, whether good or [bad].
15	56002008	a sound message beyond reproach, in order that ⸤ an opponent ⸣ may be put to shame, because he has nothing [bad] to say concerning us.
16	46015033	Do not be deceived! “[Bad] company corrupts good morals.”
17	40012045	Then it goes and brings along with itself seven other spirits more evil than itself, and they go in and live there. And the last state of that person becomes [worse] than the first. So it will be for this evil generation also!”

Table 9 continued from previous page

Nr.	Verse	Sentence in Lexham English Bible
18	42011026	Then it goes and brings along seven other spirits more evil than itself, and they go in and live there. And the last state of that person becomes [worse] than the first!"
19	41005026	And she had endured many things under many physicians, and had spent all that she had and had received no help at all, but instead became [worse].
20	61002020	For if, after they have escaped from the defilements of the world through the knowledge of our Lord and Savior Jesus Christ, and they are again entangled in these thingsand succumb to them, the last state has become [worse] for them than the first.
21	40027064	Therefore give orders that the tomb be made secure until the third day, lest his disciples come and steal him and tell the people, 'He has been raised from the dead,' and the last deception will be [worse] than the first."
22	43005014	After these things Jesus found him at the temple and said to him, "Look, you have become well! Sin no longer, lest something [worse] happen to you."
23	54005008	But if someone does not provide for his own relatives, and especially the members of his household, he has denied the faith and is [worse] than an unbeliever.
24	40005011	Blessed are youwhen they insult you and persecute you and say all kinds of [evil] things against you, lying on account of me.
25	40012035	The good person from his good treasury brings out good things, and the [evil] person from his evil treasury brings out evil things.
26	40012035	The good person from his good treasury brings out good things, and the evil person from his [evil] treasury brings out evil things.
27	40012035	The good person from his good treasury brings out good things, and the evil person from his evil treasury brings out [evil] things.
28	40012039	But he answered and said to them, "An [evil] and adulterous generation desires a sign, and no sign will be given to it except the sign of the prophet Jonah!
29	40012045	Then it goes and brings along with itself seven other spirits more [evil] than itself, and they go in and live there. And the last state of that person becomes worse than the first. So it will be for this evil generation also!"
30	40012045	Then it goes and brings along with itself seven other spirits more evil than itself, and they go in and live there. And the last state of that person becomes worse than the first. So it will be for this [evil] generation also!"
31	40016004	An [evil] and adulterous generation seeks for a sign, and a sign will not be given to it except the sign of Jonah!" And he left them and went away.
32	42006045	The good person out of the good treasury of his heart brings forth good, and the [evil] person out of his evil treasury brings forth evil. For out of the abundance of the heart his mouth speaks.
33	42006045	The good person out of the good treasury of his heart brings forth good, and the evil person out of his [evil] treasury brings forth evil. For out of the abundance of the heart his mouth speaks.
34	42007021	In that hour he healed many people of diseases and suffering and [evil] spirits, and he granted sight to many blind people.

Table 9 continued from previous page

Nr.	Verse	Sentence in Lexham English Bible
35	42008002	and some women who had been healed of [evil] spirits and diseases: Mary (who was called Magdalene), from whom seven demons had gone out,
36	42011029	And as the crowds were increasing, he began to say, "This generation is an [evil] generation! It demands a sign, and no sign will be given to it except the sign of Jonah!
37	43005029	and they will come out — those who have done good things to a resurrection of life, but those who have practiced [evil] things to a resurrection of judgment.
38	44019013	But some iterant Jewish exorcists also attempted to pronounce the name of the Lord Jesus over those who had [evil] spirits, saying, "I adjure you by Jesus whom Paul preaches!"
39	46010006	Now these things happened as examples for us, so that we should not be desirers of [evil] things, just as those also desired them,
40	51001021	And although you were formerly alienated and enemies in attitude, because of your [evil] deeds,
41	51003005	Therefore put to death what is earthly in you: sexual immorality, uncleanness, lustful passion, [evil] desire, and greediness, which is idolatry,
42	53003002	and that we may be delivered from [evil] and wicked people, for not all have the faith.
43	53003002	and that we may be delivered from evil and [wicked] people, for not all have the faith.
44	54006004	he is conceited, understanding nothing, but having a morbid interest concerning controversies and disputes about words, from which come envy, strife, slanders, [evil] suspicions,
45	55004018	The Lord will rescue me from every [evil] deed, and will save me for his heavenly kingdom, to whom be the glory forever and ever. Amen.
46	56001012	A certain one of them, one of their own prophets, has said, "Cretans are always liars, [evil] beasts, lazy gluttons."
47	58003012	Watch out, brothers, lest there be in some of you an [evil], unbelieving heart, with the result that you fall away from the living God.
48	58010022	let us approach with a true heart in the full assurance of faith, our hearts sprinkled clean from an [evil] conscience and our bodies washed with pure water.
49	59003016	For where there is jealousy and selfish ambition, there is disorder and every [evil] practice.
50	59004016	But now you boast in your arrogance. All such boasting is [evil].
51	61001004	through which things he has bestowed on us his precious and very great promises, so that through these you may become sharers of the divine nature after escaping from the corruption that is in the world because of [evil] desire,
52	63001011	because the one who speaks a greeting to him shares in his [evil] deeds.
53	66016002	And the first went and poured out his bowl on the earth, and there was an [evil] and painful sore on the people who had the mark of the beast and who worshiped his image.

Table 9 continued from previous page

Nr.	Verse	Sentence in Lexham English Bible
54	55003013	But [evil] people and imposters will progress to the worse, deceiving and being deceived.
55	59001021	Therefore, putting aside all moral uncleanness and [wicked] excess, welcome with humility the implanted message which is able to save your souls.
56	44018014	But when Paul was about to open his mouth, Gallio said to the Jews, "If it was some crime or [wicked] villainy, O Jews, I would have been justified in accepting your complaint.

