Semantic Dimensions of Tsuut'ina Verbs: A Corpus-Based Investigation of Synonymy and Hyponymy

by

Karoline Antonsen

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science

Department of Linguistics
University of Alberta

Abstract

Tsuut'ina is a language in the Dene (Athabaskan) language family spoken by approximately 175 people. Due to its low speaker numbers, it is considered critically endangered. Existing literature describing Tsuut'ina does not include discussions of lexical relations, the relationships between meanings of words including synonymy (where two words have the same/similar meanings) and hyponymy (where one word means a "type" of another word's meaning).

The Tsuut'ina language, like other languages in the Dene family, has a complex verb system made up of a series of inflectional morphemes and a verb theme organized into what is called a verb template. Tsuut'ina verbs can be organized into verb theme categories following the methodology of Kari (1979), which includes a sub-category of verbs called classificatory verbs. Classificatory verbs assign physical properties of usually shape or texture to the absolutive which impact the context of the utterance.

There are two key issues being addressed in this thesis. The first is: can corpus data provide enough information to determine lexical relations in a language? And second: are hyponym and synonym lexical relations present and observable among Tsuut'ina verbs? A selection of corpora including a preliminary lexical database made up of recordings from the Onespot-Sapir glossary, the *Tsuut'ina Narratives* compiled by Starlight and Donovan (Eds.) (2018), the *Sarsi texts* transcribed from Goddard (1915), some selected examples pulled from *A Sarcee Grammar* by Cook (1984), and a collection of sentences confirmed by a native Tsuut'ina speaker (Personal communication, J. Holden, February 25, 2023) were used to pull examples of two sets of verb candidates: verbs containing the meaning 'eat' and verbs exhibiting the stative neuter 'S is lying' and active 'pick O up' meanings of classificatory verbs. These verb candidates were analysed following the interpretations of lexical relations put forth by Cruse (1986, 2000, 2002) and Murphy

(2003). Cruse follows a lexical model which proposes that synonyms exist on a scale from more strictly synonymous to less strictly synonymous starting with absolute synonymy, followed by cognitive synonymy, then plesionymy (elsewhere called near-synonymy), and finally non-synonymy. Hypernyms and hyponyms are judged on a list of goodness-of-exemplar features that determine whether a set of lexical items are hyponymous based on how well they fulfil certain properties. Murphy puts forth the Relation by Contrast metalexical approach to both synonymy and hyponymy where each lexical relation is determined when the lexical items in a set share all the same contextually-relevant properties but one. For synonymy, following the model of Relation by Contrast-Synonymy, the items in a synonym set share all contextually relevant properties except for form. For hyponymy, following the model of Relation by Contrast-Asymmetric Lexical Contrast, the items in a hyponymy set share all contextually relevant properties but one with the subsets which operate beneath it, and those subsets share all contextually relevant properties but one with each other.

The analyses conducted on the Tsuut'ina verb candidates using both Murphy and Cruse's approaches to synonymy and hyponymy found evidence pointing towards hyponymy for both sets of candidates. Some of the evidence is speculative, as speaker intuitions are required to confirm or test for some properties and characteristics required by each approach. Because they require speaker intuitions, these requirements are less easily sought after using corpus data. Therefore, though some evidence for hyponymy is found using the available corpora, the picture is still incomplete.

Preface

Acknowledgements

Table of Contents

List of Tables

List of Figures

List of Abbreviations

21C: 21st Century Tools for Indigenous Languages (SSHRC funded Partnership project)

ALT Lab: Alberta Language Technology Lab

AO: Singular animate being

CHV: classificatory handling verb(s)

DO: Singular dish-like object

FO: Singular fabric-like object

O: (Direct) object

PEG: Gloss referring to a 'peg' morpheme (morpheme with no lexical or grammatical meaning)

PLD: Preliminary lexical database of the unpublished Onespot-Sapir glossary

RC: Relation by Contrast

RC-ALC: Relation by Contrast-Asymmetrical Lexical Contrast

RC-LC: Relation by Contrast-Lexical Contrast

RC-S: Relation by Contrast-Synonymy

RO: Rope-like object or plural inanimate beings

SO: Singular solid object

THM: Gloss meaning 'thematic' prefix

VTC: Verb theme categories

Tsuut'ina Practical Orthography
The Tsuut'ina language is written using the following practical orthography (Omniglot, 2023).

a [a]   m [m]
i [i/e]   n [n]
o [ɒ]   s [s]
u [u/o]   sh [ʃ]
ch [ʧ]   t [tʰ]
ch' [ʧˀ]   t' [tˀ]
d [d]   tc [ʧʰ]
dl [dl]   tł [tɬʰ]
dz [dz]   tł [tɬˀ]
g [g]   ts [tsʰ]
gh [ɣ]   ts [tsˀ]
h [h]   w [w]
j [ɟ]   x [x]
k [kʰ]   y [j]
k' [kˀ]   z [z]
l [l]   zh [ʒ]
ł [ɬ]   ʔ/' [ʔ]

1. Introduction

Lexical relations describe the relationship between words (or rather lexical units) within a single language. These form-meaning relationships include those where the lexical units share core semantic traits (synonymy) (Cruse, 1986, p. 267); those in which the lexical units' core semantic traits are in opposition (antonymy) (p. 199); and finally those in which one lexical unit is the superordinate of another unit, either in a general-specific hierarchy (hyponymy) (pp. 88-89), or in a whole-part relation (meronymy) (p. 178).

This thesis examines lexical relations in Tsuut'ina. To the author's knowledge, this is the first academic study of lexical relations in this language. Tsuut'ina [ISO: srs] is a Dene language with approximately 175 living speakers (Statistics Canada, 2022a) mostly concentrated in the southern Alberta region of Canada where Tsuu T'ina Nation 145 is also located. Tsuut'ina verbs have a complex prefix structure which includes information on subject, aspect, etc. in a Tsuut'ina sentence (Cook, 1984, p. 126). The language includes properties like classificatory verbs (pp. 139-143) and verb theme categories (pp. 143-160), which further distinguish a verbal lexical unit as defined in Tsuut'ina from how one considers it in, for example, English.

Figure 1.1: Map of the distribution of Dene languages; the Northern Athabaskan sub-grouping is the topmost image and Tsuut'ina (Sarcee) is labelled as "21" (Encyclopædia Britannica, 2009)

The aim of this thesis is to use existing semantic approaches to lexical relations to evaluate if and how synonymy and hyponymy relations operate among verbs in Tsuut'ina. Lexical relations are a semantic phenomenon that has had limited research done regarding Indigenous languages like Tsuut'ina. Some observations on hyponymy have been made towards other Dene languages, but only as a small portion of a larger discussion on another topic. No known works exists on lexical relations in Tsuut'ina, including synonymy and hyponymy. These two lexical relations are interesting to investigate together because they involve some of the same semantic properties.

The analysis of synonymy and hyponymy in Tsuut'ina is done using two groups of verb forms as candidates. First are the classificatory verbs or, more specifically, classificatory handling verbs, one subset with the stative neuter meaning 'S is lying' and one subset with the active meaning 'pick O up'. The second group is made up of verbs with the meaning 'eat'. The data is obtained from corpora consisting of a preliminary lexical database (PLD) of annotated recordings

of the unpublished Onespot-Sapir transcripts (Starlight, et al., in progress), the *Tsuut'ina Narratives of John Whitney Onespot and Edward Sapir* compiled and edited by Gary Donovan and Bruce Starlight (2018), and *Sarsi Texts* by Pliny Earle Goddard (1915). There are also some additional examples taken from Cook (1984) or from a conversation between a native speaker and Joshua Holden, reported back to the author via personal communication (Personal communication, J. Holden, February 25, 2023).

The PLD was developed for Tsuut'ina language research by the 21st Century Tools for Indigenous Languages (21C) Partnership based at the University of Alberta with partnerships with other universities, organizations, and communities such as the Tsuut'ina Gunaha Institute. It is an annotated version of an already-existing database of Onespot-Sapir recordings from the 1910s, which underwent semantic classifications by the author using the Princeton WordNet and SIL International's RapidWords semantic domain.

The listed corpora were used in lieu of native speakers through elicitation or linguistic interviews. This was done because these corpora were readily available as resources from which one can gain information from. When dealing with a language with a critically small number of speakers like Tsuut'ina, this is important to consider as not all speakers are willing to involve themselves in linguistic projects, and those that are willing are often already involved in other projects. To respect their limited availability, corpus data may be used to answer questions, then, when questions arise which the corpus cannot answer due to gaps in data, that is when speakers are consulted. During the research proceedings for this thesis, there was also the additional stressor of the COVID-19 pandemic reducing the ability to conduct in-person meetings with speakers.

The synonymy and hyponymy lexical relations are analysed using a combination of the theoretical approaches of Cruse (1986, 2000, 2002) and Murphy (2003). Each approach is evaluated for how successfully their theory works when applied to Tsuut'ina with data obtained from corpora. Also discussed are the aforementioned semantic classifications and their corresponding English-language artefacts in the WordNet and Rapid Words semantic ontologies conducted by the author independent of (and before the formulation of) the aim of this thesis. Each analysis is finished with a visual representation of how the lexical relations among the verbs being studied occur according to the approach in question.

Including this introduction, the thesis is organized into seven sections. Chapter Two discusses the existing literature on lexical relations—both the theories and how it occurs in various

languages—and describes semantic ontologies. The discussion on lexical relations begins with the general concepts of what is a lexical relation and then goes into the definitions of hyponymy and synonymy put forth by Cruse (1986, 2000, 2002) and Murphy (2003). This is followed by lexical relations being described as they appear in other languages; more specifically, hyponymy is described as it appears in other Dene languages and Indigenous languages on a wider scale. Finally, descriptions are given of the structure of the WordNet and Rapid Words semantic ontologies. Chapter Three discusses the Tsuut'ina language, beginning with its geographic and social history explaining how it has become an endangered language. The rest of the section is dedicated to the grammar of the language, describing its phonological, morpho-syntactic, and semantic properties. Chapter Four goes through the data collection and how it was obtained from the corpora. It describes the classificatory verbs and verbs with the sense 'eat' that were extracted as candidates to be investigated for their lexical relations. Chapter Five goes through the analysis of the Tsuut'ina verb candidates using the available resources. First, the direct analysis of the 'eat' and classificatory handling verb candidates is given using the theories of Cruse and Murphy as put forth in their respective works. Then, the semantic classification work conducted for the ALT Lab using WordNet and Rapid Words is described. Finally, Chapter Six discusses the outcomes of the analysis and concludes that there was evidence of hyponymy and no evidence for synonymy in Tsuut'ina. It was found from the chosen candidates and that some information on lexical relations can be obtained using corpus-based data assuming the corpora are large and varied enough to include important contextual information, including information that would otherwise be obtained from a speaker.

The intended outcome of this thesis is to provide evidence of lexical relations in Tsuut'ina as it is an unexplored phenomenon of the language while exploring properties unique to the Dene verb system and doing so using data obtained from corpora rather than directly from native speaker(s).

2. Available literature on lexical relations, linguistic ontologies, and Dene languages

Lexical relations are the relations between words. Or rather, they are between lexical units, which prototypically are words but can also be idiomatic phrases (Gibbon et al., 1997). For instance, in English, the word "ill" may have the idiomatic phrase "under the weather" as its synonym assuming both of these items have the same or similar senses, which make them synonymous. Lexical relations are paradigmatic relations, i.e., "those holding between words or signs which a user may substitute one with another because they are in the same category" (Hjørland, 2015, p. 1367). The main four types of lexical relations are synonymy, antonymy, hyponymy, and meronymy (Murphy, 2003, p. 9). In the most general definitions, these types of lexical relations are described as follows: Synonymy consists of lexical items "whose semantic similarities are more salient than their differences" (Cruse, 2000, p. 156). Hyponymy is an inclusion relation which describes the relationship between a subordinate lexical unit called the hyponym and a superordinate unit called the hypernym (p. 150). Cruse uses diagnostic frames as tests for lexical relations—to test for hyponymy, the following frame is used:

(1)   X [hyponym] is a type/kind/sort of Y [hypernym] (p. 152)

Another inclusion relation is meronymy, also called a part-whole relation or partonymy, where the subordinate unit, the meronym (or partonym), is a part of the superordinate unit, the holonym (p. 153). Lastly, antonymy is a type of opposition in which pairs of lexical units possess characteristics which place them in contrast to one another, for example, they may exist at opposing ends of a scale (Cruse, 1986, p. 204). While future work may include a focus on other lexical relations, for instance antonymy, in Tsuut'ina, for this thesis, only synonymy and hyponymy relations are being investigated.

Research into lexical relations is typically focussed on data including nouns, as nouns are the most common part of speech found to have lexical relations between its lexical units. However, synonym and hyponym-and-hypernym relations are also observed between verbs, just to a lesser degree (Arppe, 2008; Cruse, 2002, p. 3; Divjak & Gries, 2009; Fellbaum, 1990, 1998). There are also tests which help to determine the existence of each type of lexical relations. Synonym relations are tested for via substitution (Murphy, 2003, p. 148); hyponymy is tested for with the frame *X is a kind of Y* or some variation of it (Cruse, 2000, p. 152). However, in order to perform these tests,

a certain approach or method must be chosen as a means of defining the lexical relations in question.

Majority languages like English are the primary focus of research into lexical relations—both Cruse and Murphy use mostly English examples in each of their respective texts. But some research has also been conducted on how lexical relations are or are not realized in minority languages including Indigenous languages. The section following the description of Cruse and Murphy's definitions looks at how hyponymy is realized according to the Natural Semantic Metalanguage in Indigenous languages including two other Dene languages: Dënësųłinë́ and Upper Tanana.

Lexical relations, especially synonyms, feature significantly in the design of online semantic ontologies. Created for the purpose of rapid vocabulary extraction or making words and their meanings more easily accessible compared to a traditional dictionary or thesaurus, semantic ontologies like the Princeton WordNet and Rapid Words by SIL International are useful digital resources when trying to determine the lexical relations between lexical items in a language. These two ontologies in particular were used by the author to semantically classify and group Tsuut'ina verbs as part of additional research conducted for the ALT Lab. The ontologies themselves are discussed later in this chapter; the semantic annotations placed on Tsuut'ina are described in Section 5.3.

2.1 Theoretical discussions of lexical relations: Cruse and Murphy

2.1.1 Crusian approaches to lexical relations

Cruse's (1986, 2000, 2002) discussion of lexical relations and lexical semantics as a whole is focused on a lexical approach in which "it is assumed that the semantic properties of a lexical item are fully reflected in appropriate aspects of the relations it contracts with actual and potential [linguistic] contexts" (Cruse, 1986, p. 1). In other words, the meaning of a lexical item is assumed based on all possible linguistic contexts it may occur in. The grammatical content of a given lexical item is important to consider because, with regard to a given lexical relation, a lexical item's grammatical constraints may either be considered "semantically arbitrary" and have no impact on the semantic constraints, or they "overlap and reinforce" those constraints (p. 1; see also Arppe, 2008).

2.1.1.1 Hyponyms and hypernyms as described by Cruse. Hyponymy is broadly defined as the inclusion of one class in another (Cruse, 1986, p. 88; see also 2000, p. 150). The exact definition of hyponymy Cruse subscribes to requires unilateral entailment between two sentences, one containing the hyponym X and the other containing the superordinate Y, with the sentences being otherwise identical to one another. For example, the sentence "This is a dog" entails "This is an animal" where "dog" is the hyponym and "animal" is the superordinate (Cruse, 1986, pp. 88-89). There are two ways of describing the inclusion of classes that hyponymy involves: the extensional view and the intensional view. The extensional view sees that the superordinate class includes the hyponym class as a sub-class (Cruse, 2000, p. 150). To use the above example, the class of "animal" includes the class of "dog" as one of its sub-classes. The intensional view sees that the meaning of the hyponym is richer (more specific) than that of the superordinate; the hyponym's meaning includes the superordinate's meaning (p. 151). In terms of context environments, hyponymy is characterized such that hyponyms are more specific than superordinates, and therefore the contexts in which a hyponym may appear belong to a sub-set of the contexts in which its superordinate may appear (Cruse, 1986, p. 92).

Cruse approaches hyponymy using Rosch's prototype theory (Rosch, 1973), in which "some items (good examples) were more easily identified as falling under a concept than others (poor examples)", so that the "mental representations of category words are […] closer to good examples than to bad examples of the category" or, in other words, the good example is closer to the prototype (Marconi, 1997, p. 23; see also Cruse, 1994, pp. 167-168). Using this, Cruse sees taxonymy as the prototypical form of hyponymy, of which it is regarded as a "sub-species" (Cruse, 1986, p. 137; see also 1994, pp. 175-176; 2000, p. 152). Generally, taxonomic hierarchies in English are described using the diagnostic frame found in (2) below. Diagnostic frames in general are used for the purpose of proving a lexical relationship between lexemes—in this case to prove that relationship is one of hyponymy:

(2)   X [hyponym] is a kind of Y [hypernym] (Cruse, 1986, p. 137)

A second frame, which is an extension of the frame in (2), is used to describe co-taxonymy between two co-hyponyms, X and Z:

(3)   An X is a kind of Y, and a Z is another kind of Y (p. 138)

Additionally, verbal hyponymy is illustrated using its own diagnostic frame:

(4)   X-ing is a way of Y-ing (p. 139)

One of the key components of taxonymy, though not a strict requirement, is its strong correlation to natural kind terms. With regard to verbal lexemes, the concept of natural kind is difficult to apply to verbs, though some, such as *walk, crawl, swim, etc.* or *see, hear, taste*, *etc.* can plausibly be argued as natural kind terms if one argued for the "fundamental nature of the processes and actions they refer to" (p. 142).

For the purposes of this thesis, the distinction between taxonymy and hyponymy is not wholly observed. While discussing what will be called Cruse's goodness-of-exemplar (GoE) approach (explained further later) with regard to Tsuut'ina verb forms, the lexical relations are referred to as hyponyms, hypernyms, and co-hyponyms rather than taxonyms, superordinates, and co-taxonyms, respectively.

In Cruse's framework, there is a certain overlap between co-hyponyms and incompatibles. Co-hyponyms are described by Cruse using the diagnostic frame in (3). While sister-nodes in a semantic hierarchy do not necessarily have to be incompatibles, such as *paperback* and *novel* under the mother-node *book* (p. 137), the Crusian approach requires that co-hyponyms be strict incompatibles with one another (p. 150). *Incompatibles* mutually entail one another such that, assuming X and Z are co-hyponyms following the frame, the sentence *A is f(X)* entails the parallel sentence *A is not f(Z)*. They are only considered interesting in the case of incompatibles which belong under a single superordinate such as a hypernym for co-hyponyms (p. 93). Therefore, strict incompatibility between items with a shared hypernym is a necessary determiner among the candidates studied.

A maximum of five levels of hierarchy are proposed for a natural or folk taxonomy (a taxonomy which consists of natural objects/phenomena as opposed to man-made) though they are still considered for use with lexical taxonomies as well. These levels are labelled as *unique beginner*, *life-form* (*kind* is an alternate label proposed for non-biological entities), *generic*, *specific*, and *varietal* (p. 145). The third level, *generic*, is regarded as the most significant level in

the hierarchy, as it contains the greatest number of items. Lexical items belonging to the *generic* level are morphologically simple and 'original' in that they were not borrowed from another semantic area via metaphorical extension. Most often, taxonomic hierarchies end at the *general* level; lexical items at the *specific* or *varietal* levels often are morphologically complex (ex. compounding) (p. 146).

Taxonomic hierarchies ideally should have nodes at every level; however, this is not always possible in natural taxonomies or taxonomies of artifacts (p. 146). For instance, Cruse provides the following example of a hierarchy showing musical instruments:

musical instrument

strings   woodwind   brass   percussion   ø   ø

cello   viola   flute   oboe   tuba   horn   triangle   timpani   concertina   bagpipes
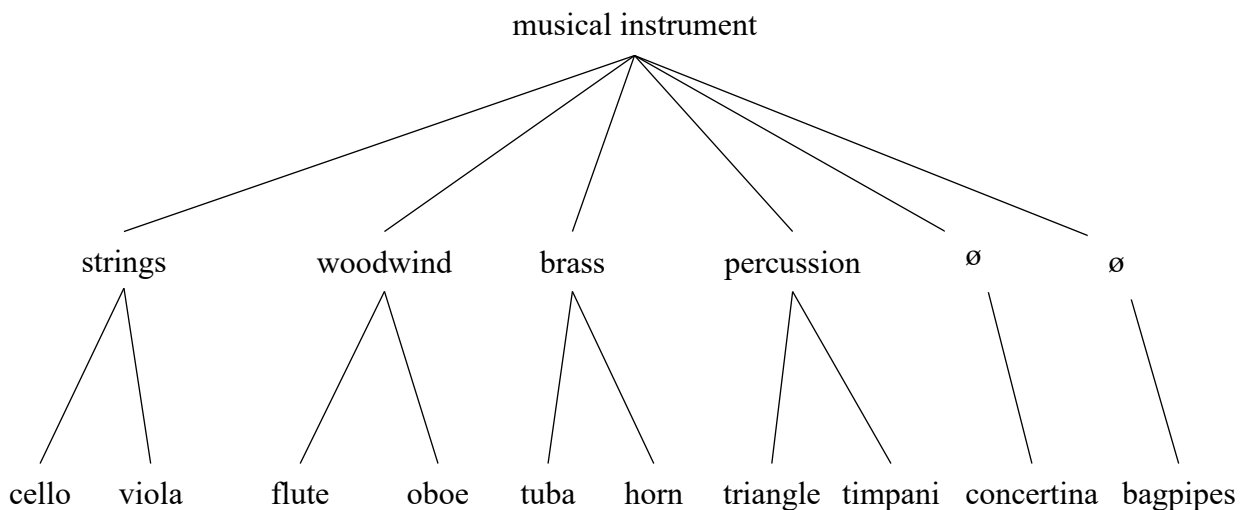
Figure 2.1: Taxonomic hierarchy of musical instruments (Cruse, 1986, p. 147)

In Figure 2.1 above, three taxonomic levels are observed to describe the different kinds of musical instruments. At the topmost level is the hypernym lexical item "musical instrument". The middle level is made up of the different sub-categories of musical instruments which function as the hyponym forms to the hypernym "musical instrument". Then, there is the third and bottommost level. However, there are two lexical items at this level—"concertina" and "bagpipes"—which each do not have a lexical item as their hypernym at the second level labelling them as another type of musical instrument (p. 147). Despite this, there is still a hypernym operating at that level, it just has no lexical item to correspond to it. This is called a covert category and is linguistically motivated as there are cases of lexical items like those which clearly exist within a category where they are co-hyponyms of one another but do not share a hypernym. While there is no sub-category

to describe the type of musical instrument a bagpipe is, for instance, that sub-category still exists, and bagpipes are included within it (pp. 147-148). Folk taxonymy and cultural or natural kind terms are not discussed beyond this, as they are well discussed in other literature. Instead, more space is given to other topics which are less frequently researched.

Later work on goodness-of-exemplar theory led to Cruse developing the namesake goodness-of-exemplar features list, a list of criteria for hyponymous relations (assuming X = hyponym and Y = hypernym) which are ranked from most to least weighted:

1. "There is no inherent categorical incongruity between X and Y.
2. The truth of *A is X* leads to an expectation of the consequent truth of *A is Y* that is greater than the reverse expectation.
3. Expression of the form *An X is a kind/sort/type/variety of Y* are normal.
4. There is no lexical item Z which is a hyponym of Y and a hypernym of X.
5. X and Y are matched in respect of their non-propositional features (such as expressiveness, register affiliation, etc.)"
(Cruse, 2002, pp. 9-10)

This feature list does follow the taxonymic sub-field of hyponymy as indicated in the third feature, which posits that the diagnostic frame requires taxonymic approaches to hyponymy (ex. *cat:animal)*. At the time of publication, it had not gone under any empirical testing to see if it works in natural language (p. 10).

2.1.1.2 Synonyms as described by Cruse. The lexical approach to synonymy that Cruse follows is focussed on a scale of synonymy. Rather than focus on a single definition of synonymy, Cruse's view is that some synonym pairs should be judged as "more synonymous" than others (Cruse, 1986, p. 265). While other writers have constructed their own scales of synonymy which may contain other types of synonymy, such as Rubenstein and Goodenough (1965) and Miller and Charles (1991), Cruse's scale is constructed as follows: absolute synonymy sits at the endpoint from which the scale originates (Cruse, 1986, p. 268), which then extends into cognitive synonymy, followed by plesionymy (or near-synonymy), and finally into non-synonymy (p. 270). As the scale moves into each following section, the synonymy becomes more varied (p. 270).

