Conor Snoek*

From ‘clubs’ to ‘clocks’: lexical semantic extensions in Dene languages

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Abstract: This study examines the semantics of a root form underlying a wide range of Dene lexical expressions. The root evolved from a simple nominal denoting “club” to expressions lexicalizing the movement of stick-like objects and the rotation of helicopter blades. These semantic extensions arise through source-in-target and target-in-source metonymies. Drawing on Cognitive Linguistics, especially the theory of metonymy, offers a method of describing the range of meanings expressed by this root in a concise manner. Focusing on the results of metonymic meaning extensions also opens the way to addressing questions in the history of Dene languages. This study contributes to increasing the typological scope of Cognitive Linguistic approaches and argues for the usefulness of the theory in addressing problems in Dene linguistics.

Keywords: cognitive cultural models; Dene languages; historical linguistics; metonymy; semantic change

1 Introduction

The Dene languages form a large and geographically extended family indigenous to the North American west. Numerous and diverse in the subarctic north, but more populous in the southwest, Dene languages have drawn the attention of linguists since before the time of Boas and Sapir. However, the majority of the scholarship on these languages has focused on grammatical and lexicographic description, predominantly from structuralist viewpoints (Rice 2017). The diachronic study of Dene languages has focused on sound change and phonological reconstruction. This study builds on this research, but focuses on lexical semantics drawing on Cognitive Linguistic insights into meaning change, especially the theory of metonymy. The Cognitive Linguistic theory of metonymy provides a powerful tool for the description of semantic change (Blank 1999; Koch 2011; Paradis 2011; Radden and Kövecses 1999). Metonymy has been found to be active across many domains

*Corresponding author: **Conor Snoek**, Indigenous Studies, University of Lethbridge, Lethbridge, Canada, E-mail: conor.snoek@uleth.ca

of language and to take many different forms (Panther and Thornburg 2007). The following discussion, however, will illustrate the particular usefulness of Ruiz Mendoza Ibáñez's reformulation of metonymy for the description of semantic change in Dene verbs (Ruiz de Mendoza Ibáñez 2003).

At the center of the analysis is the semantic evolution of the morphological root $*\chi^w a^{\text{ʔ}}$ meaning 'club'. Originating in Proto-Na-Dene, the root has evolved to form part of a network of nominal and verbal constructions centered on schematic imagery derived from 'clubs' as elongated, wooden objects used for striking. The diachronic trajectory of this Dene root can be described as repeated extension through SOURCE IN TARGET and TARGET IN SOURCE metonymies. The physical and functional features of clubs have been exploited semantically by Dene languages to form lexical expressions ranging from striking and drumming to rolling motions associated with cylindrical or round objects. Along the way, $*\chi^w a^{\text{ʔ}}$ has schematized, ultimately only expressing particular aspects of shape and motion. Developing into an abstract root conflating semantic properties of form and motion, some of the reflexes of this root form patterns resembling classificatory verbs. As such, the semantic extensions of the root described here can be seen as strengthening the hypothesis that classificatory verbs emerged from other verb forms (Fortescue 2006).

The paper aims to draw attention to the importance of bringing Cognitive Linguistic analyses to semantic and diachronic problems in Indigenous languages of the Americas – and, in turn, contribute to strengthening the role of Indigenous languages for theoretical discussion in the field. The analysis of the polysemic extensions of $*\chi^w a^{\text{ʔ}}$ reflexes follows a discussion of the relevant descriptive and theoretical background.

2 The Dene languages

The Dene languages form part of the Na-Dene (also called Athapaskan-Eyak-Tlingit) family, whose members are spread over a large, discontinuous territory in western North America. The largest continuous area where these languages are spoken stretches across interior Alaska, the Yukon, and across much of the Canadian subarctic boreal forestland west of the Hudson Bay. South of the subarctic, Dene languages are spoken in interior British Columbia and central Alberta. Intriguingly, languages belonging to this family are also found in two other geographically distant and separate regions: along the Pacific Coast in Oregon and Northern California, and in the southwestern United States. Historical relationships among the Dene languages are complex and scholars tend to make reference to broad geographic regions instead (Mithun 1999; Snoek et al. to appear). The geographic regions that Dene languages are found in are also associated with

culture areas. In Alaska and the Canadian Interior, for instance, speakers of Dene languages traditionally lived the nomadic lifestyles of subarctic hunter-gatherers forming family-sized bands with little or no hierarchical structures beyond the family unit. In this paper, the subarctic Dene are represented by Koyukon, which was once spoken in the Alaskan interior, but is now on the verge of extinction, and South Slavey, which still has many speakers in the Deh Cho Region of the Northwest Territories in Canada. The Pacific Coast Dene languages are represented by Hupa, which is spoken by riverine peoples of northern California who lived sedentary lives and congregated in long-houses typical of the region. The Navajo, far to the south, represent the culture area today known as the American Southwest. Relative newcomers to the region, the Navajo adopted pastoralist economic modes as well as growing maize. Finally, the Tsuut'ina represent Dene groups that came to live on northern reaches of the Great Plains in Alberta, Canada. Today, all the Dene languages are severely endangered and, with the exception of Navajo, have on average less than a few hundred fluent speakers remaining. While the Navajo are one of the most numerous groups of Indigenous America, few children are learning the language as a first language today.

3 Dene verb constructions

Typologically, Dene languages can be described as fusional and polysynthetic with complex derivational and inflectional morphology. Across the family, the grammatical description of Dene languages recognizes three major part of speech categories: nouns, postpositions, and verbs. Nouns and postpositions feature limited inflectional affixation marking person and number of possessors or postpositional objects. The most complex part of speech in Dene languages, however, are the verbs which are composed of numerous prefixes and a handful of suffixes attaching to a root form. The prefixes encode grammatical mood and aspect distinctions, a wide range of adverbial meanings, the noun class of clausal participants, as well as number and person of the clausal participants themselves. These prefixes occur in two different groups: those closer to the stem mark inflectional categories and are referred to as the conjunct; prefixes to the left of the conjunct, the disjunct, form a more heterogeneous group encoding adverbial meanings, the objects of postpositions, incorporated noun stems, and thematic or derivational affixes (Kari 1989; McDonough 2000; Young and Morgan 1987). While there is some controversy about the morphological categories expressed by these two groups of prefixes across the languages, there are good phonological and phonetic grounds for upholding the distinction between conjunct and disjunct prefix groups (McDonough 2000).

