The Semantics of Numeral Classifiers in the Pacific Northwest Languages of North America

An areal-typological study

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Abstract

This study investigates and compares the semantics of numeral classifiers in 17 languages in the North American Pacific Northwest linguistic area. Numeral classifiers are considered a central linguistic trait of the area but they have received little attention in areal-typological research so far. The purpose is to investigate and compare the numeral classification systems in terms of their semantics, with the aim of discovering the semantic parameters involved in these systems and if they reveal any areal patterns. The study uses a typologically oriented cross-linguistic comparison with reference grammars and dictionaries as data sources with special reference to semantic analysis. The results show that animacy and dimensionality are the primary and most basic semantic parameters. The prevalence and primacy of classifiers for III-dimensional objects are especially characteristic of the area and so are specific classifiers for canoes and a restricted applicability of classifiers, with classifiers not being used for certain types of referents. The results reveal areal patterns both in the area as a whole and in individual languages concerning for instance dimensionality distinctions, animate classifiers and numeral classification systems acquired as a result of contact.

Keywords

Numeral classifiers, Classifier semantics, North American Pacific Northwest, Areal typology

Sammanfattning

Den här studien undersöker och jämför semantiken hos numeriska klassifikatorer i 17 språk på den nordamerikanska nordvästkusten. Numeriska klassifikatorer anses vara ett centralt språkdrag hos språken i området men de har tidigare inte uppmärksammats särskilt mycket i arealtypologisk forskning. Studiens syfte är att undersöka och jämföra de numeriska klassifikatoriska systemen vad gäller deras semantik med avsikt att ta reda på vilka semantiska parametrar som kännetecknar dessa system och se om de synliggör areala mönster. Studien använder en typologiskt fotad jämförelse med grammatikor och ordböcker som datakällor, med särskild uppmärksamhet på semantisk analys. Resultaten visar att animacitet och dimensionalitet är de primära och mest grundläggande semantiska parametrarna. Den utbredda förekomsten av och den primära statusen hos klassifikatorer för III-dimensionella objekt är särskilt kännetecknande för området liksom särskilda klassifikatorer för kanoter och begränsad användning av klassifikatorer då klassifikatorer inte används för vissa typer av referenter. Resultaten synliggör areala mönster för området i största allmänhet och för enskilda språk vad gäller bland annat dimensionalitetsdistinktioner, animata klassifikatorer och numeriska klassifikatoriska system som utvecklats till följd av kontakt.

Nyckelord

Numeriska klassifikatorer, Klassifikatorsemantik, Nordamerikanska nordvästkusten, Arealtypologi

Contents

Abbreviations

1	first person
2	second person
3	third person
I	one
II	two
III	three
AET	Athabaskan-Eyak-Tlingit
ANIM	animate
AUX	auxiliary
CL	classifier (sortal)
DEM	demonstrative
DIM	diminutive
DT	determiner
LCTR	limited control transitive verb
MENS	mensural (classifier)
NC	non-determinate connective
OBL	oblique
PA	past tense suffix
PAS	passive voice
PL	plural
PNW	The North American Pacific Northwest
POSS	possessive
REL	relative
REM	remote
SG	singular
SUB	subject

1 Introduction

The North American Pacific Northwest is one of the clearest and most well-established examples of a linguistic area in the world. Stretching along the coast from the Gulf of Alaska down to the Oregon-California border, the area exhibits a high level of genealogical diversity and many shared phonological, morphological, and syntactic traits. There has been a long tradition of studying these traits from an areal-typological perspective. Numeral classifiers are considered one of the central linguistic traits characterizing the area, but they have been given little attention in areal-typological research so far. Thus, a comparative study with an areal-typological orientation is still in demand. The purpose of this thesis is to investigate and compare the numeral classification systems in the languages of the North American Pacific Northwest in terms of their semantics, with the aim of discovering the semantic parameters characterizing these systems and the areal patterns they might reveal.

2 Background

2.1 Areal typology

In contact situations, two or more languages may gradually become more similar as a result of diffusion of linguistic features from one language to another. When several diffused linguistic features cluster in languages spoken in a contiguous geographic region, it might give rise to a 'linguistic area' (Koptjevskaja-Tamm, 2010, p. 6). Identifying such linguistic areas is one of the main foci of areal linguistics, which is also concerned with investigating the spread of linguistic features through contact and similarities between languages spoken in geographically contiguous areas (Koptjevskaja-Tamm, 2010, p. 6; Hickey, 2017, pp. 22-23). Large-scale typological research has shown the role that areality plays in the uneven distribution of linguistic patterns among the languages of the world, calling attention to the importance of areal research for linguistic typology (Dryer, 1989; Nichols 1992). In a similar vein, typology can inform research on linguistic areas and areal phenomena. Typology and areal linguistics come together in the discipline of 'areal typology'.

The main concern of areal typology is "the study of patterns in the areal distribution of typologically relevant features of languages" (Dahl, 2001, p. 1956). Of particular importance for this study is how an areal-typological approach can be applied to research on areal phenomena and linguistic areas. Koptjevskaja-Tamm (2010, p. 10) outlines the following strategy for research on linguistic areas with an areal-typological approach:

i) a systematic and detailed description of certain linguistic features in as many languages in the area as possible, capturing the similarities and differences in regard to these features among the languages studied as well as the geographical distribution of patterns and types across the area,

ii) an evaluation of the typological characteristics of the area against a broader typological background through comparison with the languages of the world and

iii) an explanation for the observed similarities among the languages in the area under consideration, taking into consideration the linguistic, cultural, historical, socio-political, anthropological and geographic context.

With inspiration from this approach as applied to an investigation of the semantics of the areal feature of 'numeral classifiers' (see 2.2) in the Pacific Northwest linguistic area of North America (see 2.3), this study aims to characterize the semantics of the numeral classification systems in the area in terms of patterns and their areal distribution.

2.2 Numeral classifiers

In section 2.2.1 the definition and some relevant properties of numeral classifiers are provided. Section 2.2.2 describes the semantics of numeral classifiers. Lastly, section 2.2.3 addresses numeral classifiers from an areal and from a typological perspective.

2.2.1 Definition of numeral classifiers and some relevant properties

Numeral classifiers are one of several semantically based noun classification systems, wherein nouns are classified and assigned to semantically defined classes based on saliently perceived properties of the referent (Adams & Conklin, 1973, p. 1; Allan, 1977, p. 285). Different noun classification systems such as numeral classifiers, gender, verbal classifiers and noun classifiers differ in their morphosyntactic properties and in the set of semantic parameters they employ in the classification of nouns (Adams & Conklin, 1973, p. 1; Aikhenvald, 2000, p. 1). Numeral classifiers are morphemes that are contiguous to numerals and quantifiers in numeral noun phrases, forming syntactic units that

cannot be interrupted by the classified noun (Aikhenvald, 2000, p. 98; Allan, 1977, p. 288). Numeral classifiers vary in the degree in which they are morphologically bound or morphologically free elements. Most often they occur as free morphemes, but they can also appear as affixes on numerals and quantifying expressions or be fused with the numerals or quantifiers themselves (Aikhenvald, 2000, pp. 98-99, 108). Example (1) shows a numeral classifier construction in Minangkabau (Austronesian), where the numeral classifier *inkue* classifies the noun *anjiang* 'dog' based on the animacy of the referent:

(1) Minangkabau (Austronesian)

duo *inkue* *anjiang*

two CL dog

'two dogs' (Gil, 2013)

A language may have more than one type of numeral classifier that might differ in their formal, semantic and functional properties (Aikhenvald, 2000, pp. 184-185). The classifier types may stand in complementary distribution depending on the numeral they occur with or the semantics of the classifier (Aikhenvald, 2000, p. 112). In many languages there are different forms for human or animate classifiers depending on the numeral they occur with (Aikhenvald, 2000, p. 112). An example of this is shown in the following examples from Nias (Austronesian), where human classifiers occur as suffixes with the numeral 'one' (2) but as prefixes for higher numerals (3):

(2) Nias (Austronesian)

sa-mösa *niha*

one-CL:HUMAN person

'one person' (Aikhenvald, 2000, p. 112)

(3) Nias (Austronesian)

da-rua *niha*

CL:HUMAN-two person

'two people' (Aikhenvald, 2000, p. 112)

It is also possible for different types of numeral classifiers to co-occur in the same environment, classifying the same referent in terms of different semantic properties, where one type refers to the animacy of the referent while the other refers to the referent's physical properties (Aikhenvald, 2000, pp. 113-114).

2.2.2 The semantics of numeral classifiers

The choice of a numeral classifier is predominantly based on the salient semantic properties of the noun it refers to. This section describes the various semantic properties of nouns that are relevant for numeral classification systems, beginning with a discussion of sortal and mensural classifiers in 2.2.2.1, followed by a discussion of semantic parameters and the semantic organization of numeral classifier systems in 2.2.2.2.

2.2.2.1 Sortal and mensural classifiers

There are two basic kinds of numeral classifiers: sortal and mensural. These kinds differ in the semantic properties they use as a basis of classification. Sortal classifiers classify nouns based on the inherent and permanent semantic properties of the referent such as animacy and physical property (Aikhenvald, 2000, p. 115), and thus the noun itself provides the natural unit by which its referent is counted. This can be illustrated with the example below from Mandarin (Sino-Tibetan), where the sortal classifier *zhī* refers to the inherent physical property of elongated shape of *bǐ* 'pen':

(4) Mandarin (Sino-Tibetan)

liǎng zhī bǐ

two CL pen

'two pens' (Doetjes, 2017)

Mensural classifiers will not be considered for this study, but they deserve to be mentioned. In contrast to sortal classifiers, mensural classifiers are used to measure units based on temporary properties and states, which means that the measured unit is not inherent to the classified referent (Aikhenvald, 2000, p. 115). Instead, it is the mensural classifier that provides the unit to be counted and therefore determines the unit of measure. Below is an example of the mensural classifier *jì* in Mandarin (Sino-Tibetan), which provides a unit to measure rice:

(5) Mandarin (Sino-Tibetan)

liǎng jì mǐ

two MENS.CL rice

'two pounds of rice' (Doetjes, 2017)

Sortal classifiers can be considered the most prototypical kind of classifier. The type of measure words and quantifying expressions that are expressed by mensural classifiers exist in all languages, but sortal classifiers only occur in numeral classifier languages and define these languages in contrast to languages without classifiers (Croft, 1994). Mensural classifiers are therefore excluded from the definition of 'classifier' by many authors (Allan, 1977; Croft, 1994; Greenberg, 1977; Adams, 1989) even if sortal and mensural classifiers tend to be formally very similar in numeral classifier languages (Aikhenvald, 2000, p. 116). Another kind of classifier present in most languages are counting words that classify groups, parts, kinds and arrangements. According to Croft (1994) these should not be considered classifiers proper as they provide the unit to be counted rather than refer to inherent, natural properties of a referent. These counting words are closely related to classifiers and are usually included in classifier inventories for many languages.

This thesis will exclusively deal with sortal classifiers that classify referents based on inherent, permanent properties. The term 'classifier' as used in this thesis therefore excludes mensural classifiers and counting words.

2.2.2.2 Semantic parameters of numeral classifiers and the classification of referents

Nouns are classified based on the perceived properties of their referents. Every numeral classification system uses a set of semantic parameters that encode these properties, providing a basis of classification and sorting the referents of nouns into classes. Each class may have prototypical members that reflect the perceived properties that are extrapolated as the most salient and important ones for that class, but the class membership may be extended to referents that do not reflect the semantic properties used as a basis for that class, but are associated with some of its prototypical members: like 'banana', which might be assigned to the class that uses III-dimensionality as its semantic basis simply because other fruits like apples and oranges are prototypical members of that class (Adams & Conklin, 1973, p. 2). In addition, some nouns may occur with several different classifiers depending on which property of the referent of the noun is in focus (Aikhenvald, 2000, p. 98). The classification can also be subject to culture-specific criteria, reflecting the importance of certain objects or animals among speakers of a particular language (Allan, 1977, p. 290). There can also be gaps in the classification system where some referents are not assigned a class and therefore do not take classifiers (Aikhenvald, 2000, p. 98). This may be due to the productivity of the classification system or the nature or perceived saliency of the semantic properties of the referent (Aikhenvald, 2000, pp. 334-335). Due to this heterogeneity, the semantic organization of numeral classification systems and the class assignment of certain nouns can be highly opaque.

What follows is a presentation of the most commonly used semantic parameters in numeral classification systems. The three most basic categories of semantic parameters are animacy, physical

property and function (Adams and Conklin, 1973; Aikhenvald, 2000). These categories and their various parameters will be presented below.

Animacy is the primary semantic parameter in noun classification systems (Adams and Conklin, 1973, p. 3). It refers to the sentience of a referent but what counts as sentient might differ from language to language. Animacy might divide referents into classes based on distinctions between 'human' and 'non-human', having a human class separate from animals and inanimate objects, or alternatively make a distinction between 'animate' and 'inanimate', placing humans and animals in one class separate from inanimate objects. Some languages make a three-way distinction between 'human', 'non-human animate' and 'inanimate', having a human class, an animal class and an inanimate class (Aikhenvald, 2000, p. 286). Aikhenvald (2000, p. 287) mentions three exceptions to the presence of these animacy-based classes in numeral classifier systems:

> "i) Languages with two sets of numeral classifiers may have animacy distinctions in one, but not in the other. […] ii) Animacy-based oppositions may be absent from numeral classifier systems if they are found elsewhere in the language. […] iii) Some recently developed systems of numeral classifiers do not have any special classifiers for animates, or humans."
>
> (Aikhenvald, 2000, p. 287)

Many languages have more than one classifier for humans. In these cases, human referents are placed in sub-classes based on status, social function, kinship, age or sex (Aikhenvald, 2000, p. 288). For classifiers that are used exclusively for animals, there might be several different sub-classes that classify animals based on status, habitat, size and function (Adams & Conklin, 1973, p. 4). There might be differences in treatment between different animals based on their perceived animacy (Allan, 1977, p. 299), as some animals such as dogs and horses tend to be considered more animate and is thus placed in an animate or non-human animate class in contrast to less animate animals such as insects and fish, that may be treated as inanimates. Animals are often classified based on physical property if they are grouped together with inanimates. In these cases, the physical properties of the animal override the notion of animacy (Adams & Conklin, 1973, p. 4).

For inanimates or non-humans, physical property is usually the most relevant basis of classification. 'Physical property' is a collective term for various parameters of which dimensionality and shape are most widely used. Nouns can be classified according to the dimensionality values 'I-dimensional', 'II-dimensional' and 'III-dimensional'. In literature, these values are usually referred to by the shape values 'long', 'flat' and 'round', but the most essential and salient feature of these classes are their relative extension in one, two or three dimensions rather than their shape (Friedrich, 1970, Denny, 1979). There is evidence from several languages that dimensionality and shape are separate concepts that may be combined, creating combinations like 'flat I-dimensional' and 'long II-dimensional' (Denny, 1979). Besides the basic shapes 'long', 'flat' and 'round', there are various other shape values that denote objects as 'curved', 'thin', 'thick', pointed', 'concave' etc. that may combine with dimensionality or occur on their own (Aikhenvald, 2000, pp. 272-273, 288). Besides dimensionality and shape, there are several other semantic parameters that may combine with these. The most common of these parameters, together with their definitions and values are presented in table 1 below. The information mainly comes from Aikhenvald (2000).

Table 1: The secondary semantic parameters

Parameters	**Definition**	**Values**
Size	Refers to the relative size of an entity	1) 'big' 2) 'small'
Consistency	Refers to the plasticity of an entity	1) 'rigid' 2) 'flexible'
Interioricity	Refers to the distinction between hollow entities with a focus on an exterior outline, like rings and those without, like holes	1) 'hollow with exterior outline' 2) 'hollow without exterior outline'
Constitution	Refers to the physical state of an entity	1) 'liquid' 2) 'mucky'

		3) ‘solid’ 4) ‘granular’ etc.
Material	Refers to the material an entity is made of	1) ‘wooden’ 2) ‘metallic’ etc.
Orientation	Refers to the spatial orientation of an extended entity	1) ‘vertically extended’ 2) ‘horizontally extended’
Boundedness	Refers to the limitation of an entity	1) ‘bounded’ 2) ‘unbounded’

Function is another common semantic parameter. It classifies objects based on their use or types of actions performed on them (Aikhenvald, 2000, p. 273). Function may occur on its own or combine with other parameters (Adams & Conklin, 1973, p. 7). It is usually used as a basis of classification in classes for vehicles or tools (Adams & Conklin, 1973, p. 8). It is also very common to have ‘specific classifiers’ that refer to the inherent nature of a referent. These classifiers can be highly specific, referring only to one type of referent. They might base the classification on the function or value of an item, sometimes making it difficult to distinguish between function-based and inherent nature-based classifiers. Classifiers based on function and inherent nature are usually culture-specific, reflecting the importance of a certain object or animal in the culture (Aikhenvald, 2000, p. 273). Some languages also have a so-called ‘generic’ or ‘default’ classifier that is used for referents that fall outside the domains covered by other classifiers (Aikhenvald, 2000, p. 335).

2.2.3 Numeral classifiers from an areal and typological perspective

The occurrence of numeral classification systems is strongly areal in distribution (Nichols, 1992, pp. 132-133). They are concentrated in East and Southeast Asia, in smaller pockets in West Asia and along the west coast of the Americas but are overall rare in other parts of the world, including Europe, Africa and Australia (Aikhenvald, 2000, pp. 121-124; Gil, 2013).

In contact situations, it is usually not the classifier morphemes themselves that are borrowed, but rather the patterns of classification (Sinnemäki, 2019, p. 161). Languages may adopt the “idea” of using classifiers in numeral constructions from other languages, but employ native morphemes for this purpose (Seifart, 2010, p. 730).

The languages of the world demonstrate a striking similarity in the semantic patterns found in their numeral classification systems. Classifiers reflect human perception, and since human perception is largely the same, entities tend to be classified along similar lines (Allan, 1977, pp. 307-309). There can be cross-linguistic variations and culture-specific constraints regarding the semantic patterns of numeral classification systems, but overall, a common set of values relating to animacy and dimensionality are found in most inventories.

2.3 The languages of the North American Pacific Northwest

Section 2.3.1 will present the languages and genealogical groupings that are present in the North American Pacific Northwest. Section 2.3.2 will discuss what characterizes the Pacific Northwest as a linguistic area. In section 2.3.3 earlier studies on the numeral classifiers in the area will be presented, and the distribution of numeral classifiers will be described.

2.3.1 Languages and genealogical groupings

The North American Pacific Northwest (henceforth PNW) exhibits the greatest linguistic diversity in North America. More than 40 languages from 12 distinct language families were once spoken here (Stephenson & Acheson, 2003, p. 891). The PNW linguistic area stretches from the Copper River

delta in the Gulf of Alaska in the north down to Winchuk River near the border between Oregon and California in the south and is flanked by the Pacific Ocean to the west and the Cascade Mountains, the Coast Mountains and the Chugash Mountains to the east (Cable, 2008, p. 2). From north to south the following languages and genealogical groupings are included in the area: Eyak, Tlingit, Haida, Tsimshianic languages, Wakashan languages, Coast Salishan languages, Chimakuan languages, Lower Chinook, Alsea, Siuslaw, Takelma, Central Kalapuya, Coos and a few Pacific Coast Athabaskan languages (Mithun, 1999, p. 314).

Table 14 in appendix A lists all the languages in the PNW with ISO codes and alternative names arranged by family and genus. The genetic groupings primarily follow the information found in Mithun (1999) and Glottolog 4.5 (Eberhard et al., 2022). ISO codes and alternative names are taken from Ethnologue (Hammarström et al., 2022).

2.3.2 The Pacific Northwest as a linguistic area

The PNW is a strong and well-established contact area, both in linguistic and in cultural terms (Mithun, 2017, p. 883). It has the greatest linguistic diversity of any linguistic area in North America, with languages from twelve distinct language families (Campbell, 1997, p. 332).

Contact between speakers of different languages in the area is ancient, intensive and enduring (Mithun, 2017, p. 883). Individuals and groups were in intimate contact with speakers of other languages through trade and intermarriage, as well as shared festivities (Sherzer, 1976, p. 142). There are also many cultural traits in terms of art, social organization and folktales that are shared by many of the groups in the area (Boas, 1897; Stephenson & Acheson, 2003). This kind of intense contact presupposes bi- and multilingualism, and as a result, the languages of the area have converged, giving rise to striking grammatical similarities (Sherzer, 1976, p. 142).

The languages of the PNW are characterized by elaborate consonant inventories, alienable/inalienable opposition in nouns, pronominal and nominal plural, verbal reduplication signaling distributives and iteratives, evidential markers, locative-directional markers in the verb and suffixation of tense-aspect markers (Sherzer, 1976, p. 139). Numeral classifiers are also considered a central linguistic trait characterizing the area, being present in most of the languages (Sherzer, 1976).

Many of these traits are also shared with the nearby Plateau, itself considered a linguistic and cultural area located immediately to the east of the PNW (Sherzer, 1976, p. 147; Campbell, 1997, p. 333). The PNW to a lesser extent also shares some traits with Northern California and the Subarctic (Sherzer, 1976, p. 147). There has been extensive trade between the PNW and the Plateau, allowing the spread of linguistic traits (Driver & Massey, 1957). The similarities of the areas have led some researchers to propose the Pacific Northwest-Plateau as a single linguistic area. According to Kinkade et al. (1998) “there is no outstanding set of language traits that sets off the Plateau as a major linguistic diffusion area distinct from other regions; rather it is part of a larger area that includes the Northwest Coast culture area" (in Campbell, 1997, p. 334). Nonetheless, the Plateau is often excluded from the definition of the PNW proper (Mithun, 1999, p. 315; Thompson & Kinkade, 1990; Campbell, 1997, p. 332; Cable, 2008) and will not be considered for the sample for this study.

The reconstruction of language contact in the PNW is somewhat impeded by the lack of written historical records for the languages. The inability to establish and trace ancient contact and change with the help of historical records means that other approaches must be taken. Evidence of contact can be deduced from borrowings in vocabulary, phonological matter and grammatical structures and can be gleaned from features shared with neighboring languages but not with linguistic relatives (Mithun, 2010, pp. 674-675).

The PNW has several identifiable sub-areas. One of these is the Northern sub-area, which includes Eyak and Tlingit (Athabaskan-Eyak-Tlingit), Haida (Isolate), and to a marginal extent the Tsimshianic and Northern Wakashan languages (Sherzer, 1976, p. 140). Further south we have the Central PNW, which constitutes the core of the PNW linguistic area. The Central PNW includes languages from the Salishan, Wakashan and Chimakuan families as well as Lower Chinook (Sherzer, 1976, p. 141). There is relatively little lexical borrowing, but the languages share a large number of grammatical traits

(Sherzer, 1976, p. 141). Based on typological similarities between the Salishan, Wakashan and Chimakuan languages some researchers like Swadesh (1953a, 1953b, 1953c) have argued that these languages belong to a common genetic stock referred to as "Mosan". Later typological research on other languages shows that the type of features shared by the languages in the Central PNW may be borrowed (Heath, 1978; Thomason & Kaufman, 1988; Nichols, 1992; Aikhenvald, 1996). Thomason & Kaufman (1988, p. 95) states that the structural patterns of the Central PNW are characteristic of what Nichols (1992) refers to as a linguistic "residual zone". The proposed Mosan grouping finds little support today (Jacobsen, 1979a, 1979b; Thompson, 1979), but it serves to illustrate what intensive contact can lead to in terms of linguistic convergence.

The Central PNW itself has sub-areas. The southern part of the Central PNW includes Twana and Lushootseed (Salishan), Ditidaht and Makah (Wakashan) as well as Quileute (Chimakuan) (Mithun, 1999, p. 316). In the northern part of Central PNW the Salishan outlier Bella Coola exhibits great grammatical similarity to its Northern Wakashan neighbors (Beck, 2000, p. 168).