Appendix C Probabilistic semantic maps

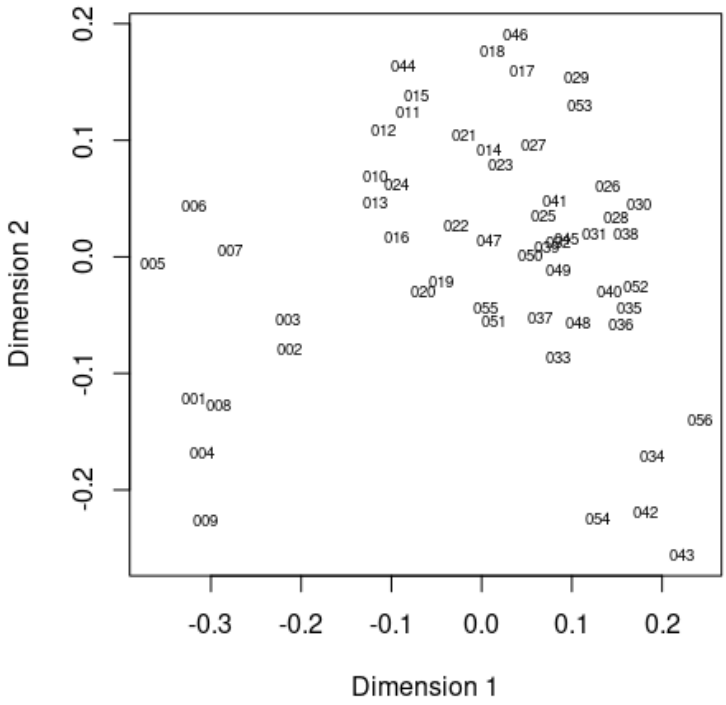

Figure 17: Underlying probabilistic semantic map.

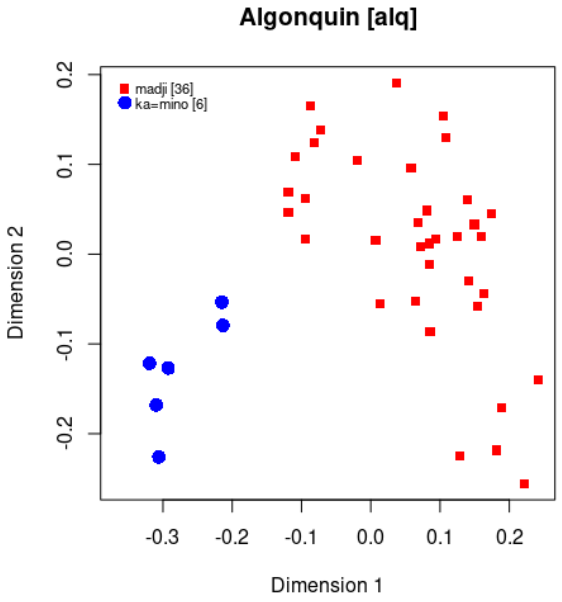

Figure 18: Probabilistic semantic map of Algonquin.

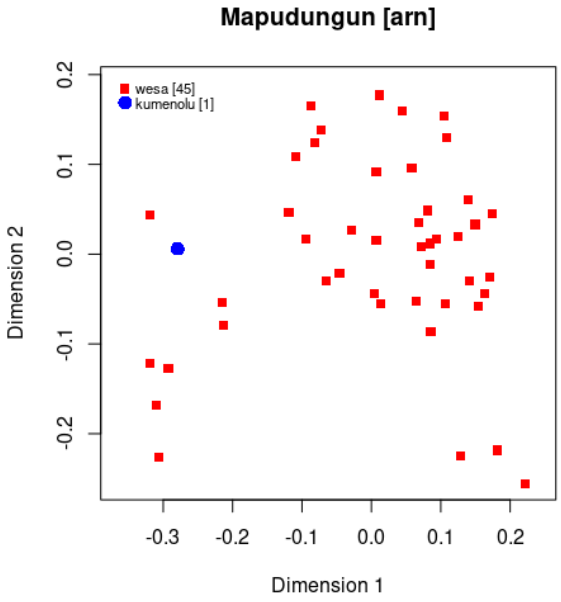

Figure 19: Probabilistic semantic map of Mapudungun.

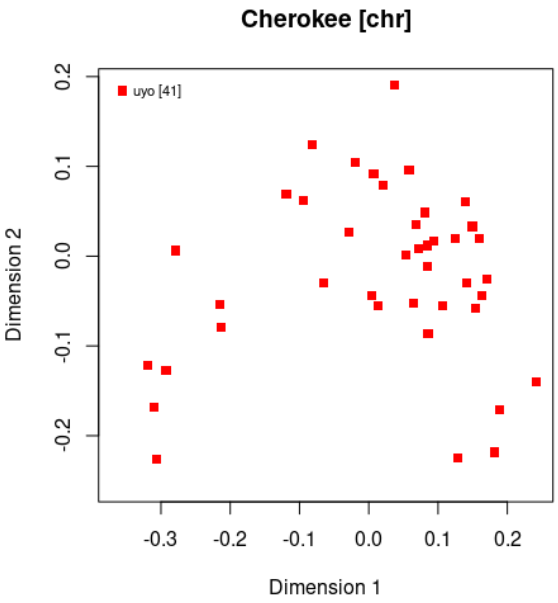

Figure 20: Probabilistic semantic map of Cherokee.

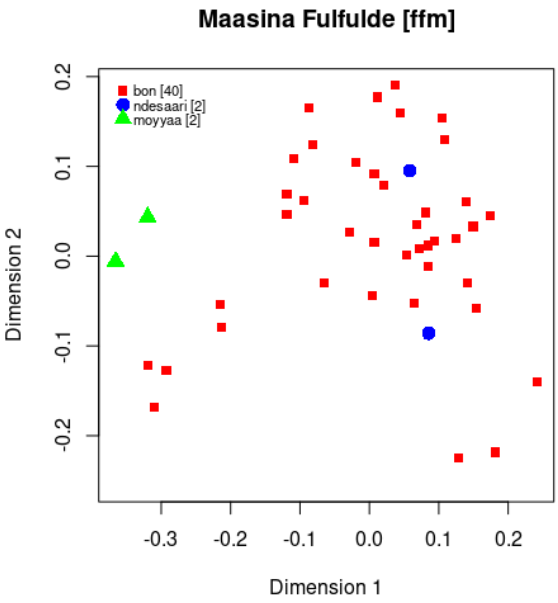

Figure 21: Probabilistic semantic map of Maasina Fulfulde.