For the sake of clarity, and since the focus here is on the semantics, some of the morpho-phonological details of the conjunct prefixes are omitted (for a fuller

treatment of Dene verbal morphology see Rice 2000). Example (1) shows the typical structure of a Dene verb. Since the data presented in this paper come from different Dene languages, the origin of each example is indicated by the language name to the right of the example number.¹

- (1) Tsuut'ina
ʔidísxàt
 ʔí- dí- s- ø- ɬ- -xàɬ
 INDF.OBJ NC PERF 3.SG.SUB VV club
 'He threw a club-like object'
 (Starlight and Donovan 2004: 911)

The voice/valency marker *ɬ-* (glossed as vv) and the noun classifier *dí-* (glossed as nc) stay constant in all inflected forms of this verb. Together with the root these prefixes form the verb theme (Kari 1979; Young and Morgan 1987: 140), which can be understood as one of the basic units of the Dene lexicon (Rice 1989). The verb themes form word families of often closely related and polysemic senses based around meanings encoded in the roots. Incorporated objects and postpositional phrases can be added to these themes in creative ways to meet specific communicative demands. In (2), for example, the verb root expresses the movement of an object specified in terms of its form, i.e. a small round object. This object – the speaker's head, is explicitly represented as an incorporated noun. At the far left end of the verb complex, the verb features an incorporated postposition (against) with a prefix indicating a third-person object.

- (2) Tsuut'ina
mátsiyist'ón
 m- -á ts'í- yí- s- d- -ʔón
 3.SG.OBJ against head PERF 1.SG.SUB VV solid.round.object.moves
 'I have rubbed my head against it'
 (Cook 1984: 135)

The verb root *-ʔón* occurs in combination with many different prefixes. Strings of prefixes form stable patterns with the root to derive lexical meanings. In example (2), the root is coupled with the voice/valency marker *d-* as well as the incorporated noun *ts'í-* 'head'. Even though these elements are discontinuous, they form a lexical unit known as a verb theme in the literature on Dene languages (Kari 1979;

¹ Abbreviations used: DL = dual, IMPF = imperfective, INDF = indefinite, ITER = iterative, prefix, MOM = momentaneous aspect, NC = noun classifier, NMLZ = nominalizer, OBJ = object, PERF = perfective, POSS = possessive, REFL = reflexive, REP = repetitive, SG = singular, SUB = subject, THEM = thematic, VV = voicevalency prefix.

Rice 2000). As stable form-meaning pairings, these can be considered constructions in the sense of Langacker (2008: 161), and this terminology is used in the discussion of the lexical semantics of club-verbs in the following sections. Viewing Dene verb themes as lexical constructions also provides a theoretical basis on which to apply a Cognitive Linguistic approach to semantic change to these data. The relevant aspects of the theory are presented in the next section.

4 Metonymy and lexical semantic change

Describing the diachronic trajectory of the root form with the meaning ‘club’ in Dene languages requires taking into account the rich conceptual structure associated with this item of material culture. The relevant conceptual structures for the meaning of the root $*x^w a^{\text{ʔ}}$ are those of a *THING* in the sense of Langacker (2008: 105), as the oldest identified form of this root is a noun form (see discussion in Section 5). The conceptual structure associated with nominals can be described in terms of qualia roles (Paradis 2005: 553), especially as developed for lexical semantic analysis by Pustejovsky (1998). The qualia structure is a useful descriptive tool because it allows an encyclopedic approach to meaning to be operationalized through an emic grid of categories that support more detailed analysis. The categories of qualia serve to describe aspects of nominals such as shape and form of a denoted object (formal role), the way it came into being (agentive role), its function (telic role), and its meronymic structure (constitutive role) (Pustejovsky 1998: 85–86). For the object club, the formal role can be described as: roughly cylindrical in shape, and thicker at one end; the agentive role as that of a man-made object; the telic role as that of an implement made for striking – in the Dene case especially as used for killing certain types of land animals and fish; the constitutive role as that of a simple object typically made of wood with no other sub-parts (Figure 1).

From a Cognitive Linguistic point of view, qualia structure can be seen as capturing lexically relevant elements of conceptual structures such as frames, Idealized Cognitive Models, or domains. These conceptual structures are mental models that emerge as an organization of perceptual, sensorimotor, experiential, and learned cultural knowledge and ‘serve as the background for interpreting the meaning of linguistic forms’ (Cienki 2007: 183). The term *idealized* is drawn from

Figure 1: Fish club used among the Hupa (Goddard 1903–1904: 24).

the Cognitive Linguistic literature and is intended to draw attention to the schematic and generalized nature of conceptual structures relevant to metonymy. However, the term *Cognitive Cultural Model* or CCM (Blount 2014) may be more appropriate, since it explicitly draws attention to the shared conceptual content metonymies need to presuppose in order to signify successfully. The cultural nature of mental models is especially apparent when considering instances of mental models more closely tied to specific cultural contexts as when considering the conceptual structure underlying lexical expressions denoting lightning discussed in Section 5.5. The term CCM will generally be used here.

All these elements form contiguous parts of a conceptual model of the item and associated activities or events that is accessible to speakers. The conceptual contact or contiguity of the qualia elements as part of a CCM makes them possible sources and endpoints of processes of semantic change (Blank 1997, 2002; Koch 2011). In particular, the term denoting the whole CCM can be used for some of its parts or vice versa through metonymy. Metonymy involves a conceptual leap from the semantic information that is explicitly and conventionally encoded by the morphological vehicles (roots, affixes, and their combinations) to the intended meaning. The conceptual leap afforded by metonymic inference is guided by two factors: the metonymic inference schema or cognitive operation and the conceptual domain which provides the elements for the inference. In Radden and Kövecses's definition:

Metonymy is a cognitive process in which one conceptual entity, the *VEHICLE*, provides mental access to another conceptual entity, the *TARGET*, within the same idealized cognitive model. (Radden and Kövecses 1999: 21)

The term *vehicle* (also known as *source*) is here intended to designate the overtly encoded meaning of the given form while the *target* denotes the meaning actually realized through the expression. Metonymy thus involves an associative inference from a vehicle to a target, as in the *WHOLE FOR PART* metonymy *Germany won the world cup*, where *Germany* is a vehicle denoting the national football team. In contrast to other forms of linguistic association, the *VEHICLE* and *TARGET* must be conceptually related, forming part of a unified mental structure – the ICM or CCM. In the case of the football team, the vehicle can stand for the target only on the basis of a presupposed CCM of international athletic competition. Many individual metonymies have been identified giving rise to the definition above, as well as to competing definitions differing in important descriptive and theoretical details (Croft 2006; Littlemore 2015; Peirsman and Geeraerts 2006). However, all the theories of metonymy put forward within the theoretical framework of Cognitive

Linguistics share the idea that metonymy abounds in language (Panther and Thornburg 2007).