There is also a Southern PNW sub-area with links to the languages of California (Sherzer, 1976, p. 142)

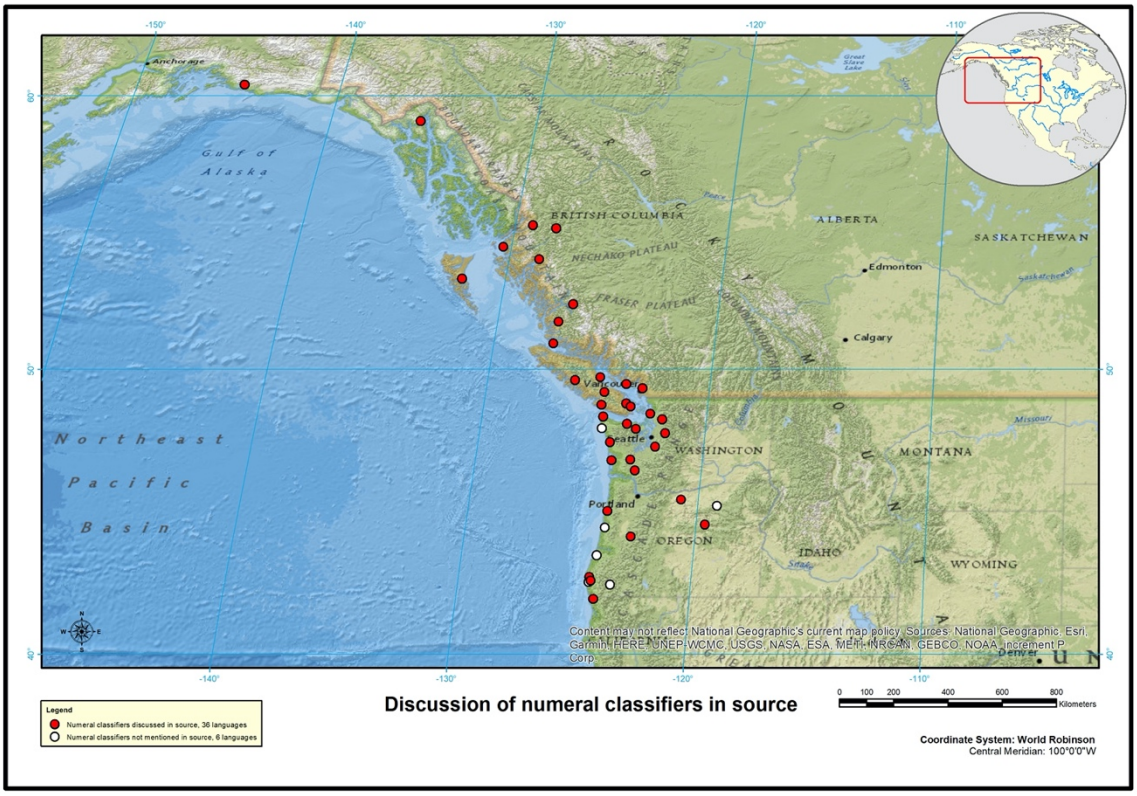
The convergence of grammatical features in the PNW is typical of linguistic areas that Nichols (1992) refers to as "residual zones": large areas characterized by ongoing accumulation of genetically and structurally diverse languages over a long period of time. These zones tend to develop rather homogeneous typological profiles despite large genealogical and structural diversity, as easily diffused traits spread from language to language within the area (Nichols, 1992, p. 250). Numeral classifiers are one such trait which is found in most languages in all parts of the PNW linguistic area.

2.3.3 Numeral classifiers in the languages of the Pacific Northwest

In 2.3.3.1 the distribution of numeral classifiers in the PNW is presented and in 2.3.3.2 earlier research on the subject is discussed.

2.3.3.1 Distribution of numeral classifiers

Numeral classifiers are one of the central linguistic traits characterizing the PNW and are found in most languages of the area (Sherzer, 1976, pp. 139, 144). Coastal western America, like East and Southeast Asia and the western Pacific, is considered a hotbed for numeral classifiers (Nichols, 1992, pp. 132-133). The languages of the area that have numeral classifiers are: Salishan languages, Wakashan languages, Tsimshianic languages, Haida, Eyak, Kalapuya (Beck, 2000, p. 159) and Tlingit (Gil, 2013). In some cases, it is unclear if a language has numeral classifiers. According to Thompson and Kinkade (1990) Alsea has numeral classifiers, but others do not list Alsea as possessing this trait (Beck, 2000). Judging by the information presented in Boas (1892, p. 40) the Chimakuan language Chimakum has numeral classifiers, but its relative Quileute does not (Nichols, 1992, p. 299). Aikhenvald (2000, p. 121) states that the inventories of numeral classifiers in North American languages tend to be small and that the semantics of the systems are based on dimensionality and animacy. Numeral classifiers are also present in several languages in neighboring and overlapping areas, such as the Plateau and the northwesternmost part of California as well as in many neighboring Athabaskan languages (Aikhenvald, 2000, pp. 121-123). Map 1 shows the distribution of languages for which numeral classifiers are discussed in the sources.



Map 1: The distribution of languages with numeral classifiers in the PNW. Colors indicate: numeral classifiers discussed in source (red) and numeral classifiers not discussed in source (white)

2.3.3.2 Earlier research on numeral classifiers in the Pacific Northwest

Most grammatical descriptions of the languages of the PNW deal with noun categorization systems. These descriptions are often brief, usually only including a listing of classifiers, examples of associated nouns, a few glossed examples and sometimes a few comments on use and function. There are a few good descriptions of classifiers in specific languages: Hori (2001), Enrico (1981) and Enrico (1987) deal with classifiers in Haida, Berman (1990) describes numeral classifiers in Kwak'wala and Yiu & Stonham (2002) in Nuu-chah-nulth. Gerdts & Hinkson (2004) and Gerdts et al. (2012) describe the numeral classification system in Halkomelem. Gerdts & Hinkson (2004) includes a discussion about the numeral classifiers in Salishan languages but notes that "There is a paucity of published data on classifiers and their uses in the modern Salish languages. Many grammars or dictionaries include a list of lexical suffixes with some indication as to which ones are used with numerals. Usually, a brief discussion ensues concerning the semantics of classifiers, with comments about prototypical nouns that they classify, but very few examples are given." (p. 27). The paper concludes with a short discussion on numeral classifiers as an areal feature, noting the similarities between the numeral classification systems of Salishan languages and those of the Wakashan family. Both families use a subset of lexical suffixes as numeral classifiers, and the semantics of these classifiers denote humans and canoes as well as dimensionality-based entities (Gerdts & Hinkson, 2004, p. 34). In conclusion, the work on classifier systems in the PNW has mostly focused on specific languages so far and there is a lack of a more comprehensive comparative study of numeral classifiers in the languages of the PNW.

2.4 Purpose and research questions

The purpose of this study is to investigate and compare the semantics of numeral classification systems in the languages of the North American Pacific Northwest with the aim of discovering what characterizes the languages of the area in terms of the semantic parameters involved in these systems and the areal patterns they might reveal. The research questions pursued in this thesis are as follows:

1. What characterizes the numeral classification systems in the languages of the North American Pacific Northwest in terms of semantic parameters and the way they are used in the classification of referents?
2. Do the semantic patterns of the numeral classification systems reveal any areal patterns that are enlightening in regard to diffusion and contact between languages in the area?

3 Method and data

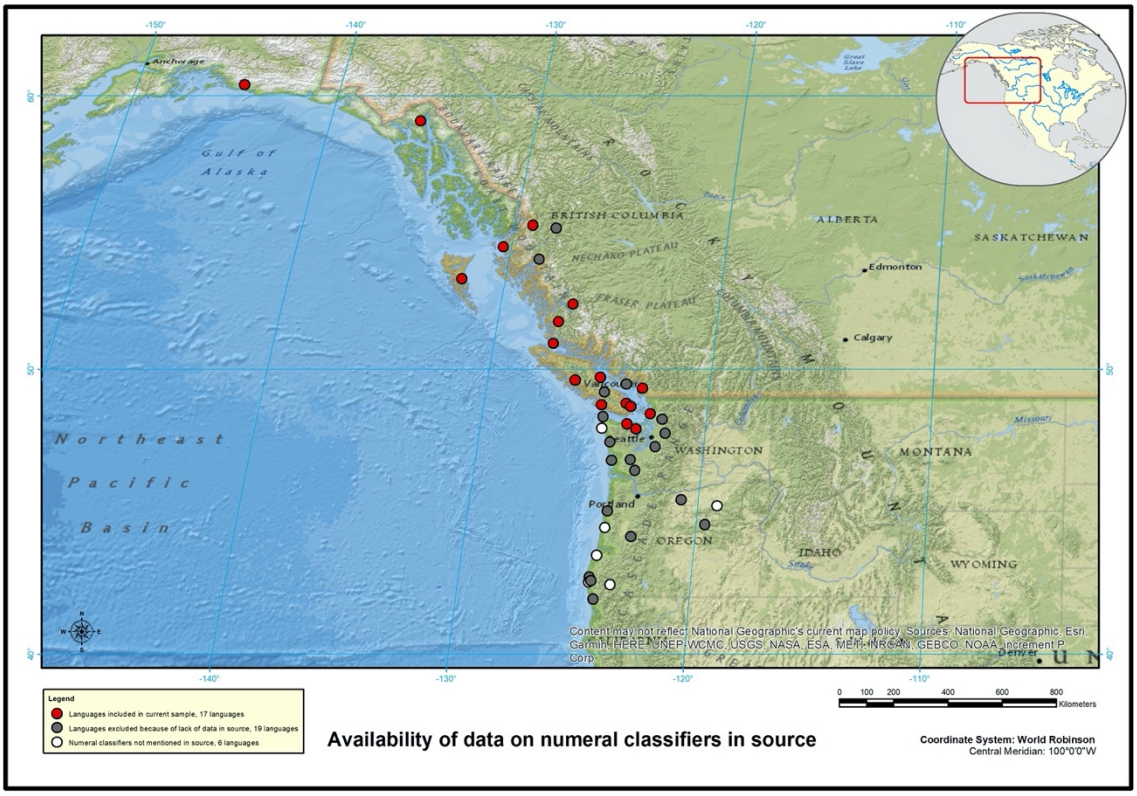
3.1 Data

The sampling is geographically delimited to the PNW as traditionally defined (Thompson & Kinkade, 1990; Mithun, 1999), which means that languages of the neighboring and overlapping areas of the Plateau, northern California and the Subarctic are excluded from the sample. The study uses a feature-oriented sample where only the languages with numeral classifiers are considered: Eyak, Tlingit, Haida, the Wakashan languages, the Tsimshianic languages, the Coast Salishan languages, the Pacific Coast Athabaskan languages, Kalapuya and Chimakum. The sample is further restricted due to paucity or lack of data for certain languages. For example, data for the languages in the more southern parts of PNW is insufficient, which means that the Pacific Coast Athabaskan languages, the Tsamosan languages of the Salishan family and Kalapuya must be excluded. This causes the sample to be geographically restricted to the languages of the central and northern parts of the PNW.

The sample consists of the 17 languages listed in table 2 together with family, genus, ISO code and sources. The genealogical classification in terms of family and genera is based on the information in Mithun (1999). Map 2 shows all languages in the area, with the languages included in the sample shown in red and the languages excluded shown in blue.

Table 2: The language sample. The dash '–' indicates that the language itself is the closest to the family node

Family	**Genus**	**Language**	**ISO**	**Source**
Isolate	–	Haida	[hai]	Levine 1977, Enrico 1987, Enrico 2003, Enrico 2005, Hori 2001
Athabaskan-Eyak-Tlingit	Athabaskan-Eyak	Eyak	[eya]	Krauss 1968, Krauss 2009, Krauss 2011, Krauss 2012
Athabaskan-Eyak-Tlingit	–	Tlingit	[tli]	Naish 1979, Edwards 2009, Passer 2016, Twitchell 2017, Mills 1973
Tsimshianic	Nass-Gitxsan	Nisga'a	[ncg]	Tarpent 1987
Tsimshianic	Tsimshian	Coast Tsimshian	[tsi]	Boas 1911, Carroll Flaherty 1979
Wakashan	Northern	Kwak'wala	[kwk]	Berman 1990
Wakashan	Northern	Heiltsuk	[hei]	Boas 1890, Rath 1981
Wakashan	Southern	Nuu-chah-nulth	[nuk]	Swadesh 1938, Yiu & Stonham 2002, Stonham 1998
Wakashan	Southern	Ditidaht	[dtd]	Thomas & Hess 1981, Hess 1990
Salishan	–	Nuxalk	[blc]	Nater 1984, Saunders & Davis 1975
Salishan	Central Salish	Halkomelem	[hur]	Gerdts & Hinkson 2004, Gerdts et al. 2012, Shaw et al. 2002
Salishan	Central Salish	Squamish	[squ]	Kuipers 1967
Salishan	Central Salish	Comox	[coo]	Sapir 1915, Harris 1977
Salishan	Central Salish	Lushootseed	[lut]	Bates et al. 1994, Beck 2020
Salishan	Straits Salish	Klallam	[clm]	Montler 2015
Salishan	Straits Salish	Northern Straits Salish	[str]	Hill-Tout 1906, Montler 1986, Raffo 1972
Chimakuan	–	Chimakum	[xch]	Boas 1892



Map 2: The languages of the PNW. Colors indicate: sample languages (red), languages excluded because of lack of data (grey), languages excluded because they lack the feature (white).

There are a few things to note about the sample language regarding dialects. Firstly, Haida consists of two rather different dialects that are sometimes considered separate languages. In this study they are treated as one language, but glossed examples will be provided with information about which dialect is represented if the dialects differ in the example presented. Secondly, Northern Straits Salish consists of several mutually intelligible dialects, even though they are usually referred to as separate languages. The dialects represented in the data are the Songish and Saanich dialects.

The sources mainly consist of reference grammars and pedagogical grammars, dictionaries and linguistic papers, all listed in table 2 above. The sources vary considerably in how detailed the descriptions of numeral classifiers are, ranging from elaborate (e.g Gerdts & Hinkson, 2004; Yiu & Stonham, 2002; Berman, 1990) to brief (e.g Montler, 2015; Harris, 1977; Boas, 1892), with most descriptions falling somewhere in between. The problems and limitations of the sources are discussed in section 3.3.

3.2 Procedure

The method of this study is inspired by the areal-typological approach to research on areal phenomena outlined in 2.1, with special attention paid to the 'areal' component: i) a description of the linguistic feature under consideration, capturing the similarities and differences among the languages as well as the distribution of patterns across the area, ii) evaluation through comparison with languages in other parts of the world and iii) an explanation for the similarities between the languages in the area. The following steps were involved in the procedure:

The first step was to create an overview of the numeral classifier system for each sample language. To do this, I searched for information on numeral classifiers in the sources listed in table 2 and summarized in files what was found. Later, I returned to all sample languages for a more in-depth

reading of the grammars to understand how numeral classifiers fit in with their language systems as wholes.

The information on numeral classifiers was not always clear, not least because of the terminology used in some sources. Especially in older sources, the term “numeral classifier” is not used. Instead, many sources explain the meaning and function of the morphemes in a roundabout way, like e.g “The Tsimshian dialects use various sets of numerals for various classes of objects” (Boas, 1911, p. 396). Numeral classifiers are referred to by many different terms such as “class-marks”, “qualifiers” (Krauss, 2009), “numerate suffixes” (Swadesh, 1938), “classifying suffixes” (Boas et al., 1947), “shape classifiers” (Berman, 1990). Because of this multiplicity of terms, it was necessary to refer to a definition of numeral classifiers to identify them. Hereby, Aikhenvald’s (2000, p. 98) definition of numeral classifiers as morphemes that appear contiguous to numerals and quantifiers in numeral noun phrases was used for identifying numeral classifiers. All mensural classifiers denoting concepts like ‘year’, ‘day’, ‘fathom’, ‘ten’ as well as counting words denoting groups, kinds and non-inherent arrangements were excluded (see 2.2.2.1).

The second step was to analyze the semantics of the numeral classification systems. To do this, the method described in Adams & Conklin (1973, p. 2) was used:

1. identify the semantic parameters used in the numeral classification system.
2. examine the nouns that belong to each semantically defined class to determine which semantic properties are considered the most salient and central to each class and investigate the relationship between the members of each class in terms of prototypical members and possible semantic extensions.

In the case that no examples of nouns were given, the gloss for the classifier provided by the source was used to determine the semantics. In many cases I have interpreted the semantics of a classifier differently than the source. For example, many sources refer to basic values like ‘long’, ‘flat’ and ‘round’, but as stated in 2.2.2.2, better and more fitting labels for these are ‘I-dimensional’, II-dimensional’ and ‘III-dimensional’, respectively. To facilitate the analysis, the data was considered in relation to the semantic parameters described in section 2.2.2.2. This provided a way to standardize the glosses provided in the sources, as a classifier based on the same parameter may be described in different ways in different sources e.g a classifier referring to I-dimensional objects may be glossed as ‘long’ in one source and ‘stick-like’ in another.

The third step was to compare the semantics of the numeral classifier systems to identify similarities, differences and patterns. The comparison was concerned with the use of semantic parameters such as animacy, physical property, various physical property-based parameters, function and inherent nature as a basis of classification, and how the sample languages combine and organize these in order to create classes in their numeral classification systems. In order to characterize the numeral classification systems of the PNW and explain their similarities, they were considered against the backdrop of a wider typological background, taking into consideration what is cross-linguistically common and uncommon in order to shine light on the patterns that the languages of the PNW share with other numeral classifier languages and what is especially characteristic of the numeral classification systems in the area.

Finally, the analyzed and compared data was used to determine whether the semantic patterns of classification reveal any possible areal patterns within the area.

3.3 Limitations

As was stated earlier, due to paucity of data for the languages of the southern PNW the study will not include languages in that area. Thus, the study only includes languages of the central and northern parts of the PNW, which are fortunately both well-represented by the sample. This nonetheless means that the results will not be fully representative of the PNW as a whole.

The sources vary in the level of detail and completeness in the description of numeral classifier systems. In some cases, the description is very brief and consists mostly of a list of classifiers, often without examples of associated nouns. It is often still possible to use these descriptions, but due to a lack of detail and information on use and function the picture might not be complete. As a result, for some languages it is not possible to conduct an analysis on a deeper level and some of the results regarding the semantics involved may turn out to be wrong in subsequent studies.

It is probably the case for at least some languages that I do not have access to the full list of existing classifiers. Thus, the results might not paint a complete picture of the numeral classifier systems in these languages.

Since there are no written historical records concerning ancient linguistic contact and areal diffusion, it is somewhat difficult to reconstruct and establish linguistic contact in the languages of the PNW. This study must therefore take a less reliable approach, using observable patterns and shared features as evidence for possible diffusion and contact. This approach is thus not able to eliminate similarities and shared traits that are due to chance, universals or possible undetected genetic relationships.

4 Results

4.1 General properties of the numeral classifier systems

This section presents an overview of a few general properties of the numeral classifier systems in the languages of the PNW, with the aim of providing the reader with understanding of some of the most relevant formal properties of these systems. Section 4.1.1 presents the morphological realization of numeral classifiers while 4.1.2 discusses languages with more than one type of numeral classifiers and 4.1.3 presents the inventory size for each language. 4.1.4 summarizes the entire section.

4.1.1 Morphological realization of numeral classifiers

In most languages in the sample, classifiers occur as bound morphemes that attach to a numeral stem, either as suffixes, prefixes or clitics. In almost all cases, classifiers are added after the numeral like the suffix *-c'aq* in (6), the only exception being the Masset dialect of Haida, where classifier morphemes are prefixed to the root like in (7):

(6) Kwak'wala (Wakashan)

mu-c'aq-i *haʔənaƛ'əm*

four-CL:IDIMENSONAL-DEM arrow.PL

'four arrows' (Berman, 1990, p. 38)

(7) Masset Haida (Isolate)

cookies *skaa-sdang-rahl* *skaa-hlun.ahl* *hi* *taa-gan.*

cookies CL:IIIDIMENSIONAL.SMALL-two-or CL:IIIDIMENSIONAL.SMALL-three I eat-PA

'I ate two or three cookies' (Enrico, 2003, p. 780)

In the Skidegate dialect of Haida classifiers occur as free morphemes, where they are placed before the numeral (Enrico, 2005, p. 750):

(8) Skidegate Haida (Isolate)

tsi *ts'a* *sding*

fish.egg CL:SKEIN.OF.FISH.EGGS two

'two skeins of salmon eggs' (Enrico, 2005, p. 417)

There are a few languages like Nisga'a (Tsimshianic), Coast Tsimshian (Tsimshianic) and Chimakum (Chimakuan) where the numeral classifier system consists of sets of numeral stems where the classifier has been fused with the numeral. Table 3 illustrates the numeral sets in Nisga'a for the numerals one – three (Tarpent, 1987):

Table 3: The numerals 1-3 in Nisga'a (Tsimshianic)

Numeral	Inanimate	Non-human animate	Human	Canoe
1	*k̲'il'*	*k'é:kʷ*	*k'ó:l*	*q'améʔet*
2	*k̲'ilp'il*	*t'ipx̲á:t*	*paqatíl*	*qalpéʔeltkʷs*
3	*kʷilál'*	*kʷilán*	*kʷiló:n*	*kʷilál'tkʷs*

Squamish (Salishan) also has sets of numerals realized with reduplication for counting humans, animals and inanimates respectively, in addition to classifier suffixes. Languages with more than one morphological system of numeral classifiers will be presented in 4.1.2 below.

4.1.2 Multiple types of numeral classifiers in one language

All Salishan languages except Nuxalk have more than one type of numeral classifier. These types often differ in both morphological expression and semantics. Squamish (Salishan) has two types of classifiers that may co-occur in the same environment. As mentioned in 4.1.1, Squamish has a type of classifier that consists of three sets of numerals realized with reduplication for counting humans, animals and inanimates, respectively. Squamish in addition has another type of classifier that consists of suffixes attached to the numerals (Kuipers, 1967). Several other Salishan languages have sets of numerals for counting humans, parallel to the human numeral set in Squamish. In Lushootseed, there is a set of human numerals that is formed from the plain numeral set through reduplication (Beck, 2020, p. 3) in addition to classifier suffixes attached to the non-human numerals that are used to classify non-human referents. In contrast to the situation in Squamish, the two types of classifiers do not co-occur in the same environment.

Other Salishan languages have more restricted sets of human numerals 'one' and 'two', that stand in complementary distribution with classifier suffixes. This is the case in Comox, Halkomelem, Klallam and Northern Straits Salish, where there are numerals often expressed through reduplication for 'one human' and 'two humans' but where classifier suffixes are used for counting three or more humans. Example (9) from Halkomelem illustrates the reduplicated form of *n'əc'aʔ* 'one' for counting 'one human', while (10) illustrates the use of the human classifier *=elə* for the numeral three:

(9) Halkomelem (Salishan)

nan'əc'aʔ

one.human

'one person' (Gerdts & Hinkson, 2004, p. 10)

(10) Halkomelem (Salishan)

ɬxʷ=elə

three=CL:HUMAN

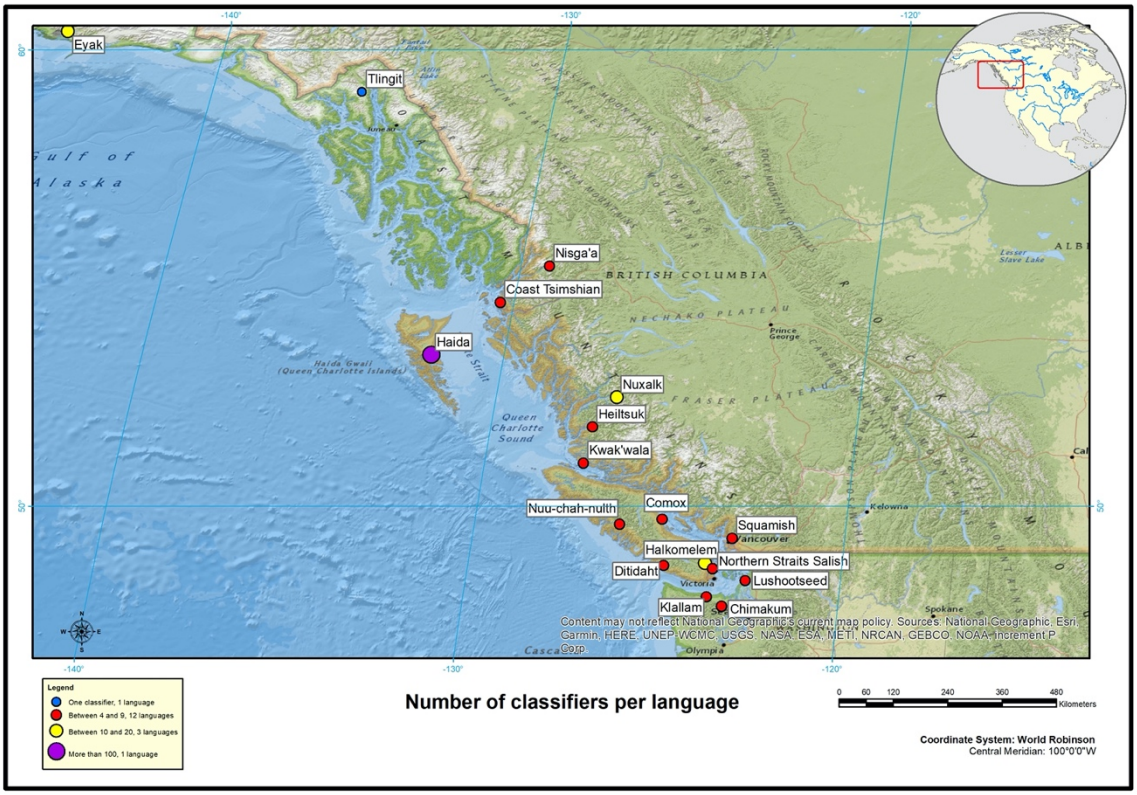
'Three people' (Gerdts & Hinkson, 2004, p. 9)

4.1.3 Size of numeral classifier inventories

Table 4 lists the number of classifiers found in dictionaries and grammars for each language. For languages with more than one type of classifier the combined number of classes expressed by the classifiers is given, which means that a language like Squamish with three numeral sets and five classifier suffixes that each express separate classes has a total of eight classifiers. The exception to this are languages with classifier types that stand in complementary distribution like the human numerals 'one' and 'two' in some Salishan languages (see 4.1.2). These will not be counted as separate classifiers. Only classifiers that have a surface realization are included, which means that a language like Tlingit (Athabaskan-Eyak-Tlingit, henceforth AET) which only uses one classifier morpheme for marking humans in contrast to non-humans, will be considered to have a classifier inventory of a single classifier. Map 3 shows the distribution.