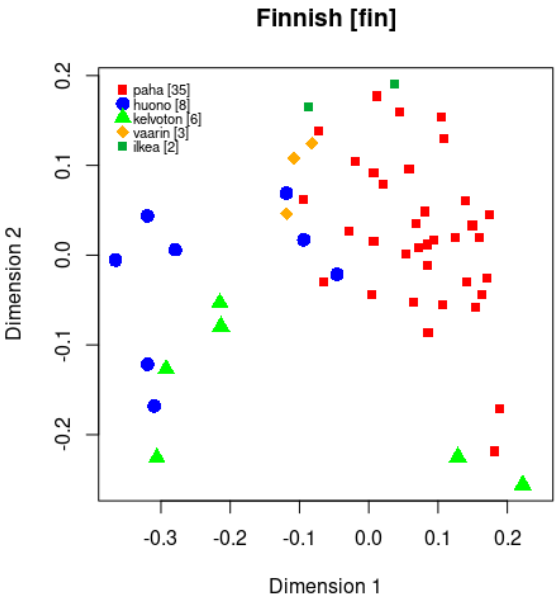

Figure 22: Probabilistic semantic map of Finnish.

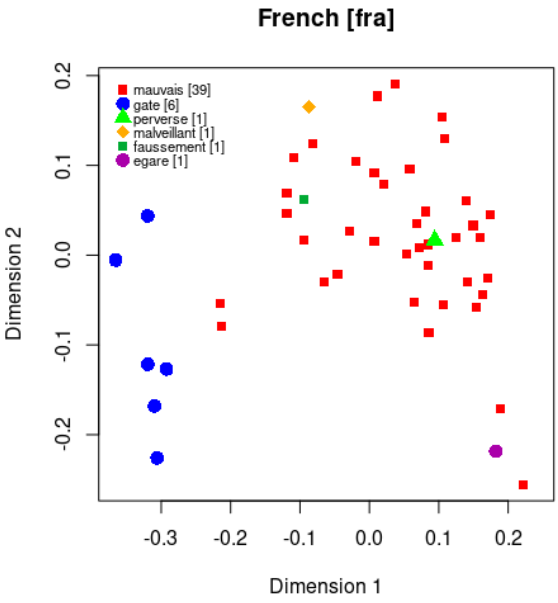

Figure 23: Probabilistic semantic map of French.

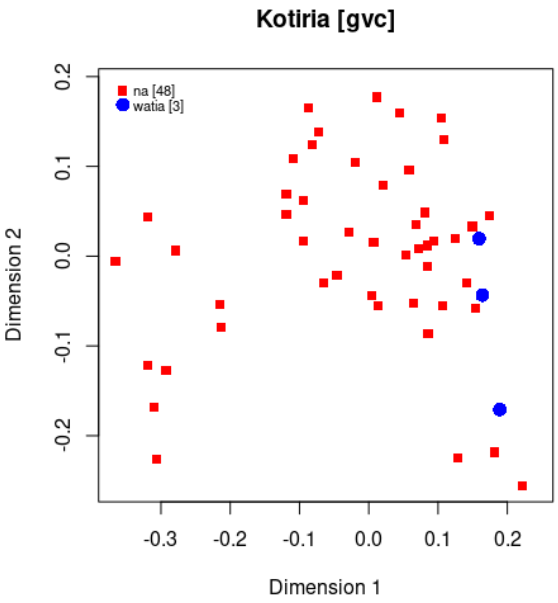

Figure 24: Probabilistic semantic map of Kotiria.

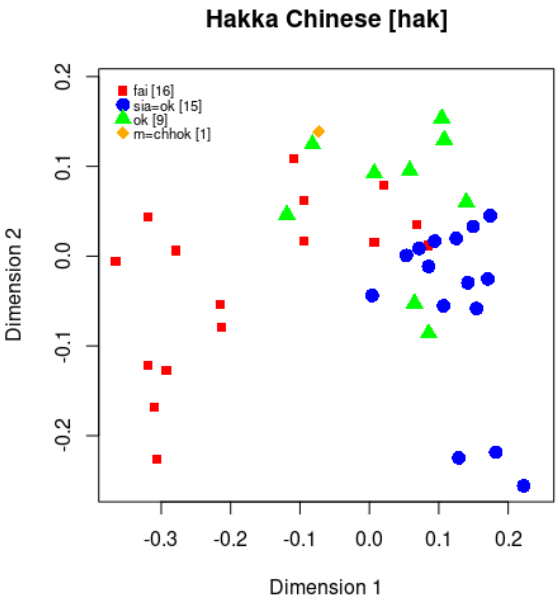

Figure 25: Probabilistic semantic map of Hakka Chinese.

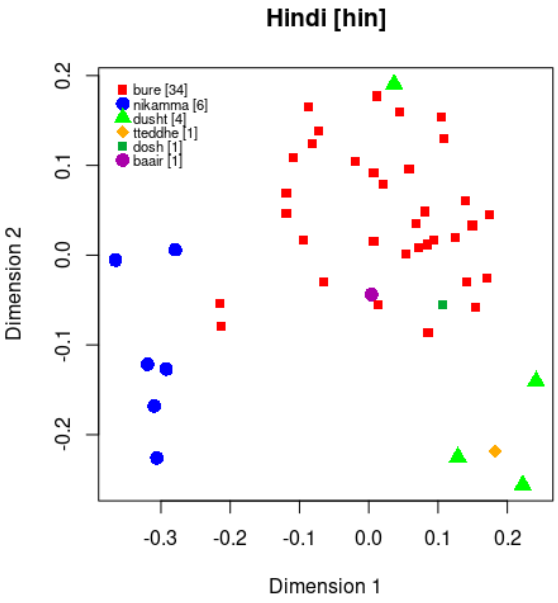

Figure 26: Probabilistic semantic map of Hindi.