Ruiz de Mendoza Ibáñez (2011) has proposed that the large number of documented metonymies can be seen as instantiations of two general types: those metonymies in which the vehicle forms a salient element of a complex CCM and those in which the vehicle denotes a CCM with only one part being salient. The former are called *SOURCE IN TARGET* metonymies, as for example in *the piano has been drinking*, where the instrument denotes the musician. The latter are called *TARGET IN SOURCE* metonymies as for example in the sentence *Germany won the world cup*, where the football team forms the salient sub-part of the CCM of the Nation. Importantly, Geeraerts and Peirsman have drawn this idea out further, and argued that *TARGET IN SOURCE* metonymies can also account for cases of meaning facetization – those cases where particular semantic sub-parts or aspects of a conceptual structure become the operative meanings (Geeraerts and Peirsman 2011). For example, when *book* is taken to refer only to the *text* within, rather than the *tome*, the source expresses only a part of its meaning range. This development of the idea of *TARGET IN SOURCE* and *SOURCE IN TARGET* metonymies provides an effective theoretical tool for the description of the diachronic development of the root denoting 'club' in Dene languages. The semantic extensions of the root discussed in Section 5 emerge from the application of both of the kinds of metonymies posited by Ruiz Mendoza Ibáñez, but they produce different effects over time. While *SOURCE IN TARGET* metonymies lead to the lexicalization of complex events in which clubs or stick-like elements play central roles, *TARGET IN SOURCE* metonymies bring semantic elements to the fore while backgrounding or eliding others.

From a diachronic perspective, the cognitive process involved in *TARGET IN SOURCE* metonymies is close to schematization which Talmy defined as: 'a process that involves the systematic selection of certain aspects of a referent scene to represent the whole while disregarding the remaining aspects' (Talmy 1983: 225). The result of this process is what traditional historical semantics identifies as a *broadening* of meaning. Broadening or generalization typically involves a taxonomic change in which an older meaning becomes a hyponym of a newer meaning, and consequently loses some of its semantic features (Blank 1997: 201). In his important discussion of the role of contiguity and metonymy in semantic change, Koch sharply distinguished between broadening and metonymy on the grounds that, conceptually, taxonomic relations and relations of contiguity should be clearly distinguished (Koch 2011: 275–276). The analysis of the semantic changes undergone by the root denoting 'club' in Dene languages presented in Section 5 suggests that repeated *TARGET IN SOURCE* metonymies can lead to broadening in certain cases. This point will be returned to following the discussion of the data.

5 The polysemic network around ‘club’

The lexical network described in this section originates in the semantics associated with the ancient root $*\chi^w a^{\text{ʔ}}$. Cognates of this root are found in all branches of Na-Dene. The reflexes of the Proto-Dene root $*\chi^w a^{\text{ʔ}}$ in the sample of Dene languages considered in this study are listed in Table 1. The attested root forms are written in the orthographies for each language which consistently encode the distinction between voiced and unvoiced back velars as *gh* and *x* respectively.

The qualia structure of ‘club’ described above forms the conceptual substrate on which new meanings evolve – predominantly through processes of metonymy. The stages of the evolution of this root are shown schematically in Figure 2: the development from stage 1 to stage 2 comes about through a TARGET IN SOURCE where the telic role of the club as a material object is the target. The shift from stage 1 to stage 2 involves a SUB-EVENT FOR WHOLE EVENT metonymy (which is a type of TARGET IN SOURCE metonymy). The shift from stage 3 to stage 4 involves highlighting the movement of the shape of club-like or stick-like objects – again through a TARGET IN SOURCE metonymy.

As indicated in Figure 2, the meaning evolution of this root can be grouped into four stages. These stages reflect diachronic phases in evolution with the earlier stages being shared by all the Dene languages considered here, and the later ones evolving only in some of the languages. These stages and the lexical items that instantiate them in the Dene languages are described in Sections 5.1–5.4.

5.1 Stage 1: From nominal to verb stem

There are many root forms in Dene languages that can occur both as nouns and as verbs, taking distinctive affixes in each case. Once inflected for nominal or verbal categories these forms are termed *stems* (Rice 1989). As will be shown in this section, reflexes of $*\chi^w a^{\text{ʔ}}$ occur both as nouns and verb stems in most Dene languages. Nevertheless, the noun form is taken as the origin of the diachronic trajectory described here. The prior existence of the nominal form is based on

Table 1: Cognates of ‘club’.

Proto-Dene	Koyukon	South Slavey	Tsuut’ina	Hupa	Navajo
$*\chi^w a^{\text{ʔ}}$	<i>xáł</i>	<i>xah</i>	<i>xot</i>	<i>-wul</i>	<i>hał</i>

Figure 2: Stages of the polysemic extensions of $*x^w a^?$.

semantic and morphological evidence. In terms of the semantics, the root can be reconstructed as a noun denoting the instrument ‘club’ in Proto-Dene² (Krauss 2005: 130). The great age of this root is attested by the fact that cognate forms exhibiting regular correspondences exist in the two non-Dene languages that make up the Na-Dene family: Tlingit and Eyak (Leer 2008). No directly corresponding noun with the meaning ‘club’ has been recorded for Eyak, a language which became dormant in the 1980s. However, Michael E. Krauss, the last person to carry out fieldwork on this language, recorded the term *xits* ‘drum’ and *xi’ts* ‘beat object (drum)’ (Krauss 2012). Tlingit has the word *x’ús* for club (Leer et al. 2001: E39). The established order of branching of the family is that Proto-Na-Dene split into Proto-Dene-Eyak and Tlingit (Krauss 1973; Mithun 1999). Therefore, the root can be reconstructed for the even more temporally remote Proto-Na-Dene as $*xu:tʔ$ as a nominal, which was lost at a later stage in Eyak (cf. Leer 2008). It follows from the lexical patterns in Eyak mentioned above that a semantic shift from a nominal meaning ‘club’ to a verbal meaning ‘to hit something with a club, to club something’ is most likely to have occurred in Proto-Dene-Eyak, since this polysemy

2 Also known in the literature as Proto-Athapaskan.

is present in languages representing all the regional groups of the family as demonstrated by examples (3)–(6).