Table 4: Number of classifiers per language

Languages	**Number of classifiers**
Tlingit (AET)	1
Nisga'a (Tsimshianic)	4
Chimakum (Chimakuan)	4
Comox (Salishan)	4
Ditidaht (Wakashan)	4
Klallam (Salishan)	4
Heiltsuk (Wakashan)	5
Nuu-chah-nulth (Wakashan)	5
Kwak'wala (Wakashan)	6
Coast Tsimshian (Tsimshianic)	6
Squamish (Salishan)	8
Northern Straits Salish (Salishan)	8
Lushootseed (Salishan)	9
Nuxalk (Salishan)	13
Eyak (AET)	17
Halkomelem (Salishan)	19
Haida (Isolate)	100+



Map 3: Number of numeral classifiers per language. Colors indicate: one classifier (blue), four – nine classifiers (red), 10 – 20 classifiers (yellow), 100+ classifiers (purple).

The numeral classifier inventories tend to be small, with a median of six classifiers. 47% (8 of 17) of the languages in the sample have less than six classifiers in their inventory and 76% (13 of 17) have less than 10 with all but one language having less than 20 classifiers, Haida (Isolate) being the sole exception, as it has an inventory of well over a hundred classifiers.

4.1.4 Summary

This section provides an overview of the general properties of numeral classification systems for each language presented in the sections above. Included in table 5 is information on the number of classifiers in each language and the morphological expression of the different types of numeral classifiers that exists in one and the same language. Affixes and clitics are collectively labelled with the term 'bound morphemes' as the distinction between these morpheme types are not relevant to this thesis. A dash '–' means that the language only has one type of numeral classifier.

Table 5: Summary of the general properties of numeral classification systems.

Languages	**Number of classifiers**	**Morphological expression of numeral classifier type 1**	**Morphological expression of numeral classifier type 2**
Eyak (AET)	17	Bound morphemes	–
Tlingit (AET)	1	Bound morphemes	–
Haida (Isolate)	100+	1. Bound morphemes (Masset) 2. Free morphemes (Skidegate)	–
Nisga'a (Tsimshianic)	4	Sets of numerals	–
Coast Tsimshian (Tsimshianic)	6	Sets of numerals	–
Heiltsuk (Wakashan)	5	Bound morphemes	–
Kwak'wala (Wakashan)	6	Bound morphemes	–
Nuxalk (Salishan)	13	Bound morphemes	–
Comox (Salishan)	4	Bound morphemes	Reduplicated numerals 'one' and 'two' for counting humans
Nuu-chah-nulth (Wakashan)	6	Bound morphemes	–
Ditidaht (Wakashan)	4	Bound morphemes	–
Squamish (Salishan)	8	Sets of numerals	Bound morphemes
Halkomelem (Salishan)	19	Bound morphemes	Reduplicated numerals 'one' and 'two' for counting humans
Northern Straits Salish (Salishan)	9	Bound morphemes	Reduplicated numeral set for counting humans
Klallam (Salishan)	8	Bound morphemes	Reduplicated numerals 'one' and 'two' for counting humans
Chimakum (Chimakuan)	4	Bound morphemes	Reduplicated numerals 'one' and 'two' for counting humans
Lushootseed (Salishan)	4	Sets of numerals	–

4.2 The semantics of the numeral classification systems

This section presents the semantics of the numeral classification systems under investigation. The first part focuses on animacy. In 4.2.1, the relevance of animacy as a semantic parameter is presented, with the animacy-based distinctions made in the languages presented in 4.2.2. 4.2.3 investigates the way animacy and animacy distinctions are encoded in the classification of referents and how they organize the system in terms of classes. The next part focuses on physical property. 4.2.4 explores the relevance of physical property in the numeral classification systems while the various physical property-based parameters employed in these systems and the way they create classes are presented in 4.2.5. In 4.2.6,

the way physical property is used in the classification of referents will be exemplified. 4.2.7 investigates the semantic parameters of function and inherent nature and how these parameters are encoded in classifiers for specific objects. The results are summarized in 4.2.8.

4.2.1 Animacy as a basis of classification

This section presents the results concerning the relevance of animacy as a semantic parameter in the numeral classification systems of the PNW.

Animacy can be considered relevant for high-level distinctions in all languages in the sample (presented in 4.2.2). In most cases, the animacy distinctions are present in the classification system, distinguishing animacy-based classes through overt expression with classifiers. In some cases, however, animacy can be considered relevant only for the distinction between classified and unclassified referents but is not present as a semantic basis of any classifier.

In Eyak (AET), there are no animacy-based classifiers as neither humans nor animals are counted with classifiers. Nonetheless, animacy can be considered relevant for the higher-level distinction between unclassified and classified referents, where animate referents are considered unclassified and can therefore arguably be considered to be outside of the classification system. A similar pattern can be found in Nuu-chah-nulth (Wakashan), where humans are counted without classifiers, while animals and inanimates are classified based on physical properties. In this language, animacy is important for the distinction between unclassified referents (humans) and classified referents (non-humans) but is arguably irrelevant as a basis of classification.

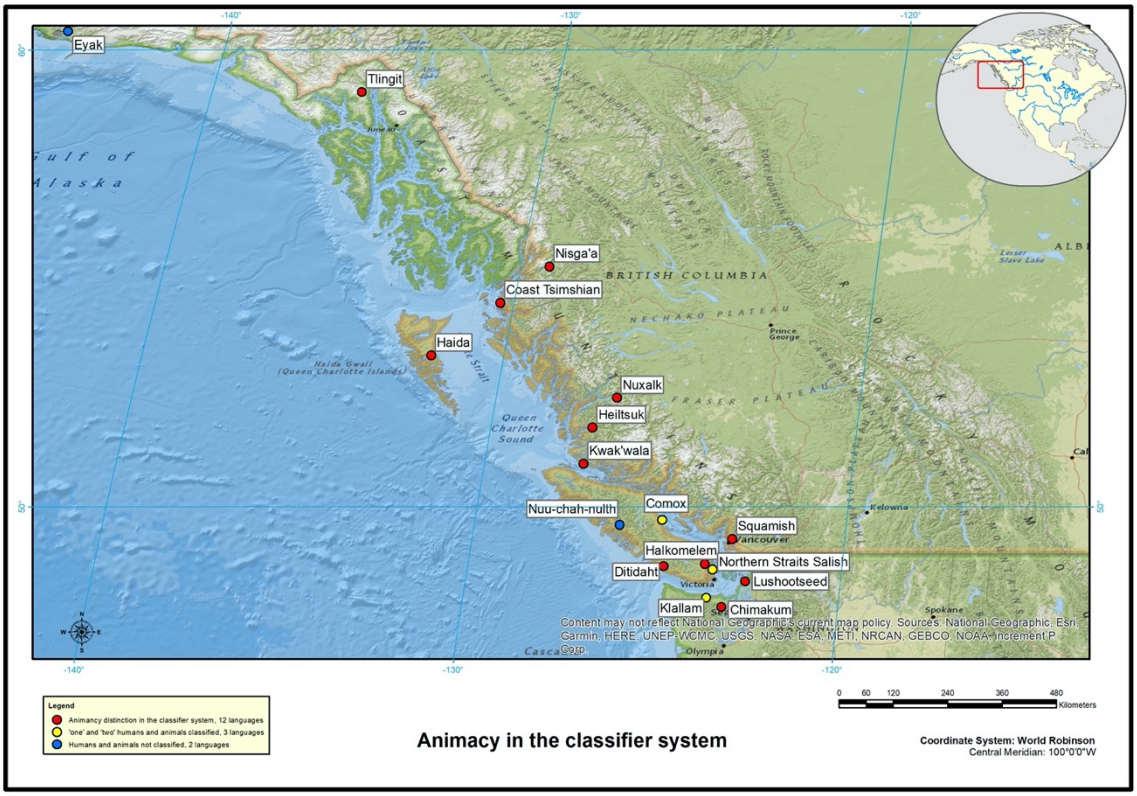
Another exception is presented in the three Salishan languages Comox, Klallam and Northern Straits Salish, where animacy-based classification is restricted to the human numerals ‘one’ and ‘two’ used only to count one and two humans (see 4.1.2). For counting three or more humans the classifier suffixes for containers are used, which means that the human numerals ‘one’ and ‘two’ stand in complementary distribution with the container classifiers. For the human numerals ‘one’ and ‘two’ animacy is clearly relevant but for the container classifiers used to count three or more humans the basis of classification seems to be the physical properties of the referents rather than their animacy.

Table 6 shows the relevance and importance of animacy as a basis of classification in the languages of the PNW and map 4 shows the distribution of values. Languages without animacy-based classifiers are labeled ‘No animacy-based classifiers’, while those languages with restricted use of animacy are labeled ‘Restricted to numerals 1-2’.

Table 6: Animacy used as a basis of classification

Animacy used as a basis of classification	**Number of Languages**	**%**	**Languages**
Animacy-based classifiers	12	70%	Tlingit (AET) Haida (Isolate) Nisga’a (Tsimshianic) Coast Tsimshian (Tsimshianic) Heiltsuk (Wakashan) Kwak’wala (Wakashan) Nuxalk (Salishan) Ditidaht (Wakashan) Squamish (Salishan) Halkomelem (Salishan) Chimakum (Chimakuan) Lushootseed (Salishan)
No animacy-based classifiers	2	12%	Eyak (AET) Nuu-chah-nulth (Wakashan)
Restricted to numerals 1-2	3	18%	Klallam (Salishan)

Animacy used as a basis of classification	Number of Languages	%	Languages
			Comox (Salishan) Northern Straits Salish (Salishan)
Total:	17	100%	



Map 4: Animacy used as a basis of classification. Colors indicate: Languages with animacy-based classifiers (red), languages without animacy-based classifiers (blue) and languages where animacy is restricted to the numerals 'one' and 'two' (yellow).

4.2.2 Animacy distinctions

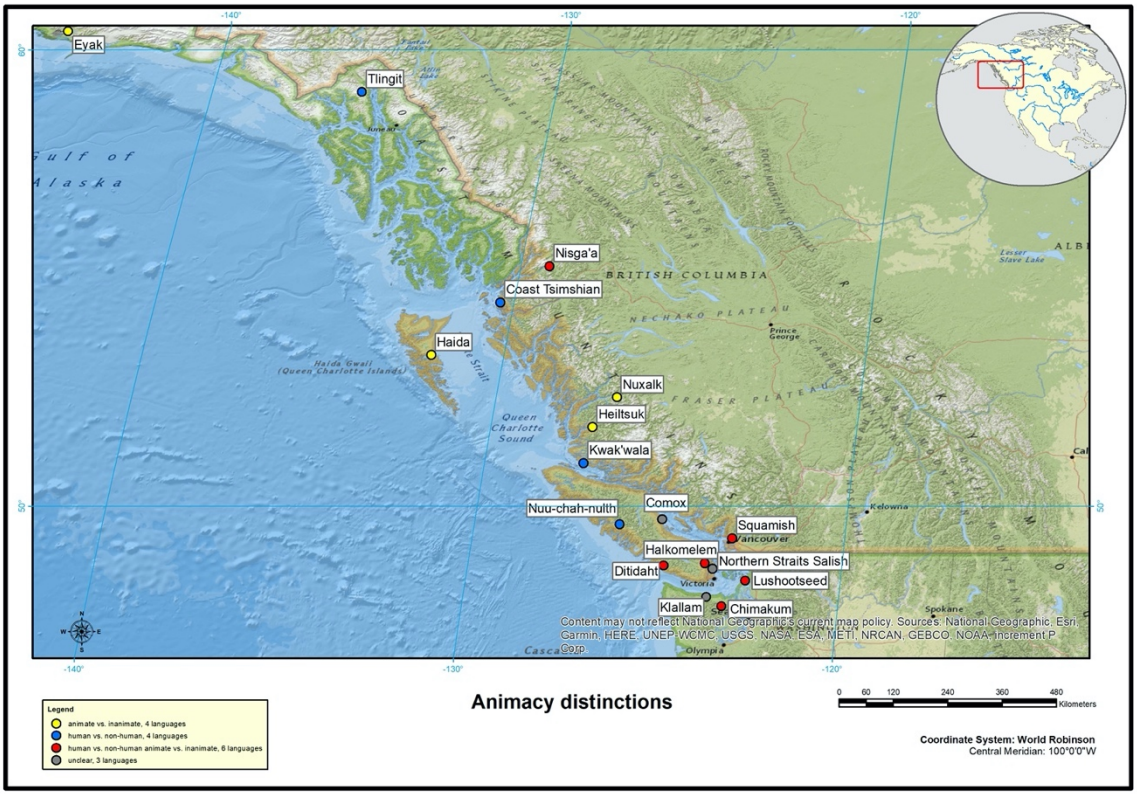
This section presents the basic animacy distinctions made in the numeral classification systems of the PNW. Numeral classifier languages tend to divide nouns based on animacy either by making a two-way distinction between 'human' and 'non-human' or between 'animate' and 'inanimate' or alternatively making a three-way distinction between 'human', 'non-human animate' and 'inanimate'.

What is considered in this section are the animacy-based distinctions made, whether they are overtly expressed through the use of classifiers or not (see 4.2.1). Therefore, the underlying animacy-distinction in languages for which it is only relevant for the division of referents into classified and unclassified categories will also be considered. The properties of the classes created by these distinctions will be presented in 4.2.3.

Table 7 shows the animacy distinctions made in each language while map 5 shows the distribution.

Table 7: Animacy distinctions in the languages of the PNW

Animacy distinction	**Number of Languages**	**%**	**Languages**
Two-way distinction: human vs. non-human	4	23,5%	Tlingit (AET) Coast Tsimshian (Tsimshianic) Kwak'wala (Wakashan) Nuu-chah-nulth (Wakashan)
Two-way distinction: animate vs. inanimate	4	23,5%	Eyak (AET) Haida (Isolate) Heiltsuk (Wakashan) Nuxalk (Salishan)
Three-way distinction: human vs. non-human animate vs. inanimate	6	35%	Nisga'a (Tsimshianic) Ditidaht (Wakashan) Squamish (Salishan) Halkomelem (Salishan) Chimakum (Chimakuan) Lushootseed (Salishan)
Unclear	3	18%	Comox (Salishan) Northern Straits Salish (Salishan) Klallam (Salishan)
Total:	17	100%	



Map 5: Animacy distinctions in the languages of the PNW. Colors indicate: 'animate' vs. 'inanimate' (yellow) 'human' vs. 'non-human' (blue), 'human' vs. 'non-human animate' vs. 'inanimate' (red).and unclear (grey).

35% (6 of 17) of the languages make a three-way distinction, treating humans, animals and inanimates separately. Nisga'a is one of these languages, where there are separate sets of numerals for humans, animals and inanimates, respectively. Examples (6), (7) and (8) show this three-way distinction with the numeral 'two':

(11) Nisga'a (Tsimshianic)

paqatìl-ət=ɬ *ha:náq'*

two.human-REL=NC woman.PL

'the two women' (Tarpent, 1987, p. 310)

(12) Nisga'a (Tsimshianic)

t'ipx̲á:t-ət=ɬ *ʔasʔus*

two.non.human.animate-REL=NC dog.PL

'the two dogs' (Tarpent, 1987, p. 310)

(13) Nisga'a (Tsimshianic)

k̲'ilp'il

two.inanimate

'two objects' (Tarpent, 1987, p. 308)

Most commonly, there is a two-way distinction, with a total of 47% (8 of 17) of the languages making this type of distinction. Half of these languages make a distinction between 'human' and 'non-human' while the other half distinguishes between 'animate' and 'inanimate'. It is very common to have several classifiers for inanimate or non-human referents that further categorize them based on their physical properties.

The animacy distinction in Comox, Klallam and Northern Straits Salish is unclear due to lack of data about the classification of animal referents.

The properties of the classes created by the animacy distinctions are shown in section 4.2.3.

4.2.3 Animacy in the classification of referents

This section will show how animacy is involved in the classification of referents and how it is used to create the classes distinguished through the animacy distinctions presented in 4.2.2.

4.2.3.1 The human class

In 76% (13 of 17) of the languages, humans are distinguished from animals and inanimates as a separate class. In most of these languages, there is a classifier specifically for humans as shown in example (14) with the human classifier *-náx̲* in Tlingit (AET):

(14) Tlingit (AET)

nás'ki-náx̲ *kašxìdi*

three-CL:HUMAN secretary

'three secretaries' (Naish, 1979, p. 104)

In Comox, Klallam and Northern Straits Salish, humans are treated as a class separate from other types of referents only for numerals 'one' and 'two', as humans are placed in the same class as containers for numerals 'three' and up (see 4.1.2, 4.2.1 and 4.2.6.1).

4.2.3.2 Humans unclassified

In 12% (2 of 17) of the languages, the human class is expressed through the absence of a classifier. This is the case in the two Southern Wakashan languages Nuu-chah-nulth and Ditidaht. As noted in 4.2.1, Nuu-chah-nulth does not use animacy as a basis of classification, but it is relevant for the animacy distinction between 'human' and 'non-human'. The following examples from Nuu-chah-nulth show how the animacy distinction between humans (15) and non-humans (16) are expressed through the absence of a human classifier:

(15) Nuu-chah-nulth (Wakashan)

ʔaƛa ḥaaw'iiḥaƛ

two young.men

'two young men' (Yiu & Stonham, 2002, p. 11)

(16) Nuu-chah-nulth (Wakashan)

ʔaƛ-c'iq-ʔis-uk *c'iiḥati*

two-CL:1DIMENSIONAL-DIM-POSS arrow

'his two arrows' (Yiu & Stonham, 2002, p. 11)

In Ditidaht, there is a non-human animate classifier that distinguishes animals from humans and inanimates, creating a three-way animacy distinction. Just as its relative Nuu-chah-nulth, Ditidaht does not have a human classifier, leaving human referents outside the classification system.

4.2.3.3 Further distinctions between human referents

There is only one example of a sub-class for humans in the numeral classification systems of the PNW and that is the child classifier *=eyəɬ* in Halkomelem (Salishan) shown in (17):

(17) Halkomelem (Salishan)

t'x̌əm=ey'ɬ *kʷθə nə* *sc'al'əm'əqʷ*

six=CL:CHILD DT IPOSS greatgrandchild.PL

'I have six great grandchildren' (Gerdts & Hinkson, 2004, p. 11)

The Halkomelem human classifier *=elə* classifies people of all types, including children. The classifier for children may be added to the human classifier creating a form of "classifier stacking" not observed with any other classifiers in the language (Gerdts & Hinkson, 2004, p. 11):

(18) Halkomelem (Salishan)

t'x̌əm=ələ=ey'ɬ *kʷθə nə* *sc'al'əm'əqʷ*

six=CL:HUMAN=CL:CHILD DT IPOSS greatgrandchild.PL

'I have six great grandchildren' (Gerdts & Hinkson, 2004, p. 11)

4.2.3.4 Morphological realization of human classifiers

In most cases human classifiers are of the same type as classifiers for other types of referents, but in several Salishan languages human classifiers are of a different type (see 4.1.2). In Squamish (Salishan) there are three sets of numerals: a fully reduplicated one for humans, a partially reduplicated one for animals and one without reduplication for inanimates (Kuipers, 1967). In Lushootseed (Salishan) there is a separate set of partially reduplicated numerals for counting humans as well as a plain, non-human

numeral set that may take classifier suffixes (Beck, 2020, p. 3). (19) shows an example of plain, non-human numerals, while (20) shows human numerals:

(19) Lushootseed (Salishan)

ʔulub ʔi kʷi dič'uʔ

ten and REM one

'11' (Beck, 2020, p. 2)

(20) Lushootseed (Salishan)

ʔululub ʔi diič'uʔ

ten.HUMAN and one.HUMAN

'11 people' (Beck, 2020, p. 2)

Klallam, Northern Strait Salish, Comox and Halkomelem have a set of human numerals for numerals 'one' and 'two' but use classifier suffixes for higher numerals.

4.2.3.5 The animate class

In 23,5% (4 of 17) of the languages, the animacy distinction is between 'animate' and 'inanimate'. In three of these languages, there is an animate classifier. This is true for Haida (Isolate) where the classifier *dll-* (Skidegate)/ *dla-* (Masset) refers to humans and other mammals as well as birds and fish (Enrico, 2005, p. 642). In Nuxalk (Salishan) there is a classifier for animates *-ao*, that may combine with the prefix *nu-* when referring to humans (Saunders & Davis, 1975, p. 113). *nu-* is not a classifier but rather a grammatical prefix with the meaning 'human' that often co-occurs with classifiers in numeral constructions (Nater, 1984, p. 96). There is no further information on the function of this prefix. The following example illustrates the combination of both markers when counting humans:

(21) Nuxalk (Salishan)

nu-mūs-ao

human-four-CL:ANIM

'four humans' (Saunders & Davis, 1975, p. 113)

Without the *nu-* prefix *-ao* refers to animates in general:

(22) Nuxalk (Salishan)

mūs-ao

four-CL:ANIM

'four animates' (Saunders & Davis, 1975, p. 113)

In Heiltsuk (Wakashan) the classifier *-ok* is glossed as 'animate' (Boas, 1890, p. 106), though it seems like many animals such as deer and ducks are classified as 'III-dimensional' rather than 'animate' (Rath, 1981, p. 733).

4.2.3.6 Animates unclassified

As stated in 4.2.1, animacy is not involved in the classification of referents in Eyak (AET) but is relevant for the distinction between unclassified (animate) and classified (inanimate) referents, as the distinction between animate and inanimate is expressed through the absence of a classifier for animates (Krauss, 1965, p. 174). The classifier *-nu:* may be used when counting plural humans (Krauss, 2009) but since it denotes pairs of any object it is not specific to human referents and should not be considered a human classifier.

In Haida (Isolate), there is an animate classifier, but it is often not used (Enrico, 1987, p. 62).

4.2.3.7 The non-human animate class

In 35% (6 of 17) of the languages, there is a class specifically for animals (non-human animates). In Nisga'a (Tsimshianic), Squamish (Salishan), Lushootseed (Salishan), Ditidaht (Wakashan) and Chimakum (Chimakuan), this class is overtly expressed through a classifier. Nisga'a, Chimakum and Squamish have separate sets of numerals used specifically for animals while Lushootseed and Ditidaht have classifier suffixes. In Halkomelem, the non-human animate class is expressed through the absence of classifiers, as shown in (23), where *məlusməs* 'cows' is counted without a classifier:

(23) Halkomelem (Salishan)

t'eʔcəs *tᶿə* *p'əp't'ᶿ=əl'məxʷ-təm* *məlusməs*

eight DT squeeze=breast-PAS cow.PL

'There were eight cows to milk' (Gerdts & Hinkson, 2004, p. 11)

4.2.3.8 Further distinctions between animal referents

There are usually distinctions made between animals that are classified based on animacy and animals that are classified based on physical property. This distinction is often based on the size of the animal, where only large or higher animals are classified based on animacy, either placed in an animate class or a non-human animate class, while small animals are grouped with inanimates and classified based on physical property. This is the case in Ditidaht (Wakashan), where the non-human animate classifier *-kʷɬʔi:t* is used for big animals, while smaller animals seem to be classified based on physical property (Thomas & Hess, 1981, p. 39).