As the first item on the scale, absolute synonymy takes place between two lexical items which are synonymous in all contextual relations; any context where the items in question are not used identically proves that absolute synonymy does not exist between those items. Because of how strict absolute synonymy is, it is difficult to find examples of it in natural language and is easily falsified (p. 268). Therefore, in the case of the candidates being discussed later, no evaluation is made of absolute synonymy because there are no cases where the items are used identically in every context they appear in with identical connotations and associations.

Following absolute synonymy, the scale moves on to cognitive synonymy (p. 270)—also called propositional synonymy (Cruse, 2000, p. 158)—which requires that the lexical items in a set are synonymous if they can substitute for one another in an otherwise identical sentence while the truth-conditions of the sentence remain the same and the two resulting sentences are mutually entailing (Cruse, 1986, p. 88; Cruse, 2000, p. 158). Several properties are involved which are used to differentiate cognitive synonyms from one another. Their differences in meaning involve one or more differences in non-propositional meaning, be that expressive meaning, stylistic level, and/or the presupposed field of discourse (Cruse, 2000, p. 158). Propositional meaning is the presented meaning which determines truth-conditions in a statement and has varied in "discrete jumps" (Cruse, 1986, p. 272). Expressive meaning does not determine truth-conditions and has continuous variations (p. 272). An example of propositional meaning is the sentence "I just felt a sharp sudden pain", whereas an example of expressive meaning is in the sentence "Ouch!" (p. 271)—both sentences describe the same scenario, but only the former of the two contains truth-conditions. A lexical item's inherent meaning can consist of both propositional and expressive meaning so long as its cognitive synonym, which may have identical propositional meaning, has a different expressive meaning (p. 273). Among the expressive meanings, there are stylistic differences which separate cognitive synonyms. There are informal and formal styles with differing levels of expressiveness, with informal styles being considered more expressive than formal styles (p. 276).

The meanings of the cognitive synonyms can also be divided into presupposed and evoked meaning. Presupposed meanings are more "taken for granted" with certain presuppositions being connected to certain lexical items. The presupposed meanings place a set of semantic restrictions called semantic co-occurrence restrictions on the syntagmatic companions of a lexical item in a cognitive synonym set (p. 278). There are two types of semantic co-occurrence restrictions:

selectional restrictions and collocational restrictions. *Selectional restrictions* are "logically inescapable concomitant[s]" of a lexical item's propositional traits. An example of this is the verb *die*, which has the logical prerequisites for its grammatical subject that it refers to something 'organic', 'alive', and 'mortal' (p. 278). What Cruse calls *collocational restrictions* are selectional restrictions plus additional "arbitrary" semantic requirements. For example, *kick the bucket* has the same selectional restrictions as *die* (see above), but with the additional semantically arbitrary restriction of a human subject (pp. 278-279). The latter type of restriction is irrelevant to truth-conditions (p. 279).

The final aspect which differentiates cognitive synonyms is the register, which is analysed based on field of discourse, manner of transmission, and stylistic language characteristics. Field of discourse refers to how certain lexical items are more relevant given the nature of the conversation taking place (pp. 283-284). Manner of transmission is how the discourse takes place, be that spoken, written, etc. (p. 284). And stylistic characteristics mark different relations between the discourse participants dependent on familiarity, social positions, etc. which are treated usually as evoked meaning but also as expressive meaning (pp. 284-285).

In the case of the Tsuut'ina verb candidates being described later, there are many cognitive synonymy properties which they cannot be tested for due to their being acquired as corpus data. This includes confirmation of truth values, evoked meaning, and the registers by speakers for the potential cognitive synonyms in question.

Plesionymy, also called near-synonymy by other authors (see Murphy below), shares a boundary with cognitive synonymy which easily differentiates the two: where cognitive synonymy has the lexical items in a set share truth-conditions when they appear in otherwise identical sentences, in plesionymy, those items produce different truth-conditions for their sentences (pp. 285-286). Plesionyms are also noted for their shared boundary with non-synonyms, however, that boundary is more blurred with no clear property with which to distinguish the two from each other. The semantic traits which each lexical item in a proposed synonym set possess can be evaluated some way to determine their degree of plesionymy or non-synonymy (p. 286). The categories that the semantic traits belong to also factor into the plesionymy versus non-synonymy distinction: capital semantic traits—the superordinate traits—which are analogous to the head of a construction, must be shared by the lexical items; meanwhile, subordinate semantic traits, which are analogous to a syntagmatic modifier, differ. A surface level analysis of these traits as they exist

in a synonym set would determine them to be hyponymous based on the shared capital trait, but the same sharing versus differing distinction can exist between plesionyms if the differing subordinate semantic traits are highlighted so they are viewed as more important to the lexical relation than capital traits (pp. 287-288).

2.1.2 Murphian approaches to lexical relations

Another perspective on lexical relations is offered by Murphy (2003) via her discussion on semantic relations and the metalexical approach. The metalexical discussion of lexical relations (also called "semantic relations") by Murphy (2003, p. 9) is focussed on the semantic relatedness of not just words' meanings, but words themselves and their constraints (p. 42). Murphy proposes that definitions of lexical relations require a minimal difference between the lexical items being studied. More specifically, she uses a concept labelled Relation by Contrast (RC), which views lexical relations as a contrast relation where the contrast occurs if and only if the items or word concepts in the set have all contextually-relevant properties in common but one (p. 44). Following this approach, more specific definitions of RC are proposed to account for specific lexical relations including synonymy and hyponymy. Hyponymy is defined according to Relation by Contrast-Asymmetric Lexical Contrast or RC-ALC (p. 229). Synonymy is defined according to Relation by Contrast-Synonymy or RC-S (p. 134).

2.1.2.1 Hyponyms and hypernyms as described by Murphy. Hyponymy is difficult to discuss using the metalexical approach and minimal difference because the lexical-semantic relationship taking place between word concepts is less clear in hyponymy than other lexical relations. This is because hyponymy is a relation among concepts or things in the world rather than strictly the words assigned to them, as is the case for other relations (p. 216). However, Murphy makes some attempt at regarding hyponymy using RC and minimal difference meanings. The relatedness of hyponymic words is found based on the non-lexical concepts those words represent, with their minimal difference being their different taxonomic levels (p. 229).

Following the metalexical approach viewing lexical relations as being between the words themselves, Murphy proposes the Relation by Contrast–Asymmetric Lexical Contrast (RC-ALC) definition to describe hyponymy:

Relation by Contrast–Asymmetrical Lexical Contrast: "An asymmetrical lexical contrast set includes just a subset containing one word-concept and one or more subsets that are lexical contrast sets themselves, and these subsets have all the same contextually relevant properties but one" (p. 229)

In other words, there is an asymmetrical lexical contrast between the hypernym and hyponym in a hierarchy of word-concepts, wherein those items have all contextually relevant properties in common but one, and then there is a lexical contrast between co-hyponyms of the same hypernym. Therefore, lexical contrast must also be introduced to explain the connection between co-hyponyms using Relation by Contrast-Lexical Contrast (RC-LC), which was originally proposed by Murphy to define antonymy along with other lexical relations:

Relation by Contrast-Lexical Contrast: "A lexical contrast set includes only word-concepts that have all the same contextually relevant properties but one" (p. 170)

Once again, the lexical relation involves all but one contextually relevant property being shared by the two word-concepts, in this case those words being the co-hyponyms in a hierarchy.

In the case of both asymmetrical and symmetrical lexical contrasts, it is important to highlight which properties are and are not contextually relevant to hyponymy relations. When looking at hyponyms and hypernyms, there will be more than one property they do not have in common: the meanings and the forms. However, Murphy judges form to be a less relevant property with regard to hyponymy (p. 228). Therefore, in the case of hyponymy, the contextually relevant property that a hyponym and hypernym do not have in common, or two co-hyponyms do not have in common, is meaning. It is this property, then, which creates lexical contrast between word-concepts in a hyponymous relation.

While the RC approach is well explained when applied to hyponymy, it still does not work as well with hyponymy as it does with other lexical relations. Murphy even states that she would not go so far as to say that "RC is responsible for taxonomic relations" (p. 229) because RC is not enough to account for the "multi-layered, asymmetrical nature of taxonomies" (pp. 229-230). Rather, other factors also come into play (pp. 229-230). Note that when Murphy says "taxonomy", she means the *is a kind of* relation, as opposed to the functional relation which means *is used as a*

kind of relation—ex. *cow < animal* is a taxonomic relation, but *cow < livestock* is a functional relation because "livestock" refers to the function cows and other animals serve in farming (p. 220). That all being said, the analysis conducted later on Tsuut'ina verb forms will feature RC-ALC and RC-LC to define hyponymy so as to account for Murphy's metalexical approach where hyponyms, hypernyms, and co-hyponyms are concerned.

2.1.2.2 Synonyms as described by Murphy. Synonymy, given that it is more concerned with the words themselves in a lexical relation than hyponymy is found to be, is better suited to be described using Murphy's metalexical approach. Murphy proposes two possible ways of defining synonymy according to the metalexical approach, though only one of them can successfully be used. First, there is the RC definition, which specifically applies to synonymy, called Relation by Contrast-Synonymy (RC-S) which is defined as follows:

> **Relation by Contrast-Synonymy:** "A synonym set includes only word-concepts that have all the same contextually relevant properties, but differ in form" (p. 134)

This is a strict definition of synonymy, where relevant properties such as meaning must be identical (*not* similar) between two synonyms. In the case of properties being similar to one another, contextual relevance comes into play as determining which word-concept is used in a particular scenario (p. 139). At the other end, when it comes to the differing forms, it must only be established that the word-concepts' forms differ from one another; it is not important *how* different they are (p. 140). The RC-S definition aims to account for near-synonymy because it derives context-dependent synonyms, not just logical synonyms such as sense synonyms—synonyms which share one or more senses—or full synonyms—synonyms which are identical in every sense (p. 143; pp. 146-147). More specifically, Murphy regards near-synonymy as the typical definition of synonymy, so RC-S can account for that even though near-synonyms typically have similar, not the same, meanings (p. 147).

The second method of defining synonymy according to the metalexical approach that Murphy proposes is using fixed mental representations. Here, each word-concept has a concept which includes the knowledge that the word is a synonym of another word-concept. For instance, Murphy offers the pretend Martian words *zorx* and *kklak* which are understood to be synonymous

with each other in that dialect. This is because each of these word-concepts has the concept ZORX and KKLAK, respectively, which possess the information of their synonymy to one another. The knowledge of their synonymy impacts a speech participant's beliefs about their meanings, as knowing they are synonyms means one assumes they have the same meaning. However, the concept of these word-concepts being synonyms being a known fact makes that synonymy underivable. If synonyms cannot be derived, then one's beliefs about the words self-destruct because there is no space to acquire new meanings which may create different lexical relations with other word-concepts (p. 135). Ultimately, approaching synonyms as fixed mental representations does not work long-term because of this, so the focus of defining synonymy returns to RC and minimal difference.

2.2 Examples of lexical relations in other languages

Having not found any existing sources which describe lexical relations among Tsuut'ina words, in order to set a precedent for such a discussion, other languages must be investigated for similar content—more specifically, other minority languages, including other Dene (Athabaskan) languages. While the author has not found any sources describing synonymy among any of these languages, there is some precedent for describing hyponymy. Below, the Natural Semantic Metalanguage (NSM) is used to describe cases of hyponymy among various languages native to Oceania (Goddard & Wierzbicka (Eds.), 1994). Later, an additional discussion uses the NSM to, unsuccessfully, look for hyponymy among Dënësųłinë́ (Holden, 2019). Also, a lack of hypernym is observed in kinship terms of Upper Tanana (Lovick, 2023).

2.2.1 Lexical relations in other Indigenous languages

While the RC approach offers non-universality of some lexical relations, an alternative universality approach is found in the NSM approach proposed by Goddard and Weirzbicka (1994a). The NSM proposes a list of 65 semantic primes organized into 16 related categories (Goddard & Wierzbicka, 2014b, pp. 11-12). The semantic primes make up an "inventory of simple universal concepts […] embedded in the lexicons of all (or most) human languages" (p. 11). One such semantic prime is KIND OF—belonging to the category "Relational substantives" (Goddard & Wierzbicka, 2014a, p. 83); formerly labelled "Partonymy/Taxonymy" (Goddard, 1994a, p. 22)—an inherently relational prime which illustrates the taxonomic relationship between general and specific items or concepts

(Goddard & Wierzbicka, 1994a, p. 46). In other words, it describes the "X is a kind of Y" relation looked for in hyponymy.

Goddard and Wierzbicka (Eds.) (1994b) features papers discussing the use of the original English language list of NSM semantic primes to look for examples fulfilling those primes including the KIND OF prime in other languages, including Indigenous languages of places like Oceania (present-day Australia, Papua New Guinea, Nicaragua, the Samoan Islands, and the Soloman Islands) (Goddard & Wierzbicka (Eds.), 1994b). Firstly, some languages have a word which expressly reflects the KIND OF concept. Longgu, a Southeast Solomonic language spoken in Guadacanal, Solomon Islands (Hill, 1994, p. 311), has the form *vata* to represent KIND OF (p. 327). Samoan has *itu'âiga* 'kind, branch of lineage' (Mosel, 1994, p. 355). The Misumalpan languages of Nicaragua and Honduras (Hale, 1994, p. 263) Miskitu and Panamahka have the form *sat* 'kind, sort' borrowed from English fully integrated into the language—it is also found in Ulwa, another Misumalpan language (p. 281). More commonly, languages include words expressing other concepts that are used to portray KIND OF. The Misumalpan languages also have words like *dyara/dii* 'thing', *upla/muih* 'person', and *daiwan/dii* 'animal' used in the context of expressing KIND OF (p. 281).

Both Mangap-Mbula, an Austronesian language native to Papua New Guinea, and Kayardild, a Tangic language native to the South Wellesley Islands in Australia, have a lexical item commonly glossed as 'colour' which fulfils the usage functions of KIND OF. The Mangap-Mbula word is *mataana* 'kind' (Bugenhagen, 1994, pp. 101-102). The Kayardild item *minyi* 'colour' has a particular sense when referring to meaning KIND OF: the notion of 'colour' is used to describe other physical attributes, such as for other English senses of colour (i.e., race) or when comparing facial features (Evans, 1994, pp. 223-224). Both languages also express the plural variant KINDS OF using these same words: *matakiŋa* 'many.different.kinds' is used to indicate plurality of different kinds in Mangap-Mbula (Bugenhagen, 1994, p. 102) and the reduplicated form *minyiwuru minyiwuru* 'kind.having kind.having' does the same in Kayardild (Evans, 1994, p. 224).

Kalam, Mparntwe Arrernte, and Kayardild also see KIND OF expressed in words which hold other senses as well. Kalam, a language indigenous to Papua New Guinea, has the words *wagn* and *kɲŋ*, which both translate to 'kind, sort', while also having a range of senses that translate to 'base, lower part of something', 'kin group, especially extended family co-resident in house/house

cluster', and 'family class, sort, type' (Pawley, 1994, pp. 418-419). Mparntwe Arrernte, an Arrandic language native to the Northern Territory of Australia, has the KIND OF concept linked to the form *arrpehne* 'other', which is used to express the notion of 'different kinds' with the reduplicated form *arrpehne-ante-arrpehne* 'other-only-other'. There is also the form *–ulkere* 'more' which has two distinct uses associated with comparison: (1) create comparatives or indicate increased temporal range, and (2) indicate that one thing is of the same general kind as another or is of the kind being described or indicated. Together with the demonstrative *nhenge* 'you remember the one', a signal is created indicating "that the speaker has moved out of discourse into handsigning and is noting that an entity in the story was a thing of the kind indicated in the handsign" (Harkins & Wilkins, 1994, p. 302). Kayardild has the word *wuranda* 'food' which also has the senses 'creature' and 'kind' (Evans, 1994, p. 224).

The papers on Kayardild and Yankunytjatjara suggest frames in which hyponym and hypernym relations are portrayed—in line with the English frame *X is a kind of Y*. With the caveat of KIND OF not being clearly identified in Yankunytjatjara (a Wati language native to South Australia), Goddard (1994a) suggests a "generic-specific" construction seen in many Australian languages, ex. *punu apara* 'tree river-gum'; a "different kinds of" construction, *kutjupa-kutjupa tjuta* (lit. "other-other many"); and the form *ini* 'name' is used to express "this is a kind of X" (literally "this is an X name") in a way that is different from the traditional sense of "name" (pp. 257-259). Kayardild presents a nominal predicate frame "X, Y one Z" (meaning "Both X and Y are kinds of Z" like (3) does) and uses kinship terms to reflect hyponymy in such statements as "The porpoise is the younger brother; the whale is the older brother" (Evans, 1994, p. 223).

Many languages use their own equivalent of the frame *X is a Y* in place of *X is a kind of Y* to describe the KIND taxonymy relation, implying no distinction between two items existing at the same hierarchical level versus two items in a hierarchical taxonomic relationship. The languages discussed above have unique words for KIND OF, either as a separate item that carries just that one sense or have other senses but represent "kind" when that is the context of the discourse. Therefore, despite following the frame mentioned above, they are still able to make the distinction of a statement like "It is not the same fish, but it is the same kind of fish" (Wierzbicka, 1994, p. 493). Each of the referred languages then have some expression for 'kind of' which may illustrate an explicit hyponymy relation.

2.2.2 Lexical relations in other Dene languages

Little is currently written about synonymy in Dene languages; however, a few writers have made observations about hyponymy in the language family. Specifically, some have observed a lack of hypernym words in more than one language in the family. Dënësųłinë́ and Upper Tanana are two such languages where this has been observed. Holden (2019) uses the NSM to discuss how many semantic primes, including KIND and PART, are not possible in Dënësųłinë́ (p. 75). While portmanteau forms for KIND including "this kind" and "another kind of X" are expressed in the language with words like *kųt'į* 'such' and *edúni* 'different, other', respectively, there is no explicit lexical exponent of KIND (p. 110). When asked, speech consultants declined to provide a Dënësųłinë́ form for the NSM context "It is not the same fish, but it is the same kind of fish". Some words in Dënësųłinë́ have 'kind' as one element of meaning in a lexical item, but again, this is different from an explicit lexical exponent (p. 111).

Meanwhile, Lovick (2023, pp. 48-49) observed no hypernyms for kinship terms like 'parents', 'grandparents', or 'siblings'. Instead, asyndetic noun coordination connects the constituent units which fall under such concepts, for example 'grandmothers' and 'grandfathers' are said together to indicate 'grandparents'. Some semantic domains which include a hypernym term are CLOTHING and SHELTER—both hand-made items—while no general term for 'hunting gear' or 'weapon' exist while words for specific types of arrows, spears, etc. are found in the language. Semantic domains containing words describing the natural world also have few to no hypernyms: there is no general word for 'tree' but words for the different species of trees; the domain BIRDS has the hypernym 'ducks' for "dabbling and diving ducks" and the hypernym 'birds' referring to 'songbirds' but not ducks, hawks, etc.; the domain for MAMMALS also has no hypernym word meaning 'mammal'. Dena'ina is another Dene language which appears not to have general-kind terms (Kari, 2007).

2.3 Semantic ontologies

Lexical relations are used in the development of semantic ontologies as an alternative way of organizing words in a language. This is particularly useful when designing digital or online ontologies, where items can be pulled via a keyword search, therefore the alphabetization of physical dictionaries and thesauri is not needed. In the semantic ontologies described below—the Princeton WordNet and Rapid Words by SIL International, respectively—words are organized

according to their lexical and semantic relations to other words, with particular focus on their synonyms.

2.3.1 Structure of the Princeton WordNet

The Princeton WordNet is an online lexical reference system first developed in 1985 as an answer to the issue of semantically organizing vocabulary, mainly in English. While traditional physical dictionaries are organized according to the alphabetical order of their entries, the WordNet is conceptually organized under the general parts of speech, i.e., nouns, verbs, adjectives, and adverbs. Under these parts of speech, a WordNet entry is made up of *synsets*. Synsets (short for 'synonym sets') are organized in WordNet based on semantic relations (Miller et al., 1993, p. 6) and are meant to represent one lexical concept (p. 1). When it was first developed, WordNet contained 70,100 synsets made out of 95,600 unique word forms—51,500 simple words and 44,100 collocations (pp. 1-2). As of 2022, the number of synsets has increased to 117,000 (Vincze & Almasi, 2014, p. 1; WordNet, 2022).

Psycholinguistic evidence shows that syntactic categories are independently organized in semantic memory. Per the substitution test used to determine synonymy, words belonging to separate syntactic categories cannot be synonymous due to substitution. Therefore, each synset is only made up of concepts belonging to the same syntactic category (Miller et al., 1993, pp. 6-7). The synsets themselves illustrate the synonymous relationship between lexical items in WordNet and assumes that each relation is symmetric per the requirement imposed by its designers (p. 7). Each synset consists of a at least one word form, its part of speech, a definition, and at least one example sentence illustrating its use in language. When the synset has two or more word forms in it, the singular definition is applied to all of them.

Verb

- S: (v) **eat** (take in solid food) *"She was eating a banana"; "What did you eat for dinner last night?"*
- S: (v) **eat** (eat a meal; take a meal) *"We did not eat until 10 P.M. because there were so many phone calls"; "I didn't eat yet, so I gladly accept your invitation"*
- S: (v) feed, **eat** (take in food; used of animals only) *"This dog doesn't eat certain kinds of meat"; "What do whales eat?"*
- S: (v) **eat**, eat on (worry or cause anxiety in a persistent way) *"What's eating you?"*
- S: (v) consume, eat up, use up, **eat**, deplete, exhaust, run through, wipe out (use up (resources or materials)) *"this car consumes a lot of gas"; "We exhausted our savings"; "They run through 20 bottles of wine a week"*
- S: (v) corrode, **eat**, rust (cause to deteriorate due to the action of water, air, or an acid) *"The acid corroded the metal"; "The steady dripping of water rusted the metal stopper in the sink"*

Figure 2.2: Screenshot of the synsets for 'eat' in WordNet (WordNet Search – 3.1, n.d.-a)

In Figure 2.2 above taken from the search results for *eat* in WordNet, six synset entries are shown under the verb part of speech (no other part of speech results exists for *eat*). The first two entries have just the word 'eat' listed, indicating that those two definitions of the word are not shared with any other word in the English language. Each of the remaining four entries, however, have at least one other word form included in the synset which is hyperlinked to the search results for that particular word. For instance, clicking on the link to "feed" would direct one to all of the search results for that word, which would include the same synset shown above with "eat" as a synonym and the corresponding definition and example sentences (Miller et al., 1993, p. 3). Henceforth, examples and images taken from WordNet are focussed on information around the first synset shown—the first of the two "eat" synsets.

Hyponymy in WordNet is considered a transitive and asymmetrical relation. Hyponyms inherit the generic features of their preceding hypernym(s) while additionally taking on additional, more specific meaning (pp. 8-9). WordNet has hyponyms and hypernyms connected via its lexical inheritance system: for example, the WordNet database has the entry for *tree* contain a reference '@→' pointing towards the entry for *plant* (the '@' indicates the 'superordinate' label) and the synset entry would show '~' next to any 'subordinate' entry that is a hyponym of *tree*. The resulting synset entry for *tree* would appear as such:

{ tree, plant,@ conifer,~ alder,~ . . . }

With the '…' indicating any other potential hyponyms (p. 13).

WordNet follows the terminology of Fellbaum and Miller (1990) when describing hyponymy among verbs with the term *troponym* to describe the merging between the *verb hyponym* concept and the manner relation (p. 47). In synsets, both full and direct troponym lists are included to describe the subordinate items underneath a synset, and the direct and inherited hypernym lists to describe the superordinate items that precede the synset. Direct troponyms and direct hypernyms are the synsets which are one hierarchical level above or below the synset being shown. Full troponyms and inherited hypernyms include both the direct troponyms and direct hypernyms, respectively, as well as the additional levels which are the respective troponyms and hypernyms of those synsets.