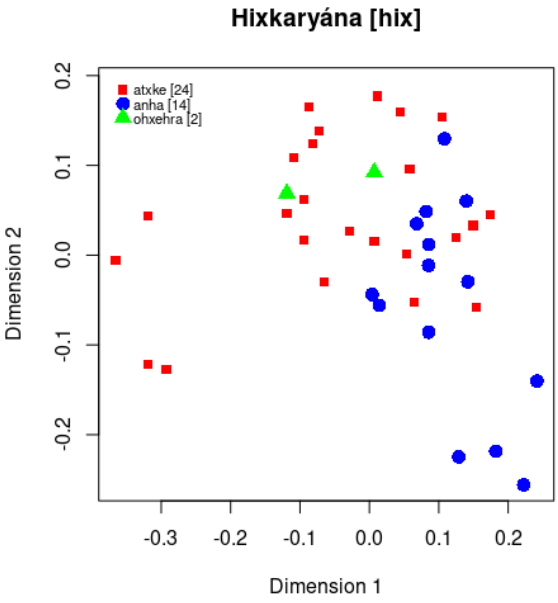

Figure 27: Probabilistic semantic map of Hixkaryána.

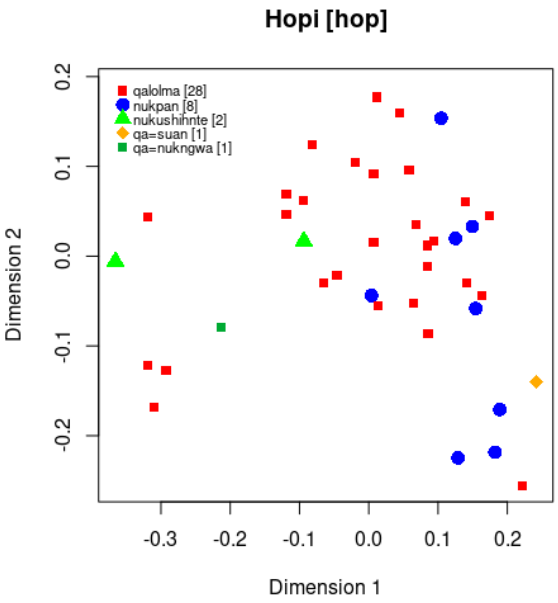

Figure 28: Probabilistic semantic map of Hopi.

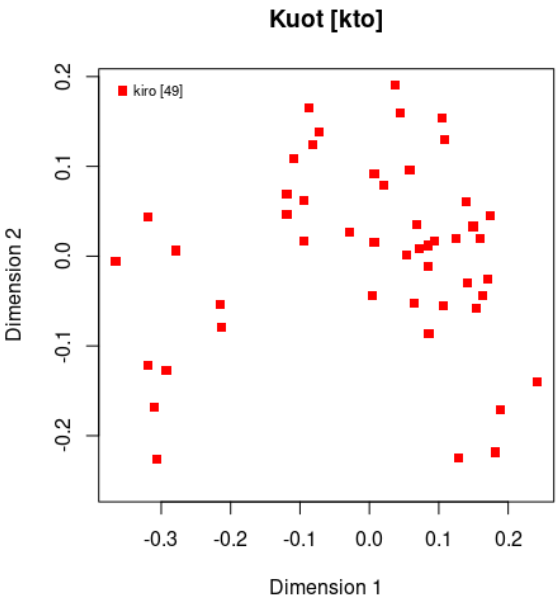

Figure 29: Probabilistic semantic map of Kuot.

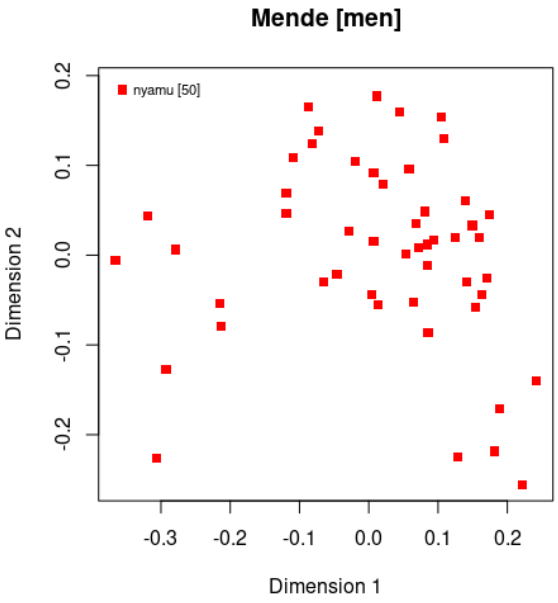

Figure 30: Probabilistic semantic map of Mende.

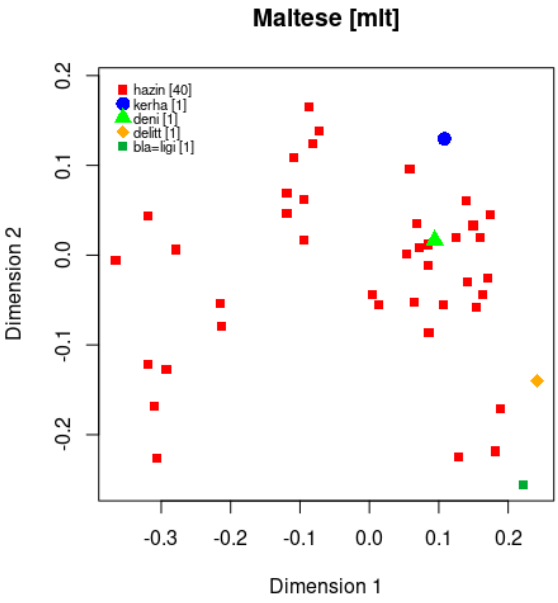

Figure 31: Probabilistic semantic map of Maltese.