The parameters of function and value seem to be important for the distinctions between different animals (see 4.2.7 for further information on function). In Haida (Isolate), numeral classifiers are only used for small and culturally useful living organisms like crabs and chitons, that are classified based on physical property, while useless living organisms like flies and fleas are unclassified (Enrico, 2003, p. 798; Enrico, 1987, p. 62). In Lushootseed (Salishan), the animal classifier *-alps* especially refers to domestic animals (Bates et al., 1994, p. 29). In Halkomelem (Salishan), animals are usually unclassified, but the classifier suffix *-iw's* is used to count animals that function as game animals such as waterfowl, chicken and rabbits as well as carcasses of larger game and domestic animals like elk, deer and horses (Gerdts & Hinkson, 2004, pp. 11-12):

(24) Halkomelem (Salishan)

niʔ *cən* *ləm-nəxʷ* *kʷθə* *ɬxʷ=iw's* *maʔaqʷ*

AUX ISUB look-LCTR DT three=CL:GAME.ANIMAL duck

'I saw three ducks' (Gerdts & Hinkson, 2004, p.12)

In Halkomelem it is possible to use the human classifier *=elə* to count living dogs. Dogs are the only animal that may be counted with the human classifier, since they have special cultural value and status in Coast Salish culture (Gerdts & Hinkson, 2004, p. 12).

4.2.3.9 The non-human class

In 23,5% (4 of 17) of the languages, there is a non-human class where animal referents are grouped with inanimate referents. Most commonly, non-humans are divided into several different sub-classes based on physical property as is the case in Coast Tsimshian (Tsimshianic) and Kwak'wala (Wakashan). In Tlingit (AET), there is only one class for non-human referents and the non-human class only refers to the animacy of the referents, more specifically, the fact that they are not human.

4.2.3.10 Languages with a generic inanimate classifier

Most languages have several classifiers for inanimates (or non-humans in languages where animals are grouped with inanimates), where inanimate referents are placed in several different sub-classes based on physical property. In Nisga'a (Tsimshianic) and Chimakum (Chimakuan), there is a generic

classifier for all inanimates, apart from canoes and other vehicles, with no further distinctions made in the form of sub-classes. In Squamish (Salishan), there is a set of classifier numerals for all inanimates in addition to several classifier suffixes that further divide inanimates into sub-classes based on physical property.

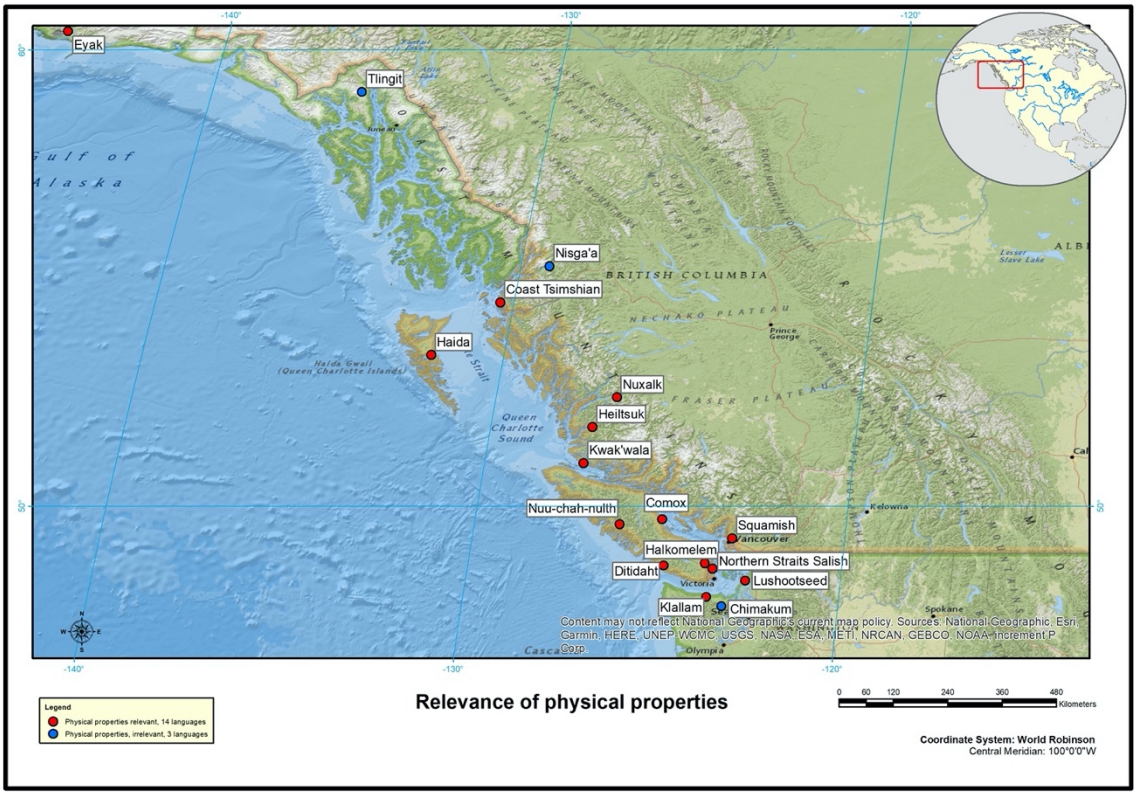
4.2.4 Physical property as a basis of classification

This section presents the results concerning the relevance of physical property as a basis of classification. 'Physical property' is a collective term for various parameters referring to physical properties like dimensionality, shape and size. These physical property-based parameters will be presented in 4.2.5. If at least one of these physical property-based parameters is relevant in the language under consideration, physical property will be considered relevant as a basis of classification in that language.

As is illustrated in table 8 and map 6, physical property is relevant as a basis of classification in 82% (14 of 17) of the sample languages. The exceptions to this are Tlingit (AET), Nisga'a (Tsimshianic) and Chimakum (Chimakuan).

Table 8: Physical property used as a basis for classification

Physical Property Used as Basis for Classification	**Number of Languages**	**%**	**Languages**
Yes	14	82%	Eyak (AET) Haida (Isolate) Coast Tsimshian (Tsimshianic) Heiltsuk (Wakashan) Kwak'wala (Wakashan) Nuxalk (Salishan) Comox (Salishan) Nuu-chah-nulth (Wakashan) Ditidaht (Wakashan) Squamish (Salishan) Halkomelem (Salishan) Northern Straits Salish (Salishan) Klallam (Salishan) Lushootseed (Salishan)
No	3	18%	Tlingit (AET) Nisga'a (Tsimshianic) Chimakum (Chimakuan)
Total:	17	100%	



Map 6: Physical property used as a basis for classification. Colors indicate: physical property used as a basis of classification (red) and physical property not used as a basis of classification (blue)

4.2.5 Physical property-based parameters

In section 4.2.4, the results concerning the relevance of physical property as a basis of classification were presented. In this section, the various physical property-based parameters encoded in the classification systems as well as examples of classes they create will be presented.

4.2.5.1 Dimensionality

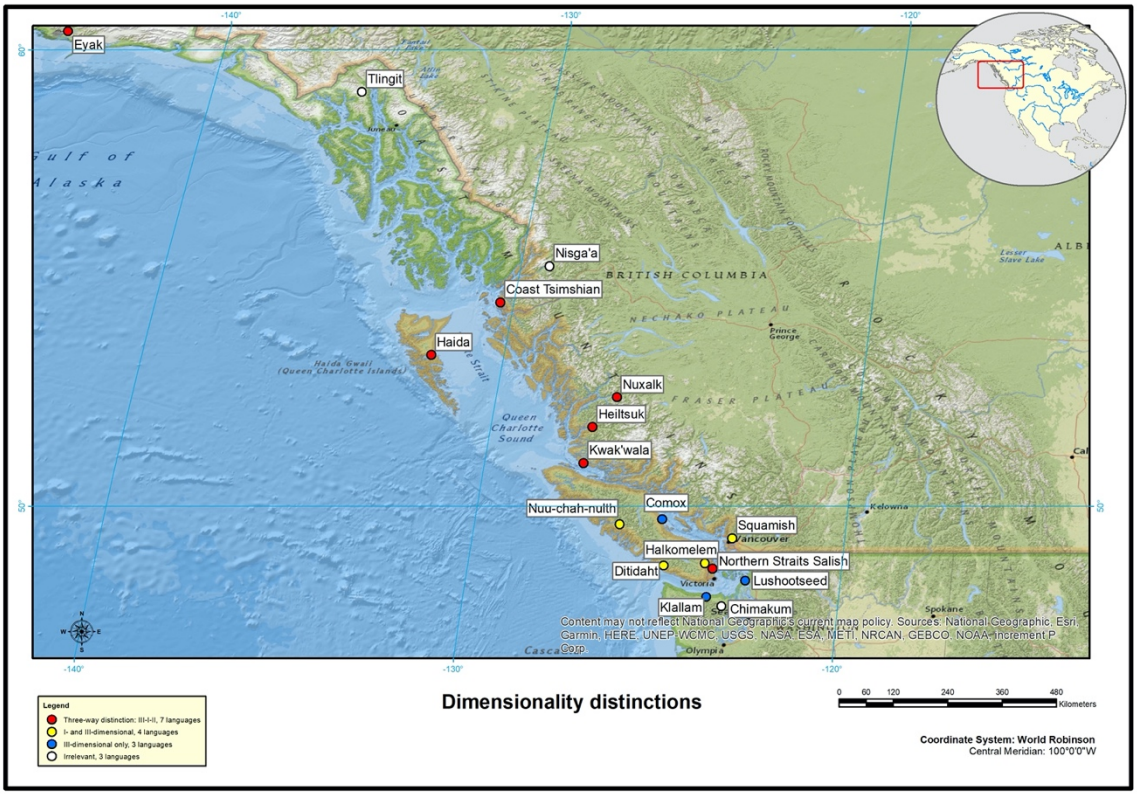
All languages that use physical property as a basis of classification employ dimensionality as a semantic parameter. The dimensionality value that is always present in these systems is that of III-dimensionality, as there is at least one classifier for III-dimensional objects in all these languages. This is the case even in some of the smallest inventories like in Comox (Salishan), Klallam (Salishan), where the only physical property-based classifier is the one that refers to III-dimensional objects. In the Wakashan languages, the III-dimensional classifier has very broad use as it classifies all kinds of objects, even those that are not necessarily saliently III-dimensional such as animals, large objects and even abstract notions. Most languages also have container classifiers, that are often conceptualized as a type of III-dimensional object, perhaps with the function of holding liquids and other objects (see 4.2.7 for information on function).

It is also common to have classifiers for I-dimensional objects in addition to one or more classifiers for III-dimensional objects. Classifiers for II-dimensional objects are less common and many languages like Ditidaht (Wakashan), Nuu-chah-nulth (Wakashan), Lushootseed (Salishan), Halkomelem (Salishan) and Squamish (Salishan) that have classifiers for I-dimensional and III-dimensional objects lack classifiers for II-dimensional objects. Even so, the most common pattern is to have a three-way distinction with classifiers for I-dimensional, II-dimensional and III-dimensional objects.

Table 9 shows the dimensionality distinctions in languages where physical property is relevant. The distribution is shown in map 7.

Table 9: Dimensionality distinctions

Dimensionality Distinctions	**Number of Languages**	**%**	**Languages**
III-dimensionality only	3	21%	Comox (Salishan) Klallam (Salishan) Lushootseed (Salishan)
I- and III-dimensionality	4	29%	Nuu-chah-nulth (Wakashan) Ditidaht (Wakashan) Squamish (Salishan) Halkomelem (Salishan)
Three-way distinction	7	50%	Eyak (AET) Haida (Isolate) Coast Tsimshian (Tsimshianic) Heiltsuk (Wakashan) Kwak'wala (Wakashan) Nuxalk (Salishan) Northern Straits Salish (Salishan)
Total:	14	100%	



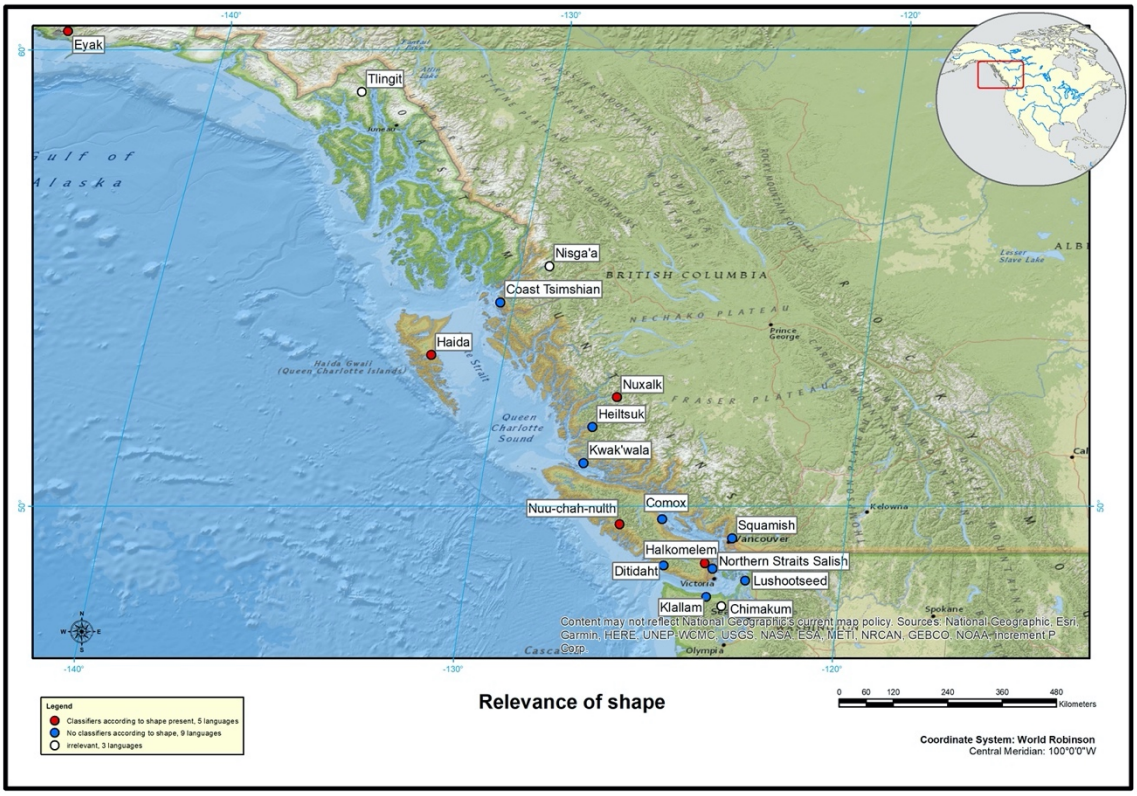
Map 7: Dimensionality distinctions. Colors indicate: III-dimensionality only (blue), I- and III-dimensionality (yellow), three-way distinction (red) and parameter irrelevant (white).

4.2.5.2 Shape

36% (5 of 14) of the languages with physical property-based parameters use shape as a basis of classification. Table 10 shows the presence of shape as a semantic parameter and map 8 shows the distribution.

Table 10: Shape used as a basis of classification

Shape used as a basis of classification	Number of Languages	%	Languages
Yes	5	36%	Eyak (AET) Haida (Isolate) Nuxalk (Salishan) Nuu-chah-nulth (Wakashan) Halkomelem (Salishan)
No	9	64%	Coast Tsimshian (Tsimshianic) Heiltsuk (Wakashan) Kwak'wala (Wakashan) Comox (Salishan) Ditidaht (Wakashan) Squamish (Salishan) Northern Straits Salish (Salishan) Klallam (Salishan) Lushootseed (Salishan)
Total:	14	100%	



Map 8: Shape used as a basis of classification. Colors indicate: Shape used as a basis of classification (red), Shape not used as a basis of classification (blue) and parameter irrelevant (white).

Shape is often explicitly combined with dimensionality to yield distinctions between e.g flat III-dimensional objects and round III-dimensional objects like in Halkomelem (Salishan), where *=aʔqʷ* and *=als* refer to spherical III-dimensional objects like balls or cabbages while *=as* refers to flat III-dimensional objects like coins (Gerdts & Hinkson, 2004, pp. 15, 17). It is often the case that one dimensionality-based classifier is marked for shape while its counterpart is not, like in Nuxalk (Salishan) where the classifier *-ikt* refers to II-dimensional objects unmarked for shape while *-aχikt* refers specifically to long II-dimensional objects (Saunders & Davis, 1975, pp. 111-113).

Most commonly, dimensionality-based classifiers combine with shapes denoting categories like long, flat and round. It is also relatively common to denote thickness like the Eyak (AET) classifier *-gw*, which denotes I-dimensional, flexible and thin referents like strings (Krauss, 2011).

In Haida (Isolate) there are more specific shapes involved, including classifiers that combine dimensionality with shapes that denote curved objects like *sga-* 'I- or II-dimensional, extended, curved' for bows, rings and hoops; *t'ab-* for straight and pointed objects like knives and *t'aw-* (Skidegate)/ *t'uu-* (Masset) for spatulate objects like feathers and spoons (Enrico, 2005). Both Haida and Eyak have classifiers for objects with curved surfaces: *tay-* (Skidegate)/ *tii-* (Masset) and *-Xdl*, respectively (Enrico, 2005; Krauss, 2011).

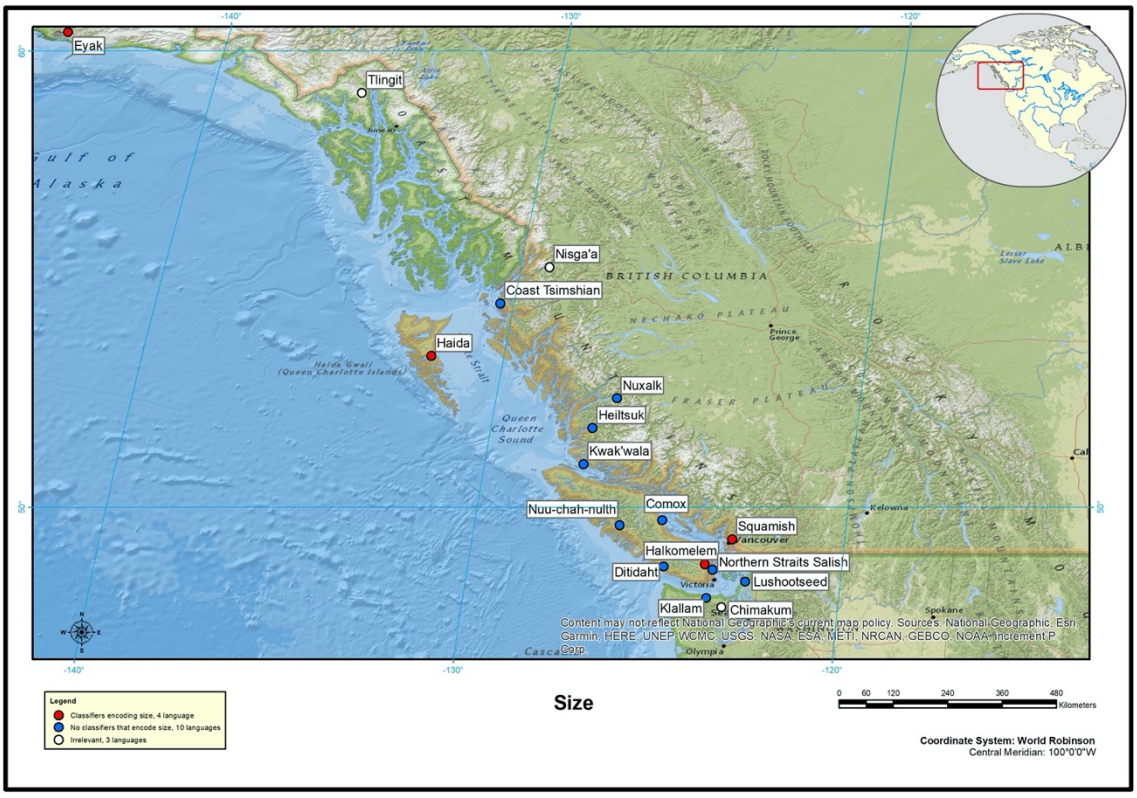
Haida also has a group of shape-based classifiers with a more complex configuration such as *hlra-* 'II-dimensional, extended object consisting of parallel I-dimensional, extended, rigid members' used to classify ladders, wagons, bed frames and deer antlers; *hlq'a-* 'object consisting of a straight, rigid member with straight, small projections in perpendicular and parallel' for combs, branches and bushes and *hlga-* 'object with (usually paired) projections/handles' for chairs, frogs, forks and crabs (Enrico, 2005).

4.2.5.3 Size

Size is employed in some of the larger classifier systems like Squamish (Salishan), Halkomelem (Salishan), Eyak (AET) and Haida (Isolate), as is shown in table 11 and map 9.

Table 11: Size used as a basis of classification

Size used as a basis of classification	Number of Languages	%	Languages
Yes	4	29%	Eyak (AET) Haida (Isolate) Squamish (Salishan) Halkomelem (Salishan)
No	10	71%	Coast Tsimshian (Tsimshianic) Heiltsuk (Wakashan) Kwak'wala (Wakashan) Nuxalk (Salishan) Comox (Salishan) Nuu-chah-nulth (Wakashan) Ditidaht (Wakashan) Northern Straits Salish (Salishan) Klallam (Salishan) Lushootseed (Salishan)
Total:	14	100%	



Map 9: Size used as a basis of classification. Colors indicate: size used as a basis of classification (red), size not used as a basis of classification (blue) and parameter irrelevant (white)

In Squamish and Halkomelem there is a differentiation between big and small III-dimensional objects. Just like with shape, one classifier tends to be unmarked for size while its counterpart is marked, like in Eyak, where the III-dimensional classifier *-lX* is marked as small while the classifiers *-l* and *-d* that also denote III-dimensional objects are unmarked for size.

Haida has an elaborate system of size-based classifiers, both ones that combine with dimensionality and ones where size is the only parameter used as a basis of classification. The classifiers *sgil-*, *t'suu-* and *xa-* denote small objects without any reference to dimensionality, while the classifiers *sgun-* and *gun-* refer to small II- or III-dimensional objects and *kal-*, *k'ul-* and *7ihl-* refer to large II- or III-dimensional objects (Enrico, 2005).

Size most often combines with dimensionality when referring to III-dimensional objects. Squamish and Haida in addition have size distinctions for I-dimensional objects. Haida is the only language with a classifier where size is marked for II-dimensional objects: *gu-* 'II-dimensional, extended, small, slightly concave, usually flat/hollow on one side' for buttons, coins and toenails (Enrico, 2005).

4.2.5.4 Consistency

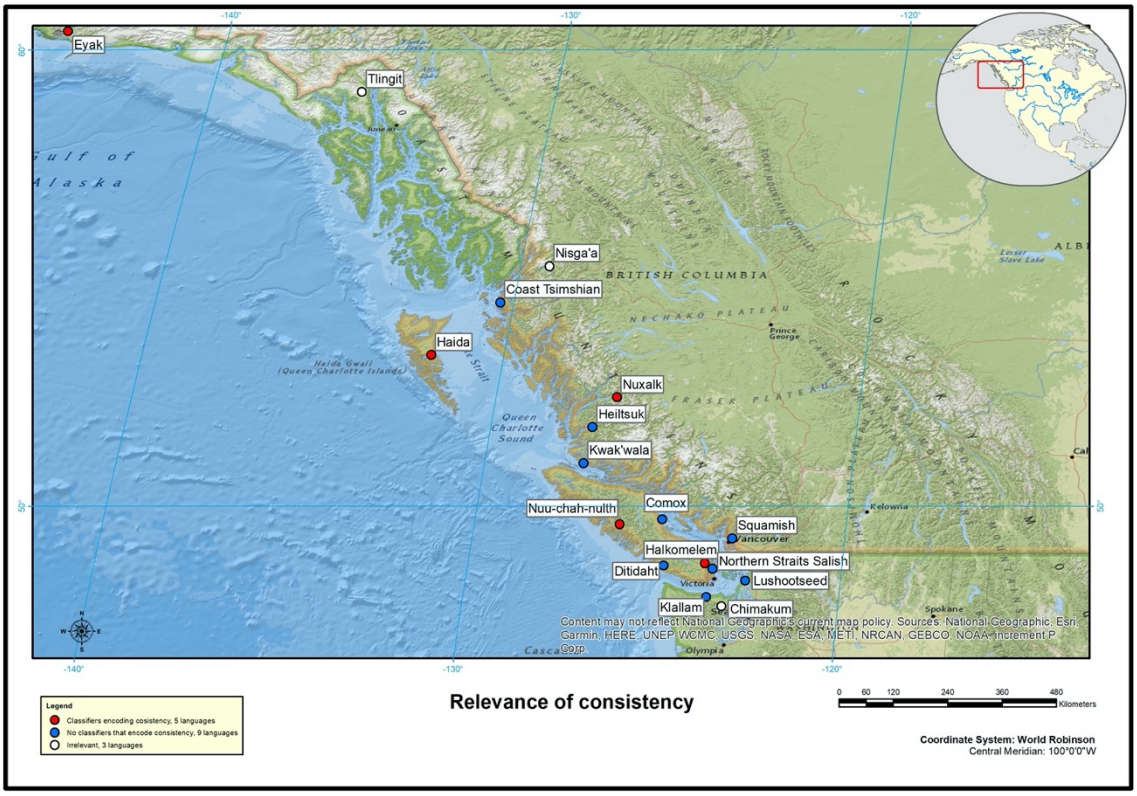
Some of the larger classifier systems employ consistency as a basis of classification. There are classifiers in Nuxalk (Salishan), Halkomelem (Salishan), Eyak (AET) and Haida (Isolate) that denote a referent as flexible or rigid. In Halkomelem the classifier *=emət'$^{\theta}$* classifies rigid I-dimensional objects like poles, rods and boards while *=it'$^{\theta}$e?* classifies flexible and thin I-dimensional objects like ropes and strands of yarn (Gerdts & Hinkson, 2004). Among the languages with consistency as a relevant parameter, there is usually a classifier for flexible II-dimensional objects like blankets, paper and leaves.