Figure 2.3: Screenshot of the list of full hyponym synsets of the synset "eat" in WordNet (WordNet Search – 3.1, n.d.-a)

Figure 2.3 illustrates the hyponymous relationship between the synset "eat (take in solid food)" (henceforth just "eat") as shown in the search results for *eat* in WordNet and its troponyms. This is the full troponym list, which includes synsets which are directly subordinate to this definition of "eat" as well as any troponyms those synsets may have, as is the case for the synset "eat up, finish, polish off", which has two of its own troponym synsets (WordNet Search – 3.1, n.d.-a). Because hyponymy is defined as a transitive relation in WordNet (Miller et al., 1993, p. 8), the synsets "tuck in, tuck away, put away" and "devour, demolish, down, consume, go through" are also hyponyms of "eat" because they are hyponyms of "eat up, finish, polish off".

Figure 2.4: Screenshot of the list of direct and inherited hypernym synsets for the synset "eat" in WordNet (WordNet Search – 3.1, n.d.-a)

Figure 2.4 shows the inherited hypernym synsets which are superordinate to the synset "eat". Based on this image, "eat" is a troponym of two direct hypernyms: "eat (eat a meal; take a meal)" and "consume, ingest, take in, take, have (serve oneself to, or consume regularly)". Additionally, the "eat (eat a meal; take in a meal)" synset is itself a troponym of the latter synset "consume, ingest, take in, take, have" (WordNet Search – 3.1, n.d.-a). Therefore, the synset "eat" is simultaneously the troponym of "consume, ingest, take in, take, have" at both one and two hierarchical levels.

Both the synset "eat (eat a meal; take a meal)" and the synset "consume, ingest, take in, take, have" have other troponym synsets in addition to "eat". These synsets are subsequently the co-troponyms of "eat":

Figure 2.5: Screenshot of the synset "eat" and its co-hyponyms under the hypernym synset "consume, ingest, take in, take, have" (WordNet Search – 3.1, n.d.-a)

In addition to the synset "eat (eat a meal; take a meal)", Figure 2.5 shows the other co-troponyms for "eat" which are all troponyms of the synset "consume, ingest, take in, take, have". There are twelve co-troponyms (called "sister terms" in WordNet—see Figure 2.4) in total. Two of the co-troponyms are other synsets which contain the word "eat": the aforementioned "eat (eat a meal; take a meal)" and "feed, eat (take in food; used of animals only)" (WordNet Search – 3.1, 2023a). The synonym relations between lexical items are maintained within a single synset and require that these lexical items all have the same meaning. Co-hyponymy, meanwhile, is maintained between synsets and is focussed on the different meanings they have while still each having inherited the same general meaning from their hypernym. Therefore, there is no overlap between synonymy and co-hyponymy as they are presented in WordNet.

WordNet contains 21,000 verb words and verb phrases divided into 15 files. These files are labelled as the following: bodily care and functions, change, cognition, communication, competition, consumption, contact, creation, emotion, motion, perception, possession, social interactions, weather verbs, and states. The last file, labelled "states" does not constitute a semantic domain like the remaining files, the verbs which make it up only share that they refer to states. The

remaining fourteen files all denote "events or actions", meanwhile (Fellbaum, 1990, p. 41). The names of these files are derived from what is usually the topmost synset in a hierarchical grouping in the WordNet. These files are not found to have rigid boundaries separating them from one another; rather these classifications help grasp the organization of the verbs (p. 42).

2.3.2 Structure of Rapid Words

What is called the RapidWords semantic classification is taken from the semantic domains created by SIL International. A semantic domain is "a family of closely related words that are linked in a variety of ways" (SIL International, n.d.-d). They are considered a means of facilitating Internet searches of word meanings as well as allowing for those meanings to be compared and contrasted (SIL International, n.d.-c). However, they are also unique and tend to vary by language (SIL International, n.d.-d).

In 2001, linguist Ron Moe began compiling a word list to be developed into semantic domains using what is called Rapid Word Collection (RWC), which is the first stage of the Dictionary Development Process (DDP) (SIL International, n.d.-d). The purpose of the collection is to be used as an alternative to the text corpus model of dictionary-making for minority languages that cannot otherwise be developed due to a lack of text data (Moe, 2003, p. 215). This list would go on to include classifications of English words and idioms and has become the Rapid Words semantic ontology (SIL International, n.d.-b). As of September 2012, the domain includes classifications of over 60,000 English words and idioms (20,000 from the Corpus of Contemporary American English) and approximately 18,000 semantic domains (SIL International, n.d.-a, -b). The semantic domains are organized into a hierarchy with nine major headings. These major headings are divided into continuous sub-categories of varying depth until the individual domains are reached.

A   B

5.2.2 Eat

C

Use this domain for words related to eating.

Related domains: 5.2.2.1 Bite, chew
OMC Codes: 260 Food Consumption
262 Diet
264 Eating
Louw Nida Codes: 23A Eat, Drink

D What general words refer to eating food?

E *eat, consume, ingest, partake*

What words refer to licking with the tongue?

lick

What words refer to swallowing?

swallow, gulp

What words refer to difficulty in swallowing?

choke, gag

What words refer to feeding someone?

feed (someone), force-feed

Figure 2.6: Screenshot of semantic domain for 'Eat' in Rapid Words semantic domain—(A) sorting number, (B) domain label, (C) description of domain, (D) questions on domain, (E) English answers

As in Figure 2.6, each semantic domain contains a sorting number, a domain label, a short description of the domain, a series of questions reflecting the domain, and a list of English words and phrases under each question (SIL International, n.d.-a). These semantic domains which Moe built have been proven to work with a "wide variety of languages to stimulate the neural networks and trigger the release of all kinds of related words" (SIL International, n.d.-d). Previously, the ALT Lab has used the RapidWords collection to semantically organize a vocabulary of Plains Cree for the Maskwačis online dictionary (Reule, 2018). Therefore, it can similarly be used for the semantic organization of Tsuut'ina lexical entries.

The RapidWords semantic domain is organized into seven separate hierarchies, each focussed on a singular topic. The hierarchies are labelled and numbered in the following order: 1

Universe, creation; 2 Person; 3 Language and thought; 4 Social behaviour; 5 Daily Life; 6 Work and occupation; 7 Physical actions; 8 States; and 9 Grammar. Each hierarchy is broken down into multiple levels of subgroups; the deepest a hierarchy travels is five levels (SIL International, n.d.-a).

The subgroups, regardless of how deep in the hierarchy they occur, contain a list of questions regarding the topic of that particular subgroup and any relevant words. The questions generally follow the frame "What words refer to X concept?". For example, the subgroup titled "5.2.2 Eat", which is described as the domain for words referring to eating, has questions like "What words refer to swallowing?", to which the suggested English word prompts are "swallow" and "gulp". Questions like this are meant to be easily answerable in a linguistic interview, regardless of the language being studied, so as to establish how words are connected to the real world and to each other within the given language, including the lexical relations being discussed here.

3. The Tsuut'ina language

Now that the necessary information regarding lexical relations as it currently stands has been established, the notion of Tsuut'ina as a language must also be illustrated. This portion goes through the language itself as well as the contexts in which it exists. The first section goes through the geography of where the language is spoken and where the Tsuut'ina language exists within the Dene language family. The second section discusses the language endangerment of Tsuut'ina, and the linguistic documentation and efforts made to increase the number of speakers, both in the past and current efforts. The final section goes into the grammar of the language, specifically focussing on properties of the language which are relevant to the study of synonymous and hyponymous lexical relations.

3.1 Geography and linguistic origin

3.1.1 History and geography of Tsuut'ina

The Tsuut'ina language (previously known in academic sources as Sarcee or Sarsi—from the Blackfoot word "saxsii" meaning "stubborn ones") (Cook, 1984, p. 1) belongs to the Northern Athabaskan branch of the Dene (Athabaskan) language family that exists throughout the western region of North America. The Northern Athabaskan branch is spread across the state of Alaska and much of northwestern Canada. The other two branches of the Dene family are Pacific Coast Athabaskan—which stretches along the western coast of the United States (Washington State, Oregon, and northern California)—and Southern Athabaskan (also called Apachean)—which includes the region of the southwestern United States (K. Rice, 2020, p. 2). The Tsuut'ina language is spoken by the Tsuut'ina, a First Nations people native to southern Alberta and who mostly live on the Tsuu T'ina Nation 145 reserve (see Figure 3.2).

The traditional lands of the Tsuut'ina occupy the region in present-day Alberta, stretching from Edmonton to Lethbridge and then west to the eastern edge of the Rocky Mountains (Native Lands Digital, 2022; see Figure 3.1). These traditional lands overlapped with those of the Siksika (Blackfoot), Plains Cree, and Stoney Nakoda (Cook, 2020; Preston, 2021). The Tsuut'ina have maintained close contact with these communities, and it is likely they adopted elements of Plains culture from them, which distinguishes the Tsuut'ina from more northern Dene peoples (Cook, 2020).
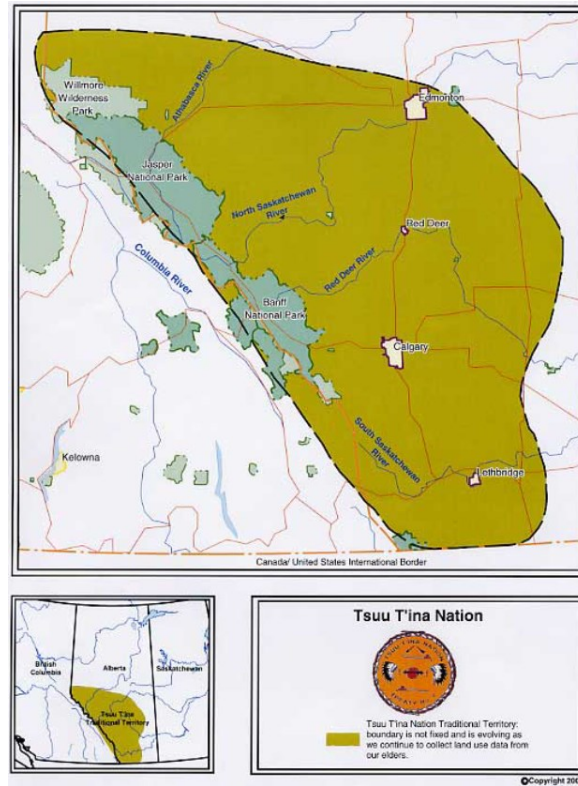
Figure 3.1: Map of the traditional territory of the Tsuut'ina (Native Lands Digital, 2022)

Tsuu T'ina First Nation, where many of the Tsuut'ina live today, was established in 1877 following the signing of Treaty 7 by Chief Bull Head and consists of 280 km^2 that borders the limits of the city of Calgary, Alberta, Canada (Cook, 2020). As of November 2022, the registered population of Tsuu T'ina First Nation is 2,564 people (Crown-Indigenous Relations and Northern Affairs Canada [CIRNAC], 2022).

Figure 3.2: Tsuu T'ina Nation 145 (Google, n.d.)

Prior to the signing of Treaty 7, the Tsuut'ina were political allies of the Blackfoot Confederacy during the 18th and 19th centuries (Dempsey, 2019). This alliance established relationships with the Kainai, Siksika, and Piikani which allowed for trade between the nations and boundary protection from enemies (Gladue Rights Research Database, n.d.).

Today, Tsuut'ina First Nation is one of over forty signatories of the Buffalo Treaty consisting of nations of Indigenous peoples in both Canada and the United States (Buffalo Treaty, n.d.-a). The purpose of the treaty is to restore and conserve the prairie ecosystem and its ties to Indigenous cultures and especially to provide a safe environment for the free-roaming of the buffalo (Buffalo Treaty, n.d.-b).

3.1.2 Tsuut'ina within the Dene family

One of the questions regarding Tsuut'ina is how it is related to other Northern Athabaskan languages. Within the Northern Athabaskan subgroup, Tsuut'ina is unique from its siblings for being the southernmost language geographically (see Figure 1.1). Likely because of this, it is regarded as an isolated language within the Northern Athabaskan subgroup because no common ancestry has linked it to any other subdivision. Some writers have suggested a relation to Dane-zaa (Beaver) from comparisons of stem-initial consonants (Hoijer, 1963; Krauss, 1973 as cited in Cook, 1984, p. 2) and the hypothesized origin of the Tsuut'ina name coming from *tsò-hú-t'ínà* "beaver-there-people" (Curtis, 1928, p. 162). However, Goddard (1915) observed no mutual intelligibility between Dane-zaa and Tsuut'ina (as cited in Cook, 1984, p. 2). More recently, Tsuut'ina has been understood as forming its own branch within the Dene family, though Dane-zaa similarly exists as an outlier such that a connection between the two cannot be proven nor denied (Snoek & Stang, 2016, p. 309).

Tsuut'ina has also been organized as belonging to a distinct group which includes the Pacific Coast and Southern Athabaskan subgroups, respectively, while being separated from the rest of the Northern Athabaskan languages (Tuttle & Hargus, 2004, as cited in K. Rice, 2020, p. 2). However, the Tsuut'ina traditional territory is still geographically closer to other Northern Athabaskan cultural regions and the Pacific Coast and Southern groups have their own unique morphological patterns which are distinct from Tsuut'ina and the rest of the Northern Athabaskan languages, so it is still considered most appropriate to organize Tsuut'ina within the Northern subgroup, as is done in most literature (ex. Cook, 1984).

3.2 Tsuut'ina language documentation work

3.2.1 Language endangerment of Tsuut'ina

Tsuut'ina has had an increase in overall speakers in recent years. However, the number of mother tongue speakers and people who predominantly speak the language at home has declined. The 2021 Census of Population for Canada reported 175 people who had some knowledge of the language (Statistics Canada, 2022a), while the previous census from 2016 reported 150 people (Statistics Canada, 2017), therefore a 17% increase in overall speakers took place. Meanwhile, the number of mother tongue speakers—speakers who acquired the language during childhood and continue to maintain it (Statistics Canada, 2022b)—decreased 69% between 2016 and 2021: 80 speakers were reported in 2016 (Statistics Canada, 2017) while only 25 reported in 2021 (Statistics Canada, 2022a). Finally, there are no longer speakers who predominantly speak Tsuut'ina in the household over other languages (Statistics Canada, 2022a); ten speakers were reported in 2016 (Statistics Canada, 2017). In 2019, the Tsuut'ina Gunaha Institute reported that there was 40 Tsuut'ina speakers (Tsuut'ina Gunaha Institute, 2019). A full comparison of speaker numbers according to census data is shown below:

	2021 Census Results (N)	2016 Census Results (N)
Mother tongue speakers	25	80
Main language spoken at home	0	10
Knowledge of language	175	150

Table 3.1: Comparison of results for mother tongue speakers, main language spoken at home, and knowledge of language for Tsuut'ina from Census 2021 and Census 2016, respectively (Statistics Canada, 2017, 2022a)

As is the case for many Indigenous communities throughout North and South America, and Canada especially, the decline in the number of speakers of Tsuut'ina comes as the result of deaths caused by diseases introduced by European colonizers, fewer instances of parent-to-child transmission, and the implementation of the residential school system, among many other causes. The residential school system existed for over 150 years, beginning with the opening of the Mowhawk Institute in Brantford, Ontario, in 1831, and continued until the last residential school closed in 1996

(Miller, 2023). The Sarcee Boys' Boarding School was a residential school run by Anglican missionaries on the Tsuut'ina (Sarcee) Nation that operated from 1892 to 1921, when it was shut down due to a tuberculosis outbreak in 1920 which infected 29 out of the 33 total students (National Centre for Truth and Reconciliation [NCTR], n.d.). 35 children are reported to have died while the school was operating (NCTR, n.d.; Salus, 2021).

Tsuut'ina children were also victims of the Sixties Scoop (Cole, 2018; Dippel, 2018), where Indigenous children across Canada were removed from their homes by child welfare services and raised in non-Indigenous families (Morin, 2018). The Scoop lasted from the 1960s and continued until 1991 (Cole, 2018) and, as with residential schools, caused many Indigenous children like the Tsuut'ina to lose their culture, identity, and language and experience physical and sexual abuse (Morin, 2018).

More recently, the key cause in the decline in speakers of Tsuut'ina and other languages indigenous to Canada (and other colonized nations) is the increased globalization of a minority of languages (ex. English, French, Spanish, Portuguese). English and French are the official languages of Canada and English is the official language of Alberta. Community services are provided in English and many businesses operate in English and it is the most widely used language socially. Indigenous speakers of First Nations languages thus have fewer usage domains with which to utilize their language. Today, the Tsuut'ina language is considered critically endangered (Starlight & Donovan (Eds.), 2018, p. ii).

3.2.2 Language documentation of Tsuut'ina

An early example of language documentation of Tsuut'ina is the collaboration of linguist Edward Sapir and Tsuut'ina elder John Whitney-Onespot. Their documentary work produced a large detailed Tsuut'ina word list of over 14,000 items that contained many verb paradigms and a collection of Tsuut'ina narrative stories (Starlight, et al., in progress; Starlight & Donovan, 2018 (Eds.), pp. ii-iv). These documents were audio recorded in sessions by Bruce Starlight, now a Tsuut'ina elder and lately the Tsuut'ina Language Commissioner for the Tsuut'ina Gunaha Institute, which he founded in 2008 (Cox, 2021), and Dr. Christopher Cox of Carleton University (Starlight & Donovan (Eds.), 2018, p. iii).

3.3 Grammar of Tsuut'ina

The grammar of Tsuut'ina contains several properties which differentiate it from the majority languages that have been the focus of study of lexical relations. Therefore, the following section goes through the phonetic, syntactic, and morphological components of the language as they pertain to the candidates described later and how their synonym, hyponym, and hypernym relations are illustrated in Tsuut'ina. Topics discussed include the tone system, syntactic structure, morphological system, verb theme categories, and classificatory verbs.

3.3.1 Tone

Tsuut'ina is recognized as having a three-tone system consisting of high, middle, and low tone, written as ‹é›, ‹e› or ‹ē›, and ‹è›, respectively. However, tone is sometimes difficult to identify, specifically the middle tone, which can be read as a lowered high tone or raised low tone in some situations (p. 11). Overall, difficulties have occurred with regard to identifying tone in transcription work (Cook, 1984, pp. 11-12). One place this is an issue is with narrated texts, such as the *Tsuut'ina Narratives* (Starlight & Donovan (Eds.) , 2018) and *Sarsi Texts* (Goddard, 1915) as discussed in chapters 4 and 5. Therefore, because there is a possibility that data presented in the later sections may be inaccurate with regard to tone, no upcoming analyses refer to any changes or differences in tone.

3.3.2 Sentence structure

The sentence in Tsuut'ina has an SOV (subject-object-verb) word order. This ordering is dependent on subject and object noun phrases being included in the sentence. However, these can both be deleted, and the sentence is still considered whole having only the verb word, which contains a verb stem and prefixes which carry information including the subject (including person and number) and/or object the verb is agreeing to (Cook, 1984, pp. 30-31). Examples of such basic sentences are found in the verb section of the PLD. Conjoined sentences are described later in Section 4.3.2 in reference to subordinating sentences with hyponymous verbs.

3.3.3 Verb morphology

The verb in all Dene languages, including Tsuut'ina, carries several pieces of information through its complex morphology, which allows a single verb word to minimally make up a simple sentence

as discussed in Section 3.3.2 above. The following sections go through the lexical and inflectional components which may make up a verb. First discussed is the verb template, a slot-and-filler system of word formation consisting of the lexical morphemes (verb stem, classifiers, prefixes) that make up the verb which then undergo phonological change as the morphemes are put together (K. Rice, 2000, p. 17). Following this are descriptions of the different morpheme types that belong to the verb template, starting with the verb stem then travelling in order of closest to furthest from the verb stem (or from right to left in the verbal structure).

3.3.3.1 Verb template. Like other Dene languages, Tsuut'ina is characterized by its polysynthetic verb morphology. The most widely accepted method of describing Dene verbal morphology is the templatic structure, which includes a morphological template—a "slot-and-filler system" (Arppe et al., 2017, p. 53)—plus morphophonemic rules. The verb theme template consists of all possible morphemes which can make up a verb word in Tsuut'ina. Cook (1984) contains a verb template for Tsuut'ina which only contains the lexical and thematic prefixes and verb stem. It includes, in ascending order, 12 morphemic positions (see Table 3.2 below): position 0: verb stem, position 1: a voice/valence marker (classifier), position 2: first or second person subject prefix, position 3: mode prefix, position 4: aspectual prefix, position 5: thematic prefix, position 6: third-person subject prefix, position 7: object prefix, position 8: distributive prefix, position 9: incorporated stem prefix, position 10: iterative prefix, position 11: adverbial prefix, and position 12: the incorporated postpositional phrase prefix:

	12	Incorporated PP
	11	Adverbial
Disjunct prefixes	10	Iterative (ná-)
	9	Incorporated stem
	8	Distributive (dà-)
		Disjunct boundary
	7	Object
	6	Deictic subject (3-person)
	5	Thematic
Conjunct prefixes	4	Aspect
	3	Aspect (Mode)
	2	Local subject (1/2-person)
	1	Voice/valence marker
	0	STEM

Table 3.2: Tsuut'ina verb template (modified from Cook, 1984, p. 126)

However, the verb template should also include derivational information in the form of derivational prefixes, for example, the pre-verb. While Cook excludes this content from his template, Keren Rice (2020, p. 4) provides a verb template shown in (5) which contains the derivational, inflectional, and thematic morphemes also necessary to a Dene verb word:

(5)   preverb # iterative # distributive # (negative) # (incorporate) # pronominal
        object/subject – qualifier – aspect – subject = voice/valence – root – suffix

The Tsuut'ina verb template includes the disjunct boundary which occurs between the object prefix (position 7) and the distributive (position 8). The disjunct boundary is phonologically well motivated across most Dene languages (Cook, 1984, p. 124). Its existence indicates differences in phonological and morphological characteristics between disjunct prefixes (prefixes to the left of the boundary) and conjunct prefixes (prefixes to the right of the boundary). For example, disjunct prefixes have fixed lexical tone, while conjunct prefixes have no fixed tone (p. 286). Conjunct and disjunct prefixes also carry certain types of meaning. Conjunct prefixes consist of functional items

which can have multiple meanings or dependent meanings whereas disjunct prefixes are lexical items which have specific meanings to those prefixes (K. Rice, 2020, p. 5).

Notice also in (5) how the different morpheme types are separated differently before and after the disjunct boundary: items followed by a "#" are disjunct prefixes—the "#" between "(incorporate)" and "pronominal object/subject" is the disjunct boundary; items followed by a "–" are conjunct prefixes, and the voice/valence marker, verb root, and any possible suffix forms follow the "=". The ordering of the template provided, however, is not quite the same as that which would appear for Tsuut'ina. Based on this and the template used by Cook (1984), the following verb template is proposed which has the derivational, morphological, and thematic morphemes:

(6)   (preverb) / (incorporated postposition # adverbial) # iterative # incorporate # distributive # *disjunct boundary* # object – 3rd person subject – thematic – aspect 2 – aspect 1 (mode) – 1st/2nd person subject = voice/valence marker – verb stem – suffix

Using the template model, a verb word is built up from right to left starting with the verb stem (Cook, 1984, p. 126; K. Rice, 2000, p. 46), then the voice/valence marker (Cook, 1984, p. 126; K. Rice, 2000, p. 405). Next are the conjunct prefixes fulfilling positions two through seven: the first/second person subject prefix (Cook, 1984, p. 126, p. 220; K. Rice, 2000, p. 66), the aspectual prefixes (Cook, 1984, p. 126; Cook, 1996, p. 96; K. Rice, 2000, p. 195), qualifier prefixes (K. Rice, 2000, p. 46), situation aspect markers (Cook, 1984, p. 126, p. 220; K. Rice, 2000, p. 66), third person subject (Cook, 1984, p. 126, p. 200; K. Rice, 2000 p. 225), and object prefixes (K. Rice, 2000, p. 405); then following the disjunct boundary (Cook, 1984, p. 126), there is the distributive *da#* prefix (Cook, 1984, p. 126; K. Rice, 2000, p. 80), the incorporated stem prefix (K. Rice, 2000, p. 80), the iterative *ná#* prefix (p. 80; Cook, 1984, p. 126), and finally the adverbial prefix (Cook, 1984, pp. 175-179) and the incorporated postposition (pp. 179-180) *or* the preverb (K. Rice, 2000, p. 66). The verb stem may also be followed by a suffix or enclitic form (Cook, 1996, p. 96; K. Rice, 2000, p. 195).