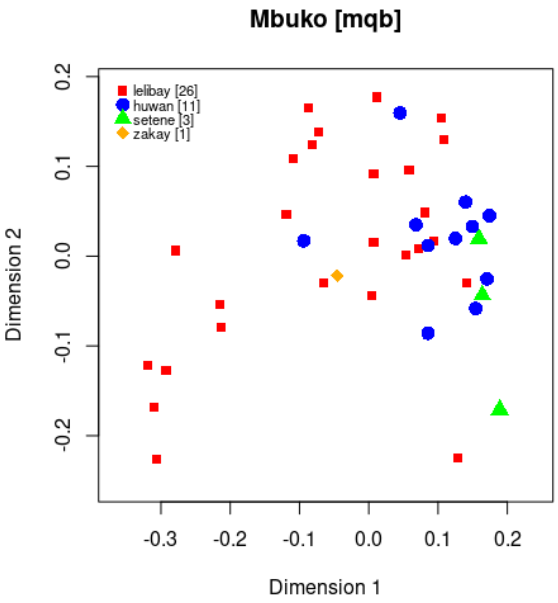

Figure 32: Probabilistic semantic map of Mbuko.

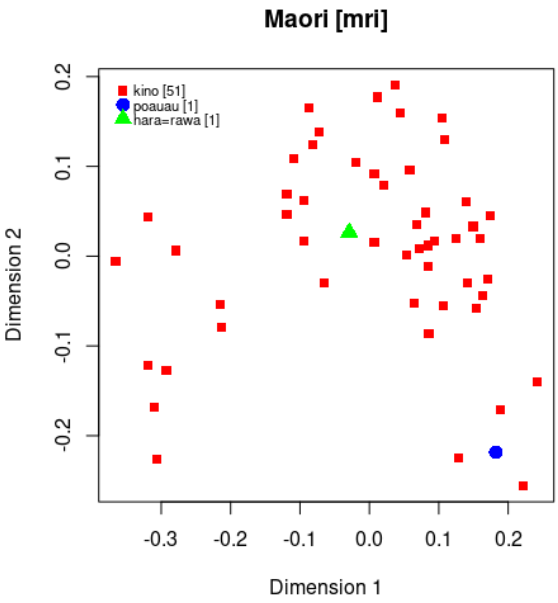

Figure 33: Probabilistic semantic map of Maori.

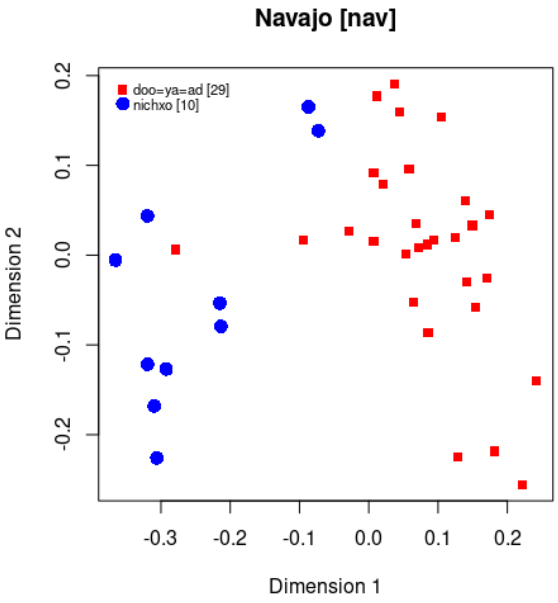

Figure 34: Probabilistic semantic map of Navajo.

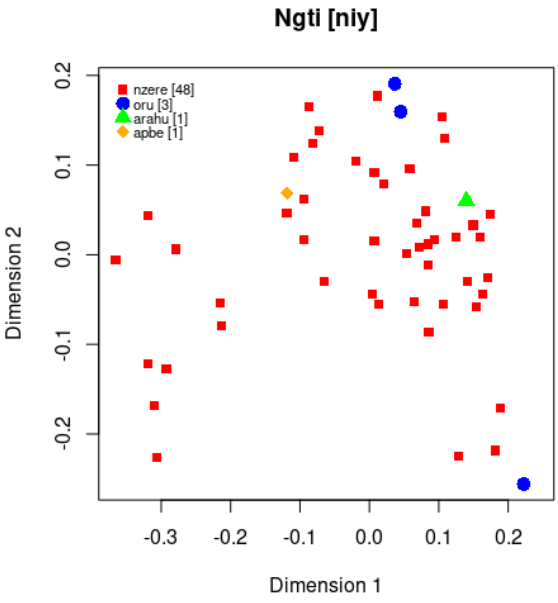

Figure 35: Probabilistic semantic map of Ngti.

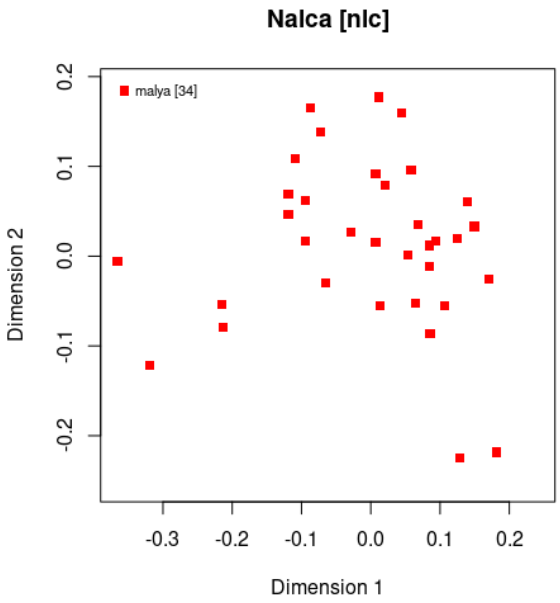

Figure 36: Probabilistic semantic map of Nalca.