- (3) Koyukon
yeetlghoɬ
 ye- de- ɬ- -ghoɬ
 3.OBJ NC VV club.PERF
 ‘He clubbed it once’
 (Jetteé and Jones 2000: 243)
- (4) South Slavey
ʔedéhxá
 ʔe- dé- ø- h- -xá
 INDF.OBJ NC 3.SG.SUB VV club.PERF
 ‘She clubbed it’
 (Rice 1989: 790)
- (5) Tsuut’ina
m̥s̥iláyà s̥isxàlt
 m̥i- ts̥i- lá- yá- s- ø- -xàlt
 3.SG.POSS head top at 1.SG VV club.PERF
 ‘I clubbed him on the top of his head’
 (Cook 1984: 185)
- (6) Navajo
nánishhaɬ
 nání- sh- ɬ- -haɬ
 REP 1.SG.SUB VV club.IMPF
 ‘I am beating him (with a club), lit. I keep clubbing him’
 (Young and Morgan 1987: 564)

The Dene languages under consideration here show evidence of a polysemy by which reflexes of $*\chi^w a^{\text{ʔ}}$ encode the verbal as well as the nominal meaning with the verb stem typically being glossed as *to hit with a club*. Given the older attestations of the nominal meaning, this polysemy is the result of a SOURCE IN TARGET metonymy, where the source, the club, is the lexical reference point for an event in which the club has central salience. The exception among these languages is Hupa, spoken in present-day California, where the nominal stem for ‘club’ is no longer attested. However, the verb stem does occur and has been extended to cover actions of chopping as well as in (7).

- (7) Hupa
yawhwul
 ya- wh- ø- -wul
 INDF.OBJ 1.SG.SUB VV move.club.IMPF
 ‘I am beating it or chopping it (with a club, axe, etc.)’
 (Golla 1996: 10)

The Hupa reflex of the verb stem $*\chi^w a^?l$ has generalized so that certain properties of clubs as material objects have been backgrounded in favour of others. Specifically, the characteristic shape of a weighted hitting instrument has given rise to a much more general meaning denoting elongated wooden objects. This broadening of the meaning can be inferred from the fact that the Hupa term allows the actions of *hitting something with a club* and *chopping something with an axe* to be lexicalized through the same form. None of the other languages examined here allow for this particular denotational extension. The action of chopping is expressed with a variety of other themes centered on sometimes cognate roots, such as South Slavey *léts’ehkáh* ‘chop in two (with an axe)’ (Howard 1990: 275) or *’ahi’dishkaal* ‘I chop (wood)’ (Young and Morgan 1987: 59). This extension of -wul-based verb constructions to other actions of chopping appears to be a later semantic innovation in Hupa. However, the emergence of constructions involving *striking* or *beating* with a stick-like implement can be observed much more broadly across the languages. Consequently, the shift from a nominal to a verbal stem can be reconstructed to Proto-Dene-Eyak, as discussed in Section 5.2.

5.2 Stage 2: To strike with a stick-like object

Eyak, the closest sister language to the Dene languages, is recorded as having a verb stem *-xits* ‘S beat O (drum)’. This verb stem is related to the root form for club in Eyak *xi’ts* (Krauss 2012: 134). The object drum itself is implicit in the verb constructions, but there are no attestations of this verb stem with other meanings. The fragmentary record available for Eyak makes closer determination of the likely semantic pathway difficult, but two possibilities suggest themselves in the light of the comparative data on this form. Speakers of Proto-Dene-Eyak might have extended *club_v* $\Rightarrow$ *drum_v* through a metaphorical extension, perhaps based on similarities in the associated motion, and, to a lesser extent, the form of the drumstick. Speakers may also have abstracted away from the specifics of the shape of the club via a TARGET IN SOURCE metonymy resulting in a more schematic meaning allowing for a greater range of instrument referents. The latter certainly seems to have occurred in the Dene languages following the split up of Proto-Athapaskan-

Eyak, as the examples in this and the following sections show. Nevertheless, it is also possible that the metaphorical extension occurred first in Proto-Athapaskan-Eyak, resulting in a strong association between the verb stem *xi'ts* and the concept of *drumming* in Eyak, but setting in motion a process of meaning schematization in Proto-Dene and its daughters. The metaphorical possibility seems the more likely explanation since this meaning extension is attested both in Eyak, as well as the Dene languages, as shown in examples (8)–(11).

- (8) Koyukon

yelghele

ye- ɬ- -gheɬ
3.SG.OBJ VV club.IMPF

'He is drumming'

(Jetté and Jones 2000: 243)

- (9) Tsuut'ina

?ásàànīsxàɬ

?ásàà- nī- s- ø- -xàɬ
drum IMPF 1.SG.SUB VV club.IMPF

'I will beat the drum'

(Starlight and Donovan 2004: 447)

- (10) Hupa

me'wiltwa:tɬ'

m- e'- wi- ɬ- -wa:tɬ'
3.INDF against PERF VV club.PERF

'He beat against it, he drummed, lit. he clubbed against it'

(Golla 1996: 10)

- (11) Navajo

yishhaat

yi- sh- ɬ- -haat
IMPF.REP 1.SG VV club.IMPF

'I am drumming, I am beating (on a drum)'

(Young and Morgan 1987: 782)

The South Slavey language, spoken in the Canadian Interior, does not appear to have an immediately corresponding verb form on the basis of a cognate root for the meaning *to drum*. Instead, this language has a phonologically similar verb construction, as in example (12):

(12) South Slavey

ihxe

i- h- -xe

1.SG.PERF VV club.PERF

'I played drums'

(Rice 1989: 517)