3.3.3.2 Verb theme. The basic lexical entry in a Dene verb is called the verb theme; it holds all the required information in a verb regardless of derivation or inflection that follows (K. Rice, 2000, p. 15). The verb theme must be made up of two things: the verb stem and a

voice/valence marker (Cook, 1984, p. 162; K. Rice, 2000, p. 15). When the voice/valence marker is zero (see Section 3.3.3.3 on voice/valence markers below), then the verb stem alone may "represent a theme" (Cook, 1984, p. 162). Additionally, it may have one or more thematic elements, often a lexicalized prefix, as part of its basic lexical entry (Cook, 1984, p. 162; K. Rice, 2000, p. 15).

At different discontinuous points in the verb theme, inflectional and derivational prefixes can be inserted. When theme derivation occurs, a new verb theme is created as a result. Through verb theme derivation, the primary and derived themes have formal and semantic differences which distinguish the two from one another, but the derived verb theme retains the verb stem of the primary theme (p. 135). An example of the difference between a primary and derived theme is shown with the verb words below:

(7)   nànisʔòh

        nà–Ø–ni–s–Ø–ʔòh

        ADV–3.SG.OBJ–IPFV–1.SG.SBJ–CLF–handle.SRO.IPFV

        "I'll put it down." (Cook, 1984, p. 133)

(8)   kútsìst'òh

        kú–tsì–Ø–s–d–ʔoh

        ADV-head-IPFV-3.SG.SBJ-CLF- handle.SRO.IPFV

        "I'll put my head in." (p. 135)

Some paradigmatic and morphological differences are observed between these two verb forms. The verb from the derived theme in (8) has an incorporated noun stem (*tsi#* 'head') and a d-classifier indicating a transitivity change. Additionally, the verb is reflexive and pseudotransitive, thus requiring that its subject and object be co-referential. The verb from the primary theme in (7) meanwhile does not require co-referential subjects and objects and also is fully transitive instead (p. 135). Note that this does not mean that the primary theme does not *allow* co-referential subjects and objects, just that it is not a requirement (p. 136).

The verb theme is one of the key factors in searching for lexical items to evaluate for lexical relations in Tsuut'ina. When the PLD was first explored for examples of lexical relations, verb

words were extracted based on the verb theme and verb stem; verb words which had the same verb stem under the FST Lemma column (as shown in Table 4.1) or were phonetically close were considered a single lexical item, while words with wholly unique stems were considered separate lexical items which could otherwise be evaluated for their lexical relations.

In the evaluation techniques proposed for synonymy and hyponymy, it is required that the lexical items in a set come from different verb themes. The morphological and functional differences that occur between a primary and derived verb theme mean that they should be thus viewed as wholly different themes when it comes to their evaluation. Therefore, in a lexical relations investigation, a primary theme and its derived theme may both appear in a set.

3.3.3.3 Voice/valence markers. Voice/valence markers appear alongside the verb stem— the final syllable in a verb word—which together make up the mandatory items for the verb theme. They are placed directly before the verb stem in position 1 in the verb template (Cook, 1984, p. 126). Voice/valence markers (also called classifiers) are used to indicate a change in transitivity or voice in the transformation of a derived verb theme from a primary theme (Cook, 1984, pp. 162-163; K. Rice, 2020, p. 5). Evidence from Proto-Athabaskan shows four voice/valence markers including one non-derived form. Following phonological changes, these have transformed into the following corresponding voice/valence markers in Tsuut'ina in Table 3.3:

Proto-Athabaskan voice/valence markers	Tsuut'ina voice/valence markers (underlying form)
*Ø	Ø (Ø)
*ł	s- (Ł)
*l	l- (L)
*d	d- (D)

Table 3.3: Proto-Athabaskan voice/valence markers and their respective Tsuut'ina reflexes (Cook, 1984, pp. 162-163)

Voice/valence markers do not themselves signal certain grammatical properties of a verb. Rather, certain voice or derivational changes are indicated by specific changes in the voice/valence marker between two verb themes. Verb theme derivation occurs via the change in the voice or valency of

the primary theme. The voice changes from the primary theme being active to the derived theme being passive. The valency changes from the primary theme being intransitive to the derived theme being transitive. Both of these changes are indicated by the verb theme going from having one voice/valence marker to another.

Active voice in the primary theme is usually indicated either by the null Ø marker or by Ł; in the derived theme with passive voice, they are replaced by D and L, respectively (p. 164). An intransitive primary theme has a null Ø marker which is replaced by Ł in the transitive derived theme (pp. 164-165). In addition, transformations where Ø is replaced with D or L in the derived verb theme have been observed in the language but do not have a consistent semantic relationship (p. 165). These different changes in voice/valence markers can be summarized below:
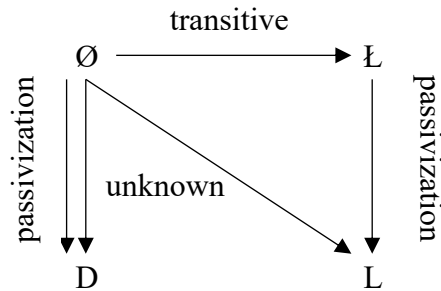
Figure 3.3: Transformations indicated by changes in voice/valence marker (Cook, 1984, pp. 164-165)

3.3.3.4 Person. The pronominal prefixes in Tsuut'ina inflect for person and number. Subject prefixes are housed in position 2 and 6 of the verb template, while object prefixes occur in position 7 or are prefixed to a noun or postposition (Cook, 1984, p. 192). These prefixes are phonologically, grammatically, and semantically similar to free morpheme pronouns (p. 192).

The subject prefixes of Tsuut'ina verbs are summarized below:

	1	2	3		
			Personal		**Impersonal**
			Specified	**Unspecified**	
sg	s–	ni–	Ø	ts'i–	ch'i–, gu–
pl	aad–	as–	gi–		

Table 3.4: Subject prefixes (first, second, and third person) from the second and sixth positions in the Tsuut'ina verb template (Cook, 1984, pp. 193-194)

The first- and second-person subject prefixes appear straightforwardly in the verb word in position 2 of the template, with clear contrasts between singular and plural (p. 193). Only the second person singular *ni*– has phonological opacity, as it may undergo deletion in some words (p. 193).

Third person subject, which appears at position 6, is more complicated (p. 192). The zero prefix shown above is arbitrarily assigned to the singular specified personal position; it can belong to either position 2 or position 6 (p. 194). The prefix *gi*– can be identified as shown above or as a plural morpheme, which would cause third-person plural subjects to be marked as *gi-Ø*. An alternative treatment does not see *gi*– as a person marker at all, but the issue with this analysis is it then requires a different prefix position which Cook is unable to account for, and so prefers the initial treatment as shown in Table 3.4 above (pp. 194-195). For the unspecified personal third person prefix *ts'i*– , it is used in lieu of *gi*– or Ø in cases where knowing the identity of the subject is deemed redundant in the given context (p. 195). Finally, the impersonal prefixes *ch'i*– and *gu*– : *ch'i*– is used rarely in pseudotransitive themes with a thematic object prefix in position 7 for example, *gu*– is more commonly used in a way that is comparable to *it* in English as a "meteorological subject" (p. 196).

Position 7 of the template holds the object prefixes. Object prefixes are considered as having more complex morpho-syntactic behaviour than the subject prefixes. Therefore, these prefixes are more difficult to understand, particularly the third person plural prefixes: Ø, *γi*–, *mi*– *(i–)* (p. 128). The object prefixes are summarized in Table 3.5 below:

	1	**2**	**3**		
			Specified	**Unspecified**	**Locative**
sg	si–	ni–	mi– ~ i– ~ Ø ~ yi–	Human: gu–	gu–
pl	nihi– ~ naa–		gi-mi–	Nonhuman: i–	

Table 3.5: Object prefixes (first, second, and third person) from position 7 in the Tsuut'ina verb template (Cook, 1984, pp. 197-199)

Just as with the subject prefixes, first and second person object prefixes are analytically straightforward (p. 197). The plural has two alternative phonological forms, *nihi–* and *naa–* but first and second person are neutralized so that only one form is used for both first person and second person plural object (p. 197).

The third person object prefixes are made more complicated by also distinguishing for the reflexive and reciprocal (p. 197). Here, only the non-reflexive, non-reciprocal prefixes are discussed. These third person object prefixes operate differently in what Cook calls "true" transitives and "pseudotransitives". In a true transitive, object prefixes are fully inflecting (p. 197). There are four third person singular specified object prefixes: *mi ~ i ~ Ø ~ yi* (p. 197). The prefixes *mi ~ i ~ Ø* are allomorphs that are not conditioned phonologically; they are divided mutually exclusively in seriative, momentaneous, and semelfactive paradigms, respectively (p. 199). The fourth prefix *yi–* only occurs in the object position when the subject position of the verb is filled by Ø or *gi–* (the third person personal specified prefixes; see Table 3.4); it does not occur with the third person unspecified subject prefix (pp. 199-200).

The prefixes of the "pseudotransitives" consist of either the thematic object prefix *i–* or an incorporated noun (p. 197). The thematic prefix does not contrast with any other object prefix, and it is not replaceable by any other object prefix (pp. 197-198). Its grammatical function is identical to that of the incorporated noun, which leads to the suspicion that the incorporated noun fills position 7 as well instead of position 9 (p. 198).

3.3.3.5 Viewpoint aspects, situation type aspects, and optative mood. Aspect in Tsuut'ina is realized in more than one way depending on which of the two grammatical categories described with the "aspect" label is being discussed. First, there is grammatical aspect, which Smith (1997) calls viewpoint aspect while discussing it in Dene languages (p. 1). The second type

of aspect is lexical aspect, or Aktionsart, which is called situation type aspect here (Smith, 1997, p. 2). Viewpoint aspect aims to distinguish imperfective and perfective aspect; "the relationship between the reference time and the event time, allowing for different viewpoints of a situation" (K. Rice, 2000, p. 247). Perfective viewpoint "includes both endpoints of a situation", while imperfective viewpoint involves "stages that are neither initial nor final" (p. 247). A perfective aspect in Tsuut'ina would indicate a past tense; for instance, verbs in the PLD that are coded as "Past" in the "Aspect" column have a perfective verb stem and allomorph (from position 3 or 4 in the template), and similarly those that are flagged as "Non-Past" have an imperfective stem and allomorph because an imperfective viewpoint aspect in Tsuut'ina indicates a non-past or ongoing action (Starlight, et al., in progress). Situation type aspect, meanwhile, "identifies a situation as either an event or a state" (K. Rice, 2000, p. 246) with a perfective allomorph and conjugation markers to indicate the aspectual types of Vendler (1967): achievement, accomplishment, activity, and semelfactive (as cited in K. Rice, 2000, p. 251; K. Rice, 2020, pp. 4-5; p. 11); "situations are the objects on which the viewpoint lenses are trained" (K. Rice, 2000, p. 251).

The candidates discussed for this thesis include verb forms as examples of viewpoint aspect, situation type aspect, and optative mood. Optative mode, cognate of "potential mood" (Personal communication, J. Holden, June 29, 2023) and labelled as "POT" for 'potential' in the PLD (Starlight, et al., in progress), is the sole mood value in Tsuut'ina which, alongside viewpoint aspect, makes temporal distinctions between speech events and narrated events and their participants, respectively (K. Rice, 2000, p. 121). The verb candidates discussed later feature forms distinguished by imperfective and perfective viewpoint aspect, optative mood and progressive and repetitive situation type aspect (see Table 4.4)—these distinctions are collectively called aspectual paradigms. Minimally, if a verb has only one aspectual paradigm, it is imperfective viewpoint. If it has two paradigms, they are imperfective and perfective viewpoint (Cook, 1972, p. 6). Full inflection of a verb is where the verb inflects for up to four aspect categories—imperfective, perfective, progressive, and repetitive—which is how true active verbs in Tsuut'ina inflect; typical neuter verbs do not fully inflect (Cook, 1984, p. 124; see also Section 3.3.4).

In the verb form, aspect is illustrated by stem set alternation and conjugation prefixes. The conjugation prefixes occur in position 3 of the verb template. Position 4 of the template, also labelled for "aspect", houses the *di–* inceptive and *ni–* terminative prefixes which precede the aspectual prefixes of position 3, though it is difficult "to determine whether they are aspects

(position 4) or thematic elements (position 5)" (p. 217). Imperfective and perfective viewpoint aspect have three sets of verbs which are most commonly found in active verb paradigms which are mutually exclusive to one another:

Imperfective viewpoint	Perfective viewpoint
ni–/Ø	ni–
Ø	si–
Ø	yi–

Table 3.6: Imperfective and perfective viewpoint prefixes used in active verbs in Tsuut'ina (Cook, 1984, p. 212)

For the perfective viewpoint prefixes, *ni*– and *yi*– freely alternate with one another in a given theme excepting that *yi*– predominantly appears in themes modified by an adverbial prefix (ex. *nà#*), while *si*– occurs in themes with incorporated elements, i.e., it only occurs in derived themes (p. 213). These three prefixes have mutually exclusive distribution in momentaneous (*ni*–), semelfactive (*si*–), and seriative (*yi*–) paradigms (p. 213). The imperfective viewpoint prefixes *ni*– /Ø correspond to the perfective *ni*–, while the perfective *si*– and *yi*– each correspond to an unmarked Ø in the imperfective viewpoint (p. 213). However, in the durative paradigm, the first-person plural imperfective viewpoint is expressed with the prefix *si*– (p. 214) or occasionally *yi*– (pp. 215-216).

Neuter verb paradigms in the motion theme category (see Section 3.3.5), meanwhile, are consistently marked with the pair *si*–*/yi*–; at the time of writing, Cook was unsure of conjugation markers for other neuter verbs (p. 216).

Progressive and repetitive situation type aspects each have only one conjugation marker, *yi*– and *ná#*, respectively. The repetitive (also called iterative) prefix does not occupy position 3 like the other aspectual prefixes discussed above. Instead, it is a disjunct prefix and placed in position 10 in the template. Repetitive verb forms do not always use the repetitive conjugation marker and "may be marked by the *yi*– perfective or *di*– inceptive marker", signalling the repetitive forms are of a separate paradigm (p. 219).

Finally, potential mood is reflected with the *yi*– potential conjugation marker (p. 221). As it also occurs in position 3, it is mutually exclusive with the other aspectual conjugation markers,

but it "may co-occur with any paradigmatic form of the verb except perhaps the [repetitive]" (p. 221). The *yi*– potential conjugation marker is also occurring optionally in "delayed future" (Li, 1930, p. 6), but the presence of "delayed future" in Tsuut'ina is "questionable" according to Cook (1984, p. 124), hence its absence for the discussion here.

3.3.3.6 Thematic prefixes. In position 5 of the template are lexicalized qualifiers, also called thematic prefixes (K. Rice, 2000, p. 330). They lack any independent meaning and occur in "a certain class of theme", so they should be considered "a semantic class marker" (Cook, 1984, p. 171; Golla, 1970, p. 137). Cook also alludes that some adverbial (position 11) and incorporated PPs (position 12) prefixes are thematic (p. 171).

The two most common thematic prefixes are *di*– and *ni*– (p. 171). The prefix *di*– is used to mark all sound and colour themes but is not restricted to only those semantic classes. It is also used in neuter verbs (p. 172). The *ni*– perfective prefix is used by a smaller group of neuter verbs which mostly refer to size or weight (p. 172). It is mutually exclusive with the *si*– perfective prefix; either prefix may co-occur with *di*– as they appear in position 3 in the template, while *di*– appears in position 5, but the use of *di*– in a verb with *si*– perfective neuter is rare (pp. 172-173). The prefix *di*– may be present or absent in a verb depending on the semantic class of the "underlying subject of the respective neuter verb" (p. 173).

3.3.3.7 Distributive dá#. In Tsuut'ina as well as other languages, the distributive *dá#* which occupies position 8 modifies subjects (Cook, 1984, p. 126; K. Rice, 2000, p. 45). Like the iterative prefix *na#* (see Section 3.3.3.9), the distributive prefix optionally occurs in imperfective or perfective verb paradigms (p. 127).

3.3.3.8 Incorporated stem. Incorporated stems in position 9 are used to "introduce a second event" that is contemporaneous with the first event (Cook, 1984, p. 126; K. Rice, 2000, p. 68, p. 71). All incorporated stems are thematic (Cook, 1984, p. 126). Verbs with incorporated stems must simultaneously involve two distinct events "with a single marking for argument and event structure" (K. Rice, 2000, p. 108). This is done by having the incorporated stem provide information about one event, while the preverb (see Section 3.3.3.12) and verb stem together provide information about the other (p. 108). In other Dene languages, it appears that the meaning

represented by the incorporate is the "main verb", while the preverb-verb stem is translated as subordinate, such as for Carrier (pp. 108-109).

3.3.3.9 Iterative na#. Position 10 of the Tsuut'ina verb template holds the prefix *na#* (Cook, 1984, p. 126). Typically, this prefix takes place in the iterative form, but is also used in imperfective and perfective aspect forms which are already marked using prefixes in position 3 as discussed in Section 3.3.3.5 (p. 127). Iterative verb forms are also found which do not have the *na#* prefix (p. 127).

3.3.3.10 Adverbial prefix. Position 11 in the Tsuut'ina template is classified as housing two types of elements: "monosyllabic or disyllabic elements which are apparently adverbial" and "other element or elements whose meaning cannot be defined independently of a given theme" (p. 175). These are labelled in the text as "thematic adverbials" (p. 175). The latter category effectively refers to "any element whose morphemic identity cannot be established (from a synchronic point of view […])" (p. 175). For example, in the verb theme *tó#0–tsò* 'to die', the prefix *tó#* has no synchronic meaning on its own and is dependent on the verb stem *–tsò*; one element cannot occur without the other and together with the zero classifier, they represent the theme with the meaning 'to die' (p. 176).

Another thematic adverbial, also written as *tó#*, is used in "causative/transitive or mediopassive" derived verb themes whose corresponding primary descriptive themes feature the thematic *di–* in position 5 (p. 176; see Section 3.3.3.6). This prefix is also used in transitive themes referring to colouring, but those have no corresponding descriptive themes (p. 177).

Nonthematic adverbial prefixes, unlike thematic adverbials, "may occur in a variety of verbs which are derivationally unrelated" (p. 177). Rather than contribute essential information to the verb theme, their role is to modify "a given lexical meaning of the theme" (p. 177). Disyllabic free adverbial prefixes also have transparent meanings that are independent of the theme they modify (p. 179). The three key nonthematic adverbial prefixes are *ná#* 'homeward', *k'à#* 'finishing', and *xà#* 'out' (pp. 177-178). Some adverbial prefixes are connected to aspectual derivation, so they have "strict co-occurrence restrictions between some adverbial prefixes and conjugation markers" (p. 178).

3.3.3.11 Incorporated PP. The incorporated postposition (PP) which occurs in position 12 of the template "has two constituents, a postposition preceded by a pronominal prefix or a noun stem" (pp. 179-180). On rare occasions, it may also be followed by a second postposition (p. 180). Incorporated postpositions follow the same methodology of thematic adverbial prefixes where they are either an "obligatory constituent of the theme" or "an optional constituent […] bound phonologically to the prefix complex" (p. 180).

One example of an obligatory thematic postposition is *à–* 'like(ness)', which Cook uses in examples where it is placed after any of the object prefixes (p. 180; see also 3.3.3.4 Person).

3.3.3.12 Pre-verb. Preverbs come from a fusion of incorporated postpositional and adverbial prefixes in the Dene verb template by Keren Rice (2000, p. 38). Their aim is modifying predicates and representing manner and oblique relations (direction, location, benefaction, etc.) like the incorporated PP and adverbials do (p. 35). This is illustrated in the template in (6) with these properties being displayed as part of either the preverb or the incorporated postposition and adverbial prefixes: (preverb) / (incorporated PP # adverb) #. Preverbs were not discussed at the time of Cook (1984), so he does not mention that. Here, the general concept of preverbs is offered as it pertains to Dene languages as whole based on what Keren Rice wrote.

Preverbs together with verb stems are used to indicate the main meaning of a verb word (K. Rice, 2000, p. 76). Secondary meanings are introduced through the incorporated stem as discussed in Section 3.3.3.8 (p. 68). To reflect the properties of both incorporated postpositions and adverbial prefixes, preverbs can be either obligatory transitive, obligatory intransitive, or optionally transitive (p. 41). Obligatory transitive preverbs are equivalent to a postposition and must occur with a complement; obligatory intransitive preverbs are equivalent to an adverbial and cannot occur with an object; optionally transitive preverbs can occur with or without an object (p. 41).

As no examples are offered of what preverbs look like in Tsuut'ina, the following example is given from Slave of a manner preverb:

(9)   ts'e–ne–h–ch'i

        ts'e#ne+h=ch'i

        in_half–2.SG.SUBJ–CLF–tear.IPFV

        "You sg. split in half." (K. Rice, 2000, p. 36)

(10)   ne–h–ch'i

        ne+h=ch'i

        2.SG.SUBJ–CLF–tear.PFV

        "You sg. split, tore." (p. 36)

The verb form in (9) has the preverb *ts'e* 'in half' which is absent from the verb form in (10). Notice the change in meaning between the two senses given: (9) is translated to the sense 'You sg. split in half' while (10) is translated to 'You sg. split, tore'.

3.3.4 Verb theme categories

The Dene verb word is organized into three levels of organization: the stem, verb theme, and base (Cook, 1984, p. 128). These three levels are distinguished according to which prefixes are included and excluded in their classification. The base is first separated from inflectional prefixes, then split up into the verb theme and any adverbial prefixes (or preverbs), then finally the verb stem is also split up into the verb stem and any thematic prefixes (Sapir & Hoijer, 1967, p. 85). The Dene verb theme minimally consists of the verb stem plus the voice/valence marker. Most verb themes include at least one other thematic element via prefix (Cook, 1984, pp. 128-129).

20th century research into the Dene language family saw multiple observations on variations on different types of verb themes, but it was not until Kari's study of Ahtna that saw the coining of the term "verb theme categories", which has since been used to describe these variations (Kari, 1979, pp. 3-4). The notion of the verb theme category is that it is made up of verb themes which share the same associated conjugation marker and "indicates derivational potential with respect to [sic] derivational prefixes" (K. Rice, 2020, p. 11). Kari (1979) proposed ten verb theme categories in Ahtna which are distinguished from one another via variation in frequency of use, derivational potential, their different primary aspectual strings, and other aspectual information (p. 5; p. 183). The ten categories are: motion themes, which categorize movement (p. 77); successive

themes, which describe sequentially sustained actions; operative themes, which describe steadily sustained actions (often grouped together with successive themes) (p. 111); conversive themes, which describe the termination or end result of a process or activity (pp. 144-145); extension themes, which show the arrangement of linear objects and geographic features to weather and illumination (p. 106); classificatory (neuter) themes, which include verbs of being and are paired with a classificatory motion theme (p. 157); positional themes, which is paired with "uncategorized active theme, a thematized intransitive momentaneous verb" and has a similar meaning to classificatory neuter themes (p. 162); stative themes (p. 188); dimensional themes, which describe size, shape, quality, and colour (p. 167); and descriptive themes, which refer to mental perceptions (p. 176).

The verb theme categories apply to Tsuut'ina as well. Tsuut'ina verb themes belong to the four categories of motion themes, succession themes, duration themes, and repetition themes (Cook, 1984, pp. 143-157). The verb candidates analysed for the purposes of this thesis belong to the motion and duration theme categories, respectively, so those are discussed in detail below.

Cook (1984) suggests that classificatory verbs are included within the motion verb theme category (MTC) because both verb groupings include the following properties: stem set variation between neuter and active verbs; paradigmatic regularity in each stem set; and an inherent number and "gender" (noun class) value in each verb stem (p. 143). The most common aspectual prefixes of classificatory verbs for imperfective and perfective aspect, respectively, are *ni–/ni–, di–Ø/di–si–,* and *Ø/yi–*, while *di–Ø/di–si–* and *Ø/yi–* plus *Ø/ni–* are the most common conjugation markers for non-classificatory verbs in the motion theme category (p. 145). For neuter verbs in the motion theme category, stems are inflected only for imperfective *si–* and perfective *yi–* aspect (pp. 144-145). The stems of active verbs, meanwhile, are fully inflected (p. 145).