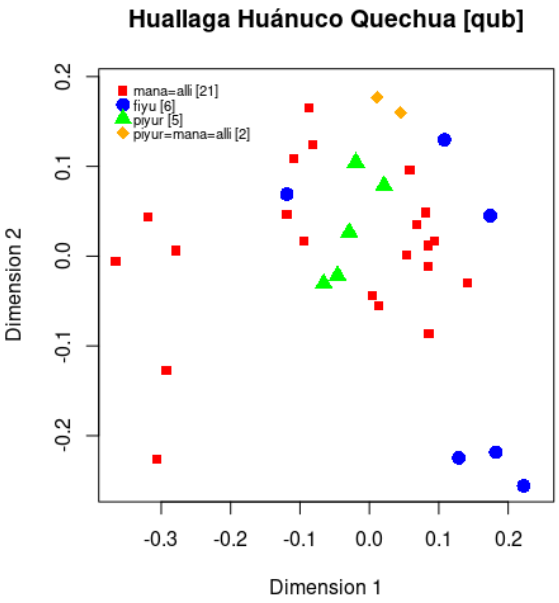

Figure 37: Probabilistic semantic map of Huallaga Huánuco Quechua.

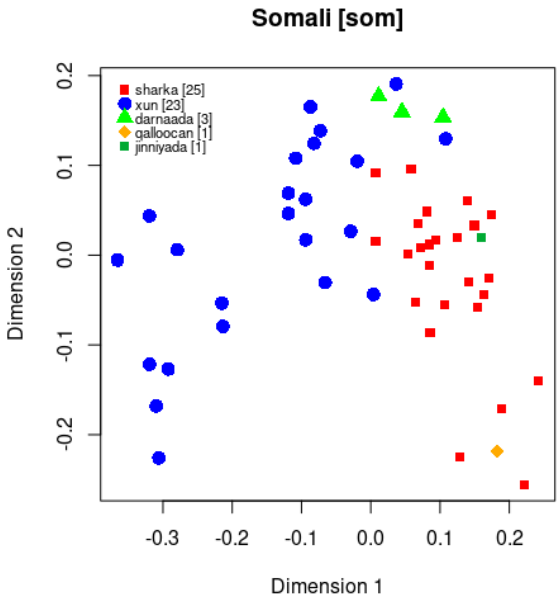

Figure 38: Probabilistic semantic map of Somali.

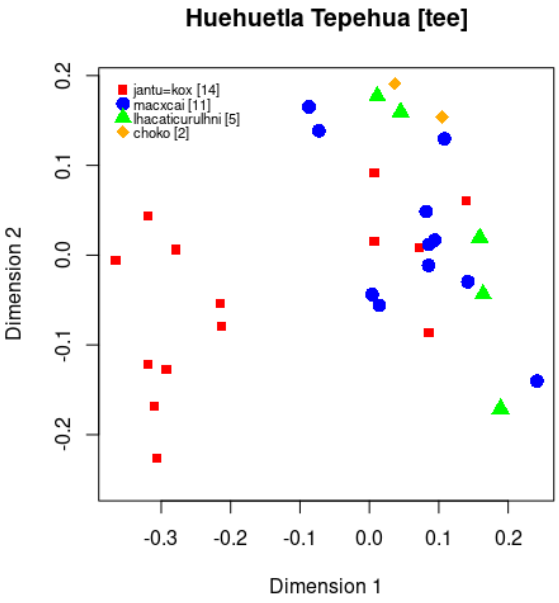

Figure 39: Probabilistic semantic map of Huehuetla Tepehua.

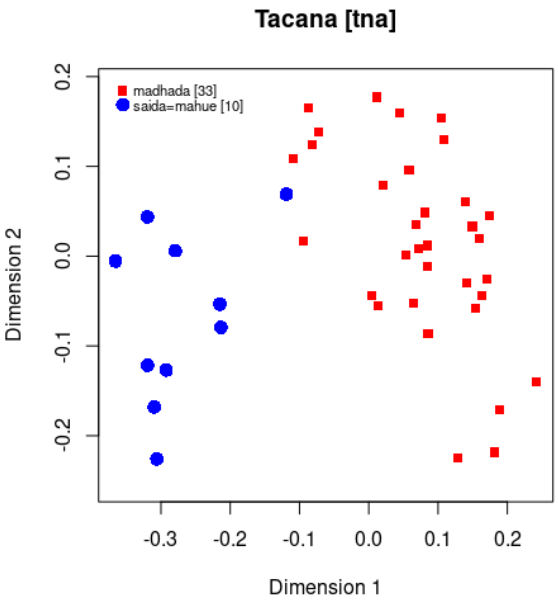

Figure 40: Probabilistic semantic map of Tacana.

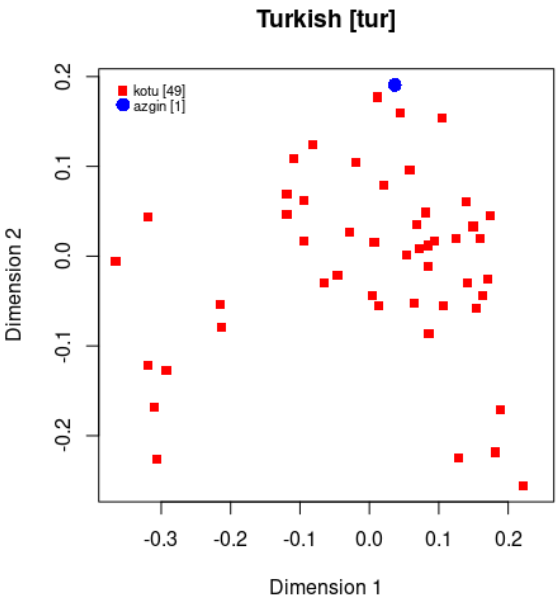

Figure 41: Probabilistic semantic map of Turkish.

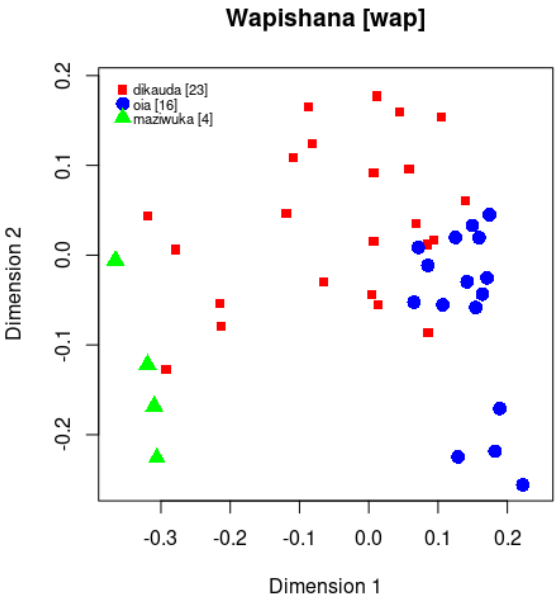

Figure 42: Probabilistic semantic map of Wapishana.