Consistency always combines with dimensionality, most often when referring to some I- and II-dimensional objects. Haida is the only language where consistency is used when referring to III-

dimensional objects: *tsi-* (Skidegate) / *tsa-* (Masset) 'III-dimensional, flexible, container object' for baskets, breasts and coats (Enrico, 2005). The use of consistency as a basis of classification is shown in table 12 and map 10.

Table 12: Consistency used as a basis of classification

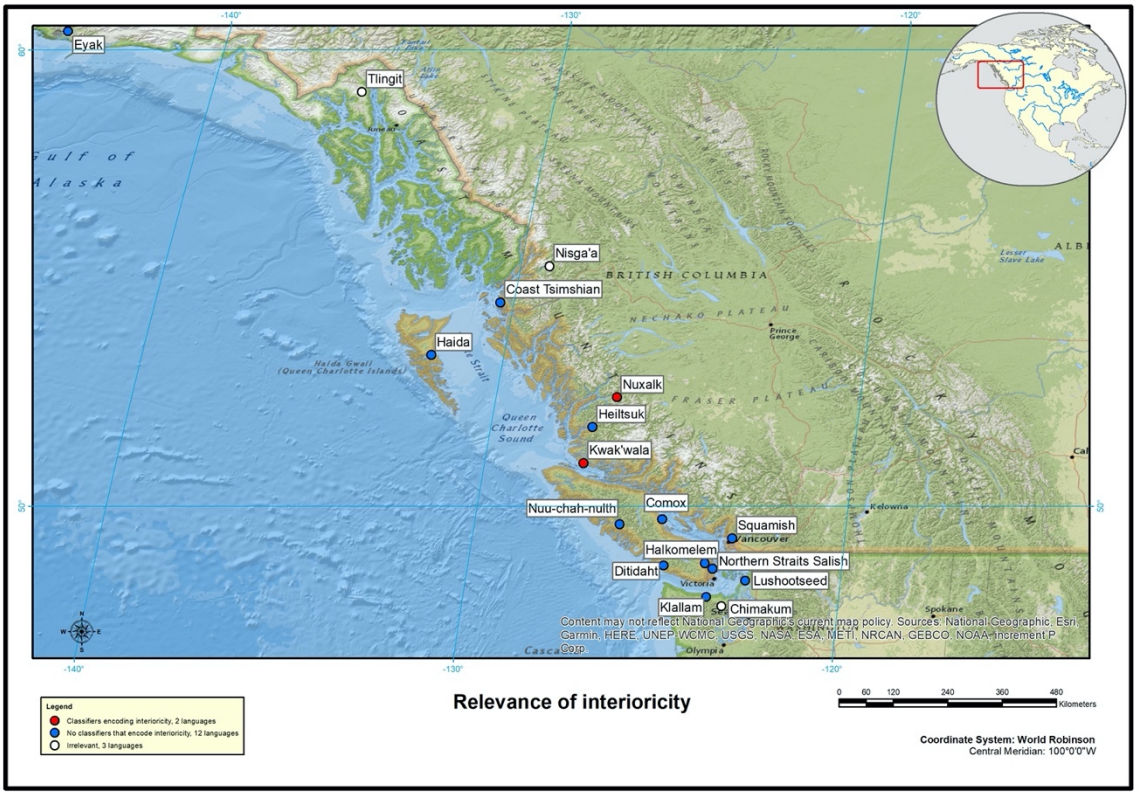
Consistency used as a basis of classification	**Number of Languages**	**%**	**Languages**
Yes	5	36%	Eyak (AET) Haida (Isolate) Nuxalk (Salishan) Nuu-chah-nulth (Wakashan) Halkomelem (Salishan)
No	9	64%	Coast Tsimshian (Tsimshianic) Heiltsuk (Wakashan) Kwak'wala (Wakashan) Comox (Salishan) Ditidaht (Wakashan) Squamish (Salishan) Northern Straits Salish (Salishan) Klallam (Salishan) Lushootseed (Salishan)
Total:	14	100%	



Map 10: Consistency used as a basis of classification. Colors indicate: consistency used as a basis of classification (red), consistency not used as a basis of classification (blue) and parameter irrelevant (white).

4.2.5.5 Interioricity

There are two languages where interioricity is an important parameter: Kwak'wala (Wakashan) and Nuxalk (Salishan). These languages make a distinction between hollow objects that have an exterior outline like rings or containers, and those that lack an exterior outline like holes. In Kwak'wala the classifier for hollow objects with an exterior outline is *-xLa* and the one for holes is *-zəq* while in Nuxalk the equivalents are *-iɬ* and *-aq'ws*, respectively. Map 11 below shows the distribution:



Map 11: Interioricity used as a basis of classification. Colors indicate: interioricity used as a basis of classification (red), interioricity not used as a basis of classification (blue) and parameter irrelevant (white)

4.2.5.6 Other physical property-based parameters: constitution, material and orientation

Eyak (AET) has classifiers based on constitution: *-gl,* which classifies liquids and mucky substances like water, rivers, soup, paint and butter and *-lXd* for granular objects like snow and moss (Krauss, 2011). Haida (Isolate) has the classifier *hlk'u-* for objects consisting of a dry, fibrous mass (Enrico, 2005).

Eyak also has the classifier *-d* which has a sub-meaning of 'wooden' based on material and is used to classify objects made of wood like houses, tables, fish spears, sleds and bark (Krauss, 2011).

Halkomelem (Salishan) has a classifier for which orientation is relevant. The classifier *=iy'əs* 'III-dimensional, vertically extended, loop-shaped' specifically refers to loop-shaped, cylindrical objects that are vertically extended in height such as baskets, and contrasts with *=aləs* 'III-dimensional, cylindrical, loop-shaped' for stitches of knitting, for which orientation is irrelevant (Gerdts & Hinkson, 2004, pp. 16-17)

4.2.6 Physical property in the classification of referents

As sections 4.2.5.1 - 4.2.5.6 showed the ways physical property-based parameters are used to create sub-classes for inanimate referents, this section will show how physical property is involved in the classification of humans and animals.

4.2.6.1 Humans classified as containers

The Salishan languages Comox, Klallam and Northern Straits Salish have restricted sets of numerals 'one' and 'two' used only to count one and two humans. To count three or more humans, the classifier for containers is used (Montler, 1986, p. 41; Harris, 1977, p. 119; Montler, 2015, p. 172), which means that the basis of classification is that of the referent's physical properties rather than their animacy. Example (25) shows the container classifier in Klallam:

(25) Klallam (Salishan)

ɬxʷ-áy

three-CL:CONTAINER

'three containers' or 'three people' (Montler, 2015, p. 172)

4.2.6.2 Animals classified on the basis of physical property

Animals are grouped together with inanimates in a non-human class in 23,5% (4 of 17) of the sample languages. In most of these languages, animals are classified based on physical property-based parameters.

In the Wakashan languages Kwak'wala, Heiltsuk and Nuu-chah-nulth, animals are classified as III-dimensional objects. Heiltsuk has an animate classifier, which based on the gloss seems to include animals, but the classifier for III-dimensional objects *-skam* is used to classify animals like deer and ducks (Rath, 1981, p. 733). In Kwak'wala and Nuu-chah-nulth the classifiers for III-dimensional objects *-sgəm* (Kwak'wala) and *-qimɬ* (Nuu-chah-nulth) classify all types of animals and many other objects (Berman, 1990, p. 39; Tomalin, 2011, p. 107).

(26) Kwak'wala (Wakashan)

mu-sgəm-i	*miğat*
four-CL:IIIDIMENSIONAL-DEM	seal

'four seals' (Berman, 1990, p. 38)

In contrast to the relative Nisga'a, Coast Tsimshian does not have a separate numeral set for animals but instead classifies all animals with the numeral set for II-dimensional objects (Carroll Flaherty, 1979, p. 143).

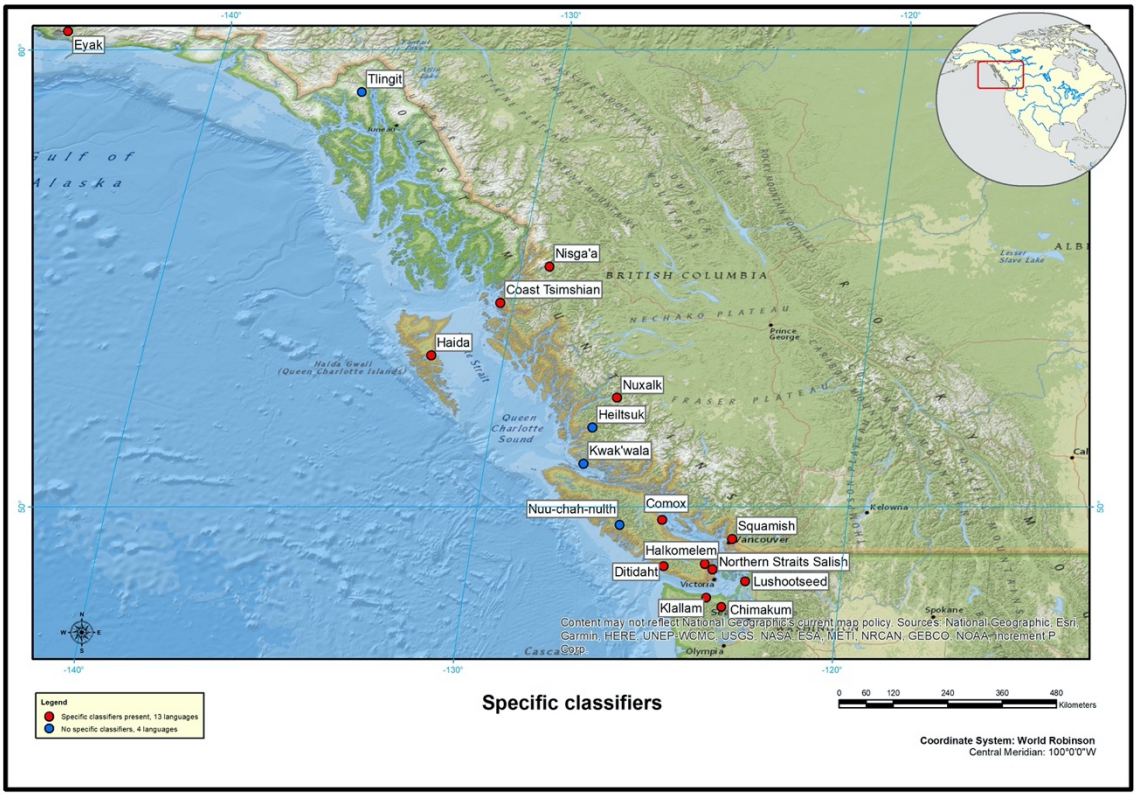
As mentioned in 4.2.3.6, it is often the case that smaller animals and living organisms like fish and other sealife, insects and amphibians are classified based on physical property. In Halkomelem (Salishan) the classifier *=aʔqʷ* which refers to large III-dimensional objects is also used to count fish, fish heads and round and cylindrical-shaped sealife like clams, oysters and sea cucumbers (Gerdts & Hinkson, 2004, p. 11). In Nuu-chah-nulth (Wakashan) fish are classified as I-dimensional, and in Kwak'wala (Wakashan) they are considered II-dimensional. In Lushootseed (Salishan) clams are considered a sort of container. In Haida, the classifier *hlga-* which refers to objects with paired projections/handles like chairs and scissors, also refers to frogs, crabs and starfish (Enrico, 2005, p. 770).

4.2.7 Function, inherent nature and specific classifiers

It is somewhat difficult to define and distinguish function from other parameters when analyzing classes, especially inherent nature. Therefore, these parameters will be presented together in this section.

As shown in 4.2.3.6, function is often involved in the classification of animal referents. Function might also play a role in the classification of some inanimate objects. It is possible that the Halkomelem classifier *=əlwət*, which refers to garments, classifies referents based on their function as clothing. The classification of containers might involve function, as these classifiers classify objects that function as vessels for other objects. Nonetheless, it is often difficult to differentiate between classifiers that classify based on function and classifiers that classify based on inherent nature or even other parameters such as dimensionality (see discussion in 5.1.7). This is the case for many of the 'specific classifiers' that refer specifically to a certain object or type of object.

Specific classifiers are present in 76% (13 of 17) of the languages, the exceptions being Tlingit (AET) and notably, the Wakashan languages Kwak'wala, Heiltsuk and Nuu-chah-nulth. Map 12 shows languages with and without specific classifiers.



Map 12: The presence of specific classifiers. Colors indicate: languages with specific classifiers (red) and languages without specific classifiers (blue)

Nearly half (47% - 8 of 17) of the sample languages have specific classifiers for canoes. It is clear that for most languages, 'canoe' is the basic and original meaning of the classifier morpheme, but it is common for canoe classifiers to be used to refer to boats and other modes of transportation like cars and planes as well, as can be illustrated with these examples from Ditidaht (Wakashan) and Halkomelem (Salishan):

(27) Ditidaht (Wakashan)

bu-c'aq

four-CL:CANOE

'four canoes' or 'four ships' or 'four airplanes' (Hess, 1981, p. 39)

(28) Halkomelem (Salishan)

k'^{w}in=əwəł *snəx^{w}əł* *niʔ* *ʔən'ex^{w}* *niʔ* *ʔə* *k^{w}θən'* *leləm'ʔ*

how.many=CL:CANOE canoe AUX stopped AUX OBL DT:2POSS house

‘how many cars were parked in front of your house? (Gerdts & Hinkson, 2004, p. 14)

In Halkomelem, the canoe classifier is also used to count plates and platters. The reason is that pre-contact Salish dishes where canoe-shaped and thus, the use of the canoe classifier *=wəɬ* has metaphorically carried over in usage (Gerdts & Hinkson, 2004, p. 14).

There are several other specific classifiers found in the languages of the PNW. Besides canoes, buildings are the objects most commonly classified with a specific classifier. The distribution of specific classifiers for buildings is restricted to the Salishan family, where they are found in all languages.

Salishan languages tend to have many specific classifiers. Klallam, Northern Strait Salish, Lushootseed and Halkomelem have specific classifiers for plants. Halkomelem in addition has several classifiers like *=nec* ‘tuber’, *=eːnxʷ* ‘plant part’ and *=ənəp* ‘ground’ (Gerdts & Hinkson, 2004). Some languages have specific classifiers that refer to fire/firewood, like the Lushootseed *-čup* ‘fire’, Nuxalk *-alus* ‘fire’ and Halkomelem *=əlcəp* ‘firewood’. Halkomelem, Northern Strait Salish and Nuxalk have classifiers referring specifically to certain articles of clothing. In Northern Strait Salish there is a classifier for hats *=ok* and in Nuxalk there is a classifier for gloves *-aːk*.

Eyak (AET) has some specific classifiers like *-gwlXd* ‘snare’ (Krauss, 2011). Haida has several highly specific classifiers like *tll-* ‘stick or rack with clams on it’, *kid-* ‘stick with drying food’, *st’a-* ‘skeins of fish eggs/dogfish liver’ and *kun-* ‘bundle of dried herring roe on kelp/stick of drying salmon fillets’ (Enrico, 2005).

4.2.8 Summary

Table 13 summarizes the use of the semantic parameters as bases of classification. The parameters of function and inherent nature are not included as these are difficult to identify and distinguish. The ‘–‘ for the physical property-based parameters indicates that they are irrelevant for the classifier system as physical property is not used as a basis for classification in the language.

Table 13: The use of semantic parameters as bases of classification

Language	**Animacy**	**Physical Property**							
		Dimensionality	Shape	Size	Consistency	Interioricity	Constitution	Material	Orientation
Eyak (AET)	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Tlingit (AET)	Yes	–	–	–	–	–	–	–	–
Haida (Isolate)	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Nisga'a (Tsimshianic)	Yes	–	–	–	–	–	–	–	–
Coast Tsimshian (Tsimshianic)	Yes	Yes	No	No	No	No	No	No	No
Heiltsuk (Wakashan)	Yes	Yes	No	No	No	No	No	No	No
Kwak'wala (Wakashan)	Yes	Yes	No	No	No	Yes	No	No	No
Nuxalk (Salishan)	Yes	Yes	Yes	No	Yes	Yes	No	No	No
Comox (Salishan)	Restricted	Yes	No	No	No	No	No	No	No
Nuu-chah-Nulth (Wakashan)	No	Yes	Yes	No	Yes	No	No	No	No
Ditidaht (Wakashan)	Yes	Yes	No	No	No	No	No	No	No
Squamish (Salishan)	Yes	Yes	No	Yes	No	No	No	No	No
Halkomelem (Salishan)	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
Northern Straits Salish (Salishan)	Restricted	Yes	No	No	No	No	No	No	No
Klallam (Salishan)	Restricted	Yes	No	No	No	No	No	No	No
Chimakum (Chimakuan)	Yes	–	–	–	–	–	–	–	–
Lushootseed (Salishan)	Yes	Yes	No	No	No	No	No	No	No

5 Discussion

This chapter consists of five sections. In 5.1 the semantics of the numeral classification systems in the languages of the PNW will be discussed while section 5.2 considers the results from an areal perspective. Section 5.3 will summarize the discussion in sections 5.1 and 5.2 in relation to the goals of areal typology. Section 5.4 discusses the method, highlighting the limitations of the study and evaluating and reflecting on the credibility of the results. Finally, section 5.5 consists of suggestions for further research.

5.1 The semantics of numeral classifiers in the languages of the Pacific Northwest

This section discusses the most important results concerning the semantics of the numeral classification systems in the languages of the PNW in light of the research questions. With the help of earlier cross-linguistic research on numeral classification systems I will attempt to explain the patterns observed and characterize the numeral classification systems of the PNW in terms of their semantics.

5.1.1 Differences in semantics between classifier types

As stated in 4.1.2, all Salishan languages in the sample except Nuxalk have two types of numeral classifiers: i) reduplicated classifier numerals and ii) classifier suffixes.

There is a noticeable difference in the semantic parameters used for each type of numeral classifier. The reduplicated numerals base the classification exclusively on animacy. As for the classifier suffixes in these languages, the semantic basis is physical property and perhaps function and inherent nature. Except for the non-human animate classifier *-alps* in Lushootseed and the human classifier *=elə* in Halkomelem, the classifier suffixes in these languages do not seem to base the classification on animacy at all.

As Aikhenvald (2000, p. 287) explains, there are three exceptions to the universal presence of animacy-based classes in numeral classification systems. One of them is that languages with two types of numeral classifiers might make an animacy distinction in one type but not in the other. This seems to be the case for most of these languages, as animacy is often absent for the classifier suffixes but is the only semantic basis used for the reduplicated numerals. The conclusion is thus that in the languages of the PNW with two types of numeral classifiers, there tends to be a different set of semantic parameters used for each type: the type consisting of reduplicated numerals exclusively uses animacy as a basis of classification, while the type consisting of classifier suffixes tends to base the classification on physical property, function or inherent nature.

5.1.2 Animacy

Based on the prevalence of animacy as a basis of classification in the languages of the PNW, it can be considered a basic semantic parameter in these classification systems. As is noted by Adams & Conklin (1973), animacy is universally the most fundamental basis of classification in numeral classification systems and its primacy can be observed even in minimal systems, where an animacy distinction is always required and might be the only one made. This can clearly be observed in Tlingit (AET), which has a minimally developed system of only one distinction: that between ‘human’ and ‘non-human’, where animacy is the only parameter involved. Thus, the findings regarding animacy in the languages of the PNW are in accordance with what is known from classification systems elsewhere in the world.

As shown in 4.2.1, there are two exceptions to the use of animacy as a basis of classification, where its use is either restricted or absent in the languages of the PNW. These cases will be discussed below in section 5.1.2.1.

5.1.2.1 Exceptions to the use of animacy as a basis of classification

Even though animacy can be considered relevant as a basis for higher-level distinctions between types of referents in all languages in the sample, there are two cases where animacy is either restricted or seemingly absent as a basis of classification (see 4.2.1).

In the first case there are languages where the use of animacy as a basis of classification is restricted. In Comox, Klallam and Northern Straits Salish, animacy is only used as a basis of classification for human referents with numerals 'one' and 'two', while humans are counted with the container classifiers for numerals 'three' and higher. Since the use of animacy as a basis of classification is restricted to the lowest numerals, it can be considered only marginally involved in the numeral classification systems as wholes.

As mentioned in 5.1.2, there is an exception to the universal presence of animacy-based classes if a language has two types of numeral classifiers, where animacy might be present for one type but not for the other (Aikhenvald, 2000, p. 287). It was concluded that in the languages of the PNW with both a set of reduplicated numerals and classifier suffixes, animacy is only used as a basis of classification for the numerals. In Comox, Klallam and Northern Straits Salish, animacy is further restricted to the numerals 'one' and 'two'. As stated in 2.2.1, there are often different forms for human or animate classifiers depending on the numeral they occur with (Aikhenvald, 2000, p. 112). There is also a general pattern observed in languages that lower numerals tend to behave differently than higher numerals in several different ways (Corbett, 1978) Thus, it is probably not a coincidence that it is specifically the numerals 'one' and 'two' that behave in this way and that these numerals have different forms when classifying humans in particular.

In the second case we have languages where animacy does not seem to function as a basis of classification, like Eyak (AET) and Nuu-chah-nulth (Wakashan), where there are no animacy-based classifiers, though the situation is perhaps more complex and will be further discussed in 5.1.8. The other two exceptions to the universal presence of animacy-based classifiers noted by Aikhenvald (2000, p. 287) may occur in languages with recently developed numeral classification systems or in languages where animacy-based distinctions are found elsewhere in the language. One of these explanations can perhaps account for the lack of these types of classifiers in Eyak and Nuu-chah-nulth and could also explain the absence of a human classifier in Ditidaht (Wakashan) and the rare use of the animate classifier in Haida (Isolate). But further research must be conducted to determine which of these explanations is most likely in the case of these languages.

5.1.3 Sub-classes: further distinctions between human, animal and inanimate referents

It is very rare to have sub-classes for humans based on specific properties of the referents such as age, kinship, status or sex in the numeral classification systems of the PNW. Cross-linguistically, it is common to only have one human classifier (Aikhenvald, 2000, p. 288), though many numeral classifier languages in some other parts of the world, mainly Southeast Asia, have several sub-classes for human referents (Adams & Conklin, 1973, p. 3). In these languages, age is the primary distinction (Adams & Conklin, 1973, p. 3). In the sole example of a sub-class for humans in the languages of the PNW, age is used as the basis of classification (the child classifier in Halkomelem), which is in accordance with the patterns found in other numeral classifier languages.

In contrast to humans, it is common to make further distinctions between animals in the PNW. While there are no examples of languages with several classifiers specifically for animals, parameters such as size, function, value as well as perceived animacy are important for the way animals are classified as either animate/non-human animate or placed in the same class as inanimates.

While it is rather common with several sub-classes specifically for animals based on parameters such as function and size in numeral classifier languages elsewhere in the world (Adams & Conklin, 1973, p. 4), it is most often the case that the notion of animacy is overridden by the notion of physical property. In Chrau (Austroasiatic), only large animals are in the non-human animate class, while other animals are placed in physical property-based classes together with inanimates (Adams & Conklin, 1973, p. 4), in a way that is rather similar to the situation in some languages investigated in this study, such as Ditidaht (Wakashan). This shows that the way animals are classified in the PNW is overall quite similar to the way animals are classified elsewhere in the world. The underlying reason for these patterns is probably due to the universal tendency to view certain animals as more animate than others, leading to differences in their classification (Allan, 1977, p. 299).