Duration themes are semantically and structurally similar to succession themes (such as how they both do not have progressive viewpoint aspect), but do not distinguish between repeated short actions and a single punctual action like the latter due to the focus on duration rather than succession or segmentation. Examples of durative actions include berry-picking or smoking. Semantically, only durative aspect is allowed for an unmodified verb theme. All other situational aspect categories occur in derivational themes (p. 150). Not all duration verb themes have stem set variation—rather, they have a single verb stem which occurs "in all aspectual paradigms" (p. 155).

3.3.5 Classificatory handling verbs

Classificatory handling verbs are a phenomenon observed in Dene languages wherein "co-occurrence restrictions" are placed on nouns by "a set of verbs known as classificatory verbs, or verbs of handling and location" (K. Rice, 2000, p. 110). What this means is that these are not classifiers in terms of a general part of speech going with numerals, nor are they classifiers in the Dene sense as discussed in Section 3.3.3.3—classificatory handling verbs have combinatorial restrictions involving shape and texture on the entities that can be the absolutive of these verbs, depending on the case (Cook, 1984, p. 54). These co-occurrence restrictions are realized through a series of distinct verb stems (see Table 3.5 below) which each correspond to a texture or shape class (p. 54). There are classificatory verbs of position and classificatory handling verbs (known as stative neuter and active stems, respectively, in Dene linguistics) in Dene languages, which involve the placement or transfer of objects (p. 55). Other Dene languages with examples of classificatory handling verbs which invoke the same selectional restrictions on shape and texture include Hupa (Golla, 1970, pp. 193-196), Upper Tanana (Lovick, 2020, p. 366), and Ahtna (Kari, 1979, p. 157). In Tsuut'ina, there are eight groups of classificatory handling verb stems (other Dene languages can have as many as 12) (p. 55). The groups correspond to the following shape and texture categories: singular animate being (ex. child), singular solid object (ex. rock), singular long object (ex. stick), singular dish, grain-like object (ex. grains of sand), singular fabric-like object (ex. blanket), plural animate being, and rope or plural inanimate beings, respectively (p. 140). These groups are typically abbreviated (see List of Abbreviations, p. viii). Each type of classificatory handling verb has two sets of stems (Singular animate being has four): one in neuter theme and one in active theme. The neuter stem set contains stems with imperfective and perfective viewpoint aspect; the active set contains imperfective and perfective viewpoint aspect plus the progressive mode and iterative situation type aspect, respectively (Cook, 1984, p. 139). Table 3.6 below shows the eight classificatory groups of Tsuut'ina organized by their viewpoint and situation type aspects in columns and by their neuter and active classifications:

Classificatory type	Imperfective	Perfective	Progressive	Iterative
1) Singular animate being	-tíh	-táh		
	-tàh	-tín		
	-tàh	-tíh	-táɬ	-tash
	-tàh	-tàʔ	-taɬ	-tash
2) Singular solid object	-ʔón	-ʔòn		
	-ʔoh	-ʔón	-ʔóɬ	-ʔosh
3) Singular long object	-tón	-tòn		
	-tìh	-tón	-tiɬ	-tiɬsh
4) Singular dish	-kón	-kòʔ		
	-kòh	-kón	-kóɬ	-koɬsh
5) Grain-like object	-ʔdjaj	?		
	-dzáh	-djàj	?	?
6) Singular fabric-like object	-tsùz	-tsùz		
	-tsús	-tsùz	-tsús	-tsuc
7) Plural animate being	-táz	-táz		
	-tàs	-táz	-tìc	-tìc
8) Rope or plural inanimate beings	-ló	-lòʔ		
	-ló	-ló	-lóʔ	-lósh

Table 3.7: Classificatory handling verb stems in Tsuut'ina (Cook, 1984, p. 140; adapted to reflect current orthography)

4.   Selection of candidate lexemes

This chapter addresses the verb form candidates selected to be evaluated for lexical relations later in Chapter 5 and how they were chosen. Before that, the grammatical and semantic characteristics which factor into how lexical relations are realized with Tsuut'ina verbs are discussed. A sequence of requirements bound to the grammar of Tsuut'ina are put forth, in addition to which, a series of sentences obtained from a native Tsuut'ina speaker are given which provide a syntactic context in which to discuss hyponym and hypernym verb forms in the language. Then the selection of the candidates from the core database is described resulting in the choice of the three non-classificatory 'eat' verb themes and the six classificatory handling verb themes, split into three active and three stative neuter themes. This is followed, finally, by a description of the 'eat' candidates and classificatory handling candidates themselves and the kinds of sentences in which they are used.

The main corpus used to collect data and determine the final candidates was the preliminary lexical database (PLD) of verb forms transcribed from the unpublished Onespot-Sapir glossary compiled in 1922 (Holden et al., 2022, p. 5146). In addition, material was provided from *Tsuut'ina Narratives of John Whitney Onespot* (Starlight & Donovan (Eds.), 2018), *Sarsi Texts* (Goddard, 1915), and *Sarcee Grammar* (Cook, 1984).

The core reason that corpora was chosen as main data source for this thesis is the limited access to native Tsuut'ina speakers at the time of research and writing in addition to the difficulty in arranging meetings due to the COVID-19 pandemic. However, co-supervisor Joshua Holden did have a brief opportunity to converse with Tsuut'ina elder Bruce Starlight, which allowed for the chance to ask direct questions regarding Tsuut'ina sentence frames, especially with classificatory handling verbs. The outcomes of this conversation are described in more detail in Section 4.1.2.

The PLD is a product of the Alberta Language Technology Lab (ALT Lab) and its on-going partnership *21st Century Tools for Indigenous Languages* (Starlight, et al., in progress). The database is a spreadsheet made up of paradigms taken from the unpublished Onespot-Sapir glossary from 1922 (Holden et al., 2022, p. 5146). The spreadsheet is organized by parts of speech and other sentence particles with the following labels: Verbs, Nouns, Postpositions, Adverbs, Particles, Idioms/Phrases, Affixes/Roots, Relative Clauses, Pronouns, and Conjunctions. Plus, there is one more tab which contains lists of each type of paradigm used for verbs, postpositions,

and nouns, and the verbal argument paradigms and verbal aspects used (Starlight, et al., in progress).

Each individual spreadsheet contains a list of paradigms for that particular part of speech or particle which are organized into columns. The Tsuut'ina verb spreadsheet contains the following information:

Column Number	Label	Description
1	ID	Alphanumeric code corresponding to where the item (2) is featured in the original Onespot-Sapir glossary
2	Form	The Tsuut'ina word or phrase
3	Corrected form	Partial list of words (2) which were corrected for tone
4	Senses	English sense translation of the Tsuut'ina word (2)
5	FST gloss template	Template of how words (2) are translated into English
6	Morphemic pairing	Lexical and inflectional prefixes and verb stem prior to triggering of phonological rules to create Tsuut'ina word (2)
7	Aspect	Non-past, Past, Progressive, Repetitive Non-past, Repetitive Past, or Potential
8	Argument structure	Impersonal, Intransitive, Intransitive (third-person singular subject only), Intransitive (third-person subject only), Intransitive (plural subject only), Intransitive-SubjSuppr, Transitive, Transitive Conative, Transitive (plural direct object only), Transitive (third-person singular direct object only), Transitive-SubjSuppr, Oblique Object, Ditransitive, Direct Object Experiencer, Oblique Object Experiencer, or Transitional Transitive
9	Inflectional paradigm	Imperfective (0-, 0i-, 0s-, i-, ii-, is-, isi-, isii-, isis-, ni-, nii-, nis-, si-, sii-, sis-), Imperfective-Repetitive (0-, 0i-, 0s-), Perfective (isi-, isii-, isis-, ni-, nii-, nis-, si-, sii-, sis-, yi-a-, yii-a-, yis-a-, yi-y-, yii-y-, yis-y-), Perfective-Repetitive (yi-a-, yii-a-, yis-a-, yi-y-, yii-y-, yis-y-), Potential (yi-, yii-, yis-), Progressive (yi-, yii-, yis-), and Irregular
10	FST lemma	Base form plus basic English sense for Tsuut'ina verb corresponding to Sense (4) given in square brackets []

11	FST morphology	Verb stems plus lexical morphemes in Tsuut'ina word (2); lexical morphemes marked as inner, middle, or outer based on computational model described in Arppe et al. (2017)—inner morphemes are followed by '.' character, middle morphemes are followed by '_' character, outer morphemes are followed by '=' character
12	Source	
13	FST Status	
14	Notes	Miscellaneous notes from contributors
15	WordNet	Corresponding WordNet entry for the Tsuut'ina word (2)
16	RapidWords items	Numeric codes for the RapidWords label (17) corresponding to the Tsuut'ina word (2)
17	RapidWords labels	Label for the RapidWords numeric code (16) corresponding to the Tsuut'ina word (2)
18	YAML	

Table 4.1: Columns in the spreadsheet containing verbs in the Tsuut'ina Onespot-Sapir preliminary lexical database and what they each include (Starlight, et al., in progress)

Figure 4.1: Screenshot of Tsuut'ina verbs from the Tsuut'ina Onespot-Sapir preliminary lexical database (Starlight, et al., in progress)

The extraction of verb candidates for the purpose of this thesis is described in Section 4.2. The extractions involve semantic classifications done with WordNet and Rapid Words (see Section 2.3) which are described in more detail later on in Section 5.3. For now, it is relevant to note that

these classifications were a necessary component in the extraction of candidates for the 'eat' verb forms described in Section 4.3.2. The classificatory handling verb candidates discussed in Section 4.3.1 were not extracted using the semantic classifications.

4.1 Investigating lexical relations in Tsuut'ina

Tsuut'ina grammar, and Tsuut'ina verbal grammar in particular, requires a different perspective than that used when discussing majority languages, especially English, and their lexical relations due to their morphological structure and how meanings are connected to words in Tsuut'ina. Therefore, before considering selecting candidates to be evaluated, the next requirement is to determine what to look out for when investigating whether these candidates have lexical relations with each other. In order to do this, the definitions, characteristics, and properties of synonymy and hyponymy are brought into play alongside the morphosemantic properties of Tsuut'ina verb forms. Below, the general grammatical properties of Tsuut'ina verbs are discussed alongside common properties of hyponym and hypernym lexical relations and synonym lexical relations which must be considered in the analysis conducted in the following chapter.

This is then followed by a discussion of proposed sentence structures which may be used as frames to display hyponymy in Tsuut'ina. These proposed sentences were acquired through personal correspondence between co-supervisor Joshua Holden and Tsuut'ina elder and former Tsuut'ina Language Commissioner Bruce Starlight, where they discussed sentence constructions in Tsuut'ina featuring classificatory versus non-classificatory verbs and frames in which hyponyms and hypernyms, or generic and specific word forms, may appear together. This correspondence was then reported back to me by Dr. Holden, again through a personal correspondence. Outside of the sentences given below, there is not external access available to these conversations.

4.1.1 Grammatical requirements

A key restriction imposed during the selection process discussed below is that the final candidates in a set, for both the 'eat' and classificatory handling verbs, must be different verb themes. There were a series of decisions behind this concerned with how synonyms, hyponyms, and hypernyms can be searched for in Tsuut'ina considering the properties of verbs in the language. These properties include the verb theme categories, verb themes themselves, and verb stems. To

summarize, both synonymy and hyponymy in Tsuut'ina require that these properties be realized in the same way as follows: the verb candidates may belong to the same verb theme category; they must be inflections of different verb themes; those themes can be such that one is derived from the other; as a result of which, they can also have the same verb stem.

To start with the verb theme categories, the two groups of candidates selected consist of items which each belong to the same verb theme category: the classificatory handling verbs, by their nature, are part of the motion theme category (Cook, 1984, p. 144) and the 'eat' verbs belong to the duration category (p. 156). (Though they are also considered to have another theme in the repetitive theme category, the interpretation of 'eat' verb themes in Section 4.3.2 reduces them to a single theme which is a duration theme.) However, that does not necessarily mean that two verb forms are required to belong to the same category to be lexical relations. Some verbs may be related while derivationally belonging to different categories. However, some contexts require that the difference be neutralized. Most likely, as in the case with the present candidates, verb forms in a lexical relation belong to the same verb theme category, but what is true derivationally does not strictly bind conversational semantic information. Therefore, while this will not be described as a *requirement* for verbal lexical relations in Tsuut'ina, it may be expected. In the case of synonymy, this is because synonym sets contain lexical items which share a sense or have similar senses to each other, so it is a fair assumption that their verb themes belong to the same category. Meanwhile, the hyponymous relations being examined are limited to lexical items belonging to the same category based on the assumption that such relations can only occur within a single category. If a hypernym passes on its general meaning to its hyponyms, then that meaning must be encased in the verb theme, and therefore the theme category. In the case of classificatory handling verbs, this is confirmed by the fact that classificatory verbs are a subcategory of the motion verb theme category. Therefore, all hyponymous relations observed between classificatory verbs all occur within the motion theme category.

Next, there are the verb themes themselves. Verb themes carry all of the required information to illustrate the meaning of a verb word. This includes, at minimum, the verb stem and voice/valence marker, plus any additional thematic elements. The concept of the verb theme is similar to that of a basic word form in languages like English which do not have the same morphological complexity—for instance, like the synonym set *violin:fiddle*. Therefore, to be considered for synonymy, two words must be of different verb themes and may or may not belong

to the same verb theme category. This is assuming the meanings that their respective themes indicate are the same as or similar to each other. Meanwhile, the verb themes in a hyponymous hierarchy must all be different from one another because the meanings they carry likewise differ between lexical items.

There is a secondary consideration that needs to be made with regard to verb themes and how they exist in a synonym relationship. Verb themes have two distinct types across all categories: there are primary themes and derived themes. Derived themes undergo a change in voice or valence (indicated by a change in voice/valence marker) and other morphological changes plus paradigmatic changes such as requiring subjects and objects to be coreferential. However, they keep the verb stem of the primary verb theme (Cook, 1984, p. 135). Because there is a change in meaning of the theme when it undergoes derivation, primary and derived verb themes are regarded as separate from one another with regard to synonymy and hyponymy. A primary verb theme and any derived themes which originated from it may all exist within the same synonym set or hyponym and hypernym set assuming the meanings are considered similar enough. A note on verb theme derivation with regard to hyponymy is that the verb themes of classificatory handling verbs differ based on their verb stems, as certain subclasses require certain verb stems. In both cases, regardless of the origins of the verb themes, their meanings must be closely linked in such a way that fulfills a definition of the lexical relation in question, as discussed in the forthcoming chapter.

Now that it is established that different verb themes can co-exist in a synonym set, regardless of their derivational status compared to other themes in the set, what does that mean for the one required item in a verb theme, the stem? While verb stems do carry some general meaning, it is too broad to assign them any value when it comes to lexical relations. It is not the same as the meaning held within a verb theme. Also, it is established above that a primary verb theme and a derived verb theme may belong to the same synonym or hyponym set. The verb stem is the one thing a derived verb theme retains when it undergoes derivation. Therefore, lexical items which have the same verb stem but come from different verb themes may belong together in a synonym or hyponym set.

To summarize, there are a series of grammatical and semantic properties to consider when searching for lexical relations among Tsuut'ina verbs before they are analysed using the approaches as described in the following chapter. Verb forms in a lexical relation are not restricted

to belonging to the same verb theme category, but it more likely that they will than not. They cannot originate from the same verb theme however, meaning also that verb forms which are inflected differently for person, aspect, etc., cannot be regarded as being in a lexical relation together. However, verb themes which are connected via derivational changes may have lexical relations to one another, and therefore can also have the same verb stem. This is all considered in addition to the meanings of the verbs themselves, which is the main focus of studies in lexical relations.

4.1.2 Tsuut'ina frames

During a personal exchange with Tsuut'ina elder and former Tsuut'ina Language Commissioner Bruce Starlight, co-supervisor Joshua Holden obtained a series of sentences in Tsuut'ina which were then passed on to the author. These sentences are an attempt to develop analogous frames for Tsuut'ina candidates in a hyponym and hypernym lexical relation. This follows a similar manner to Cruse's diagnostic frames of hyponymy, which were a method to empirically demonstrate generalizable facts about lexical relations as evidenced by a speaker's use of the lexical items with each other or in contrast to each other. For these Tsuut'ina sentences, though, the grammar of the frames is quite distinct.

The first example sees the lexical relation reflected with just the hypernym and hyponym alone appearing alongside one another. The sentence in (11) below features, in order, the specific verb form *nisgá* "I am walking" followed by the generic *nanishá* "I walked to a point":

(11)　nisgá　　　　　　　　　　　nànisho

　　　ni–s–Ø–gá　　　　　　　　na–ni–s–Ø–ya

　　　TERM–1.SG.SBJ–CLF–walk.IPFV　TERM–PFV–1.SG.SBJ–CLF–go.PFV

　　　'I am walking'　　　　　　　'I arrived, came, walked to a point'

　　　"I came on foot." (Personal communication, J. Holden, February 25, 2023)

The particle *xaʔi* 'this.is.how' is used alongside the specific verb form to form a statement describing how something is done. In (12), it appears before the specific verb form *taádìsismóóz* 'I have boiled it':

(12) xaʔí   taádìsismóóz

               ta–í–Ø–di–si–s–s–móóz

      REL.how   ADV–CON–3.SG.OBJ–INC–PFV–1.SG.SBJ–CLF–boil.PFV

      'this is how' 'I have boiled it'

      "This is the way I boiled it." (Personal communication, J. Holden, February 25,
      2023)

The same particle and specific verb combination followed by the particle *k'e* or *ʔi* '[gloss]' is used
as a question asking how to do something:

(13) dàʔí   taádìsismóóz   ʔi

               ta–í–Ø–di–si–s–s–móóz

      Q.how   ADV–CON–3.SG.OBJ–INC–PFV–1.SG.SBJ–CLF–boil.PFV Q

      'how'   'I have boiled it'   question

      "How did you boil it?" (Personal communication, J. Holden, February 25, 2023)

However, these last two examples only contain the specific verb form in a generic-specific verb
pairing. There is no inclusion of or connection to a generic verb form with an overlapping meaning.

The *xaʔi* particle again may be used at the front of the sentence which includes both the
generic and specific verb forms to connect them in a single statement. The following example in
(14) features the particle as well as the suffix form *–gù* affixed to the end of the specific verb form,
followed by the generic verb form just like in (11):

(14) xaʔí   tadisismóts–gù
                    ta–di–sis–Ø–mots–gu

REL.how   ADV–INC–1.SG.SBJ.PFV>3.SG.OBJ–CLF–boil.PFV–COMP

'this is how'   'I have boiled it'

shastɬàg

shì–á–s–Ø–lag

food–ADV–1.SG.SBJ–CLF–do.PFV

'I have cooked food'

"I cooked it by boiling it." (Personal communication, J. Holden, February 25, 2023)

While the above sentence in (14) is judged as grammatical for reflecting the relationship between the generic (hypernym) verb form—*shastɬàg* 'I have cooked food'—and the specific (hyponym) verb form—*tadisismóts* 'I have boiled it'—speaker intuitions give preference to an alternative frame which excludes the *xaʔi* 'this is how' particle entirely. No changes are made to the sense of the sentence so "I cooked it by boiling it" remains a correct translation into English as seen below in (15):

(15)   taádìsismóóz–gù
        ta–í–Ø–di–si–s–s–móóz

        ADV–CON–3.SG.OBJ–INC–PFV–1.SG.SBJ–CLF–boil.PFV–COMP

        'I have boiled it'

        shástɬà

        shì–á–s–Ø–là(g)

        food–ADV–1.SG.SBJ–CLF–make/do.PFV

        'I have cooked food'

        "I cooked it by boiling it." (Personal communication, J. Holden, February 25, 2023)

All the above sentences feature relations between verb forms which are judged as non-classificatory. For classificatory verbs, on the other hand, the generic-specific relation between

two such verbs is not so easily displayed in such a diagnostic frame. In (16) below, two classificatory verbs are used, both of which are generic in that neither includes one of the verb stems used to reflect a particular noun subclass (see Table 3.7). Rather, the initial verb form used in the sentence, *nádìsisʔó* 'I picked it up', has the stem *–ʔó* which has either a compact or default meaning, but does not refer to any of the noun subclasses of classificatory handling verbs. Also, the second verb form *mik'adìsistłod* 'I grabbed it quickly', which is meant to operate as the generic verb form in the frame, has the generic verb stem *–tład*:

(16)   nádìsisʔó-gù
         ná–Ø–di–ì–si–s–ʔó(n)=gù
         again–1.SG.SBJ >3.SG.OBJ–INC–TRANSIT–PFV–1.SG.SBJ–handle.SRO.PFV=COMP
         'I picked it up'

         mik'adìsistłod
         mik'a–di–sis–Ø–tład
         upon_it–INC–1.SG.SBJ.PFV>3.SG.OBJ–CLF–tład.PFV
         'I grabbed it quickly'
         "The time of, when I picked it, I grabbed it quickly." (Personal communication, J. Holden, February 23, 2023)

Use of the *–gù* suffix is not limited to highlighting relations of generic and specific verb forms together in Tsuut'ina. Cook (1984) describes it as a subordinator used in conjoining sentences which are more complex than simple clauses (p. 91). As discussed in Section 3.3.2, a clause in Tsuut'ina minimally requires a verb word, as shown in many of the candidates taken from the PLD. Recall that much of the database is made up of verb-only basic sentences, with the sense translations provided alongside indicating the included information. This mainly consists of information stored in the prefixes like person, aspect, etc. as described in Section 3.3.3. However, there is also linguistic context given. For example, consider the following classificatory verb:

(17) nádìsisʔón

ná–Ø–di–si–s–Ø–ʔón

home–1.SG.SBJ >3.SG.OBJ–INC–PFV–1.SG.SBJ–CLF–handle.SRO.PFV

"I took it home (stone-like object)." (Starlight, et al., in progress)

In (17) above—in addition to the first-person singular subject and perfective aspect indicated in the *'s–'* and *'si–'* prefixes, respectively—there is linguistic contextual information in the form of the perfective classificatory verb stem *–ʔón*, which refers to a singular solid object (see Table 3.7). Together with the full theme which holds the meaning 'take stone-like object home', one can understand what kind of object is being referred to. This is in addition to any other contexts created by linguistic information—i.e., a nominal object preceding the verb word to indicate a specific object such as *tsá* 'stone, mountain'—or extra-linguistic information—i.e., the speaker gesturing to the stone being discussed.

Conjoining sentences consist of two subtypes: coordinating conjunctions and subordinating conjunctions. These are further divided into two types of coordinating conjunctions and five types of subordinating conjunctions. One type of subordinating conjunction features the aforementioned *–gù* suffix, which, according to Cook (1984), is the most loaded and versatile morpheme among the conjunctions (p. 91). In addition to creating conjoined sentences, this form can be affixed to the end of any form class to create a derivational lexical class with a different, unique function from the original class. As a general complementizer and subordinator, *–gù* may appear as the conjunction joining a main clause to a subordinate clause, as in (18) below:

(18) ùwāt'īyī īsdúdī gūt'ínà–ná–gù   gwáʔín-la

gu–yi–Ø–Ø–ʔín=la

people–like–COMP 3.UNSPEC.OBJ–PFV–3.SG.SBJ–CLF–see.PFV=EVID

'and then' 'different tribes'   'he saw someone, it was'

"And then, he saw that they were strangers." (Starlight & Donovan (Eds.), 2018, p. 249)

Here, *–gù* is attached to the subordinating form *gūt'ínà–ná* 'they were strangers', as a means of connecting it to the main clausal verb *gwáʔín-là* 'someone (he) saw it'.

Other uses of –*gù* are to conjoin clauses with meanings such as 'at the same time', 'in order to/for', 'in a way that', or 'in open question'. The first of these meanings is found in (19), for instance:

(19) ts' īká   yáʔín–la
      yi–yi–Ø–ʔín=la
      3.SG.SBJ >3.SG.OBJ–PFV–CLF–see.PFV=EVID
      'woman' 'she saw it was him'

      yíyáł–gù
      yi–Ø–yał–gu
      PROG–3.SG.SBJ–walk.PROG–COMP
      'he was walking along'
      "A woman saw him as he was walking along." (Starlight & Donovan (Eds.), 2018, p. 150)

Here, –*gù* is attached to the subordinate verb *yíyáł* 'he was walking along' to indicate that the man was walking at the same time that the woman saw him, indicated by *ts'īká yáʔín-là* 'A woman saw him'.