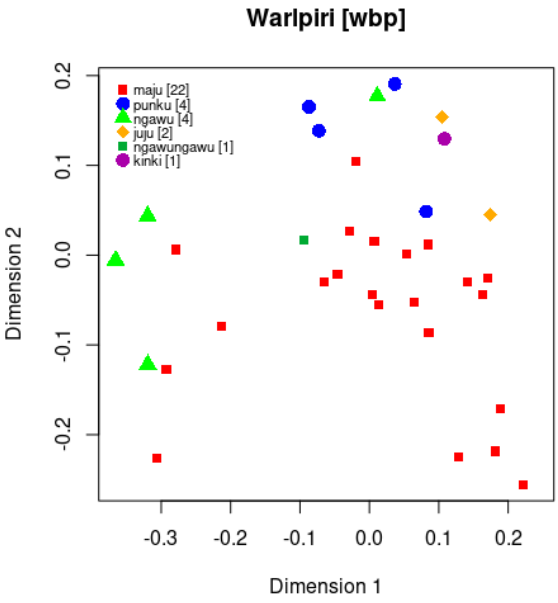

Figure 43: Probabilistic semantic map of Warlpiri.

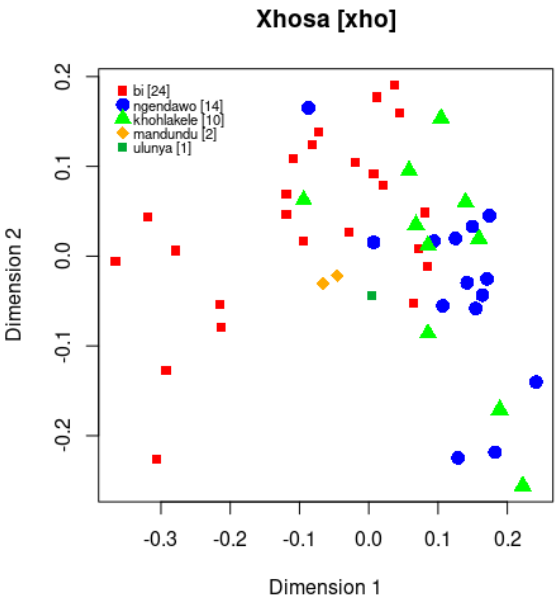

Figure 44: Probabilistic semantic map of Xhosa.

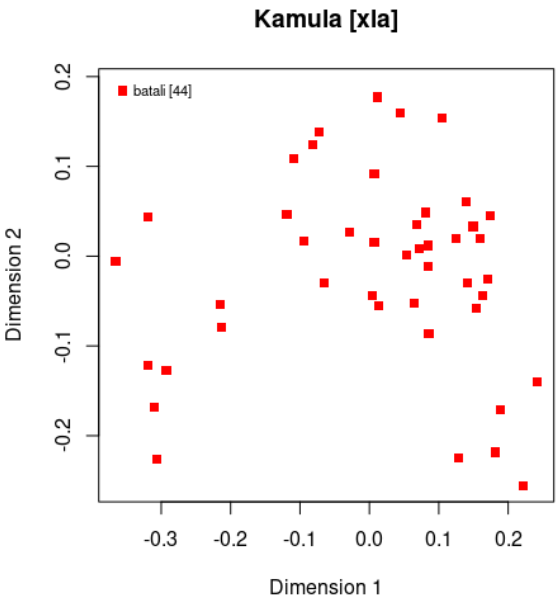

Figure 45: Probabilistic semantic map of Kamula.

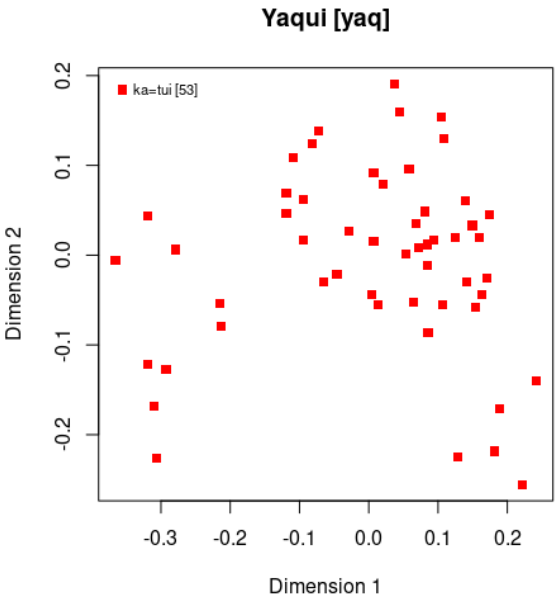

Figure 46: Probabilistic semantic map of Yaqui.

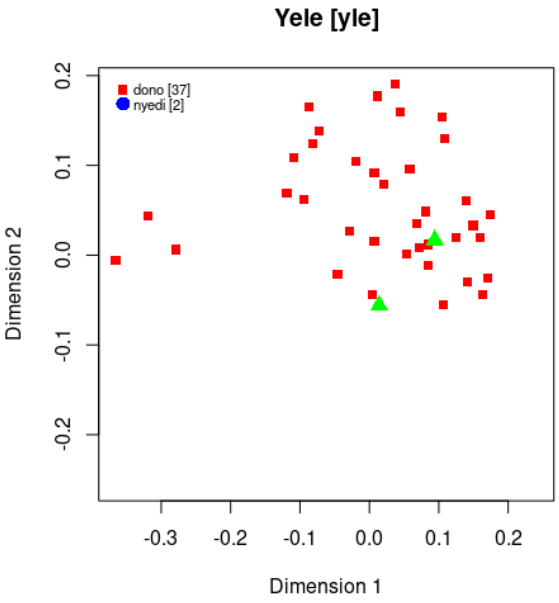

Figure 47: Probabilistic semantic map of Yele.