It is rather rare for the languages in the PNW to have a generic class for inanimates or non-humans as these referents are often placed in several sub-classes based on physical property. This is a general tendency observed in numeral classifier languages (Aikhenvald, 2000, p. 272). As such, the generic inanimate/non-human classes are rather rare. In the PNW, these generic classifiers can mostly be found in the languages that do not use physical property as a semantic parameter, making a generic inanimate/non-human classifier based on animacy useful.

5.1.4 Physical property

Together with animacy, physical property can be considered basic to the numeral classification systems of languages of the PNW as one or several physical property-based parameters are used as a basis of classification in almost all sample languages. However, three languages, Tlingit, Nisga'a and Chimakum, do not use physical property at all. In contrast to animacy, there is no reason to believe that physical property is even marginally relevant as a basis of classification or even for high-level distinctions in these three languages. Thus, physical property is perhaps slightly less basic than animacy for the numeral classification systems in the PNW, which is in accordance with what is known about numeral classification systems in other parts of the world (Adams & Conklin, 1973).

Regarding the physical property-based parameters present in the numeral classification systems of the PNW, there are both cross-linguistically common patterns as well as a few properties that seem to be specifically characteristic of the PNW. These patterns will be discussed in 5.1.5 and 5.1.6.

5.1.5 Dimensionality

All sample languages that use physical property as a basis for classification have dimensionality as a relevant parameter. Even in the smallest inventories where physical property is a relevant parameter there is at least one classifier based on dimensionality. This tells us that dimensionality is the primary physical property-based semantic parameter in the languages of the PNW. It is in fact very common for dimensionality to be the only physical property-based parameter used in classification. This supports Gerdts & Hinkson's (2004) conclusions regarding the presence of dimensionality in the numeral classifier systems in the Salishan and Wakashan languages (see 2.2.3.2) and shows that this is a general property, not only of languages from these two families, but of the numeral classifier languages of the PNW as a whole.

Dimensionality is often regarded as a basic parameter in noun categorization systems, and classes of dimensionality are probably universal in the general semantic structure of language (Friedrich, 1970). As such, dimensionality is in no way specific to the numeral classification systems of the PNW or even numeral classification in general. There are however some interesting properties of dimensionality in the numeral classification systems in the PNW that will be further explored in sections 5.1.5.1, 5.1.5.2 and 5.1.5.3.

5.1.5.1 Dimensionality distinctions

There are three basic dimensionality values that are often encoded in numeral classification systems: I-dimensional, II-dimensional and III-dimensional. Most common among the languages of the PNW is to have a three-way distinction between these values.

All languages in the sample that use physical property as a basis for classification have a classifier for III-dimensional objects. In small classifier inventories like Comox and Klallam it is the only physical property-based classifier. It is also quite common with at least one classifier for I-dimensional objects. II-dimensional objects seem to be the least differentiated as they only occur if there is at least one classifier for III-dimensional objects and one for I-dimensional objects (see 4.2.5.1 for information on dimensionality distinctions). This gives us an implicational hierarchy regarding the primacy of dimensionality values:

III-dimensional > I-dimensional > II-dimensional

Figure 1: The primacy hierarchy of dimensionality values in the numeral classification systems of the PNW.

This means that the III-dimensional value might occur on its own, while the I-dimensional value only occurs if there already is a classifier for III-dimensional objects. Lastly, the II-dimensional value only occurs if there are classifiers for III-dimensional objects and I-dimensional objects. The primacy of the III-dimensional classifiers is discussed in 5.1.5.2 while the status of II-dimensional objects is discussed in 5.1.5.3.

5.1.5.2 The primacy of the III-dimensional value

The fact that the III-dimensional value is the primary dimensionality value in the languages of the PNW offers a counterexample to Frawley's (1992, p. 123) claim that numeral classifier languages tend to encode one and two dimensions more often than they do three dimensions. This shows that the hierarchy of dimensionality values as encoded in numeral classification systems might not be based on universal cognitive and perceptual phenomena but is instead areally restricted. Thus, the primacy of the III-dimensional value is especially characteristic of the numeral classification systems in the languages of the PNW and can be seen as an areal trait.

Why is the III-dimensional value the primary dimensionality value in these languages? One possible explanation could be that it is a property of a generic or default class. As observed by Denny (1979), there might be markedness distinctions among the values of dimensionality. In many languages, the III-dimensional classifier might function as an unmarked, generic classifier used to classify objects that fall outside the semantic domain of other classifiers. As Denny (1979) notes, it is always the III-dimensional value that seems to function as the basis of a generic class. While the use of III-dimensional classifiers as unmarked, generic classifiers can be clearly seen in the Wakashan languages where they are used to classify III-dimensional objects as well as animals, large objects and abstract notions (see appendix B), this is much more doubtful for the other sample languages. In most of these languages, the III-dimensional classifiers seem to have the notion of III-dimensionality at their core since the classified referents often have a somewhat salient III-dimensional configuration. It is therefore unmotivated to conclude that the III-dimensional classifiers in these languages function as generic classifiers, unmarked for dimensionality. As such, the notion of markedness and extendedness might figure in the use of the III-dimensional classifiers in the Wakashan languages, but probably not in the other sample languages.

Another possible explanation for the primacy of III-dimensionality might be that many saliently III-dimensional objects are culturally important. For many languages, the III-dimensional classifier is primarily used to count coins and other types of money. These objects are culturally and socially important and in addition, the nouns referring to them often occur in counting constructions, making a numeral classifier for these objects useful. Thus, the prevalence of III-dimensional classifiers might be motivated by cultural importance, use and function.

5.1.5.3 The status of the II-dimensional value

Why is the II-dimensional value less differentiated than other dimensionality values? Adams & Conklin (1973) noted that II-dimensionality might be viewed as length extended in two directions, essentially making it an instance of I-dimensionality. This means that in the sample languages with only III- and I-dimensional classes, the I-dimensional class might also include objects that in other languages might be classified as II-dimensional, though there are no clear examples of this in the data.

5.1.6 Other physical property-based parameters

As was discussed in 5.1.5, dimensionality is the primary physical property-based parameter in the languages of the PNW. While it is rather common to only use dimensionality as a physical property-based parameter, some of the larger classifier inventories also make use of cross-linguistically common parameters like shape, size and consistency and less commonly interioricity, constitution, material and orientation. The only cross-linguistically common physical property-based parameter that seems to be entirely lacking in the languages of the PNW is boundedness (see table 1 in 2.2.2.2), though this may be due to the lack of detailed descriptions or depend on the way one analyzes the data.

The combinatory properties of these parameters in the languages of the PNW support some earlier conclusions from Aikhenvald (2000) about numeral classification systems: a) most often these secondary parameters combine with dimensionality, b) consistency never occurs on its own and c) size usually combines with dimensionality and rarely occurs on its own. Though the liquid classifier *-gl* in Eyak (AET) seems contrary to Aikhenvald's (2000) claim that constitution never occurs on its own, this is perhaps down to a mistake in my analysis or lack of more detailed information in the source.

Some other interesting combinatory properties concern the dimensionality values these parameters most often combine with. Size is most often expressed for III-dimensional classifiers, the probable explanation being the relative perceptual salience of size for III-dimensional objects in comparison to I- and II-dimensional objects. Consistency on the other hand, is almost always expressed for I- or II-dimensional objects rather than III-dimensional objects, since plasticity tends to be more salient for I- and II-dimensional objects, as prototypical III-dimensional objects like stones and balls can usually not be bent in any way. The reason for these combinations is thus quite clear: they are motivated by inherent properties of referents.

There is a tendency for the larger inventories to make use of more parameters than smaller inventories, as parameters such as size and consistency show up mostly in some of the larger systems and parameters like constitution, material and orientation are only present in the largest systems in the area.

As mentioned in Aikhenvald (2000, p. 291), larger inventories can have very complicated combinations and interactions between dimensionality, shape and consistency. These complicated patterns can be seen in Haida (Isolate), which has a classifier inventory of well over a hundred classifiers (see appendix B.17). As the other languages in the PNW have rather small inventories, there are usually not many particularly complex combinations or distinctions in these languages.

5.1.7 Function

Function is considered one of the three most basic properties involved in numeral classification systems (Adams and Conklin, 1973; Aikhenvald, 2000), although it is often secondary to animacy and physical property (Aikhenvald, 2000, p. 291). Adams & Conklin (1973) notes that function is widely used in numeral classification systems in East and Southeast Asia, where it is used to classify such objects as written material, tools and events. As mentioned in 4.2.7, it is often difficult to identify and distinguish function from other semantic parameters in the languages of the PNW. The primary reason is that it is especially difficult to ascertain which property of a referent is treated as salient when it comes to function, since it is not based on perceivable properties as are animacy and physical property.

Since the notion of function is not directly related to perceivable properties but instead based on the use of an object, the definition of function can be quite broad. While reading secondary literature on the subject of function in numeral classification systems, it becomes clear that function is applied to classifiers for a broad range of objects including tools with handles, means of transport, baskets, different types of buildings, written and oral speech, doors, rice fields and abstract nouns that denote events like 'phone-call' or 'incident' (Aikhenvald, 2000, pp. 291-292). Depending on how classes like these are analyzed, it might seem like other properties relating to physical property or inherent nature are just as likely to act as the basis of classification. If function is more narrowly defined, several of these examples would probably not be treated as function-based classes.

If a broad definition of function is used, the languages of the PNW seem to have a few specific classifiers based either primarily or partially on function, such as classifiers for buildings, garments, containers and most commonly, canoes. Though compared to numeral classifier languages elsewhere in the world, such as East and Southeast Asia, such classifiers seem to be less common and less numerous. Function seems to be relevant for the classification of animals as well (see 4.2.3.8).

An important aspect that needs to be considered when analyzing classifier semantics is the way culture impacts how objects are perceived and classified. Entities that are perceived in a certain way from a western perspective might be perceived differently by native speakers. As noticed in by Terry Straus & Brightman (1982) in their study of animate vs. inanimate gender in the Algonquian language Cheyenne, some objects like 'stone', which from a western perspective is considered inanimate, might be considered animate by the speakers of the language. It is possible that these kinds of highly culture-influenced classifications might be at play for some of these specific classifiers in the PNW, like those for canoes, for example.

In conclusion, function is less salient as a property than animacy and physical property since it is not overtly perceivable, which makes it difficult to identify and distinguish function from other semantic parameters. This is made more difficult when considering the culture-specific ways an object may be classified. If considering the way function has been defined in earlier research on numeral classification systems, the languages of the PNW can be said to have function-based classifiers for e.g canoes, buildings, containers and garments as well as having function as a relevant parameter for the classification of animals. Though, function-based classifiers are less common and less numerous than in many numeral classifier languages elsewhere in the world.

5.1.8 Gaps in the classification systems: unclassified referents

In many numeral classification systems in the languages of the PNW there seems to be a restricted applicability of classifiers as some types of referents are left unclassified, leaving gaps in the systems. In languages such as Haida (Isolate), Eyak (AET) and Halkomelem (Salishan), some or all animals are counted without classifiers while in Eyak and the Southern Wakashan languages Ditidaht and Nuu-chah-nulth, humans do not take classifiers. Looking at the classifier inventories included in appendix B, there are examples of gaps regarding, for example, I- and II-dimensional referents in the classification systems in languages such as Klallam, Comox and Lushootseed where the existing classes do not seem to include these types of referents.

There are some languages with classification systems that seem applicable to every type of referent as is the in Tlingit, Nisga'a, Coast Tsimshian, Chimakum and Squamish, where the systems mainly consist of generic classes based on animacy that can be assigned to any referent such as 'human', 'non-human animate', 'inanimate' and 'non-human'. Despite the lack of generic animacy-based classes, the Wakashan languages seem to use the class for III-dimensional referents as a type of generic or residue classifier used to classify objects that fall outside the semantic domains of other classes (see 5.1.5.2), creating systems that seem able to cover all types of referents.

As for languages with gaps in their numeral classification systems, there may be several explanations for the restricted applicability of classifiers. Aikhenvald (2000, pp. 334-335) mentions that the applicability of classifiers may depend on the productivity of the classification systems as some newly introduced items may be left unclassified. This is not a sufficient explanation for the gaps in the classification systems in the PNW as they often include classifiers used for relatively modern and newly introduced objects such as electrical appliances, cars, airplanes and pictures, which suggests that the systems are still productive or at least were until fairly recently. Additionally, there are many basic nouns for referents such as humans, animals or I- or II-dimensional objects like sticks, poles and blankets that are left unclassified in some of these languages, which shows that the explanation for the gaps in the systems can hardly be down to lack of productivity.

The absence of a classifier may have its basis in the semantic properties of referents. In many numeral classifier languages, abstract entities and referents that lack salience may be left unclassified (Aikhenvald, 2000, p. 334). Neither is this a satisfactory explanation for the gaps in the numeral classification systems of the PNW as many unclassified referents are concrete and highly salient.

It is possible that some gaps have to do with incomplete information in the sources used for this study, lack of use by speakers or decay of the systems. There is reason to believe that in some languages, certain classifiers have fallen out of use or that numeral classifiers in general have become optional and less used in numeral constructions (Montler, 2015; Levine, 1977; Gerdts et al. 2012). As such, it is reasonable to believe that perhaps only the most important classifiers were still in use when the data in the sources was recorded.

There seems to be cases where the applicability of classifiers is restricted to certain semantic groups as is the case in Haida (Isolate), where only inanimate objects and culturally useful living organisms take classifiers (Enrico, 2005, p. 798). Gerdts et al. (2012) suggests that the gaps in the Halkomelem (Salishan) system might be because classification is restricted to important or small and easily handled objects. While not unheard of, this kind of semantically based restrictions on the applicability of classifiers is generally uncommon in numeral classifier languages, where countable nouns usually have to take classifiers, but is common in other types of noun classification systems such as verbal or possessed classification (Aikhenvald, 2000, p. 334). Evidence from languages such as Haida and Halkomelem suggests that classification might be restricted to certain types of referents based on their cultural importance and manipulability in the numeral classification systems of some languages in the PNW. This might be related to the formal, functional and semantic similarities between numeral and verbal classification in these languages as the same classifier morphemes tend to be used for both, meaning that semantic restrictions in verbal classification might carry over to numeral classification.

In some cases, the lack of a classifier may itself be a classification device. This can be clearly seen in Tlingit (AET) where the ‘non-human’ class is signaled through the absence of a classifier. This kind of classification device might be most interesting when considering the lack of human or animate classifiers in Eyak, Nuu-chah-nulth and Ditidaht (see 5.1.2.1). While the sources are unclear on the applicability of the classifiers in Ditidaht and Nuu-chah-nulth, it seems like the III-dimensional class functions as a generic/residue class in these languages and is used to classify objects that fall outside of the domain of other classifiers (see 5.1.5.2). If this is the case, the human might be the only referents that are not counted with classifiers, meaning that it is motivated to claim that despite the lack of human classifiers in these languages, there is still a human class signaled by the absence of a classifier. This is especially important for Nuu-chah-nulth which lacks animacy-based classifiers, as it would mean that animacy might actually be used as a basis of classification in the language (see 5.1.2.1). As for the other language without animacy-based classifiers, Eyak, Krauss (1968, p. 174) mentions that the clearest distinction between classified and unclassified referents in the language is that animates (humans and animals) are unclassified while inanimates are classified, though there are examples of unclassified inanimates as well. This means that the restriction of classification is in large parts based on animacy but might not be entirely exclusive to animate referents.

How one interprets the functional aspect of the absence of animacy-based classifiers in Eyak and Nuu-chah-nulth has consequences for the discussion in 5.1.2.1 on the seeming lack of animacy as a basis of classification in these languages. If the absence of a classifier for human/animate referents can be seen as a classification device that signals a human/animate class, it is motivated to posit that the language in fact uses animacy as a basis of classification, just not through the overt use of classifiers. This could arguably be the case in Nuu-chah-nulth, though more information is needed to confirm this. As for Eyak, animate referents are not the only type of referents unclassified, making it less motivated to posit an animacy-based class for animate referents signaled through the absence of a classifier. As such, animacy might not be used as a basis of classification in Eyak, though it is important in its function as the primary basis of the distinction between classified and unclassified referents.

5.2 Areal patterns

As mentioned in sections 2.3.2 and 3.3, the lack of written historical records for the languages of the PNW makes it difficult to reliably reconstruct language contact and areal diffusion in the area. Instead, the arguments and hypotheses presented in this section are built on interpretations of observable patterns revealed by the results of the study.

In this section, more or less clear examples of observable areal patterns present both on an area-wide scale and on a smaller, regional scale will be discussed and evaluated.

5.2.1 Numeral classifiers acquired through contact

Since numeral classification systems are so prevalent in the PNW and characteristic of entire language families it is often difficult to determine whether the notion of numeral classifiers are acquired through contact or inherited for most languages. In the case of Chimakum (Chimakuan) however, the acquirement of numeral classifiers through contact seems clear. Chimakum belonged to the small Chimakuan language family together with its relative Quileute, but was spoken in a different area, surrounded by Salishan languages on all sides. Numeral classifiers do not seem to be a family trait since Quileute lacks the feature (Nichols, 1992). Features shared with neighbors but not with relatives are likely to be a result of contact (Mithun, 2010), which makes it highly likely that Chimakum acquired numeral classifiers through contact with its Salishan neighbors. As noted by Elmendorf (1990, p. 438), Chimakum exhibited strong Salish influence in both vocabulary and grammar and it can be surmised that Salish influence led to the development of numeral classifiers in the language as well.

A much less certain but possible case of acquirement through contact is the classification system in the language isolate Haida. Levine (1977) theorizes that the fairly low level of grammaticalization exhibited by the classifiers might be an indication of their late origin in the language. He hypothesizes that the classification system in Haida might have developed due to areal influence, possibly from Tlingit. Since Haida strongly differs from its neighbors in terms of the number of semantic distinctions and parameters used in the classification system, it is unlikely that the patterns of classification were borrowed or influenced to any significant degree, as a large component of the system cannot be accounted for by contact. Rather, Haida might have borrowed the “idea” of numeral classifiers from its neighbors but used native morphemes and categories to construct the system.

In 5.1.2.1 it was noted that the absence of animate or human classifiers in languages such as Eyak, Nuu-chah-nulth and Ditidaht could possibly be because of the numeral classification systems being recently developed or because of animacy being present elsewhere in the languages. If the first proposal is taken as true, it could be a sign that the numeral classification systems in these languages developed rather recently as a result of contact with neighboring languages.

5.2.2 Dimensionality distinctions

As concluded in 5.1.5, the physical property-based parameter of dimensionality can be considered a primary semantic parameter in the languages of the PNW and the primacy of classifiers for III-dimensional objects is particularly characteristic of the numeral classification systems in the area and could be seen as an areal trait for the PNW as a whole. There are also some interesting regional traits and tendencies in regard to the dimensionality distinctions made in these languages.

As seen in map 7 in section 4.2.5.1, there is a clear north-south divide in the distribution of dimensionality distinctions. All languages to the north of this division, roughly north of the Strait of Georgia, have a three-way distinction between I-dimensionality, II-dimensionality and III-dimensionality in their numeral classification systems. South of this division, in the region corresponding to the core of the Central PNW sub-area (see section 2.2.2), there is usually only one dimensionality value present (III-dimensional), or a two-way distinction between I- and III-dimensional.

The singular exception to this pattern seems to be Northern Straits Salish, spoken in the southern half of the area. Based on the data for this language, there is a three-way dimensionality distinction made. However, since the data comes from different dialects and seems to be overall somewhat incomplete, Northern Straits Salish might not prove to be an exception after all. Nonetheless, the pattern shown by the north-south divide is strong.

Since the north-south divide cuts across language families there is strong evidence that these patterns emerged as a result of contact and areal convergence. Nuxalk (Salishan) has a three-way

dimensionality distinction in similarity with its neighbors but in contrast to its Salishan relatives further south. There is also a clear divide in the Wakashan family, where the Northern Wakashan languages, spoken in the northern part of the area, have three-way distinctions while the Southern Wakashan languages, spoken further south, have two-way distinctions.

5.2.3 Animate classifiers

Humans are most commonly classified as 'human' in the languages of the PNW and are thus clearly distinguished from animals and inanimates. In Haida (Isolate), Heiltsuk (Wakashan) and Nuxalk (Salishan) however, humans and animals seem to be grouped together in an animate category and counted with a specific animate classifier (see map 5 in section 4.2.2). It is possible that there is an areal explanation for this pattern, especially considering that Nuxalk and Heiltsuk deviate from their relatives in this respect.

The Salishan relatives of Nuxalk tend to have three-way animacy distinctions between 'human', 'non-human animate' and 'inanimate' and there are classifiers specifically for humans in all languages, either as a central feature of the system or restricted to the numerals 'one' and 'two'. In contrast to its relatives, Nuxalk does not have a classifier specifically for humans and lacks the reduplicated human numerals that exist in the other Salishan languages. Nuxalk is the most divergent of the Salishan languages as it forms its own branch of the family and it shows extensive similarities with its Wakashan neighbors, mainly Heiltsuk (Mithun, 1999). It is possible that the animate class in Nuxalk emerged as a result of contact with neighboring languages like Heiltsuk.

As mentioned in the paragraph above, Nuxalk may have developed an animate classifier due to influence from Heiltsuk. This theory is not definite or entirely reliable, not least because of the somewhat uncertain status of the animate classifier in Heiltsuk. As stated in 4.2.3.5, the classifier *-ok* is glossed as 'animate' in the source (Boas, 1890, p. 106) but many animals seem to be classified as 'III-dimensional' instead of 'animate' (Rath, 1981, p. 733). Thus, the classifier might not actually refer to animates, but in case it does, it means that Heiltsuk deviates in this regard from its close relative Kwak'wala, which it is otherwise very similar to. It might be the case that Heiltsuk has developed an animate category as a result of areal influence, just like Nuxalk.

5.2.4 Interioricity

There are two languages, Nuxalk (Salishan) and Kwak'wala (Wakashan), that make an explicit distinction based on interioricity: the distinction between hollow objects like holes without an exterior outline and objects like rings and containers that have an exterior outline. Many languages in the sample have classifiers for hollow objects, but they don't explicitly make this distinction as they don't have classifiers for holes. This distinction is especially important in Kwak'wala where 2 of the only 6 classifiers deal with this distinction.

It is very likely that Nuxalk and Kwak'wala share this feature due to areal diffusion both because of the rarity of this parameter in the languages of the PNW and its absence in linguistic relatives (see map 11 in section 4.2.5.5 for the distribution of this parameter).

5.2.5 Languages with strong areal influence

As has been shown in 5.2.2, 5.2.3 and 5.2.4, Nuxalk, a Salishan language, is quite similar to some of its non-Salishan neighbors in a number of ways: the presence of an animate classifier, the use of interioricity as a semantic parameter and a three-way dimensionality distinction. These are properties that Nuxalk generally does not share with its relatives. While it is clear that Nuxalk has many aspects of its numeral classification system that are typical for Salishan languages, such as a specific classifier for buildings and a classifier for containers, the numerous similarities with its neighbors show that the language has been subject to areal diffusion and convergence. These findings are consistent with earlier research on linguistic contact between Nuxalk and its neighbors which reveals extensive borrowing on both a phonological, lexical and grammatical level (Mithun, 1999; Beck, 2000).

Similarly to Nuxalk, the Wakashan language Ditidaht has converged with its non-Wakashan neighbors in several ways. In Ditidaht, there is a classifier specifically for animals, while in the other Wakashan languages animals tend to be classified with the III-dimensional classifier. In this way, Ditidaht is somewhat similar to the Salishan languages Squamish and Lushootseed. Ditidaht, like many of its neighbors, has a specific classifier for canoes, that are classified as I-dimensional in the other Wakashan languages. The classifier for canoes *-c'aq* clearly has the same origin as the I-dimensional classifiers in the other Wakashan languages: *-c'iq* (Nuu-chah-nulth) and *-c'aq* (Kwak'wala and Heiltsuk). This heavily suggests that the classifier for I-dimensional objects might have been re-analyzed as a canoe classifier in Ditidaht, likely due to influence from neighboring languages.

Together with Nuu-chah-nulth, Ditidaht is also similar to its non-Wakashan neighbors in the dimensionality distinctions discussed in 5.2.2. Like the other languages in the central part of the PNW area, there is either just a classifier for III-dimensional objects or a two-way distinction between I-dimensionality and III-dimensionality. This sets the Southern Wakashan languages apart from the Northern Wakashan languages, that have three-way distinctions, and brings them closer to their non-Wakashan neighbors.