The meaning "in order to/for" is given in (20):

(20) nīts'iʔást'ín–gú
      ni–ts'i–Ø–s–d–ʔin–gu
      TERM–RECP–IPFV–1.SG.SBJ–CLF–see.IPFV–COMP
      'you.towards.I.will.become.in.order.to'

      nànīshó
      na–ni–s–Ø–ya
      to_a_point–PFV–1.SG.SBJ–CLF–walk.PFV
      'I walked to a point'
      "I have come to court you." (Starlight & Donovan (Eds.), 2018, p. 35)

In this sentence, *–gú* is attached to the subordinate clause *nīts'ìʔást'ín* 'I will court you' to connect it to the main clause *nànīshó* 'I have come to a point' with the implied overall meaning being 'I have walked to a point in order to court you'.

The meaning 'in a way that' is given in sentences like (21):

(21) wúnìt'ósì   tsīdìstín–gù
          tsi–di–Ø–s–tin–gu
          head–INC–3.SG.SBJ–CLF–lie_down.PFV–COMP
'north'   'head was lying'

        nàyìnístín-là
        na–yi–ni–Ø–s–tin=la
        down–3.SG.OBJ–PFV–3.SG.SBJ–CLF–put_down.PFV=it_did
        down.it.he.put.it.was
        "He placed its body so that the head was facing towards the north." (Starlight & Donovan (Eds.), 2018, p. 33)

Here, *–gù* gives the 'so that' meaning to connect the subordinate *tsīdìstín* 'head was lying' with the main clause *nàyìnístín-là* 'he put it down'. Both the main and subordinate verb forms used in (21) are classificatory handling verbs with the *–ti(n)* neuter and *–tín* active singular animate being verb stems (Cook, 1984, p. 140). So *–gù* can be attached to a classificatory handling verb which is co-referential with a particular noun subclass in sentences with subordinate clauses.

The final meaning attributed to *–gù* in Tsuut'ina is 'in open question', given in (22):

(22) xàt'á   dàsjà(g)–gù
          dà–as–Ø–jàg=gù
          DISTR–2.PL.SBJ–CLF–become.PFV=COMP
'what for' 'where each and every one became'?
"For goodness sake, where have you been?" (Starlight & Donovan (Eds.), 2018, p. 70)

Here, *–gù* is attached to the interrogative *dàsjà(g)* "where each and every one became", which is the sole verb in the sentence, so this is not an example of linking two verb forms together. Instead, it is used here as an inflectional class rather than a lexical class like the other examples shown.

All but one of these above uses feature *–gù* as a particle attached to the subordinator in a subordinating conjunction sentence. However, it can also be affixed to the verb of the main clause. As a main clause suffix, it also operates like a modal enclitic, where it refers to the opinion of the speaker. When relating a sequential relationship, *–gù* is comparable to another subordinator, *–ìdà²* (p. 89): where the latter describes (possible) future events, the former is used to describe events from the past (pp. 91-92). Based on these many ways *–gù* operates, it is best described as a complementizer where its main purpose is to connect a main clause and a subordinating clause together, be that as a general subordinator or with one of the specific meanings of 'at the same time', 'in order to/for', and 'in a way that', in addition to connecting generic and specific verbs with overlapping meaning together. For this reason, the COMP gloss is used above to reflect these meanings. Similarly, the *kind* or *way* items which connect generic and specific verbs in Cruse's hyponymy frames are used in other ways—this is discussed in more detail in chapter 5.

4.2 Candidate selection from the preliminary lexical database

Certain candidate lexemes were selected to study synonymy and hyponymy more in depth in Tsuut'ina. Two semantically rich verb series were chosen. One was the verbs expressing the meaning 'eat'. This set of verbs was selected due to the many unique verb themes which include it in its meaning and in particular the generic 'eat' verb theme which has two sets of verb stems. The second is classificatory handling verbs. Classificatory handling verbs, as discussed previously in Section 3.3.5, are a rare linguistic phenomenon that is notably found in the Dene language family. They assign special classifications of shape and texture to nouns through specific verb stems. These verbs were selected to provide an analysis of a Dene-specific phenomenon which has not been tested for lexical relations.

The selection of candidates was done using two methods. The non-classificatory 'eat' verbs were searched for based on their meanings using the WordNet and Rapid Words semantic classifications described below. Meanwhile, the classificatory handling verbs were searched for according to their morphological components, focussing first on the verb stems as given Section

3.3.5 (Cook, 1984, p. 140) and then their derivational prefixes which help to indicate active versus stative neuter meaning.

The easiest place among the semantic classifications to start looking for candidates is among the Rapid Words labels. The semantic domain labels "Eat" and "Manner of eating" correspond to the general sense for 'eat'; filtering for this label has the PLD come up with 201 verb forms. The verb forms are varied across different sense meanings given in English. However, Rapid Words labels alone are not enough to ensure the widest possible range of verb forms which qualify as having a certain meaning.

The next place to look is the WordNet semantic classifications. When the PLD was filtered for the Rapid Words labels, the WordNet classifications were also available to see. Many of the WordNet semantic classifications have a more one-to-one correlation to the sense translations given for the Tsuut'ina verb forms. Therefore, under the Rapid Words labels, there is a variety of WordNet semantic classifications given. Thus, the WordNet semantic classifications shown among the Rapid Words labels results are selected independently of filtering for those labels. This expands the possible number of verb forms based on the WordNet senses beyond the Rapid Words labels. The reason for this is that the labels are not exclusive boundaries for certain senses—the same or a similar sense can be semantically classified using a different semantic domain. However, there could possibly be other verbs that are semantically classified with that synset, but under a different Rapid Words label. Therefore, the WordNet semantic classifications found under the main Rapid Words labels are searched for without filtering for those labels, so that more results are given. Using this search method, the number of 'eat' verb forms increased to 138: under the "Eat" and "Manner of eating" Rapid Words labels, the sole WordNet semantic classification found for the sense 'eat' was "(v)eat#1" which refers to the WordNet synset "eat (take in solid food)"; when searching for just that WordNet classification marker, 138 verb forms are given.

Another means of looking for more verb forms that may otherwise be missing is to return back to the Rapid Words semantic domain, but instead of the labels, the numerical items are used. The numerical item for "Eat" is 5.2.2 and any subgroups occurring beneath that number (5.2.2.1, 5.2.2.1.1, and so on) and label correspond to eating and related activities. When the Rapid Words numerical items are subsequently used, the number of verb forms increases significantly due to the larger number of semantic domains being included in the list of possible candidates. Among the verbs semantically classified as belonging to the "Eat" 5.2.2 subcategory or lower, there are

389 verb forms featured. However, this method is faulty due to the way the Rapid Words semantic domain is arranged. While it is organized as a semantic hierarchy, this does not operate the same way as a hierarchy of hyponyms and hypernyms in a lexical relation. The subgroups of a particular domain in Rapid Words do not necessarily all represent more specific domains than their superordinate, rather, they can also be contrasting domains or domains representing information that is laterally related to that expressed in the superordinate domain. With the "Eat" semantic domain at the level 5.2.2, its subgroups consist of domains labelled "Bite, chew", "Drink", "Fast, not eat", "Hungry, thirsty", "Manner of eating", and "Satiated, full". With all but one exception, all of these subgroups were eliminated due to referring to senses which are in opposition to eating, partonymous to eating, or indicate something related to eating but not with the sense 'eat'. The verb forms under the label "Manner of eating", meanwhile, remains because they have the sense 'eat'; i.e., they were semantically classified under WordNet with the aforementioned "(v)eat#1" classification. After the necessary exclusions, 138 'eat' verb forms remained.

This final list of 138 verb forms is divided into what for now will be considered three verb themes. The first verb theme, labelled *s+nó* 'eat (Object)' and discussed in more detail in Section 4.3.2, is the parent of a series of verb forms which in the PLD are labelled as each having its own verb theme, but in actuality are inflections of the same theme. The changes in meaning for these verb forms comes from the addition of a prefix with that meaning. These different inflectional forms are summarized in Table 4.2, beginning with the uninflected *s+nó* which just means 'eat', followed by *í+di+di+nó* meaning 'eat contentedly', *k'a+nó* meaning 'finish eating' with the 'finish' meaning provided by the *k'a*–prefix, and *ná+nó* meaning 'eat again' featuring the iterative prefix *ná*–:

Themes	Prefix(es)	Example	Sense
s+nó 'eat (Object)'	í–	yísnó	'he/she/it is eating it.'
í+di+di+nó 'eat contentedly'	í+di+di–	īdìdátsàd	'he/she/it has eaten something contentedly.'
k'a+nó 'finish eating'	k'a–	k'ánītsàd	'he/she/it has finished eating.'
ná+nó 'eat again'	ná–	náyìsnò	'he/she/it is eating it again'

Table 4.2: Examples of *s+nó* 'eat (Object)' verb forms with different inflectional prefixes (Starlight, et al., in progress)

Because these verbs take their additional senses from inflectional prefixes, rather than being inherent in the verb theme, they are interpreted as belonging to a single verb theme *s+nó* 'eat (Object)'. There are some concerns with whether or not some of these verb forms should be regarded as inflections of one verb theme or a separate verb theme with its own stem set variations, i.e. *k'a+nó* 'finish eating' (Personal communication, C. Cox, May 19, 2023), but confirmation on the status of these verbs is not currently available and requires verification from a Tsuut'ina speaker. For the time being, given that the stem set alternations found in the PLD are consistent among the verbs discussed above and none of the prefixes are thematized, for the purposes of this thesis, they are discussed as inflections of a single verb theme, and thus are eliminated as candidates from further analysis. Going forward, the only verb forms from this selection which are investigated are those which have the generic 'eat' meaning as given in the *s+nó* verbs such as *yísnó* 'he/she/it is eating it'.

There remain two more verb themes which include the meaning 'eat' and have additional meanings which are inherent to the full verb theme as indicated by the fact that these themes, including their stem sets, are unique from those described above. The first theme is discussed in Section 5.2.2 and beyond as *á+t'ày/t'àł/t'à* with the meaning 'eat Object up'. The second theme is discussed similarly as *–dál* with the meaning 'eat berries'. These two verb themes alongside the *s+nó* 'eat (O)' verb forms make up the 'eat' verb form candidates being analysed here.

The classificatory handling verbs could only be extracted via keyword search in the PLD. In the FST Lemma column, the sense given for the verb theme may include an acronym such as "AO", "FO", "RO", etc., which stand for "animate object", "fabric-like object", "round object", respectively. These acronyms are meant to represent the classificatory subgroups as described in Section 3.3.5 which correspond to the verb stems of the classificatory handling verbs. Also, it is handling verbs in particular that are being searched for. Therefore, a keyword search was conducted via the FST Lemma column of the PLD which gave a list of 619 verb forms.

From this list of verb forms, the following verb stems were searched for: *tó(n)*, *ʔó(n)*, and *tsú(ú)z,* which are the classificatory handling verb stems for singular long object (LO), singular solid object (SO), and singular fabric-like object (FO), respectively. Among the results containing these stems, two forms of classificatory handling verbs were selected: those with the active meaning 'pick O up', to give examples with the active verb stems, and those with the stative neuter

meaning 'S is lying', to give examples with the stative neuter verb stems. This led to the final set of classificatory handling verb forms to be made up of six subgroups of verbs (see Section 4.3.1 for full breakdown).

4.3 Selected candidates

The final set of verb form candidates selected consists of two sets: one for classificatory handling verbs (see Table 4.3), and one for non-classificatory handling verbs with the meaning 'eat' (see Table 4.4). The classificatory handling verbs are organized into two subsets, reflective of the stative neuter form and the active form, respectively, to reflect the stem set alternation between the two. The verb form candidates for each subgroup belong to three main subsets corresponding to three classification labels: singular long object (LO), singular solid object (SO), and singular fabric-like object (FO). The 'eat' verbs are made up of three verb themes henceforth referred to as *s+nó* 'eat (O)', *á+t'à* 'eat O up', and *–dál* 'eat berries'.

4.3.1 Classificatory verb candidates

Unlike the verb forms which mean 'eat' described in the following section, the classificatory handling verb candidates chosen are done so based on the types of classifications available for them in the PLD. Because the nature of classificatory handling verbs is that particular verb stems assign a subclass to the noun it co-occurs with—either with the verb agreeing with the noun based on the object type or the noun being contextually portrayed a certain way dependent on which stem is used for the verb—and these stems remain the same regardless of the meaning of the handling verb, the candidates below are just a small selection of active and stative neuter classificatory handling verbs. The following candidates and sentence examples taken from the PLD, corpora, and Cook (1984) are focussed on three noun subclasses for classificatory handling verbs: SO (also described as stone-like in the PLD senses), LO (also described as stick-like object in the PLD senses), and FO (or cloth-like object in the PLD senses). The verbal meaning of the active verbs is 'taking/picking up', while the meaning of the stative neuter verbs is 'lying'. The verb forms with the verb stems corresponding to these specific subclasses and the prefixes which illustrate the active and stative neuter verb meanings are summarized as follows:

	LO	**SO**	**FO**
stative neuter "S is lying"	sī–tón	sī–ʔón	sī–tsùùz
active "pick O up"	ná+dì–tó	ná+dì–ʔó	ná+dì–tsùz

Table 4.3: Summary of classificatory handling verb forms with active "pick up" and stative neuter meanings and classified for long stick-like (LO), stone-like (SO), and fabric-like objects (FO)

The stative neuter verb forms all feature the prefix *si–* which together with the respective CHV stems provide the 'S is lying' meaning of each verb theme. The following sentences in (23) and (24) have the stative neuter verb form *sīstsùùz* 'FO is lying' both independently in (23) and with a subclass noun *sits'ìdà* 'my robe' as its direct object in (24):

(23)   sīstsùùz
       sis–Ø–s–tsùùz
       IPFV–3.SG.SBJ–CLF–FO.sits.IPFV
       "It is lying (cloth-like object)." (Starlight, et al., in progress)

(24)   sits'ìdà   sīstsùùz-di
       si–ts'ìdà   sis–Ø–s–tsùùz–di
       POSS–robe   IPFV–3.SG.SBJ–CLF–FO.sits.IPFV–place
       'my robe'   'FO is lying'

       ninánisúd
       nà–ná–Ø–ni–s–s–zúd
       TERM–REP–1.SG.SBJ>3.SB.OBJ–PFV–1.SG.SBJ–CLF–drag.PFV
       'I dragged it again'
       "I dragged it to where my robe lay." (Goddard, 1915, p. 63)

The verb stem *–tsùùz* indicates the FO classification which in (24) is shown to be co-referent of the direct object *sits'ìdà* 'my.robe'.

The sentences in (25) and (26) give the stative neuter imperfective verb *sītón* 'LO is lying' as shown independently in a simple sentence in (25) and with a subclass noun *Ístłí Xàłà* 'Horse Whip' in (26):

(25)   sītón

       si–tón

       3.SG.SBJ.IPFV–LO.sit.IPFV

       "It is lying (stick-like object)." (Starlight, et al., in progress)

(26)   akí-ná   nálín–ná   gimigò   tààl   k'a   Ístłí Xàłà

                         ná–Ø–lín–na

                         REP–3.SG–be.IPFV–people

       'two.persons' 'they are again'   'beside them' blanket on   'Horse Whip'

       sītón

       si–tón

       3.SG.SBJ.IPFV–LO.sit.IPFV

       'LO is lying'

       "Beside two other young men on a blanket there is a Horse Whip." (Goddard, 1915, p. 5)

The verb stem *–tón* indicates the LO classification which in (26) is shown to be co-referent of *Ístłí Xàłà* 'Horse Whip' as its direct object.

The sentences in (27) and (28) show the verb *sīʔón* 'SO is lying' as shown independently in a simple sentence in (27) and with the subclass noun *tłī chu* 'big smoke' in (28):

(27)   sīʔón

       si–ʔón

       3.SG.SBJ.IPFV–SO.sits.IPFV

       "It is lying (stone-like object)." (Starlight, et al., in progress)

(28) tłī   chū   gīmìsílā   sīʔón-là

si–ʔón=là

3.SG.SBJ.IPFV–SO.sits.IPFV=it_was

smoke big   'with them' 'SO is lying'

"There was a lot of heavy smoke." (Starlight & Donovan (Eds.), 2018, p. 248)

The verb stem –ʔón indicates the SO classification in sīʔón 'SO is lying' which in (28) is shown to be co-referent of tłī chū 'big smoke' as its direct object, thus indicating that the latter is judged as a solid object in the context in which this sentence is used.

The active verb forms feature the prefixes ná+dì–, which together with the respective classificatory stems provide the 'picked O up' meaning of each verb theme. The first two examples given in (29) and (30) below are examples such a verb form with the verb stem –tsù(ù)z referring to FO. The sentence in (30) features the direct object k'ɨ̄yìjì 'dress' which corresponds to the FO referent:

(29) nádisistsùz

ná–Ø–di–ì–si–s–s–tsùùz

REP–1.SG.SBJ>3.SG.OBJ–INC–TRANSIT–PFV–1.SG.SBJ–CLF–handle.FO.PFV

"I picked it up (cloth-like object)." (Cook, 1984, p. 55)

(30) ts'ìkúwá   k'ɨ̄yìjì   nīsch'ājí

nis–ch'aj–i

3.SG.SBJ.IPFV–bead.IPFV–NMLZ

women   dress   it.is.beaded.the.one

nádìsistsùùz–la

ná–Ø–di–ì–si–s–s–tsùùz=la

REP–1.SG.SBJ>3.SG.OBJ–INC–TRANSIT–PFV–1.SG.SBJ–CLF–handle.FO=EVID

"A beaded woman's dress, he took it." (Starlight & Donovan (Eds.), 2018, pp. 243-244)

The FO verb stem –*tsùùz* agrees with the direct object *k'ɨ̄yìjì* 'dress' above in (30). As it is used for fabric-like objects, other nouns which can appear as a direct object include *ts'ìdí* 'blanket' (Starlight & Donovan (Eds.), 2018, p. 43) and *nàmíyí* 'otter skin' (p. 93).

The verb form in (31) is the active imperfective *nádìsistó* 'I picked LO up' for the subclass of stick-like objects.

(31)   nádìsistó

ná–Ø–di–ì–si–s–s–ton

REP–1.SG.SBJ>3.SG.OBJ–INC–TRANSIT–PFV–1.SG.SBJ–CLF–handle.LO

"I picked it up (stick-like object)." (Cook, 1984, p. 55)

No evidence of this verb form being used with a direct object in a sentence was found in any of the corpora.

The sentences in (32) and (33) are all dedicated to the SO noun classification reflected in CHVs with the verb stem –*ʔó(n)*. The sentence in (33) uses the imperfective active *nádìsisʔó(n)* 'I picked it up' with direct objects like *xāní ískónà* 'buffalo blood':

(32)   nádìsisʔó

ná–Ø–di–ì–si–s–s–ʔón

REP–1.SG.SBJ>3.SG.OBJ–INC–TRANSIT–PFV–1.SG.SBJ–CLF–handle.SO

"I picked it up (stone-like object)." (Cook, 1984, p. 55)

(33)   xāní   ískónà   nádìsisʔón

ná–Ø–di–ì–si–s–s–ʔón

REP–1.SG.SBJ>3.SG.OBJ–INC–TRANSIT–PFV–1.SG.SBJ–CLF–handle.SO

buffalo   blood   'I took SO up'

"I have picked up some clotted buffalo blood." (Starlight & Donovan (Eds.), 2018, p. 105)

The SO verb stem –*ʔó(n)* in the verb form *nádìsisʔón* 'I took it up' agrees with the direct object *xāní ískónà* 'buffalo blood' (specifically because it is described as "clotted", making it a solid,

stone-like object). As it is used for solid objects, other nouns which can appear as a direct object include *tsá* 'rock' (Goddard, 1915, p. 67).

The active classificatory handling verb with the meaning "pick O up" also has a generic form featuring the verb stem *–tɬad*. The following verb form in (34) is offered from a conversation with a native speaker:

(34)   nádìsistɬad

ná–Ø–di–ì–si–s–s–tɬad

REP–1.SG.SBJ>3.SG.OBJ–INC–TRANSIT–PFV–1.SG.SBJ–CLF–handle.

"I picked O up." (Personal communication, J. Holden, February 25, 2023)

The verb form *nádìsistɬad* 'I picked O up' features the verb stem *–tɬad*. This stem is a generic alternative to the classificatory handling verb stems which assigns no shape or texture value to its absolutive (Personal communication, J. Holden, February 25, 2023). This is further supported by native speaker intuitions as also seen in sentence (16) in Section 4.1.2 earlier with the verb *mik'adìsistɬod* 'I grabbed it quickly'.

To summarize, the two sets of classificatory verbs are divided up into three verb themes dependent on the verb stem and noun classification that stem assigns to the verb. The stem *–tsù(ù)z* represents the classification FO, the stem *–tó(n)* represents LO, and the stem *–ʔó(n)* represents the classification SO. There is also a generic form of classificatory verb which features the stem *–tɬad*. In general, the use and construction of classificatory handling verbs are very standard as the verb stems are regularly used based on their classification meaning and the prefixes are regularly used based on their stative neuter or active meaning, respectively.

4.3.2 Eat verb candidates

The 'eat' verb form candidates found in the PLD are narrowed down to three key verb themes and their meanings—though one of the themes may be two separate themes. The different verb themes with their meanings and stem set alternations are listed below:

	Imperfective	Perfective	Potential	Progressive	Repetitive
'eat (O)'	í+no	–nò		–nòł	–nosh
	í+chiizh	–tsàd	–chiizh		
'eat berries'	–dàł	–dál	?	?	?
'eat O all up'	á+t'à	á+t'ày	?	á+t'àł	?

Table 4.4: Summary of 'eat' verb themes and their different verb stems corresponding to each aspectual type (Starlight, et al., in progress; Personal correspondence, C. Cox, March 23, 2023)

The verb forms with the generic meaning 'eat (O)', featured in the top two rows of Table 4.4, are judged in one of two ways. One way sees them as being two separate verb themes, one of which is made up of the *–no/nò/nòł/nosh* stems and the other made up of the *–chiizh/tsàd/chiizh* stems. The former group is missing a stem for potential aspect and the latter is missing progressive and repetitive aspect. These cases of a stem set missing a certain aspect is a paradigmatic gap. In this separate theme interpretation, in the case of the three aspectual types where only one theme is available in that aspect, that theme is the one used. For instance, in the case of potential mood, the theme containing the stem *–chiizh* is used because the other theme is blocked for potential mood. However, for the imperfective and perfective viewpoint aspects, the choice between the two themes is made based on whether the context calls for durative or momentaneous (derivational) aspect. In the case of durative aspect (describing a continuing situation), the *–no/nò/nòł/nosh* theme is used, whereas in the case of momentaneous aspect (describing a situation taking place at a moment in time), the *–chiizh/tsàd/chiizh* theme is used for imperfective and perfective viewpoint aspects (Personal communication, C. Cox, May 19, 2023).

The second way these verb forms are judged is as belonging to a larger single verb theme which is divided into two stem sets for momentaneous and durative aspects: the momentaneous aspect, which has *–chiizh/tsàd/chiizh* as its stem set, includes imperfective and perfective viewpoint aspect and potential mood; the durative aspect, which has *–no/nò/nòł/nosh* as its stem set, includes imperfective and perfective viewpoint aspect and progressive and repetitive situation type aspect. In other words, in this theme, there is more than one form of imperfective and perfective 'eat' verbs, which are dependent on the temporal distinction (Personal communication, C. Cox, May 19, 2023).

An example of a momentaneous situation type is (35), with the form *ichiish* meaning 'he/she/it is going to eat':

(35) ichiish

   i–Ø–chiish

   3.INDEF.OBJ–3.SG.SBJ.IPFV–eat.IPFV

   "He/she/it is going to eat (something)." (Starlight, et al., in progress)

Compare this to the durative situation type as shown in (36) with the form *ísno* meaning 'he/she/it is eating something':

(36) ísno

   i–í–Ø–s–no

   3.INDEF.OBJ–CON–3.SG.SBJ.IPFV–CLF–eat.IPFV

   "He/she/it is eating (something)." (Starlight, et al., in progress)

Both have the generic 'eat' meaning, but the senses given in translation are temporally distinct from one another.

Other Dene languages are found to have verbs which have similar paradigmatic gaps and linguists often use the latter approach discussed to account for this by stating that a verb may have more than one stem set which covers such aspectual distinctions or the like. For instance, in Ahtna, the verb theme meaning 'eat it' is divided into two stem sets, a durative set just as for Tsuut'ina above, and a customary set which is defined as 'customarily eat it' (Kari, 1990, pp. 680-681). For this thesis, the same distinction is made for this set of generic 'eat' verb forms in Tsuut'ina. Going forward, this theme is labelled as *s+nó*.