Appendix D Encoding of BAD and EVIL in the sample

Table 10: Results of clustering with `pam()`.

Macro area	Language	Cluster 1 (broader evil)	Cluster 2 (narrower evil)
Eurasia	Finnish [fin]	huono [6], kelvoton [4], ilkeä [2]	paha [35], väärin [3], kelvoton [2], huono [2]
	Turkish [tur]	kötü [9]	kötü [40]
	Hindi [hin]	nikamma [6], bure [4]	bure [30], dusht [3]
	French [fra]	gaté [6], mauvais [4]	mauvais [35]
	Maltese [mlt]	ħażin [11]	ħażin [29]
	Hakka Chinese [hak]	fái [9]	sià-ok [15], ok [9], fái [7]
South America	Mapudungun [arn]	wesa [8]	wesa [37]
	Wapishana [wap]	dikauda [6], maziwuka [4]	dikauda [17], oia [16]
	Hixkaryána [hix]	atxke [5]	atxke [19], anha [14]
	Huallaga Huánuco Quechua [qub]	mana alli [6]	mana alli [15], piyur [5], fiyu [5], piyur mana alli [2]
	Kotiria [gvc]	ña [11]	ña [37], watia [3]
	Tacana [tna]	saida mahue [10]	madhada [32]
North America	Yaqui [yaq]	ka tu'i [11]	ka tu'i [42]
	Hopi [hop]	qalomá [5]	qalomá [23], nukpan [8]
	Algonquin [alq]	ka mino [6], madji [3]	madji [33]
	Huehuetla Tepehua [tee]	jantu k'ox [9]	macxcai [10], lhacaticurulhni [5], jantu k'ox [5]
	Cherokee [chr]	uyo [9]	uyo [32]
	Navajo [nav]	nichxǫ́ [9], doo yá'át [2]	doo yá'át [27]
Oceania	Maori [mri]	kino [12]	kino [39]
	Warlpiri [wbp]	maju [4], ngawu [3], punku [2]	maju [18], punku [2], juju [2]
	Yele [yle]	dono [6]	dono [31], nyedi [2]
	Nalca [nlc]	malya [6]	malya [28]
	Kamula [xla]	batali [8]	batali [36]
	Kuot [kto]	kiro [12]	kiro [37]
Africa	Mbuko [mqb]	lelibay [8]	lelibay [18], huwan [11], setene [3]
	Mende (Sierra Leone) [men]	nyamu [9]	nyamu [41]
	Somali [som]	xun [12]	sharka [25], xun [11], darnaada [3]
	Xhosa [xho]	bi [9]	bi [15], ngendawo [13], khohlakele [10], mandundu [2]
	Ngti [niy]	nzέrɛ [10]	nzέrɛ [38], ɔrɔ̌rʉ̀ [2]
	Maasina Fulfulde [ffm]	bon [8], moy̆y̆aa [2]	bon [32], ndesaari [2]

Table 11: Encoding of negative adjectives in the sample.

Macro area	Language	Type	Lemma (BROAD → NARROW)
Eurasia	Finnish [fin]	2	huono, paha
	Turkish [tur]	1	kötü
	Hindi [hin]	2	bure, dusht
	French [fra]	1	mauvais
	Maltese [mlt]	1	ħażin
	Hakka Chinese [hak]	1	fái, ok, sià-ok
South America	Mapudungun [arn]	1	wesa, kümenolu
	Wapishana [wap]	2	maziwuka, dikauda, oia
	Hixkaryána [hix]	2	atxke, anha
	Huallaga Huánuco Quechua [qub]	2	mana alli, piyur, fiyu
	Kotiria [gvc]	1	ña
	Tacana [tna]	2	saida mahue, madhada
North America	Yaqui [yaq]	1	ka tu'i
	Hopi [hop]	2	qalomá, nukpan
	Algonquin [alq]	2	ka mino, madji
	Huehuetla Tepehua [tee]	2	jantu k'ox, macxcai, lhacaticurulhni
	Cherokee [chr]	1	uyo
	Navajo [nav]	2	nichxǫ́, doo yá'át
Oceania	Maori [mri]	1	kino
	Warlpiri [wbp]	2	ngawu, maju, punku
	Yele [yle]	1	dono
	Nalca [nlc]	1	malya
	Kamula [xla]	1	batali
	Kuot [kto]	1	kiro
Africa	Mbuko [mqb]	2	lelibay, huwan
	Mende (Sierra Leone) [men]	1	nyamu
	Somali [som]	2	xun, sharka
	Xhosa [xho]	2	-bi, ngendawo/kholakalele
	Ngti [niy]	1	nzɛ́rɛ
	Maasina Fulfulde [ffm]	1	bon

Table 12: Presence of negation in negative adjectives in the sample.
(++ = dominant, + = marginal, - = not present)

Macro area	Language	Negation present (number of contexts)
Eurasia	Finnish [fin]	+ (6)
	Turkish [tur]	-
	Hindi [hin]	+ (6)
	French [fra]	-
	Maltese [mlt]	+ (1)
	Hakka Chinese [hak]	-
South America	Mapudungun [arn]	+ (1)
	Wapishana [wap]	-
	Hixkaryána [hix]	+ (1)
	Huallaga Huánuco Quechua [qub]	++ (24)
	Kotiria [gvc]	-
	Tacana [tna]	++ (10)
North America	Yaqui [yaq]	++ (55)
	Hopi [hop]	++ (30)
	Algonquin [alq]	++ (6)
	Huehuetla Tepehua [tee]	++ (13)
	Cherokee [chr]	-
	Navajo [nav]	++ (40)
Oceania	Maori [mri]	-
	Warlpiri [wbp]	-
	Yele [yle]	-
	Nalca [nlc]	-
	Kamula [xla]	-
	Kuot [kto]	-
Africa	Mbuko [mqb]	++ (27)
	Mende (Sierra Leone) [men]	-
	Somali [som]	-
	Xhosa [xho]	-
	Ngti [niy]	-
	Maasina Fulfulde [ffm]	-

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