The verb form in (12) does not have cognates in the other languages investigated here.³ However, South Slavey lexicalizes the nominal meaning 'drum' with the term *egheli*, a term which has a cognate form in Koyukon, where the stem for 'drumming' can be nominalized to derive the word for 'drum' *elghele* (Jetté and Jones 2000: 243). In both the South Slavey and Koyukon forms, the final vowels are suffixes indicating nominalizations by a grammatical pattern common to all Dene languages. These two lexicalizations can be rendered semantically as 'thing that is drummed', or, at a deeper etymological level, 'thing that is clubbed'. In addition, it is worth noting that the nominal form of *club* listed in Table 1 is subject to a phonological weakening pattern reducing the final consonant from *l* to *h*, as can be seen when circumfixes marking a possessor are added: *xáh* 'club' $\Rightarrow$ *seghále* 'my club'. Given that Slavey has an *a > e* ablaut pattern indicating mood-aspect changes in the verb stem (K. Rice 1989: 862), and that final consonants are often weakened or elided (K. Rice 1989), it seems possible that the innovative verb form seen in (12) originates as a backformation from the nominalized form. In contrast, the nominalization *egheli* derives from a verb of clubbing with the vowel form changed, indicating perfective aspect. It might be supposed that these nominalizations also originated in the ancestor language. However, this seems unlikely since nominalization is a highly productive process in Dene languages (Thompson 1979; Wilhelm 2014) that has produced various derived nominals for drum. Central Carrier, a Dene language spoken in British Columbia, has the form *beulghalh*. The final syllable represents a verb stem which is also based on the reflex of Proto-Dene-Eyak $\dot{x}^w a^2$, but has come to denote 'a drum of the European variety' (Carrier Linguistic Committee 2005: 263). Another variation can be seen in Hupa where the cognate form *wul* also underwent nominalization to denote the drum itself: *miq'it-king-k'e:itwul*, literally 'on it someone hits (with a stick)' (Golla 1996: 29), but through a very different morphological construction.

³ However, the pattern of the 'club' and 'drum' stems described here also occurs in Tłı̨cḥo Yatı̨, a Dene language spoken in the Northwest Territories and closely related to South Slavey (Saxon and Siemens 1996). This pattern could be seen as indicative of linguistic changes in the subgroup of languages in that region; an issue that cannot be explored further here.

In addition to the extensions of the verb stem senses from ‘to club’ ⇒ ‘to drum’, or perhaps as a consequence of the greater scope of reference, reflexes of $\chi^w a^2$ occur in a range of verb themes whose actions involve stick-like instruments. These range from activities involving very club-like objects, such as playing baseball (13)–(14), to verbs of threshing (15) and related items.

(13) Hupa

jiwolch-na’k’itwul

jiwolch-	na’-	k’i-	Ø-	ɬ-	-wul
ball	ITER	INDF.OBJ	3.SG.SUB	VV	club

‘baseball, lit. ball-he hits it around (with a club)’

(Golla 1996: 9)

(14) Sout Slavey

tthíhetsk’edehxáh

tthí-	te-	he-	ts’e-	de-	h-	-xáh
head	over	INDF.OBJ	INDF.SUB	NC	VV	club.IMPF

‘Someone hit something above someone’s head (a baseball with a bat)’

(Howard 1990: 232)

The vigorous motion of the stick- or club-like object also provides a metonymic vehicle for another complex activity – the shelling of corn, as in example (15). In the absence of a machine, corn kernels can efficiently be removed from the cob by beating a bag full of corncobs with a stick.

(15) Navajo

’ashhaat

’a-	sh-	ɬ-	-haat
3.INDF.OBJ	1.SG.SUB	VV	club.IMPF

‘I shell corn, lit. I club something’

(Young and Morgan 1987: 126)

The corn being shelled in (15) is indicated only by the indefinite pronoun -’a. In both (11) and (15), the repeated motion of the a club-like object forms the vehicle for a metonymic inference to the activity as a whole. In each case, the SOURCE IN TARGET is operative here, allowing for a schematic root to evoke a complex CCM. While the implements used in drumming and shelling corn might differ from clubs used for striking in small ways, the imagery associated with the root is preserved in that each construction encodes actions involving elongated, rigid, and likely wooden, objects, such as in (16).

- (16) Hupa
jiwolch-na’k’itwul
 me’- k’i- ø- ɬ- -wul
 in INDF.OBJ 3.SG.SUB VV club.IMPF
 ‘seed-beating basket, lit. in-it one beats something’
 (Golla 1996: 9)

The object denoted by the expression in (16) is used for gathering seeds beaten from plants and further winnowed by hand for direct consumption, a practice that was already disappearing at the close of the 19th century (Goddard 1903–1904: 31). The form is closely related to the term for ‘thresher’ *mitk’itwul*, literally ‘with-it one beats (something)’.

Each of the complex activities such as threshing or playing baseball is lexicalized through a SOURCE IN TARGET metonymy based on the movement of a stick-like object as its most salient part. The greater variety of meanings suggests that these verb constructions are later innovations, emerging after the diversification of the shared ancestor language. Nevertheless, it seems reasonable to suppose that TARGET IN SOURCE metonymies foregrounding the elongated form and material of the club, and backgrounding the more specific formal aspects of clubs, must have preceded these lexicalizations. It is at this stage that the meaning of the verb root can be represented as ‘strike with stick-like object’.

From a semantic perspective, the constructions in examples (8)–(11) involve three clause participants: an agent striking an object with an instrument. These features are shared with the verb forms in (3)–(6), with the main distinctions residing in the form of the instrument and the purpose of the activity. This meaning shift comes about through a TARGET IN SOURCE metonymy whereby the properties of shape (an elongated rigid object) and the associated motion (vigorous striking) are mapped onto the action of drumming. The function or intent of the action has fallen away in these lexicalizations, as have the more specific features of form, such as the tapered shape of instruments designed to kill fish or small land animals. In the next stage of semantic evolution, the verb stem encodes only the movement of the stick-like object with the participant role of a struck or affected object falling away.

5.3 Stage 3: Movement of a stick-like object

The next group of verb constructions denote the movement of a stick-like object. The subjects of the verbs of these constructions must themselves exhibit formal properties that enable them to be construed as elongated and rigid. These

expressions are less widely distributed across the Dene family and show greater variety, suggesting that these are innovations occurring at the level of individual languages. Hupa, for example, shows evidence of *-wul* being used to describe the growth of plants, as in (17).