Another query regarding the organization of the *s+nó* theme is why the verb stems in the momentaneous set appear as they do. Notice that, while the durative stems *–no/nò/nòl/nosh* are clearly phonologically related, that is not the same for the momentaneous stems *–chiizh/tsàd/chiizh* as the stem *–tsàd* is phonologically separate from the other two. So far, the reasoning is unknown, so the author will just suggest that diachronic fusion took place putting the two types of stems together over time.

The *s+nó* 'eat (O)' verb forms can appear both intransitively and transitively in a sentence. First, the sentence in (37) which has it occur as an intransitive—the verb *ìts'ísnó* 'someonePL is eating' appears without an object noun form:

(37)   ùwāt'īyī   ìts'ísnó–ʔí   ghà

         i–ts'í–s–nó=ʔí

         PEG–3.INDEF.OBJ–CLF–eat.IPFV=NMLZ

'and then'   'someone is eating (something)'   at

         nàts'īyídál-là

         na–ts'i–yi–dal=la

         ADV–3.INDEF.OBJ–PFV–walk.PFV=it_was

         'someone walked to a point'

         "They went to where everyone was eating." (Starlight & Donovan (Eds.), 2018, p. 2)

As a transitive verb, it is used as in (38), where the verb *ísno* 'he was eating' has the direct object *jijá* 'berries':

(38)   diyí   jijá   zá   ísno

                                 i–í–Ø–s–no

                                 3.INDEF.OBJ–CON–3.SG.SBJ.IPFV–CLF–eat.IPFV

         this   berries only   'he was eating (something)'

         "He was eating only berries." (p. 11)

Because this verb theme has both transitive and intransitive uses and has the generic meaning 'eat', it is henceforth given the sense 'eat (O)' such that the full theme going forward is written as *s+nó* 'eat (O)'.

    s+nó 'eat (O)' is used in a variety of sentences. As a transitive form, it is used with many possible noun forms as its direct object. Below is a summary of the kinds of items which can be a direct object of *s+nó* 'eat (O)':

	Tsuut'ina noun	English sense
s+nó	dóní	'food'
	jijá	'berries'
	tóshkōshí	'frogs (water.in.he.croaks.the.one)'
	nàdúzághá	'snakes'
	sīlích'à	'my pets'
	álíní	'meat'
	īts'úzá	'a kidney'
	ditłidi	'the fat'
	súní	'dried meat'
	lúdà	'scab'
	itsù	'tongue'
	its'ághá	'birds'
	tsúustł'á	'gopher'
	didághá	'calf'
	áyuwà	'marrow'

Table 4.5: Nouns which may be the direct object to a verb from the theme s+nó 'eat (O)'
(Starlight & Donovan (Eds.), 2018; Goddard, 1915)

Aside from the possible direct objects it may take in a transitive argument, *s+nó* 'eat (O)' has other uses in linguistic contexts. In one story in Starlight and Donovan (Eds.) (2018), it is the verb used when discussing which type of dish to eat food from (pp. 126-127, see Appendix for full excerpt).

The remaining two candidates of verb forms for 'eat' in Tsuut'ina are the verb theme *á+t'ày/t'àł/t'à* meaning 'eat an Object up' or 'devour'—henceforth, it is simplified to the theme *á+t'à* and the sense 'eat O up' following the theme's stem sets—and *–dál* 'eat berries'.

The verb theme *–dál* 'eat berries' technically means 'eat Plural Objects', but 'berries' is the most common object referred to, so it is often taken to mean 'eating berries' specifically in the language (Personal communication, C. Cox, March 23, 2023). In the narratives referenced throughout this thesis, no examples are found of a *–dàł* 'eat berries' verb form being used with a direct object other than *jijá* 'berries' (Starlight & Donovan (Eds.), 2018; Goddard, 1915). In other Dene languages, cognate forms of *–dàł* 'eat berries' exist which have examples of other small

items as the food of consumption direct object. The Apachean languages, Navajo and Jicarilla, for instance, feature the verb forms *yištéél* and *yiłteeł*, respectively, which offer the words for 'corn kernels' and 'grapes' as possible object nouns (S. Rice, 2009, p. 119). Meanwhile, in Ahtna, the cognate verb theme *O+G+l+daetl'* 'eat plural O' defaults to berries as the food of consumption as in *kiineldael* 'they are eating them (berries)', but also allows other foods of consumption as the direct object noun, as in *tselc'utsaey kuggaedi ldael* 'The dragonfly is eating mosquitoes' (Kari, 1990, p. 146).

Examples of the verb theme *á+t'à* 'eat O up' are featured in the sentences in (39) and (40) below. In (39), the verb form *áyinìst'ày* meaning 'he/she/it has eaten it all up' occurs independently on its own:

(39)   áyinìst'ày

á–yi–ni–s–Ø–s–t'ày

ADV–3.SG.SBJ>3.SG.OBJ–THM–PFV–3.SG.SBJ–CLF–devour.PFV

"He/she/it has eaten it all up." (Starlight, et al., in progress)

In (40), the verb form *áyinìst'ày* meaning 'he ate it' is used in a transitive sentence agreeing with the direct object noun *dóní* 'food':

(40)   ùwāt'īyī   dīk'ōyí   īī   tłāāt'ā   dóní

'and then'   coyote   the   all   food

áyinìst'ày–là

á–yi–ni–s–Ø–s–t'ày=la

ADV–3.SG.SBJ>3.SG.OBJ–THM–PFV–3.SG.SBJ–CLF–devour.PFV=it_was

'he ate it all'

"Coyote had already finished eating all the food." (Starlight & Donovan (Eds.), 2018, p. 170)

While *s+nó* 'eat (O)' verb forms were found with a variety of different food items as the direct objects in their sentences in the corpora, for *á+t'à* 'eat O up', the only examples of the verbs being

used in a sentence with a direct object were with the item *dóní* 'food'. In Kari (1990), verb themes with the same meaning in Ahtna are treated similarly, with the sole example of a food of consumption being directly stated as a direct object noun being *'use 'iyesi 'itnax xona* 'You devour the one singed over the fire' (p. 297). The remaining examples are without a direct object noun, like *sayalghel* 'He devoured it' (p. 218).

Examples of the verb theme *–dál* 'eat berries' are given in (41), (42), and (43) below. In (39), the verb form *yīīdàł* 'he/she/it will eat berries (only berries)' appears independently on its own:

(41)   yīīdàł

yi–l– dàł

3.SG.SUBJ.IPFV–CLF–berry_eat.IPFV

"He/she/it will eat berries (only berries)." (Starlight, et al., in progress)

The sentences in (42) and (43) below each feature the theme in a transitive sentence. In (42), the verb form *yīdál* 'he/she/it ate berries' appears with the direct object *jijá* 'berries' as its direct object:

(42)   jijá   yīdál

yi–l–dál

3.SG.SBJ.PFV–CLF–berry_eat.PFV

berries   'he ate berries'

"He/she/it ate berries." (Starlight, et al., in progress)

In (43), the verb form *yīdìł* 'he ate all the berries' also occurs as a transitive verb, but without a direct object to agree with:

(43)   ùwāt'īyī   yīdìł–là

yi–dal=là

3.SG.SBJ.PROG–berry_eat.PROG=it_was

'and then' 'he ate all the berries'

"Old Man then began to eat the berries." (Starlight & Donovan (Eds.), 2018, p. 173)

To summarize, the 'eat' verb candidates consist of three verb themes: *s+nó* 'eat (O)', *á+t'à* 'eat O up', and *–dàł* 'eat berries'. The theme *s+nó* 'eat (O)' has a generic sense which is applied to multiple nouns as its direct object as well as other contexts pertaining to the general action of eating. The theme *á+t'à* 'eat O up', also defined as 'devour', has a more specific usage found in available texts based on its meaning and its limited use with foods of consumption as direct object nouns for it. The theme *–dàł* 'eat berries' trends towards referring to berries as the food of consumption but is also available for other small food items. For both *á+t'à* 'eat O up' and *–dàł* 'eat berries' verb forms, these usages are attested in other Dene languages.

5. Searching for lexical relations in Tsuut'ina

The Tsuut'ina verb candidates described in the previous chapter are analysed using the approaches to lexical relations put forth by Cruse (1986, 2000, 2002) and Murphy (2003). The analyses conducted following the Crusian approach include the properties and characteristics described in Section 2.1.1 like the scale of synonymy used to describe synonyms and the hyponymy frames such as "Xing is a way of Ying". The analyses conducted following the RC approach by Murphy include the properties and characteristics described in Section 2.1.2, most especially the concept of Relation by Contrast and its different variations.

5.1 Analysis of classificatory handling verbs

Cruse's methodology of lexical relations is focused on a lexical approach which is applied to both hyponymy and synonymy. Beginning with hyponymy, this incorporates Rosch's prototype approach to focus on taxonymy as the "better" "sub-species" (Cruse, 1986, p. 137) of hyponymy (Marconi, 1997, p. 23). A key tendency, though not a requirement, in taxonymy is for the hyponyms in such a hierarchy to also be natural kind terms. However, it is unclear to what extent natural kinds apply to verbs, particularly given that verbs are paid less attention in discussion of taxonomies and hyponymous hierarchies though some actions may be considered natural kinds (Cruse, 1986, pp. 140-142). For now, CHVs are not considered regarding natural kind terms or nominal kind terms (Cruse, 2002, p. 18) or taxonymy, but the diagnostic frame Cruse uses to describe verbal hyponymy in (3) is still given attention (Cruse, 1986, p. 139).

The CHV candidates contain verb stems which assign shape and texture classifications to the absolutive. Because of this, their senses may be judged as specific, while items featuring the verb stem –*tład* would be judged as generic, for example *nádìsistład* 'I picked O up'. These labels are the same, though not identical, to the terminology used to describe the typical five levels of a taxonomic hierarchy. The two most important levels for this discussion, also called 'generic' and 'specific', refer to morphologically "simple" and "original" lexical items and lexical items which are more morphologically complex, respectively (pp. 145-146). The taxonomic level 'specific' best refers to the main set of classificatory handling verb candidates described in Section 4.3.1 given the noun classifications and classificatory verb stems. Therefore, classificatory handling verbs are judged as belonging to the specific taxonomic level and generic classificatory verbs are judged as belonging to the specific taxonomic level.

The Crusian approach includes a goodness-of-exemplar rating from speakers of the features of a hyponymous set wherein that set must possess certain features to be judged a good example of hyponymy. For instance, one would judge the hyponymous set *cat:animal* as a "better" example of hyponymy than the set *pussy-cat:animal* (Cruse, 2002, p. 10). The first feature asks that there be no incongruence between the hypernym and hyponyms in question—they must be predicable to the same argument without grammatical error (p. 10). While there was no evidence found of a verb form with the meaning 'S is lying' that could be the hypernym candidate to the proposed stative neuter classificatory verb candidates, the following sentences see each respective verb form appear in the same argument type and each has a verb stem which assigns a classification to the absolutive. First (24) has the FO stem *–tsù(ù)z* appear alongside *sits'ìdà* 'my.robe', thus co-referencing a fabric-like clothing item. In (26) the LO stem *–tó(n)* appears alongside *Ístłí Xàłà* 'Horse Whip', co-referencing a whip, a long, stick-like object.

In (44) below, the nominalized SO stem *–ʔó(n)* appears alongside *tsá chu* 'big stone', co-referencing a stone-like solid object:

(44)   tsá   chū   sīʔóní   ghà
                      si–ʔón–i
                      3.SG.SBJ.IPFV–SO.sits.IPFV–NMLZ
        stone big   'it was lying'   at

        nàyíyá–là
        na–yi–ya=la
        to_a_point–3.SG.SBJ.PFV–walk.PFV=it_was
        'he walked it to a point'
        "He walked up to a big rock." (Starlight & Donovan (Eds.), 2018, p. 184)

Each verb form with the meaning 'S is lying' and a classificatory handling verb stem have the same argument structure where they follow the object noun which was assigned the classification. There is similar evidence for the active 'pick O up' candidates with the exception of those assigning the classification LO to the noun, which had no examples in the corpora. First, in (45), the *–tsù(ù)z* FO stem found in *tāts'ídìstsùùz-là* 'someonePL puts FO up' is used in the same

transitive type of argument alongside the fabric-like object in question referenced in *ts'ìdí* 'blanket':

(45) ts'ìdí mīyāghā tāts'ɪ́dìstsùùz–là

ta–ts'i–di–s–s–tsùùz=la

ADV–3.UNSPEC.SBJ–INC–PFV–CLF–handle.FO=it_was

blanket 'under it' 'someonePL puts FO up'

"They held a blanket up for her." (Starlight & Donovan (Eds.), 2018, p. 43)

Second, the sentence in (33) has the SO stem *–ʔó(n)* used in the verb *nádìsisʔón* 'I took SO up' in a transitive argument alongside *xāní ískónà* '(clotted) buffalo blood'.

Finally, there is the generic active hypernym, found, with the verb stem *–tɬad*, in (34) and (15). In (34), the verb is used alone in a simple sentence, but is defined as a transitive verb, thus corresponding to how the FO and SO verbs are used in (45) and (33), respectively. Therefore, at least in the case of the active CHVs, there is no incongruence between the hypernym and at least two of the hyponyms. For the stative neuter classificatory verbs, there is also no incongruence found at least between the three candidates as prospective (co-)hyponyms.

The second GoE feature describes the relationship between the expectations of truth in the statements *A is X* and *A is Y*, where *A is X* being true give the expectation that *A is Y* is also true, and the reverse expectation also takes place but to a lesser extent (Cruse, 2002, p. 10). Among the active CHVs, this feature may at least be judged as plausible given that the FO, LO, and SO classificatory hyponym verbs operate in sentences like the *A is X* construction like in the sentences in (29), (31), and (32); then the generic active hypernym verb operates in a sentence like the *A is Y* construction as shown in (34). Assuming these sentences can express a relationship where, if the sentences (29), (31), and (32) are true, they each individually create the expectation that the sentence (34) with the verb *nádìsistɬad* 'I picked O up' is true, and that the sentence (34) being true also creates the expectation that the sentence (29) with *nádisistsùz* 'I picked FO up' is true, the sentence (31) with *nádìsistó* 'I picked LO up' is true, and the sentence (32) with *nádìsisʔó* 'I picked SO up' is true, but not to the same level as the original series of expectations, then this feature is fulfilled for the active CHVs. For the stative neuter classificatory verbs, however, only the hyponym verbs in (23) *sīstsùùz* 'FO is lying', (25) *sītón* 'LO is lying', and (27) *sīʔón* 'SO is

lying' are present in the available data which would correspond to the *A is X* construction; no hypernym examples are available to correspond to the *A is Y* construction. Therefore, this second goodness-of-exemplar feature can only be confirmed regarding the active CHVs.

The first two GoE features are considered the most weighted regarding determining hyponymy between two hypernym and hyponym lexical items (Cruse, 2002, p. 10). At least for the active CHVs, these features are deemed plausible to reflect hyponymy between the candidates. However, both features fail to be used regarding the stative neuter CHV candidates because no examples were found of a hypernym stative neuter verb which occupies the 'generic' level in a taxonomic hierarchy. Though there is the possibility of a covert category (a level in the hierarchy with no corresponding lexical item) which consists of generic stative neuter CHVs, that does not work with regard to either of these features because it cannot be contextualized the same way a genuine verb form can as shown in the examples given from the corpora.

The third GoE feature requires that when the verb forms are expressed in their diagnostic frame, it is normal (Cruse, 2002, p. 10)—the verbal diagnostic frame for English being *X-ing is a way of Y-ing* (Cruse, 1986, p. 139). For verbal hyponymy in Tsuut'ina, the sentence (15) is presented as an example of a diagnostic frame with the particle *–gù* conjoined to the hyponym. While both CHVs and non-classificatory verbs may use this frame to reflect a hyponymy lexical relation, the frame is not offered automatically for CHVs—the closest example with CHVs is given in (16). Also, there are no examples of the frame being used with CHVs in the corpora. Therefore, so far, one can only guess as to whether or not such a diagnostic frame works with CHVs in Tsuut'ina, including both the stative neuter and active candidates.

The fourth GoE feature assumes there is no lexical item which is the hyponym of Y and the hypernym of X. In the case of the active CHV candidates, this states that the item *ná+dì+tɬad* 'pick O up' does not have a hyponym Z which is then also the hypernym of *ná+dì+tsú(ú)z* 'pick FO up', *ná+dì+ʔó(n)* 'pick SO up', and *ná+dì+tó(n)* 'pick LO up'. No such lexical items have been found in the corpora.

The fifth and final GoE feature requires that the hyponym and hypernym candidates be matched with regard to their non-propositional features. However, because these candidates were obtained via corpora, these non-propositional features, such as register and expressiveness, cannot be evaluated for in this analysis (Cruse, 2002, p. 10).

Aside from the GoE features, there are other properties to consider when analysing CHVs using the Crusian approach to hyponymy. Each set of hyponym candidates are also judged as incompatibles. For the active verbs, *ná+dì+tsú(ú)z* 'pick FO up', *ná+dì+ʔó(n)* 'pick SO up', and *ná+dì+tó(n)* 'pick LO up' are incompatible with one another: if it is the case that the sentence (29) is true, then it is not the case that (31) or (32) are true, and so on (Cruse, 1986, p. 93). Typically, incompatibles are not required to be contrary to one another (p. 94); they may be alternately used towards the same referent in different contexts. The purpose of classificatory verbs is to "assign certain physical features to a noun" (Morgan, 2012, p. 59), so this satisfies how incompatibles are used. All the classificatory verbs with the meaning 'pick O up', including the active verb candidates, are used in such a way, as shown below:

Classificatory stem	Verb form	Sense
–ʔó(n-)	nádìsisʔó	'I picked it up' (ex. a rock)
–tó(n-)	nádìsistó	'I picked it up' (ex. a stick)
–tíh	nádisistíh	'I picked it up' (ex. a child)
–tsùz	nádisistsùz	'I picked it up' (ex. a quilt)
–ló	nádìsistló	'I picked them up' (pl. inanimate object)

Table 5.1: Classificatory handling verbs meaning 'pick O up' which are incompatibles (Cook, 1984, p. 55)

By nature of their different roles and how they are connected to one another, CHVs with the same general sense aside from the classification they assign to the absolutive are incompatibles and therefore can be co-hyponyms.

Murphy's approach to lexical relations involving Relation by Contrast and minimal difference also has issues interpreting CHVs as hyponyms and hypernyms. One major difference between the two approaches is that RC does not allow for covert categories like the Crusian approach does—rather, hyponymy is where named categories (hypernyms) have named subcategories (hyponyms) (Murphy, 2003, p. 228). Therefore, in the case of the stative neuter CHVs, because no hypernym verbs are observed for that group, they cannot be evaluated for hyponymy according to Murphy's interpretation. The remainder of this portion will be focussed solely on the active CHV candidates.

Murphy states that minimal difference for hyponymy is acquired via different taxonomic levels (p. 229): for the active CHVs, we see that the hyponym verb forms *ná+dì+tsú(ú)z* 'pick FO up', *ná+dì+ʔó(n)* 'pick SO up', and *ná+dì+tó(n)* 'pick LO up' exist together on one taxonomic level and the hypernym verb form with the meaning *ná+dì+tɬad* 'pick O up' occupies another taxonomic level one tier above the hyponym level. Additionally, the RC definition Murphy proposes, Relation by Contrast-Asymmetrical Lexical Contrast (RC-ALC), defines hyponymy as an asymmetrical relation wherein hyponyms and hypernyms are symmetrical regarding each other (p. 223): if X is a hyponym of Y, then Y is a hypernym of X. An example Murphy offers of hyponymy according to RC-ALC is *book>{hardback/paperback}* (p. 229). In the case of the active CHVs, if the verb form *nádisistsùz* 'I picked FO up' is a hyponym of *nádìsistɬad* 'I picked O up', then *nádìsistɬad* 'I picked O up' is a hypernym of *nádisistsùz* 'I picked FO up' and so on for *nádìsistó* 'I picked LO up' and *nádìsisʔó* 'I picked SO up'.

The asymmetrical lexical contrast also accounts for lexical contrast between co-hyponyms. Lexical contrast is defined as where word concepts have all the same contextually relevant properties but one (p. 170). The best case for any lexical contrast among the active classificatory handling verbs is between the hyponym candidates against one another. The co-hyponyms for "pick O up" would appear as follows:

nádisistsùz	*nádìsistó*	*nádìsisʔó*
I picked FO up	I picked LO up	I picked SO up

Table 5.2: Classificatory handling verbs as co-hyponyms according to lexical contrast (Murphy, 2003, p. 170)

Among these above verb forms, the meanings are different enough from each other given the noun classifications required for each of them and the corresponding verb stems which assigned those classifications. These differences in meaning are contextually-relevant given that they can change the meaning of the sentence (see sentences (46) and (47) below) and therefore the wider contextual information of the utterance they appear in. These meanings are tied to the verb stem, so though a change in verb stem is also seen in these contextually-relevant changes, they along with the meanings themselves are regarded as a single property: the change in meaning is realized through change in the verb stem. Therefore, there is only one contextually-relevant property which changes

between the co-hyponym active CHV candidates, which indicates that they are in lexical contrast with one another. This same difference separates them from the hypernym candidate as well, further qualifying the asymmetrical lexical contrast as put forth in RC-ALC.

Just like with the Crusian approach, the Murphian RC definitions of hyponymy can only partially account for hyponymy among CHVs. Murphy does not allow for covert categories, so the missing hypernym candidates in the case of the stative neuter verbs cannot be accounted for anywhere in the analysis, which prevents minimal difference and asymmetrical lexical contrast from being investigated. However, it does allow for hyponymy among the active CHV candidates where Cruse's approach does not, as those candidates successfully fulfil the requirements of RC-ALC.

Both the Crusian and RC approaches to hyponymy described above only partially account for hyponymy among CHVs. In both cases, the absence of a hypernym candidate for the stative neuter verbs prevents an analysis of hyponymy as, in the case of the Crusian framework, there cannot be any involvement of GoE features and normal contexts for hypernyms which are entailed by the contexts of the hyponym candidates, and in the case of Murphy, prevents any potential analysis as Murphy does not allow for covert categories like Cruse, and also the contextually relevant properties among the existing categories are too diverse for any minimal difference to occur through RC.

The Crusian approach to synonymy follows a scale from absolute synonymy to cognitive synonymy to plesionymy to non-synonymy (Cruse, 1986, p. 270). Absolute synonymy is quickly eliminated as a possible relation among CHVs because the contextual basis of these verb forms is that they assign certain shape and texture classifications to absolutives. There can be no perfect one-to-one replacement of one CHV for another including regarding their meanings.

Cognitive synonymy also does not work for CHVs. Sentences containing cognitive synonyms must successfully undergo substitution of the synonym without changing their meanings and the synonyms must be syntactically identical (Cruse, 1986, p. 88). While CHVs may appear in syntactically identical sentences, their verb stems and meanings force the truth-conditions of the sentence to change because they assign different classifications to absolutives. Consider the noun *tàl* 'blanket', which can appear as the object noun more than one CHV, but the verb stem determines how the physical blanket is described, as shown with the verbs *disk'ósh* 'they throw SO' in (46) and *diskoł* 'they throw DO' in (47):

(46)   tàl   disk'ósh

        di–s–k'osh

        3.SG.SBJ.IPFV.INC–CLF–SO.throw.IPFV

'blanket' 'throw SO up'

"They throw the blanket bundled up." (Personal communication, J. Holden, February 25, 2023)

(47)   tàl   diskoł

        di–s–koł

        3.SG.SBJ.PROG.INC–CLF–DO.throw.PROG

blanket   'throw DO up'

"They throw the blanket spread out." (Personal communication, J. Holden, February 25, 2023)

The difference in verb stem for the two CHVs shown above means that there are two different ways the object of the sentence, *tàl* 'blanket' is classified. In (46), it is interpreted as a bundled-up round (stone-like) object because of the SO stem *–ʔosh*, whereas in (47), it is a flat, spread out (dish-like) object because of the DO stem *–koł*. The outcome of this change in the way the blanket is viewed is that these sentences have different truth-conditions from one another. Therefore, they cannot be cognitively synonymous with each other. As a result, sentences like this also cannot be mutually entailing (Cruse, 1986, p. 285).