5.3 Areal-typological evaluations

This section will serve as a summary that evaluates the results discussed in 5.1 and 5.2 from an areal-typological perspective, summarizing how the numeral classification systems of the area can be characterized compared with other parts of the world and what explanations might be underlying the patterns and similarities observed.

From the discussion in 5.1 it becomes clear that the numeral classification systems of the PNW are in many ways similar to those in other parts of the world, with animacy and dimensionality being the primary semantic parameters employed in the numeral classification systems. While some patterns such as the lack of sub-classes for humans and animals and the lesser importance of the parameter of function differ from those observed in some other areas, like Southeast Asia, they still follow cross-linguistically common trends.

What sets the PNW apart from other parts of the world in terms of patterns that are can be considered especially characteristic of the PNW but cross-linguistically rare, we have the primacy of the III-dimensional value and the restricted applicability of classifiers, resulting in gaps in the systems. The primacy of the III-dimensional value is discussed in 5.1.5.1 and 5.1.5.2, where it is noted that the III-dimensional value is cross-linguistically the *least* encoded dimensionality value (Frawley, 1992, p. 123), which shows that the primacy of the III-dimensional value in numeral classification systems is an areal trait of the PNW. Several languages in the PNW have restricted applicability of classifiers, resulting in gaps in the systems as some basic referents like humans, animals and certain types of inanimate objects are counted without classifiers (see 5.1.8 for a more in-depth discussion). Aikhenvald (2000, p. 334) remarks that all countable nouns generally must take classifiers in numeral classifier languages, making many of the numeral classification systems in the PNW quite unusual in this regard.

As for the patterns and similarities observed in the area there can be many explanations. As shown mostly in 5.2, some similarities have clearly resulted from contact, either on an area-wide scale or on a smaller, more local scale. Through the discussion in 5.1 it becomes clear that some patterns found in the PNW are cross-linguistically very common or even more or less universal in numeral classification systems. Other patterns observed in all or some of the languages seem to be either inherited or exist as a result of language-internal causes such as the size of the classifier inventory and others seem to have cultural explanations.

5.4 Discussion of method

Since the sources used for this study consist of grammars, dictionaries and research articles, the credibility of the results and conclusions concerning classifier inventories, the semantics and the use of numeral classifiers in many ways depend on the quality of the descriptions provided. The descriptive quality, level of detail and completeness vary from source to source, which means that for some languages like Haida, Kwak'wala, Halkomelem and Squamish, for which the quality and detail of description is high, the results and conclusions might be more credible than for less described languages like Comox and Chimakum. There were three main problems concerning many of the sources:

1. Lack of detail: there are often few or no examples of nouns occurring with certain classifiers, and usually very little to no information on the use of numeral classifiers which can give some indication on their semantics, which makes analysis difficult. This was the case for languages like Comox and Lushootseed. While the semantics of most of the classifiers in these languages were more or less clear, there were also examples of classifiers for which the meaning was quite obscure due to lack of detail in the description.
2. Terminology: there are in many cases differences between the sources and the background literature regarding the terminology for semantic parameters and values (see 2.1.2.2). This means that my analysis of the semantics of numeral classifiers might be faulty due to misunderstandings and unclarified glosses. For example, the Nuxalk classifier *-lits'* is glossed as 'blanket-like' in the source (Nater, 1984), which I have interpreted as 'II-dimensional and flexible' based on the use of the '-like' suffix (indicating likeness based on physical properties) and the way blankets are classified in other languages. It is however difficult to know if my gloss really describes the properties of the classified objects that are seen as salient due to lack of detail and differences in terminology.
3. Incompleteness: there is reason to believe that the lists of classifiers are incomplete for some languages. Montler (2015) in his description of Klallam, in fact mentions that some classifiers other than those included in the description were in earlier use in the language. It is possible that this is the case for other languages as well. Thus, some of the conclusions in this study could turn out to be wrong in light of more data.

While these problems should be considered when evaluating the validity and generalizability of the results, especially concerning the use of individual semantic parameters in the languages, there is little reason to believe that they lower the validity of conclusions regarding general patterns and trends such as the primacy of III-dimensional classifiers, the importance of animacy and physical property and the north-south divide concerning dimensionality distinctions since most of these tendencies are strong.

Since languages from the southern part of the PNW had to be excluded from the sample, the results of this study might not be fully representative of the numeral classification systems in the area as a whole. While the languages of the northern and central parts of the PNW are well represented in the sample and exhibit quite strong tendencies and patterns in their numeral classification systems, a study including languages from the southern PNW might show other tendencies since the languages in the southern sub-area often belong to other genealogical groups from those further north and have a somewhat different history of linguistic contact.

The characterization of the semantics of the numeral classification systems in the PNW would probably benefit from a more systematic, detailed and in-depth comparison with other languages of the world and with other linguistic areas in particular. As is, the study is mostly informed by general cross-linguistic tendencies but overall fails to compare the PNW with linguistic areas other than Southeast Asia. Thus, this study might not fully characterize the PNW linguistic area in comparison to the rest of the world as it does not include an elaborate comparison of how the semantic patterns of numeral classification can be manifested in areally-determined ways in different areas.

5.5 Suggestions for further research

This study has a sample geographically delimited to the central and northern parts of the PNW as it is traditionally defined. This means that the southern part of the area is not represented and that languages from neighboring and overlapping areas to the east, north and south are excluded from the sample. It could be beneficial and interesting for future studies to include languages from the areas excluded in this study since this would make the sample more representative for the numeral classification systems in this part of the world and show possible similarities and differences between overlapping linguistic areas. A future study should take such a comparison into account as it could give interesting results regarding universals, common patterns and features specific to the PNW.

A study of the diachrony of the numeral classifier systems of the PNW could be very beneficial for an areal study, as it could give insights to contact-induced change. In a similar vein, a future study could include a more detailed investigation of the historical, cultural and socio-political context of the area which might be able to add further information regarding contact in the area and further explanations for the similarities in the semantics of numeral classification.

It could be interesting to compare the numeral classification systems with other noun classification systems in the languages of the PNW. Most of these languages also have verbal classifiers that in some cases use the same classifier morphemes for both numeral and verbal classification. Such a study could show if there are differences in the semantic parameters encoded in these two systems.

6 Conclusions

6.1 Answers to the research questions

6.1.1 What characterizes the numeral classification systems in the languages of the North American Pacific Northwest in terms of semantic parameters and the way they are used in the classification of referents?

The primary semantic parameters in the languages of the PNW are animacy and dimensionality.

Animacy can be considered relevant for high-level distinctions in all languages, but there are two cases where the use of animacy as a basis of classification is restricted or arguably absent: i) in languages with both reduplicated numerals 'one' and 'two' standing in complementary distribution with classifier suffixes, animacy is often restricted to the reduplicated numerals 'one' and 'two' and ii) in languages without human or animate classifiers, either as a result of the numeral classification system being recently developed or due to animacy-based distinctions being present elsewhere in the language. For the second case, the situation might prove to be more complex if it can be proven that the absence of human or animate classifiers constitutes a classification device, signaling animacy-based classes through the absence of classifiers.

About one-third of the languages make animacy distinctions between 'human', 'non-human animate' and 'inanimate', while distinctions between 'human' and 'non-human' or 'animate' and 'inanimate' are made by about one-fourth of the languages each. It is very rare to have several classifiers for humans. There are no examples of languages with several classifiers specifically for animals, but the size, function, cultural value or perceived animacy of an animal might be important for whether they are classified as animate/non-human animate or placed in the same class as inanimates.

All but three languages use one or several physical property-based parameters, out of which dimensionality is the primary and most basic parameter. Most commonly, the languages of the PNW exhibit a three-way dimensionality distinction between I-dimensional, II-dimensional and III-dimensional classifiers. The III-dimensional value can be considered the primary and most basic of the dimensionality values as it is always present in the languages that use dimensionality as a semantic parameter and is in some languages the only physical property-based classifier that exists. The prevalence and primacy of classifiers for III-dimensional objects is especially characteristic of the PNW as it is cross-linguistically the least used of the dimensionality values.

In the larger classifier systems, there are often other physical property-based parameters used in addition to dimensionality, the most common being shape, size and consistency. Less common physical property-based parameters are interioricity, material, constitution and orientation. Most of these parameters combine with dimensionality to form further distinctions and classes.

Function is quite difficult to identify and distinguish from other semantic parameters, but it is arguably important for the classification of animals and might be present for certain 'specific classifiers', that are very common among the languages of the PNW. Specific classifiers for canoes are very common in the area, but specific classifiers for buildings, garments, plants and fire are also present, mostly in the Salishan family.

In contrast to most numeral classifier languages in other parts of the world, there are many languages in the PNW that have gaps in their numeral classification systems due to restricted applicability of classifiers.

6.1.2 Do the semantic patterns of the numeral classification systems reveal any areal patterns that are enlightening in regard to diffusion and contact between languages in the area?

The results reveal several contact-induced phenomena and areal patterns, present both on an area-wide scale and on a smaller, regional scale.

The most significant areal pattern is the strong north-south area-wide divide regarding dimensionality distinctions, cutting through language families. Languages to the north of this divide exhibit three-way dimensionality distinctions while languages to the south tend to only have III-dimensional classifiers or a two-way distinction between I- and III-dimensional classifiers.

Several languages show differences from their relatives and striking similarities with their neighbors. There is pretty strong evidence that Chimakum (Chimakuan) acquired numeral classifiers through contact with neighboring Salishan languages, as its relative Quileute lacks the feature. Nuxalk (Salishan), in contrast with its relatives but in accordance with some of their nieghbors, have a three-way dimensionality distinction, interioricity as a relevant semantic parameter and an animate classifier. Ditidaht (Wakashan) differs sharply from its relatives in the presence of a non-human animate classifier and a specific classifier from canoes, both of which are present in many neighboring Salishan languages but absent in other Wakashan languages.

6.2 Concluding remarks

In this study, I have investigated the numeral classification systems in the PNW linguistic area with the aim of characterizing the systems by the semantic parameters they use as bases of classification and the areal patterns they might reveal. To do this, the semantics of the numeral classification systems were analyzed and compared with reference grammars and dictionaries as data sources. The data was considered against a wider typological background, taking into account what earlier research on numeral classification has shown. The results were then analyzed to see if they reveal any areal patterns. The study reveals that the semantics of numeral classification systems in the languages of the PNW are in most ways similar to numeral classification systems elsewhere in the world, but that there are also some patterns and properties that are especially characteristic of the PNW. The results show some areal patterns present both on an area-wide scale and on a smaller, regional scale. This study is important for establishing the characteristics of the semantics of numeral classification systems in the PNW and how they compare with what earlier typological and areal research has revealed about numeral classification systems in general and in other parts of the world in particular.

Since numeral classification systems have received little attention in areal-typological research in the PNW, this study is the first attempt at a larger comparative study that aims to characterize the numeral classification systems found in this area in terms of their semantics. Thus, this study is able to contribute to the knowledge of one of the central areal traits that characterize the PNW as a linguistic area. Further research should include languages from the southern area of the PNW as well as languages from neighboring and overlapping areas to the north, east and south to create a sample that is more representative for the numeral classification systems in this part of the world, giving greater insight to the characteristics of these systems and linguistic contact in the area.

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Appendix A: The languages of the North American Pacific Northwest linguistic area

Table 14 below lists the languages of the PNW arranged by family and genus. Included are also ISO codes enclosed in brackets as well as dialects and alternative names. The genetic groupings primarily follow the information found in Glottolog 4.5 (Eberhard et al., 2022) with supplementary information from Mithun (1999). ISO codes and alternative names are taken from Ethnologue (Hammarström et al., 2022).

Table 14: The languages of the PNW linguistic area

Athabaskan-Eyak-Tlingit
- **Tlingit** [tli] alt. *Kolosch, Kolosh, Thlinget, Tlinkit*
  - Athabaskan-Eyak
    - **Eyak** [eya]
    - Pacific Coast Athabaskan
      - Oregon Athabaskan
        - **Upper Umpqua** [xup]
        - **Tolowa-Chetco** [tol] (d. Chetco, Smith River)
        - Rogue River
          - **Tututni** [tuu] alt. *Lower Rogue River* (d. Upper Coquille, Chasta Costa, Tututni, Euchre Creek)
            - **Galice** [gce] (d. Galice, Applegate)
            - **Coquille** [coq] alt. *Chasta Costa, Ko'kwel, Miluk, Mishikhwutmetunee, Tutuni-Chasta Costa-Coquille, Upper Coquille*

Haida [hai] (d. Northern Haida [hdn] alt. *Masset, X̲aad Kíl, Xaad Kil* (d. Kaigani, Masset), Southern Haida [hax] alt. *Xaaydaa Kil* (d. Skidegate, Ninstints))[1]

Tsimshianic[2]
- **Coast Tsimshian** [tsi] alt. *Chimmezyan, Maritime Tsimshianic, Tsimpshean, Zimshian* (d. Coast Tsimshian/Sm'algyax, Southern Tsimshian/Sgüüx̣s)
  - Nass-Gitxsan
    - **Nisga'a** [ncg] alt. *Nass, Nisgha, Nishga, Nishka, Nisk'a, Nisqa'a*

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[1] There are several controversies regarding the classification of Haida. Firstly, there is the Na-Dene hypothesis which proposes that Haida is related to Athabaskan-Eyak-Tlingit (Sapir, 1915f). Nowadays, most scholars consider Haida to be genetically unrelated and similarities are attributed to areal contact (Mithun, 1999, p. 308). Secondly, due to large differences between Northern (Masset) and Southern (Skidegate) Haida some treat them as different languages (Eberhard et al., 2022; Hammarström et al., 2022). In this thesis, examples are labelled for whether they represent Northern (Masset) or Southern (Skidegate) Haida.

[2] The exact number of Tsimshianic languages is unclear. Southern Tsimshian is a divergent dialect of Coast Tsimshian that might be considered a separate language (Thompson & Kinkade, 1990, p. 31-32). Nisga'a and Gitxsan are often treated separately, but they are in fact mutually intelligible and might thus be considered dialects (Mithun, 1999, p. 525).

Gitxsan [git] alt. *Giklsan, Gitksan, Gitxsen, Gityskyan, Hazelton, Nass-Gitksan* (d. Gitxsan/Eastern, Gitsken/Western)

Wakashan[3]
- North Wakashan
  - **Haisla** [has] alt. *Haishilla, Kitlope, Northern Kwakiutl, Xenaksialakala* (d. Kitimat, Henaksiala)
  - Kwakiutlan
    - **Kwak'wala** [kwk] alt. *Kwagiutl, Kwakiutl, Kwakwaka'wakw* (d. Northern, Southern)
    - **Heiltsuk-Oowekyala** [hei] alt. *Bella Bella* (d. Heiltsuk, Ooweekeeno)
  - South Wakashan
    - **Nuu-chah-nulth** [nuk] alt. *Aht, Nootka, Nootkans, Nutka, Nuučaan'ul, Quuquu'aca, T'aat'aaqsapa, West Coast* (d. Cheklesaht, Kyuquot, Ehattesaht, Nuchatlaht, Mowachaht, Muchalaht, Hesquiaht, Ahousaht, Tla-o-qui-aht, Ucluelet, Toquaht, Uchucklesaht, Tseshaht, Hupacasath, Huu-ay-aht)
    - Makah-Nitinaht
      - **Ditidaht** [dtd] alt. *Diidiitidq, Diitiid'aatx, Nitinaht, Nitinat*
      - **Makah** [myh] alt. *Kwe-Nee-Chee-Aht, Kweedishchaaht, qʷi·qʷi·diččaq*

Salishan
- **Nuxalk** [blc] alt. *Bella Coola*
- Coast Salishan
  - Central Salish
    - **Comox** [coo] alt. *Comox-Sliammon* (d. Island Comox, Mainland Comox)
    - **Pentlacht** [ptw]
    - **Sechelt** [sec] alt. *She Shashishalhem*
    - **Squamish** [squ] alt. *Skwxwu7mesh Snichim*
    - **Halkomelem** [hur] alt. *Holkomelem* (d. Downriver/Hun'qumi'num', Upriver/Halq'eméylem, Island/Hul'q'umín'um')
    - **Nooksack** [nok] alt. *Lhéchelesem, Nootsack*
    - **Twana**
    - Lushootseed-Puget[4]
      - **Lushootseed** [lut] alt. *Dəxʷləšucid, Northern Lushootseed, Northern Puget Sound Salish, Xʷəlšucid* (d. Sauk-Suiattle, Skagit, Snohomish)
      - **Southern Lushootseed** [slh] alt. *Southern Puget Sound Salish, Twulshootseed, Whulshootseed, Xʷəlšuʔcid* (d. Duwamish, Muckleshoot, Nisqually, Puyallup, Snoqualmie, Suquh, Southern Lushootseed, Sahewamish, Suquamish, Skykomish)
    - Strait Salish
      - **Klallam** [clm] alt. *Clallam, Na'klallam, S'klallam*
      - **Northern Strait Salish** [str] alt. *SENĆOŦEN, Straits* (d. Lummi, Saanich, Samish, Songish/Songhees, Semiahmoo, Sooke)
  - Tsamosan
    - Coastal Tsamosan
      - **Quinault** [qun] alt. *Kwinaył*
      - **Lower Chehalis** [cea] alt. *Łəw'ál'məš*
    - Inland Tsamosan
      - **Upper Chehalis** [cjh] alt. Chehalis, Kwaiailk, Q̓ʷaɁáyiłq̓ (d. Satsop, Oakville, Tenino)
      - **Cowlitz** [cow] alt. Lower Cowlitz

- **Tillamook** [til] (d. Tillamook, Siletz)

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[3] The languages within each subgroup (northern and southern) are closely related, but the relation between the two subgroups is distant (Thompson & Kinkade, 1990, p. 39).

[4] Some count four separate Lushootseed varities: Lushootseed, Southern Lushootseed, Skagit and Snohomish (Hammarström et al., 2022).

Chimakuan
Chimakum [xch] alt. *Chemakum*
Quileute [qui] alt. *Quillayute* (d. Quileute, Hoh)

Chinookan
Lower Chinook [chh] alt. *Chinook, Shoalwater* (d. Klatsop, Shoalwater)

Alsea [aes] (d. Alsea, Yaquina)[5]

Siuslaw [sis] alt. *Lower Umpqua, Siuslawan*

Takelma [tkm] (d. Lower Takelma, Latkawa)

Kalapuyan
Central Kalapuya [kyl] alt. *Kalapuyan, Luckiamute, Lukamiute, Santiam, Wapatu, Yoncalla*

Coosan
Hanis [csz]
Miluk [iml]

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[5] Some consider Alsea to be a small language family consisting of two closely related languages: Alsea and Yaquina (Thompson & Kinkade, 1990, p. 42).

Appendix B: Lists of classifiers

This appendix includes lists of the classifiers found in the sources for each language. Included are the classifier morphemes, my glosses and examples of associated nouns for each classifier mentioned in the sources. A question mark '?' is added to highly uncertain glosses. Included are also numerals 1-10 for each language.

The languages are organized according to the number of classifiers included in their classifier inventories, with the language with the fewest classifiers first and the ones with the largest number of classifiers last.

B.1 Tlingit (Athabaskan-Eyak-Tlingit)

The only semantic distinction that is relevant in Tlingit is that between humans and non-humans. Numerals (table 15) are marked with a classifier suffix (table 16) only when enumerating human referents. The sources are Mills (1973) for the numerals and Naish (1979) and Passer (2016) for information on the classifier system.

Table 15: The Tlingit numerals 1-10

Tlingit numerals	
1	*tléix'*
2	*déix̲*
3	*nás'k*
4	*daax'oon*
5	*keijín*
6	*tleidooshú*
7	*dax̲.adooshú*
8	*nas'gadooshú*
9	*gooshúk̲*
10	*jinkaat*

Table 16: The numeral classifier in Tlingit

Classifier	**Gloss**	**Associated Nouns**
-náx̲	'human'	people, humans

B.2 Nisga'a (Tsimshianic)

Nisga'a has four sets of numerals for classifying different referents: 1) inanimates, 2) humans, 3) non-human animates (also skins/garments) and 4) canoes/boats/vehicles. Table 17 shows the classifier numerals 1-10. The source is Tarpent (1987).

Table 17: The Nisga'a numeral classifier numerals 1-10

Numerals	**Inanimate**	**Human**	**Non-human animate**	**Canoe, boat, vehicle**
1	*k̲'íl'*	*k'ó:l*	*k'é:k^{w}*	*q'amé?et*
2	*k̲'ílp'il*	*paqatíl*	*t'ipx̲á:t*	*qalpé?eltk^{w}s*

3	*kʷilál'*	*kʷiló:n*	*kʷilán*	*kʷilál'tkʷs*
4	*tx̲álpx̲*	*tx̲alpx̲tó:l*	*tx̲álpx̲*	*tx̲álpx̲kʷs*
5	*kʷstíns*	*kʷstinsó:l*	*kʷstíns*	*kʷstínskʷs*
6	*q'ó:l't*	*q'o:l'tó:l*	*q'ó:l't*	*q'ó:l'tkʷs*
7	*t'ipx̲ó:l't*	*t'ipx̲o:l'tó:l*	*t'ipx̲ó:l't*	*t'ipx̲ó:l'tkʷs*
8	*qantó:l't*	*y'uxʷta:l'tó:l*	*y'uxʷtá:l't*	*qantó:l'tkʷs*
9	*kʷstimó:s*	*kʷstimo:só:l*	*kʷstimó:s*	*kʷstimó:skʷs*
10	*xpíl*	*xpó:l*	*k'áp*	*k'ápkʷs*

B.3 Chimakum (Chimakuan)

Chimakum has four sets of numerals for classifying different referents: 1) inanimates, 2) humans, 3) non-human animates and 4) canoes. Table 18 shows the classifier numerals 1-10. The source is Boas (1892). The missing numerals might be due to lack of data.

Table 18: The numeral classifier numerals in Chimakum

Numerals	Inanimate	Human	Non-human animate	Canoe
1	*kuḗ'l'*	*koā́'l'*	*kuḗěns*	*kuḗěkō*
2	*l'ákua*	*l'áhuɣas*	*l'ákuāns*	*l'ákuakŭ*
3	*ɣoā́'lē*	*ɣoá'l'tsō*	*ɣoalā́ns*	*ɣoá'lakŭ*
4	*mě́'ēs*	*mě́'ēs*	*mě́'ēsěns*	*mě́'ēskō*
5	*tcā́'aa*	*tcā́'aa*	*tcā́'aans*	*tcā́'aakŭ*
6	*tsě́'l'as*	*tsě́'l'as*	*tsě́'l'āsěns*	*tsě́'l'askŭ*
7	*ts!ɣṓ'olkoant*		*ts!ɣṓ'olɣoantěns*	*ts!ɣṓ'olkoantkō*
8	*ɣ!'oá'yēkoant*			*ɣ!'oá'yēkoantkō*
9	*kuḗ'l'tsqal*			*kuḗ'tsqalkō*
10	*tc!ḗ'taa*			*tc!'ētā́'akŭ*

B.4 Comox (Salishan)

Comox has four classifier suffixes shown in table 20. The plain numerals and the human numerals are shown in table 19. The human numerals are used to count 1-2 humans but for numerals three and up humans are counted with the *-ayi* 'container' classifier. The sources are Harris (1977) and Sapir (1915).

Table 19: The Comox numerals 1-10

	Comox numerals	
	Plain numerals	Human numerals
1	*páʔa*	*pípaʔa*
2	*sáʔa*	*sísaʔa*
3	*tcálas*	–
4	*mōs*	–
5	*síyātcɨs*	–
6	*t'áxam*	–
7	*ts'ó'tcī**s***	–
8	*tá'atcī**s***	–
9	*tígɨʷx̲ʷ*	–
10	*ópān*	–

Table 20: The numeral classifier suffixes in Comox

Classifier	Gloss	Associated nouns
-ayi	'container'	containers, humans, cylindrical objects
-os	'III-dimensional'	dollars, heads, turnips
-agəl	'canoe'	canoes
-awʔtxʷ	'building'	buildings, houses

B.5 Ditidaht (Wakashan)

Ditidaht has four classifier suffixes shown in table 22. The Ditidaht numerals are shown in table 21. The source is Hess (1990) for the numerals and Thomas & Hess (1981) for the classifiers.