- (17) Hupa
xa:diwul
 xa:- Ø- d- -wul
 THEM 3.SG.SUB VV club.PERF
 ‘it (a plant) sprouts, lit. it throws itself up out of the ground’
 (Golla and O’Neill 2001: 313)

Example (17) occurs in a mythical story in which the growth of the plant is endowed with magical properties allowing it to sprout and grow suddenly and forcefully, as if shooting up out of the ground.

The language that has taken this direction of semantic extension furthest, however, is Koyukon. In (18), the root *-ghel* forms part of a nominalization denoting the spring-pole of a traditional snare.

- (18) Koyukon
nohɔnoghɔɭ
 no- hɔ- no- Ø- -ghɔɭ
 arc up MOM.PERF VV club.move.PERF
 ‘spring-pole of collar snare, lit. up in an arc stick-like object moves’
 (Jetté and Jones 2000: 240)

The term for ‘spring-pole of a collar snare’ is a nominal derived by conversion of a verb form. The noun retains the adverbial prefixes indicating the (potential) upward motion of the stick-like object (*no-* ‘circle’ [Jetté and Jones 2000: 477], *hɔ-* ‘up’ [Jetté and Jones 2000: 477]) implied by the verb root *-ghɔɭ*. This tool, used for trapping animals whose fur is desired intact, relies on a wooden element that tightens quickly around an animal’s neck. The overt encoding in (18) is of shape and motion properties which trigger a SOURCE IN TARGET metonymy evoking the CCM of the collar snare. Koyukon also takes the motion of a stick-like object as a source for ‘pole-vaulting’ as in example (19).

- (19) Koyukon
yetel edetlaak’enolghet
 ye- -tel ede- tlaa- k’e- no- Ø- l-
 3.INDF. over REFL head 3.INDF MOM.PERF 3.SG.SUB VV
 -ghet
 club.move.PERF
 ‘He pole-vaulted up out of the place, lit. he moved (by means of an elongated object) his head over it’
 (Jetté and Jones 2000: 242)

The construction in (19) involves an item that still shares many properties with clubs and drumsticks in that it is still a hand-held, likely wooden, object. But the semantics of size, evident in the previous examples, have completely given way to the abstract features of elongated rigid objects in motion evident in examples (20) and (21).

- (20) Koyukon
neeghel
 nee- ø- ø- -ghel
 MOM.PERF 3.SG.SUB VV club.PERF
 'It (vehicle, barge) arrived'
 (Jetté and Jones 2000: 240)

The vehicle itself, in example (20), is inferred from the lexical meaning of the root or the context (though it may be mentioned explicitly). The verb theme is in the momentaneous aspectual derivation and the verb root is in the imperfective. The boat is even more strongly evoked in the related verb form in (21):

- (21) Koyukon
neeghonneeghel
 nee- gho- nee- ø- ø- -ghel
 to.a.point edge MOM.PERF 3.SG.SUBJ VV club.PERF
 'It (motor-driven boat) has landed, lit. to the edge it (elongated object) moved'
 (Jetté and Jones 2000: 240)

In (21), the verb is supplemented with additional prefixes that evoke the image of the shore as indicated through the form denoting 'to an edge' (Jetté and Jones 2000: 240). The examples (20) and (21) show the *-ghel* root in meanings where the 'elongated' component is semantically distant from the older 'club' meanings. Supported by additional prefixes, the SOURCE IN TARGET metonymy allows the construction to sketch the scene of the boat's arrival in vivid, albeit minimalist, imagery as a cylindrical object coming up on an edge.

Further evidence that the root *-ghel* has evolved away from the original imagery of a club-like object and schematized to the notion of a rigid, elongated object in motion comes from its ability to denote the hands of a clock as in example (22).

- (22) Koyukon
neenohaaghedenaa deghel
 nee- no- haa- ghe- de- naa- ø- de-
 to.a.point ITER attached MOM.PERF NC PERF 3.SG VV
 -ghel
 club.PERF
 'It (clock, watch) stopped again'
 (Jetté and Jones 2000: 241)

While the reduction of the root meaning to ‘elongated, rigid object’ have come about through a TARGET IN SOURCE metonymy, the target object ‘clock’ is reached through a SOURCE IN TARGET metonymy: hand of the clock $\Rightarrow$ clock. The additional meanings provided by the prefixes render the literal meaning ‘the elongated object attached at one point stopped moving or pivoting again’. In this case too, the meaning ‘clock’ must be reached by enriching the expression through a SOURCE IN TARGET metonymy. The CCM of an analog clock allows for other expressions of time to be derived; always encoding the hand of the clock through the properties of its form, such as (23).

- (23) Koyukon
hɔtɛlhaaghedengheghet
 hɔ- tɛl- haa- ghe- de n- ghe- ø- ø-
 area over attached THEM NC PERF PERF 3.SG VV
 -ghet
 club.PERF
 ‘It is past the hour, lit. it (clock, watch) pivoted all over the place’
 (Jetté and Jones 2000: 241)

In these forms, the *haa-* prefix provides the information that the elongated object is attached at one end (Jetté and Jones 2000: 230). The combination of *haa-* and the root *-ghet* can equally be used to describe the movement of a twig or branch attached to a tree (Jetté and Jones 2000: 241).

5.4 Stage 4: Rotation

The final and most schematic group of verb constructions based on reflexes of $*\chi^w a^{\text{a}}$ no longer involve an instrument at all. Instead, the stem has come to encode primarily the motion aspect of the older meanings. Nevertheless, the described motion is that of elongated, cylindrical objects such as clubs or logs. The meanings may be described as that of ‘rotate’ or ‘be rotating’.

- (24) Navajo
náhidéshghal
 ná- hi- de- sh- -ghal
 around SERIATIVE NC 1.SG club.PERF
 ‘I turned over’
 (Young and Morgan 1987: 535)

In (24), the turning motion arises as a combination of the root *-ghal* with the adverbial prefix *ná-*. The root sense of an elongated cylindrical object affording a

rolling motion is the metonymic vehicle here evoking a human body. This meaning is an aspect of the original 'club-like object' which has been brought to the fore via a TARGET IN SOURCE metonymy activating the formal role of 'club'. In a further schematization, *-ghał* can be used to describe a rolling motion in the absence of other characteristics of shape or form. In (26), the described movement is that of the eyes in looking around. Many more processes involving circular motions of cylindrical objects can be denoted by *-ghał*-based constructions in Navajo (Young and Morgan 1987: 329). The turning or rotating motion is also a sense that South Slavey verb stems can express as in (25).

- (25) Navajo
nálaedaahxáh

ná-	lae-	daa-	ø-	h-	-xáh
around	DL	NC	3.SG	VV	club.rotate.IMPF

 'It is rotating (a helicopter rotor), lit. they two stick-like-things move around'
 (Howard 1990: 232)

The sense of rotation can also be found in Navajo lexicalization of eye movements.

- (26) Navajo
niséghał

ni-	sé-	ø-	-ghał
around	1.SG.SUB:PERF	VV	club.PERF

 'I rolled (my eyes) around'
 (Young and Morgan 1987: 596)

In this final example the meaning of *-ghał* has become entirely disassociated with stick-like or club-like instruments or shapes.

5.5 Discussion of polysemic extensions

The TARGET IN SOURCE metonymies have resulted in the semantic narrowing of the reflexes of the verb stem $*\chi^w a^{\text{ʔ}}$ so that the conceptual content has been reduced from the rich semantic imagery associated with words such as *club* to encoding just schematic aspects of form and motion associated with that form. As can be seen from Table 2, the extensions of the verb stem have reached different stages in different languages, with only South Slavey and Navajo exhibiting the most schematic meanings. While there is no longer a directly attested nominal form in Hupa, the evidence strongly suggests that it must have been there in an earlier form

Table 2: Cognates of *club*, to *club*.

Language	Stage 1 <i>club_N</i> ⇒ <i>club_V</i>	Stage 2 'strike with stick-like object'	Stage 3 'move stick-like object'	Stage 4 'rotate'
Koyukon	+	+	+	–
South Slavey	+	+	+	+
Tsuut'ina	+	+	–	–
Hupa	–	+	+	–
Navajo	+	+	+	+

of the language. Therefore, all the Dene languages considered here can be said to have passed through stages 1 and 2 in terms of the extensions of the verb stem.

Languages reaching stage 3 have evolved a highly schematic form of the verb. Through TARGET IN SOURCE metonymies, these languages have semantically reduced the rich imagery associated with clubs to properties of shape and form. Consequently, the verb stem has been used in the construal of a much wider range of entities as evidenced by the verb constructions in Section 5.3. In a certain sense, modern reflexes of * $\chi^w a^q$ have become hypernyms of the older forms in a process that can be described as broadening, following the discussion in Section 4. Koch's discussion of these semantic changes (Koch 2011) can be extended to the effect that, while taxonomic relations and relations of contiguity should be kept apart, the two processes can interact diachronically – under certain circumstances. Understanding certain aspects of the semantic evolution of * $\chi^w a^q$ as broadening also has the potential of providing insight into the origin of classificatory verbs in Dene languages. This semantically and grammatically particular class of verbs is described more fully in Section 6. The similarity of * $\chi^w a^q$ to this class of verbs can best be understood through the consideration of a further example. Koyukon also shows an extension of the verb form from this stage by way of a complex chain of metonymic inferences (Hilpert 2007; Nerlich and Clarke 2001). In (27), the movement of eyelashes is a vehicle denoting an action of the eyes which, in turn, stands for a weather phenomenon in a complex CCM of the mythical Thunderbird.

- (27) Koyukon
nodootlk'elghut
no- dootl- k'e- l- -ghut
eye fur 3.INDF.SUB VV move.club.IMPF
'Lightning flashes, lit. something moves its eyelashes'
(Jetté and Jones 2000: 151)

The chain of metonymies involved in expression (27) presupposes the traditional CCM of thunder lightning among the Koyukon. These weather phenomena are associated with the Thunderbird, a mythical creature whose wings produce thunder and whose eyes produce lightning. The movement of the eyelashes results in a twinkling of the eyes, which in turn cause the flashing. The compositional path brings to mind the staccato effect of lightning across a dark sky. The target meaning 'lightning flashing' is then brought about by CAUSE AND EFFECT metonymies linking the movement of the eyelashes to the opening and closing of the eyes, and that, in turn, to the flashes of lightning. It is worth noting that the root *-ghul* in this verb form is being used to denote the movement of the eyelashes. Since those, however, are explicitly encoded as an incorporated noun at the left periphery of the verb constructions, the root can be seen as matching or agreeing with the object in terms of semantic specifications. This particular property is characteristic of a special set of verbs in Dene languages known as classificatory verbs. The reflexes of **χ^waʔ* have not been deemed to belong to classificatory verbs by most Dene grammarians (Davidson et al. 1963; de Reuse 2001). However, it can be argued that the verb stem is transitioning toward the status of a classificatory verb in those languages where the polysemic extensions have reached stage 3. The characteristics of classificatory verbs are discussed in the next section.

6 Metonymy, schematization, and Dene classificatory verbs

Dene languages have evolved a highly schematic set of constructions known as classificatory verbs which describe objects being handled, being in position, or in moving independently. The verbs are matched to particular objects on the basis of properties of form, shape or consistency. The classificatory verbs are a distinct sub-set of the Dene verbal roots that have received sustained attention in the linguistic literature (most notably Davidson et al. 1963; Hoijer 1945a; de Reuse 2001; Rice 1998). The roots in this lexical subsystem encode information about a salient object as well as the type of event this object is involved in. The kind of events described by this system fall into four types, according to whether the object is at rest or in a location, being handled or manipulated, under active control, or moving independently (Davidson et al. 1963). Along with nature of the event, the semantics of the verb roots foreground the physical and constitutive properties of the object. To describe the handling of objects of a certain sort, a verb root is chosen whose semantics match the properties of the object, as in (28).

- (28) Bearlake
Kwik'u détə
 Kwik'u dé- Ø- Ø- -tə
 gun PERF 3.SG.SUB VV handle.stick-like
 'The gun was taken, lit. gun it was taken (a stick-like object)'
 (Rushforth 1991: 255)

The verb is appropriate in this case, since it matches the properties of a gun as being long and rigid or stick-like (the description common in the literature for the meaning of this verb root in other Dene languages is 'slender stiff object'). A mismatch between the verb semantics and the properties of the object is typically deemed ungrammatical. Consequently, there are classes of object that are matched with the verb. However, some objects can occur with multiple roots. The semantic properties of the root then play a role in the interpretation of the nominal object.