Table 21: The Ditidaht numerals 1-10

Ditidaht numerals	
1	*c'awa:ʔk*
2	*ʔaƛ̓*
3	*qakac'*
4	*bu:*
5	*šuč*
6	*či:χpa:ɬ*
7	*ʔaƛ̓pu:*
8	*ʔaƛ̓asib*
9	*c'awa:sib*
10	*ƛ̓aχʷ*

Table 22: The numeral classifiers in Ditidaht

Classifier	Gloss	Associated nouns
-kʷɬʔi:t	'(large) animal'	large/higher animals
-qʷabɬ	'III-dimensional'	birds, bullets, cars, electrical appliances, pianos
-p'e:y'ɬ	'I-dimensional'	spears, guns, trees, flowers, poles, sticks
-c'aq	'canoe'	canoes, ships, vehicles, airplanes

B.6 Klallam (Salishan)

Klallam has 4 classifier suffixes shown in table 24. The plain numerals and the human numerals are shown in table 23. The human numerals are used to count 1-2 humans while for numerals three and up humans are counted with the *-áy* 'container' classifier. The source is Montler (2015).

Table 23: The Klallam numerals 1-10

Klallam numerals		
	Plain numerals	Human numerals
1	*nəc'uʔ*	*náʔc'uʔ*
2	*čə́saʔ*	*čáʔsaʔ*
3	*łíxʷ*	–
4	*ŋús*	–

5	*łqʼáčš*	–
6	*tʼx̣áŋ*	–
7	*cʼúʔkʷs*	–
8	*táʔcs*	–
9	*təkʷxʷ*	–
10	*ʔúpən*	–

Table 24: The numeral classifier suffixes in Klallam

Classifier	Gloss	Associated nouns
-áy	‘container’	humans, containers
-áʔitxʷ	‘III-dimensional’	dollars
-íɬč	‘plant’	trees, bushes
-áwʼtxʷ	‘building	buildings, houses, rooms

B.7 Heiltsuk (Wakashan)

Heiltsuk has five classifier suffixes shown in table 26. The Heiltsuk numerals are shown in table 25. The sources are Boas (1890) and Rath (1981).

Table 25: The Heiltsuk numerals 1-10

Heiltsuk numerals	
1	*men*
2	*matl*
3	*yutq*
4	*mu*
5	*skyʼa*
6	*katla*
7	*matlaaus*
8	*yutquaus*
9	*mamene*
10	*aikyʼas*

Table 26: The numeral classifiers in Heiltsuk

Classifier	Gloss	Associated nouns
-ok	‘animate’ ?	humans, animals
-skam	‘III-dimensional’	deer, ducks, houses, dollars
-cʼaq	‘I-dimensional’	canoes, bottles, trees, cigarettes
-qsa	‘II-dimensional’	paper, halibuts, slabs of lumber
-qtla	‘container’	cups, bowls, glasses

B.8 Nuu-chah-nulth (Wakashan)

Nuu-chah-nulth has five classifier suffixes shown in table 28. The numerals are shown in table 27. The gloss for the classifier *-pʼiːɬʷ* ‘I-dimensional, flat’ comes from Swadesh (1938) which specifies the shape ‘flat’ for this classifier. This gloss should be seen as highly tentative as the notion of flatness is neither particularly motivated by the referents belonging to the class nor mentioned in other sources

such as Yiu & Stonham (2002). The sources are Yiu & Stonham (2002) and Swadesh (1938) for the classifiers and Stonham (1998) for the numerals.

Table 27: The Nuu-chah-nulth numerals 1-10

Nuu-chah-nulth numerals	
1	*c'awaa*
2	*ʔaƛ̓a*
3	*qačc'a*
4	*muu*
5	*suča*
6	*n'upu*
7	*ʔaƛ̓pu*
8	*ʔaƛ̓ak^{w}aɬ*
9	*c'awaak^{w}aɬ*
10	*ḥayu*

Table 28: The numeral classifiers in Nuu-chah-nulth

Classifier	Gloss	Associated nouns
-qimɬ	'III-dimensional'	hoops, skins, money, clothing, birds, animals, houses, stones, guns, paddles, months
-c'iq	'I-dimensional'	salmon, spears, arrows, canoes, boats, trees
-ḥtayuk	'I-dimensional, thin, flexible'	strings
-p'i:ɬ^{w}	'I-dimensional, flat' ?	spines, cannons, house posts, songs
-ḥta:k^{w}	'container'	sacks, baskets

B.9 Kwak'wala (Wakashan)

Kwak'wala has six classifier suffixes shown in table 30. The numerals 1-10 are shown in table 29. The source is Berman (1990) for the classifiers and Boas et al. (1947) for the numerals.

Table 29: The Kwak'wala numerals 1-10

Kwak'wala numerals	
1	*nɛm*
2	*maɛɬ*
3	*yu'dɛx^{w}*
4	*mo*
5	*sek'a*
6	*q'aL'a*
7	*aLɛbo*
8	*ma^{ɛ}ɬg^{w}ɛnaɬ*
9	*^{ɛ}na^{ɛ}nema*
10	*la^{ɛ}sto*

Table 30: The numeral classifiers in Kwak'wala

Classifier	Gloss	Associated nouns

-ukʷ	‘human’	people, humans
-sg̱əm	‘III-dimensional’	quadrupeds, stones, houses, large objects, abstract notions
-c’aq	‘I-dimensional’	arrows, canoes, sticks, poles
-x̱sa	‘II-dimensional’	fish, blankets, leaves, mats, boards
-x̱La	‘container’	dishes, spoons, ladels, cradles, buckets
-zəq	‘hole’	holes

B.10 Coast Tsimshian (Tsimshianic)

Coast Tsimshian has six sets of numerals for classifying different referents: 1) inanimates, 2) human 3) I-dimensional objects 4) II-dimensional objects 5) III-dimensional objects 6) canoes. Table 31 shows the numerals 1-10. The source is Boas (1911).

Table 31: The numeral classifier numerals in Coast Tsimshian

Numerals	**Inanimate**	**Human**	**I-dimensional**	**II-dimensional**	**III-dimensional**	**Canoe**
1	*k’āk*	*k’ōl*	*q’a’wutsxan*	*k’āk*	*kE’rEl*	*q’amā’t*
2	*t’Epxā’t*	*t’əpxadō’l*	*qō’psxan*	*t’Epxā’t*	*gū’p’El*	*galbā’ltk*
3	*gwant*	*gulō’n*	*g̱a’ltsg̱an*	*gwant*	*k’ulē’*	*g̱altsg̱a’ntk*
4	*txālpx*	*txalpxdō’l*	*txō’psxan*	*txālpx*	*txālpx*	*txālpxsk*
5	*kʷstōns*	*kstEnsō’l*	*ktu:’nsxan*	*kʷstōns*	*kʷstōns*	*kstō’nsk*
6	*q’ōlt*	*q’aldō’l*	*q’o’ltsxan*	*q’ōlt*	*q’ōlt*	*q’oltk*
7	*t’Epxō’lt*	*t’Epxaldō’l*	*t’Epxā’ltsxan*	*t’Epxō’lt*	*t’Epxō’lt*	*t’Epxā’ltk*
8	*q’andō’lt*	*yukleadō’l*	*yuklatsxa’n*	*yukdal’t*	*yukdal’t*	*yukdāltk*
9	*kstEmō’s*	*kstEmasō’l*	*kstEmō’tsxan*	*kstEmō’s*	*kstEmō’s*	*kstEmō’sk*
10	*k’ap*	*kpōl*	*kpētsxan*	*k’ap*	*kpīl*	*k’apsk*

B.11 Squamish (Salishan)

Squamish has two types of numeral classifiers: 1) sets of numerals for inanimates, non-human animates and humans and 2) classifier suffixes. The non-human animate numerals consist of partial reduplication of the simple ‘inanimate’ numerals, while the human numerals are totally reduplicated. Table 32 shows the numeral sets for the numerals 1-10 while table 33 shows the classifier suffixes. The source is Kuipers (1967).

Table 32: The Squamish numeral classifier numerals 1-10

Numerals	**Inanimate**	**Non-human animate**	**Human**
1	*nč’uʔ*	*niˡ-nč’uʔ*	*nč’-nč’uˡʔ*
2	*ʔaˡnʔus*	*ʔaˡn.nʔus*	*ʔn-ʔaˡnʔus*
3	*čaˡnat*	*čaˡ-čʔnat*	*čn-čaˡnat*
4	*x̌aʔuˡcn*	*x̌iˡ-x̌aʔuˡcn*	*x̌ə-x̌aʔuˡcn*
5	*ciˡačis*	*ciˡ-ciʔaˡčis*	*ci-ciˡačis*
6	*t’aˡq’ač*	*t’a-t’q’aˡč*	*t’əq’-t’aˡq’ač*
7	*t’ak̓usaˡč*	*t’aˡ-t’k̓usaˡč*	*t’ək̓-t’ak̓usaˡč*
8	*tqač*	*ʔaʔ-tqaˡč*	*təq-tqaˡč*
9	*c’əs*	*c’i-c’s*	*c’əˡs-c’əs*
10	*ʔuˡpn*	*ʔuˡ-ʔpn*	*ʔəp-ʔuˡpn*

Table 33: The numeral classifier suffixes in Squamish

Classifier	Gloss	Associated nouns
-qs	‘I-dimensional, small’	piece of wood
-u̱i̱ʔs	‘III-dimensional, big’	rocks, dollars
-a̱i̱umʔ	‘III-dimensional, small’	berries, marbles, pennies
-au̱ʔs	‘building’	buildings, houses
-ax ɬʲλ	‘container’	canoes, buckets, bottles, pots, plates, spoons, baskets

B.12 Northern Straits Salish (Salishan)

Northern Straits Salish has eight classifiers shown in table 35. The plain numerals and the human numerals 1-2 are shown in table 34. The data on the numerals comes from the Songish dialect as it is difficult to find data for the other dialects. The human numerals are used to count 1-2 humans but for numerals three and up humans are counted with the *-eləʔ* ‘container’ classifier. The data comes from the Songish and Saanich dialects. The sources are Hill-Tout (1906), Montler (1986) and Raffo (1972).

Table 34: The Northern Straits Salish (Songish) numerals 1-10

Northern Strait Salish numerals		
	Plain numerals	Human numerals
1	*nə́cʼa*	*nácʼa*
2	*čə́saʔ*	*čäsáʔ*
3	*ɬíxʷ*	–
4	*ŋás*	–
5	*ɬqʼéčəs*	–
6	*tʼx̣ə́ŋ*	–
7	*cʼáʔkʷəs*	–
8	*tʼáʔsis*	–
9	*tə́kʷəxʷ*	–
10	*ʔápən*	–

Table 35: The numeral classifier suffixes in Northern Straits Salish

Classifier	Gloss	Associated nouns
=eləʔ	‘container’	humans, containers
=mits	‘I-dimensional’	poles
=amət	‘II-dimensional’	blankets
=ətxʷ	‘III-dimensional’	dollars; stones
=kʷəɬ	‘canoe’	canoes, boats
=iɬč	‘plant’	trees, bushes
=ok	‘hat’	hats
=ewʼtxʷ	‘building’	buildings, houses

B.13 Lushootseed (Salishan)

Lushootseed has eight classifier suffixes shown in table 37. The plain numerals and the human numerals are shown in table 36. The sources are Bates et al. (1994) and Beck (2020).

Table 36: The Lushootseed numerals 1-10

Lushootseed numerals		
	Plain numerals	Human numerals
1	*dəču?*	*diiču?*
2	*sali?*	*səsa?li?*
3	*łix^{w}*	*łix^{w}ix^{w}*
4	*buus*	*bəbu?s*
5	*cəlac*	*cələlac*
6	*yəla?c*	*yələla?c*
7	*c'uk^{w}s*	*c'uk^{w}uk^{w}s*
8	*təqači?*	*təqqači?*
9	*x̌^{w}əl*	*x̌^{w}ələl*
10	*?ulub*	*?ululub*

Table 37: The numeral classifier suffixes in Lushootseed

Classifier	Gloss	Associated nouns
-alps	'animal (mainly domestic)'	horses, ducks
-ilc	'III-dimensional'	dollars
-əlus	'III-dimensional, (loop)' ?	squares in nets, stitch in knitting
-g^{w}il	'canoe'	canoes
-al?tx^{w}	'building'	buildings, houses
-ali	'plant'	plants
-ulč	'container'	containers, clams
-čup	'fire'	fires

B.14 Nuxalk (Salishan)

Nuxalk has 13 classifiers shown in table 39. The numerals 1-10 are shown in table 38. The sources are Nater (1984) and Saunders & Davis (1975).

Table 38: The Nuxalk numerals 1-10

Nuxalk numerals	
1	*smaw*
2	*lhnus*
3	*7asmus*
4	*mus*
5	*ts'icw*
6	*t'xulh*
7	*nus7alhklhm*
8	*k'ilhnus*
9	*k'ismaw*
10	*ts'klakt*

Table 39: The numeral classifiers in Nuxalk

Classifier	Gloss	Associated nouns
-ao	'animate'	humans, animals

-aɬ	‘container’	canoes, cars, beds, dishes, boxes, baskets, spoons
-aχ	‘I-dimensional’	poles, trees, sticks
-ikt	‘II-dimensional’	
-aχikt	‘II-dimensional, long’	
-u:ɬ	‘III-dimensional’	balls, fruit, bread, rocks, bundles, bee hives, dollars
-aʔɬ	‘II-dimensional, rigid’ ?	paddle-shaped stirrer
-lits’	‘II-dimensional, flexible’	blankets
-iɬ	‘hollow object with exterior outline (ring/hoop-like)’	rings, bracelets
-uɬ	‘building’	buildings, houses
-a:k	‘glove’	gloves
-aq’ws	‘hole’	hole
-alus	‘fire’	fire

B.15 Eyak (Athabaskan-Eyak-Tlingit)

Eyak has 17 classifiers shown in table 41. Most of the classifiers are combinations of some of the more basic classifiers like *-gl* which is a combination of *-gw* ‘I-dimensional, thin, flexible (filament-like)’ and *-l* ‘III-dimensional’. The meanings of some classifiers are unclear and are glossed as ‘unclear’. It is unclear if all classifiers are used as numeral classifiers as the sources don’t specify if they are used in numeral constructions or not. The Eyak numerals 1-10 are shown in table 40. The suffix *-ih* is added to numerals ‘one’, ‘two’ and ‘five’ for abstract counting and to count unclassified nouns (Krauss, 2009). The sources are Krauss (2009) and Krauss (2011).

Table 40: The Eyak numerals 1-10

Eyak numerals	
1	*LinhG-ih*
2	*la’d-ih*
3	*t’uhLga’*
4	*qAlahqa’ga’*
5	*ch’a:n’-ih*
6	*tsi’i:n*
7	*la’dits’i:n*
8	*q’adits’i:n*
9	*guts’de:*
10	*dAGa:q’*

Table 41: The numeral classifiers in Eyak

Classifier	**Gloss**	**Classified nouns**
-d	‘wooden, fire, oral/noise, flat natural expanse, pretuberance, III-dimensional’	woody plants, wooden artifacts, buildings, tables, fish spears, doors, stores, arrows, sleds, automobiles, bark, fire, lamp, floor, name, song, glacier, ice, clearing, eggs, mussels, bracelets, rings, hoops, frying pans, dollars, knives etc.

-l	‘III-dimensional’	head, heart, fish roe, hat, breast, basket, bucket, paddle, shovel, moon, abalone, mountain, wedge, gravel beach, fat etc.
-lX	‘III-dimensional, small’	berries, fruit, vegetables, eyes, balls, beads, coarse granular material etc.
-dl	unclear	stones, objects made of stone, buttons, earth, land, tree branch, nets, needles etc.
-Xd	‘I-dimensional, thick’	logs, planks, poles, fishing rods, candles, matchsticks, riverbank, fog, cloud, rainbow, days, shoulders etc.
-gw	‘I-dimensional, thin, flexible’	spruce roots, strings, cords, veins, strands of hair, blade of grass, knitting yarn, moss on tree, grass species etc.
-qi:l	‘I-dimensional, flexible’	ropes, strings, chains, twines, snares
-qi:dl	‘I-dimensional, hollow’	intestine, garden hose, rope kelp
-ti:l	‘II-dimensional, thin, flexible’	pelts, leaves, feathers, gloves, mittens
-Xdl	‘curved surface’	waves, dunes
-gd	unclear	grass, braid of hair, dry salmon, neck, lake
-gl	‘liquid’	water, milk, tea, beer, soup, liquid medicine, river, paint, butter, grease, blood, salt water, salt etc.
-lXd	‘granular’	snowballs, expanse of snow, cotton, moss
-gdl	‘neck’	neck
-gwlX	‘spine’	spine, backbone, spine and ribcage
-gwlXd	‘snare’	snare
-Xu:l	‘ladder i.e object with rungs’	teeth-like objects in position, ladder

B.16 Halkomelem (Salishan)

Halkomelem has 19 classifiers shown in table 43. The plain numerals and the human numerals are shown in table 42. The sources are Gerdts & Hinkson (2004) and Shaw et al. (2002).

Table 42: The Halkomelem numerals 1-10

	Halkomelem numerals	
	Plain numerals	Human numerals
1	*nə́c'aʔ*	*nan'əc'aʔ*
2	*yəsél’ə*	*yey'səl'ə*
3	*ɬíxʷ*	–
4	*χəʔáθən*	–
5	*ɬq’écəs*	–
6	*t’χə́m*	–
7	*t'θáʔkʷs*	–
8	*tqéceʔ*	–
9	*tú:xʷ*	–
10	*ʔápən*	–

Table 43: The numeral classifier suffixes in Halkomelem

Classifier	**Gloss**	**Associated nouns**

=elə	‘human’	human
=eyəɬ	‘child’	children
=aʔqʷ	‘III-dimensional (spherical), big’	lettuce, cabbage, balls of yarn, fish, sealife
=als	‘III-dimensional (spherical), small’	stones, eggs, berries, fruits, vegetables, balls
=əs	‘III-dimensional, flat’	dollars
=aləs	‘III-dimensional, (loop, cylindrical)’	rows of knitting, meshes of net, campfires (sitting in ring), pens, sticks, boards
=iy’əs	‘III-dimensional, vertically extended, (loop)’	rings, bracelets, baskets, coils of rope
=emət’θ	‘I-dimensional, thin, rigid’	poles, rods, boards, sticks, roads, house posts
=it’θeʔ	‘I-dimensional, thin, flexible’	cedar root, ropes, strands of yarn, strips of cloth/bark
=wəɬ	‘canoe’	canoes, boats, car, plates, platters
=ew'txʷ	‘building’	buildings, houses
=e:l’wəs	‘paddle’	paddles
=əlwət	‘garment’	shirts, coats, pajamas, ceremonial blankets
=əɬp	‘plant’	plants, trees, bushes
=nec	‘tuber’	potatoes, carrots, tree roots
=e:nxʷ	‘plant part’	ear of corn, sprout
=əlcəp	‘firewood’	firewood
=ənəp	‘ground’	garden plot, planted flowers
=əqən	‘container’	pot, bowl, cup, lantern, bucket, barrel, basket, jar, box, sack

B.17 Haida (Isolate)

Table 45 shows a partial list of classifiers in Haida. Only the most basic classifiers and the ones mentioned in the thesis are included. If the phonological form of the classifier differs between the Skidegate (southern) and Masset (northern) dialects the respective forms will be specified for Skidegate (S) and Masset (M). For a more comprehensive guide to Haida classifiers see Enrico (2005). The numerals 1-10 in the Masset and Skidegate dialects are shown in table 44. The sources are Enrico (2005) and Enrico (2003).

Table 44: The Haida numerals 1-10

Haida numerals		
	Masset Haida	Skidegate Haida
1	*swaansang*	*srwaansing*
2	*sdang*	*sding*
3	*hlun.ahl*	*hlrun7uhl*
4	*stansang*	*sdansing*
5	*tleehl*	*tleehll*
6	*tluwan.ahl*	*tllrun7uhl*
7	*jagwa.a*	*jigura*
8	*sdaangsaangaa*	*sdaansingxa*
9	*tlaa.ahl swaansang gaw*	*tlaa7allhng(gi) srwaansing gaw*

Table 45: Numeral classifiers in Haida

Classifier	Gloss	Associated nouns
dll- (S) / *dla-* (M)	'animate'	humans, mammals, birds, fish, logs, sets of clothes
st'a-	1. 'skeins of fish eggs' 2. 'dogfish liver'	skeins of fish eggs, dogfish liver
tll-	'stick/rack with clams on it'	stick/rack with clams on it
kid- (S) / *ki-* (M)	'stick with drying food'	stick with drying food
t'ab-	'I-dimensional, extended, straight, pointed'	swords, shards of glass, sharp-pointed knives
t'aw- (S) / *t'uu-* (M)	'I-dimensional, extended, broadening out at one end i.e spatulate-shaped'	feathers, spoons, whiskers, evergreen needle
tay- (S) / *tii-* (M)	'forming a series of curved surfaces, particularly composed of fluffy material'	buildings, houses, brushes, waves, breasts, brooms, clouds, axes
t'a-	'I-dimensional, extended, relatively short, flexible'	necklace, nets, kelp, piece of rope, piece of string, belts, shoelaces
sq'a-	'I-dimensional, extended, straight, rigid'	cane, needles, pencils, sticks legs, arm, arrows, canoe paddles, harpoons
sda-	1. 'I-dimensional, extended, curved, arc-shaped'; 2. 'II-dimensional, extended, ring-shaped'	bows, tires, scythes
sga-	1. 'I-dimensional, extended, curved, arc-shaped'; 2. 'II-dimensional, extended, ring-shaped'	circles, bows, hoops, rings, bracelets
sk'a-	'I-dimensional, cylindrical, extended (solid or hollow)'	tower, icicles, bottles, cans, jars, fingers, tongues, teeth, riffles, stars
hlgi-	'I-dimensional, cylindrical, big (with large diameter relative to length)'	logs, totem pole, thick ropes
k'u-	'III-dimensional, extended, small (compact/block-like)'	bags, nails, red cod, crumbs
skaa- (S) / *skáa-* (M)	1. 'III-dimensional (spherical), small' 2. III-dimensional (hemispherical) bowl 6 inches in diameter	fruit, eggs, eyes, potatoes
q'ay- (S) / *q'ii-* (M)	1. 'III-dimensional (cylindrical or round), extended, big (chunky)' 2. Large mass	chunk, money, heads, drums, hammers, clams, rocks, large boats, lamps, cakes, big loaves of bread, months
tsi- (S) / *tsa-* (M)	'III-dimensional, flexible, container object'	baskets, breasts, coats
tl'l- (S) / *tl'a-* (M)	'II-dimensional, extended, semi-flexible, thin'	papers, leaves, saws, pants, stockings, pictures, sheet metal, axheads, pies, paper money

gi-	'II-dimensional, extended, flexible, thin'	canoes, map, sails, rugs, blankets, towels, curtains, shawls
gu-	'II-dimensional, extended, small, slightly concave, usually flat/hollow on one side'	buttons, coins, hats, flatfish, masks, toenails
ra-	'II-dimensional, extended, rigid, non-thin'	canoes, towns, dishes, boards, doors, knives, lakes, gardens, mirrors
hlra-	'II-dimensional, extended object consisting of parallel I-dimensional, extended, rigid members'	bed frames, drying racks, wagons, ladders, fences, wheelbarrows, bridges, tables, deer antlers
hlga-	'object with (usually paired) projections/handles'	chairs, frogs, anchors, scissors, crabs, starfish, forks, buckles, beds
hlq'a-	'object consisting of a straight, rigid member with straight, small projections in perpendicular and parallel'	combs, branches, halibuts spines, rakes, bushes
ji- / ja-	'object with projections in two dimensions'	hands, feet, octopus, gloves, shoes
hlku-	1. 'object with sharp projections' 2. 'untidy object with slender parts sticking out all over'	teeth sticking out, bushy branches, seal hind flippers, bunch of flowers
hlk'u-	'dry fibrous mass'	spruce roots, brushes, brooms, whiskers
ts'uu- (S) / *ts'úu-* (M)	'very small object or amount'	cookie, tiny baby
sgy@l- (S) / *sgil-* (M)	'very small object or amount'	short piece of string, small child, rings
xa-	1. 'small' 2. 'collection of 2-5 objects'	
gun-	'II- or III-dimensional, extended, very small'	baby
sgun-	'I- or II-dimensional, small'	small child, small pants, small cake
kal-	'II- or III-dimensional, extended, big'	large pot, rugs, big bags, big seals, dishpans, tall and fat adult, big garden, big deer, big blanket
k'ul-	'III-dimensional, big'	very large pot, salmon, barrel, block of wood
7ihl-	'III-dimensional, big'	large piece of firewood, large adult