- (29) Bearlake
Lidi segháni'a
 Lidi se- ghá- nı- Ø- -'a
 tea 1.SG.OBJ IMPF 2.SG.SUB VV handle.solid.round.object
 'Give me a (single box or bag) of tea'
 (Rushforth 1991: 254)

In (29) the speaker has used the classificatory root -'a which is used when handling compact objects (or co). The tea is therefore construed in typical compact forms such as a teabag or a box of tea. Different classificatory stems produce different construals of the noun, as in (30) and (31).

- (30) Bearlake
Lidí segháni'ka
 Lidí se- ghá- nı- Ø- -ka
 tea 1.SG.OBJ IMPF 2.SG.SUB VV handle.open.container
 'Give me (a cup or other open, shallow container) of tea'
 (Rushforth 1991: 254)

- (31) Bearlake
Lidí segháni'a
 Lidí se- ghá- nı- h- -xo
 tea 1.SG.OBJ IMPF 2.SG.SUB VV handle.loose.granular.substance
 'Give me (some loose, a handful of) tea'
 (Rushforth 1991: 254)

In (30), the root specifies the object as being a shallow open container. The target meaning 'cup' (or other contextually relevant container) is inferred from the CCM via a TARGET IN SOURCE metonymy (Ruiz de Mendoza Ibáñez 2011). The term *lidí* denotes a cultural model of tea as the substance introduced by Europeans and occurring in the form of chopped leaves, bags, tins, or as a beverage imbibed from shallow containers. *Lidí* is the source that attains the precise target meanings through metonymic inference.

Beyond triggering facet readings in overt nominals, classificatory verbs can also have discourse tracking functions. This secondary property acts as a constraint on creative uses of classificatory verbs since the referent needs to be made evident by contextual cues (Axelrod 2000; Rushforth 1991). Nonetheless, metaphorical and other extensions of the verb used do occur.

- (32) Bearlake
Sedzí godi 'i'q
 Se- dzí godi 'i- ø- ø- -'q
 1.SG.POSS ear story PERF 3.SG.SUB VV handle.solid.round.object
 'S/he told me the news, lit. my-ear story she placed it'
 (Rushforth 1991: 263)

The phrase in (32) is an idiom used to talk about news or gossip, but nonce formations are also possible and technically ungrammatical uses occur, especially in humorous contexts (Sapir 1932).

The system of classificatory verbs is found in all Dene languages (Hoijer 1945b; de Reuse 2001; Young and Morgan 1987). This system has grown over time. The evidence for this growth comes from the observation that different Dene languages have different classificatory verbs, while sharing a core set (de Reuse 2001; Vajda 2019). In addition, classificatory verbs are not found in the closest sister languages to the Dene stock: Eyak and Tlingit. From a semantic perspective, all classificatory verbs specify two things: (1) the properties of a salient event participant and (2) whether the object is being handled, moving independently, or at rest (de Reuse 2001: 76). Structurally, the classificatory verbs are expected to occur only with specific strings of derivational affixes. As de Reuse notes, this latter criterion serves to divide the category of classificatory verbs into better and less clear instances. For instance, some verbs clearly fit the semantics, while not participating in all the same patterns as the clearest cases. There is some variation in the criteria used and some authors include stems which others don't. For example the root denoting 'club' or 'to club' is considered a classificatory verb by dint of its semantics in the Koyukon language (or some analyses of the system in those languages), but not in others. As the analysis in Section 5 shows, the roots denoting 'club' can also be used to express much more schematic meanings combining properties of a form

that is an elongated object with various states and movements. In many derivations, constructions involving the ‘club’ root have semantic properties very much in line with those of true classificatory verbs. Classificatory verbs are, therefore, best understood as constituting a prototypical category as argued by de Reuse (2001).

The emergence of this class of verbs can be traced to Proto-Dene (Vajda 2019), but the growth and evolution of this system of verbs remains an open research question. While all Dene languages have classificatory verb stems, their numbers differ from language to language (Davidson et al. 1963; de Reuse 2001; Vajda 2019). Vajda has suggested that the origin and growth of the classificatory system may have come about through contact with other languages (Vajda 2019), especially the Wakashan languages spoken in British Columbia. Classificatory verbs are rare typologically (Aikhenvald 2003: 153) and are sometimes thought to have originated in incorporated nouns Aikhenvald (2003). However, Fortescue, working on the origins of classificatory verbs in Wakashan argued that they evolved from other verbs: ‘Arguably, then, some classificatory roots developed in the Wakashan languages from earlier ordinary verbs undergoing either collocation restrictions or semantic widening and generalization’ (Fortescue 2006: 280). As this seems to be a process very similar to the evolution of $*\chi^w a^?l$ in some Dene languages, semantic changes through TARGET IN SOURCE metonymies might be a productive future area of research in the diachronic study of classificatory verbs.

7 Conclusion

The classification of the wide range of possible metonymies into just two types by Ruiz Mendoza Ibáñez provides a powerful but elegant tool for the description of semantic extensions from a diachronic point of view. In conjunction with detailed descriptions of Cultural Cognitive Models, they can help to model patterns of association leading to lexical changes. The reflexes of the root $*\chi^w a^?l$ share a deep history dating back to Proto-Na-Dene, diversifying only in the more recent past in three evolutionary stages. The further evolution of reflexes of $*\chi^w a^?l$ are suggestive of the development of a schematic form of the verb resembling members of the classificatory verbs, which specify the nature of the objects they denote in terms of shape and constitution. Taking metonymic change as an analytical tool revealed extensions of meanings through SOURCE IN TARGET and TARGET IN SOURCE metonymies in a language family that is typologically quite distinct from those in which these theoretical tools were developed. It is hoped that this study contributes to the greater application of Cognitive Linguistics to data from other languages, and that, in turn, the theoretical framework may benefit from a broader typological scope.

Data availability statement

All the data used in this paper are listed in the examples (1)–(32). With the exception of examples (1), (2), (5), and (9), the data are drawn from publicly available, published dictionaries and grammars. Examples (1), (2), (5), and (9) are drawn from an unpublished manuscript. This manuscript may be available on request from the Tsuut'ina Gunaha Institute (<https://www.tsuutinagunahainstitute.com/>). However, the data taken from that manuscript are represented in their entirety in the examples above.

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