This lack of mutual entailment between sentences containing two unique CHVs is the dividing line between cognitive synonymy and plesionymy according to Cruse (p. 285). Therefore, what is left for evaluation in the Crusian method is plesionymy and non-synonymy, which are less distinct from one another (p. 286). One way of deciding whether CHVs are either plesionyms or non-synonyms is by looking at their capital and subordinate semantic traits (p. 287). In the case of CHVs, their capital traits would be the core meaning expressed by their prefixes, while the subordinate traits would be the noun classifications represented by the verb stems. Among the verb forms featured in Table 4.3, the capital traits are the prefix *si–* for the stative neuter CHVs which include the meaning 'S is lying' and the set of prefixes *ná+dì–* for the active classificatory verbs which include the meaning 'pick O up'.

The subordinate semantic traits of CHVs are expressed in English as syntagmatic modifiers. In the case of Tsuut'ina, these are the items being 'handled' as indicated by the verb senses: "I picked up a stick-like object" versus *nádìsistó*. While the capital semantic traits for a set of CHVs are known to be the same, the subordinate semantic traits will differ as shown in Table 5.3:

Stick-like object	Fabric-like object	Stone-like object	Generic object
sītón 'it is lying (stick-like object)'	*sīstsùùz* 'it is lying (cloth-like object)'	*sīʔón* 'it is lying (stone-like object)'	
Capital trait: *si–* (stative neuter 'lying') Subordinate trait: –*tón* (classificatory 'stick-like object')	Capital trait: *si–* (stative neuter 'lying') Subordinate trait: –*tsùùz* (classificatory 'fabric-like object')	Capital trait: *si–* (stative neuter 'lying') Subordinate trait: –*ʔón* (classificatory 'stone-like object')	
nádìsistó 'I picked stick-like object up'	*nádisistsùz* 'I picked cloth-like object up'	*nádìsisʔó* 'I picked stone-like object up'	*nádìsistɬad* 'I picked object up'
Capital trait: *ná+dì–* (active 'pick up') Subordinate trait: –*tón* (classificatory 'stick-like object')	Capital trait: *ná+dì–* (active 'pick up') Subordinate trait: –*tsùùz* (classificatory 'fabric-like object')	Capital trait: *ná+dì–* (active 'pick up') Subordinate trait: –*ʔón* (classificatory 'stone-like object')	Capital trait: *ná+dì–* (active 'pick up') Subordinate trait: –*tɬad* (classificatory 'stone-like object')

Table 5.3: Capital and subordinate semantic traits of classificatory handling verbs

Across the three classificatory verb forms with a classified absolutive given in Table 5.3, the capital semantic traits remain the same, indicating an overlap in their meaning regarding the 'head' of the construction (Cruse, 1986, p. 287), while the subordinate semantic traits are unique to each verb form. The unity of the capital traits while the subordinate traits differ is a surface-level display of plesionymy between the verb forms (p. 287).

Both the capital and subordinate semantic traits operate as important components of the meanings of the CHVs and contribute to how they impact the context of a sentence in which they may appear. Distinguishing them as plesionyms as opposed to non-synonyms is difficult, however, because one fades into the other gradually—there is no clear distinction between the two the same way plesionyms are clearly distinct from cognitive synonyms because of their different substitution outcomes. One way to determine the type of synonymous relation that occurs between each of the CHVs is to place them along a string. Lexical items which are adjacent to one another on a string can be regarded as plesionyms, whereas items which are non-adject can subsequently be considered non-synonyms. To determine the ordering on the string, the subordinate semantic traits must be investigated.

All three types of classificatory verb stems assign a specific shape or texture property to the absolutive. LO may refer to any long and/or thin item, for instance, in Starlight and Donovan (Eds.) (2018), it is used to refer to a snake, *nàdúzághá*:

(48)   ách'á   nàdúzághá   mīt'ō-là   mōghà
        'it just so happened'   snake   'it was inside it' 'for him'

        yīts'īnītón–là
        yi–ts'i–ni–ton=la
        3.SG.OBJ–3.UNSPEC.SBJ–PFV–LO.pick_up.PFV=it_was
        'someone handed him it'
        "Inside of it was a snake. It was handed to him." (Starlight & Donovan (Eds.), 2018, p. 190)

The LO classification gives the reading that the snake has its body fully extended, as opposed to curled up, for instance.

FO may refer to any flat piece of cloth or fabric, such as a blanket:

(49)   ùwāt'īyī   ìsīnā   nīstín–là
                                    ni–s–Ø–tín=la
                                    THM–PFV–3.SG.SBJ–CLF–sleep.PFV=it_was
        'and then' 'it must have been'   'he went to sleep'

        dīts'ìdà   kīdà   yīk'ā   dīstsùùzi
                                         di–s–Ø–s–tsùùz–í
                                         INC–PFV–3.SG.SBJ–CLF–handle.FO–NMLZ
        'his own blanket' 'in it'   it.off   'she took'

        ínídzà   mīts'ìnà   zá   sījààsh–là
                                           si–jash=la
                                           3.SG.SBJ.PFV–GO.lie_down.PFV=it_was
        'during that time'   'his bones' only   'it was lying'
        "And then, he went to sleep in his blanket. When she lifted the blanket, only his
        bones were left." (Starlight & Donovan (Eds.), 2018, p. 192)

The FO classification gives the reading that the blanket is laid out flat, as opposed to rolled up into
a ball like (46).

        And finally, SO may refer to any round, hard, and solid object, like *xāní tsònà* 'buffalo
dung':

(50)   xāní   tsònà   īī   xàdàʔón-là
                                   xà–di–ì–s–Ø–Ø–ʔón=la
                                   off–INC–TRANS–PFV–3.SG.SBJ–CLF–handle.SO.PFV=it_was
        buffalo   dung   the   'she took it off'
        "She removed the buffalo dung." (Starlight & Donovan (Eds.), 2018, p. 38)

The SO classification gives the reading that the buffalo dung is round and solid, as opposed to
pressed flat into the ground, for instance.

The natural way of stringing these different classifications alongside one another would be based on the similarities between each classification type as well as their semantic distance. However, the nature of these classifications ensures a wide possibility in the kinds of objects they contain, therefore making it difficult to point out certain key similarities or differences in their meanings. Cruse states that a lexical string must have a consistent ordering principle based on asymmetry and catenarity that is inherent in the meanings of the members of the string (Cruse, 1986, p. 187). However, that is difficult to manage with CHVs because the verbs themselves do not have inherent properties that asymmetrically distinguish themselves from each other, such as size and shape.

One possible way of confronting this is by making judgments based on the types of objects each CHV can take and proposing a partially inherent ordering based on that (p. 187). However, more than one CHV can take on the same object noun, and subsequently impact the interpretation of that object noun and what its properties are. Consider *tàl* 'blanket'—the physical description of this object noun is dependent on the type of classificatory verb stem that assigns the classification. When used as the object to the SO *–ʔosh* verb stem in *disk'ósh*, it refers to a bundled up, round object in the sentence in (46), but as the object to the DO *–koł* verb stem in *diskoł,* it refers to an open, spread-out object (47).

Ultimately, what is left are three sets of verb forms which due to the kind of semantic distance between each set cannot adequately be judged on a lexical string to determine which are more or less synonymous to one another. In the case of the active CHVs, there is also the generic active CHV candidate, which can be placed on a string together with the other three active CHVs, but because the three themselves do not sit on a string, they can be regarded as equally plesionymous to the generic *–tład* candidate.

The Murphian approach to synonymy featuring the Relation by Contrast-Synonymy definition—where two word-concepts share all contextually relevant properties in common except for form (Murphy, 2003, p. 134)—immediately creates problems for CHVs once again due to the concept of minimal difference. The forms of CHVs with overlapping meaning differ based on the verb stems. However, the morphological component which accounts for the overlap in meaning remains the same. Consider, for instance, the stative neuter verbs as described in Table 4.3 and sentences (23) through (28): *sītón* 'It is lying (stick-like object)' and *sīstín* 'It is lying (dead body)' feature the same prefix *si–* to indicate the stative neuter meaning 'S is lying' alongside the stative

neuter verb stems for SO and singular animate object (AO), respectively (Cook, 1984, p. 140), as opposed to the verbs each having entirely unique forms. This problem is repeated for the active CHVs. There is still a morpho-semantic overlap between each active candidate or each stative neuter candidate without their coming from the same verb theme. Additionally, the meanings among all the candidates (both generic and otherwise) have contextually-relevant properties which cause them to differ from one another through the noun classifications that the verb stems assigned. As a result, CHVs cannot be synonyms according to the RC-S definition posited by Murphy.

Alternatively, the metalexical approach understands synonyms according to the fixed mental representations of prospective synonyms (Murphy, 2003, p. 135). Rather than judging whether or not CHVs are synonymous based on their minimal difference in form as required in RC-S, instead, their being each other's synonym is included as part of their concepts. For instance, consider the active "pick O up" CHVs: the verb form *nádìsistó* 'I picked LO up' has the concept NÁDÌ+TÓ which, assuming the fixed mental representation method, includes the fact that the concepts NÁDÌ+ʔÓ and NÁDI+TSÙZ, which are the form concepts of *nádìsisʔó* 'I picked SO up' and *nádisistsùz* 'I picked FO up', respectively, are its synonyms as well as synonyms of each other:

(51)   NÁDÌ+TÓ =   NÁDÌ+ʔÓ   =   NÁDI+TSÙZ

   nádìsistó   *nádìsisʔó*   *nádisistsùz*

   'pick up LO'   'pick up SO'   'pick up FO'

This impacts the speaker's beliefs about the meaning of each of these words, as one now assumes they all have the same meaning. The problem with this, however, is that the notion of synonymy and what are the synonyms of a word concept being inherently part of that word concept means synonymy is non-derivable, which can cause one's beliefs about a word concept to self-destruct.

Traditionally, synonymy is something that is "evolved out" of a language (p. 135) by dropping one or more words from use or having the word concepts each pushed away from each other until they are judged as too dissimilar to be synonymous (p. 161). Both the meanings and uses of CHVs indicate that, while they have overlapping meanings regarding the action taking place, they are distinct enough from each other due to their verb stems. The choice in verb stem impacts the context of the sentence, as shown in the sentences in (46) and (47). Effectively, where

CHVs are concerned, both metalexical approaches to synonymy do not work because there is too much of a difference between the word concepts outside of their form.

Since the RC-S and fixed mental representation approaches to synonymy do not apply to CHVs, can near-synonymy be applied instead? Near-synonymy is accounted for in RC-S but instead of the senses being the same, they are similar (Murphy, 2003, p. 147). Once again, because of the different classificatory verb stems, which is enough to say that there is a difference in form between the candidates. There is then the question of whether the senses of these verbs are similar enough to fulfil the near-synonymy requirement. It may be that the classifications are too distinct to be considered near-synonyms, or the context-dependent nature of near-synonymy allows for these candidates.

5.2 Analysis of non-classificatory 'eat' verbs

The verb forms which include the meaning 'eat' are going to have different outcomes from the CHVs in the prior discussion, mostly due to the former not also being classificatory. Regarding the lexical approach put forth by Cruse, the 'eat' verb forms are describing a phenomenon which occurs in nature, thus there is the possibility of their being categorized as natural kind terms, though those are less easily assigned to verbs than nouns (Cruse, 1986, p. 142). This opens up 'eat' verbs to being more easily described as taxonymic compared to the CHVs and they may also be better fitted to the diagnostic frames and other lexical properties of hyponymy and synonymy. Following the basic definition of hyponymy, the analyses done going forward follow the assumption that the verb theme *s+nó* 'eat (O)' is the most generic of the three themes and therefore is analysed as the hypernym in the hierarchy, while the themes *á+t'à* 'eat O up' and *–dál* 'eat berries', having more specific senses, are analysed as hyponyms of the aforementioned hypernym and therefore co-hyponyms of each other.

The generic theme *s+nó* 'eat (O)' has a broad meaning and range of usage (see Table 4.5) which qualifies its verb forms to occupy the generic taxonomic level (Cruse, 1986, p. 146). For instance, in the sentence (52) below, the verb form *ísno* 'he/she/it is eating' describes an everyday general activity or action taking place within a normal context:

(52) tłásgúlā dóní–tīī ísno

           dóní–ti i–í–Ø–s–no

           food–real 3.INDEF.OBJ–CON–3.SG.SBJ.IPFV–CLF–eat.IPFV

forever 'real meat' 'she is eating'

           ájàg–là

           a–Ø–jàg=la

           ADV–3.SG.SBJ–become.PFV=it_was

           'she became'

           "Forever after she began to eat meat." (Starlight & Donovan (Eds.), 2018, p. 59)

Meanwhile, the verb form *ách'ìdīnìst'ày* 'someone completely ate it up' in the sentence (53) contains a more specific meaning which also takes place within a normal context which can be argued as a subset of the normal contexts in which the verb in (52) is used because the sense is more specific:

(53) mínághà ách'ìdīnìst'ày–là

                a–ts'i–di–ni–s–s–t'ày=la

                PEG–3.UNSPEC.SBJ–INC–THM–PFV–CLF–devour.PFV=it_was

      'his food' 'someone completely ate it'

      "Somebody ate all his food." (Starlight & Donovan (Eds.), 2018, p. 162)

The goodness-of-exemplar features posit different outcomes among 'eat' verbs compared to CHVs. Considering the first feature, among the 'eat' verbs, whether or not the generic and specific 'eat' verbs are incongruent to one another is dependent on the transitivity of the verb form. The theme *s+nó* 'eat (O)' has forms used in both transitive and intransitive arguments, as shown in (54) and (55) below, respectively, as well as (37) and (38). In a transitive argument, the direct object is indicated either by an object prefix in the verb form, as in (54 a), which refers to a nominal object elsewhere in the utterance, or as a nominal object preceding the verb form, as in (54 b) or (38). In an intransitive argument, the verb form is the same as if it were to have a direct object noun, as in (37):

(54) a. ùwāt'īyī   yísnó-là

i–í–Ø–s–no=la

3.INDEF.OBJ–CON–3.SG.SBJ.IPFV–CLF–eat.IPFV=it_was

'and then' 'he was eating it'

"And then, he was eating it." (Starlight & Donovan (Eds.), 2018, p. 164)

b. ùwāt'īyī isgááka   ts'ìkúwá tłat'a tłī   ii   ísno

i–Ø–s–no

PEG–3.SG.SBJ.IPFV–CLF–eat.IPFV

'and then' 'young men' women   all   dog   the   'he is eating'

"And then all the young men and women eat the Dog meat." (Goddard, 1915, p. 16)

(54 a-b) give different verbs to present the same transitive argument. (54 a) has the transitive form *yísnó* 'he was eating it', its transitivity signalled by the third person singular object prefix *yi–*. (54 b), though, signals transitivity with the direct object *tłat'a tłī ii* 'the Dog meat' which precedes the verb *ísno* 'all are eating'. (54 a) does have a direct object, *nīsúnà* 'dried meat', but it is included in the greater linguistic context of the story this sentence is extracted from. (This greater context is shown in Appendix.) The verb *ìts'ísnó* 'someonePL is eating' in (37) also does not mark for transitivity with no object prefix or voice/valence marker, but that is because the sentence remains intransitive—no reference is made towards an object in the greater linguistic context of the story (also found in Appendix). The variety in argument structure which *s+nó* 'eat (O)' appears in allows for multiple opportunities for the other forms to match in predictability as perspective hypernyms.

The verb *á+t'à* 'eat O up' is exclusively featured in transitive arguments. Either it can be a transitive verb itself or is supported by a direct object in the argument. Both transitive arguments featuring an *á+t'à* 'eat O up' verb are shown in (55 a-b):

(55) a. ùwāt'īyī   dīk'óyí-tsìnā   yòghà

                coyote–the_unrespected_one

    'and then' 'coyote, unrespected one'   'to his detriment'

    ánìst'ày–là

    á–yi–ni–s–Ø–s–t'ày=la

    ADV–3.SG.SBJ>3.SG.OBJ–THM–PFV–3.SG.SBJ–CLF–devour.PFV=it_was

    'he completely ate it up'

    "And then coyote ate up all the meat." (Starlight & Donovan (Eds.), 2018, p. 161)

  b. diyí   dóní   ii   ánìst'àsh

                     á–ni–Ø–s–t'àsh

                     ADV–THM–3.SG.SBJ–CLF–devour.REP.IPFV

    this   food   the   'he eats it all'

    "He eats up all the food." (Goddard, 1915, p. 12)

The sentences in (54 b) and (55 a) both have the verbs used transitively without including a direct object noun, which is included in the sentences in (54 a) and (55 b); another example of the latter is (38). In both cases, the *á+t'à* 'eat O up' verb has no incongruence with *s+nó* 'eat (O)' because they are predicable in the same argument structure. No evidence in the corpora is found of *á+t'à* 'eat O up' being used in an intransitive argument, which corresponds to its being a transitive verb.

    The verb *–dál* 'eat berries' has the same role as *á+t'à* 'eat O up' where it is only used in transitive arguments either with or without *jijá* 'berries' as a direct object. While sentences in the corpora give preference to *–dál* 'eat berries' being used without a direct object—like in (43)—and *s+nó* 'eat (O)' being preferred to take on a direct object—like in (38) or (54 b)— *–dàł* 'eat berries' may also be used with the direct object like in (42).

    The argument structures in (42) and (43) show that *–dál* 'eat berries' is predicable in the same type of argument as *s+nó* 'eat (O)' as shown in (37), (38), and (54 b). It also matches the argument structures allowed for *á+t'à* 'eat O up' as shown in (55 a-b). Therefore, both specific verbs, *á+t'à* 'eat O up' and *–dál* 'eat berries' each have no incongruity with the generic *s+nó* 'eat (O)' regarding their predictability in transitive sentences. The key difference between the generic

and specific verbs regarding argument structure is that *s+nó* 'eat (O)' appears in intransitive arguments, while the specific verbs do not.

The second goodness-of-exemplar feature states that "the truth of *A is X* leads to an expectation of the consequent truth of *A is Y* that is greater than the reverse expectation" (Cruse, 2002, p. 10). To apply this to the 'eat' candidates, it requires that a sentence with the proposed hyponym featuring either the theme *á+t'à* 'eat O up' or *–dál* 'eat berries' that is true causes the expectation that a sentence with the proposed hypernym featuring the theme *s+nó* 'eat (O)' is also true. This expectation is greater than the expectation of the reverse being true. Using the examples below, the sentence (55 b) featuring *ánìst'àsh* 'he eats it all' being true must then cause the expectation that the sentence (56) featuring *ísno* 'he/she/it is eating' is true:

(56)   dóní   ísno

        i–í–Ø–s–no

        3.INDEF.OBJ–CON–3.SG.SBJ.IPFV–CLF–eat.IPFV

    'food'   'he is eating'

    "He/she/it is eating food." (Starlight, et al., in progress)

Similarly, the same outcome must also occur in the case of *–dál* 'eat berries'. If a statement such as the one in (57 b) is true, then it is expected that a statement such as the one in (57 a) is also true:

(57) a. diyí   ichíízh

        i–Ø–chiizh

        PEG–3.SG.SBJ.IPFV–eat.IPFV

    this   'he is going to eat'

    "He/she/it will eat this." (Starlight, et al., in progress)

   b. jijá   īīdàł

        i–Ø–dał

        PEG–3.SG.SBJ–berry_eat.IPFV

    berries   'he will eat berries'

    "He/she/it will eat berries." (Starlight, et al., in progress)

If the sentences in (56) and (57 a) are true, however, that does not ensure that the sentences in (55 b) and (57 b) are also true. This is due to the meanings of the verbs. The verbs from *s+nó* 'eat (O)'—*yísnó* and *ichíízh*—have the generic meaning 'eating (something)', which is included in the meanings of both *áyinìst'ày* from the theme *á+t'à* 'eat O up' and *ūdàł* from the theme *–dál* 'eat berries'. However, both of the latter two verb forms have additional facets in their meaning which distinguish them from *s+nó* 'eat (O)' as their hypernym. The meaning of *s+nó* 'eat (O)' does not include the fact that the object is being 'eaten all up' or 'devoured' as in *á+t'à* 'eat O up'—all cases where this sense is given in either of the narrative texts, it is done so with *á+t'à* 'eat O up' verbs. *s+nó* 'eat (O)' also does not indicate in its meaning that the object being eaten is 'berries' as in *–dál* 'eat berries' and is not bound to *jijá* 'berry' as a direct object like *–dál* 'eat berries' is. Therefore, this second GoE feature holds for the 'eat' verb themes because there is the greater expectation for the sentences with *á+t'à* 'eat O up' and *–dál* 'eat berries' themes being true to signal the sentences with *s+nó* 'eat (O)' being true.

At this point, both the first and second GoE features are confirmed to be true in the case of 'eat' verbs in Tsuut'ina. These are the most strongly weighted of the features put forth by Cruse (2002, p. 10), so this initially ensures a relation of hyponymy between these three sets of verbs.

The third GoE feature requires the inclusion of the generic-specific diagnostic frame featuring the *–gu* suffix. While CHVs are difficult to place in this frame, non-classificatory verbs are more successful. Though there are no examples given of the 'eat' verbs, in particular, being used in the frame, they may be constructed for an elicitation task.

Testing for the diagnostic frame featuring *–gù* raises the same questions for the 'eat' verbs as for the CHVs. The greatest issue is these frames are not found with these verb forms in the corpus, though the role of *–gù* and its many purposes are well-established earlier in Section 4.1.2. That does not mean, however, that such constructions are not possible in Tsuut'ina. For now, one can theorize as to how they may appear based on the examples in (11) and (14-16). Additionally, one must also consider the meaning implied by these diagnostic frames, the *way/manner/method* sense which is meant to connect the hyponym to the hypernym. For now, though, this is something which specifically requires confirmation from a native Tsuut'ina speaker, as was already the case of the diagnostic frames when they were applied to the CHVs. Therefore, for now, it will just be said that a diagnostic frame exists which may be used to study hyponymy between the 'eat' candidates.

The fourth GoE feature is well established with 'eat' verbs. There is no evidence for multiple taxonomic levels of transitivity of hyponymy between the verb candidates such that there is an item that is a hyponym of *s+nó* 'eat (O)' and is a hypernym of *á+t'à* 'eat O up' and *–dál* 'eat berries' (Cruse, 2002, p. 10). Therefore, this feature is confirmed to work in the case of the 'eat' verb form candidates.

The fifth and final GoE feature requires that *s+nó* 'eat (O)' be matched with *á+t'à* 'eat O up' and *–dál* 'eat berries' for non-propositional features. This purely lexical feature is difficult to test for using corpus data because it requires information on those non-propositional features such as register and expressiveness which are more easily expressed in speech, not text. As a result, no definitive conclusion can be made as to whether this feature is fulfilled regarding 'eat' verbs in Tsuut'ina. However, there is enough evidence gathered among the previous four features assuming native speakers approve those judgments to allow this feature to be bypassed for now.

In addition to the GoE features described above, the taxonymy of 'eat' verbs is supported by other lexical properties put forth by Cruse. 'Eat' verbs should be regarded as natural kind terms as they refer to an action that is naturally occurring rather than human-made (or human-centered) (Cruse, 2002, p. 18). As natural kind terms have a strong correlation with taxonyms, this makes them ideal candidates for a taxonomic hierarchy. However, not all the Tsuut'ina 'eating' verbs would qualify as taxonomic hyponyms following this criterion due to not being natural kind terms according to the definition given. In (37) and (58) below, the *s+nó* 'eat (O)' verbs are shown. These verbs most appropriately occupy the generic taxonomy level because they name an everyday phenomenon (Cruse, 1986, p. 146):

(58)　　ùwāt'īyī　　ísno–là

　　　　　　　　　i–í–Ø–s–no=là

　　　　　　　　　3.INDEF.OBJ–CON–3.SG.SBJ.IPFV–CLF–eat.IPFV=it_was

　　　'and then'　　'he was eating it'

　　　"And then, he was eating." (Starlight & Donovan (Eds.), 2018, p. 58)

Additionally, *s+nó* 'eat (O)' verbs are used with a wide variety of nouns as their direct object in various sentences in Tsuut'ina, as shown in Table 4.5, whereas the verbs of the *á+t'à* 'eat O up' and *–dál* 'eat berries' have fewer examples of different direct objects, either because they are

restricted to certain nouns as their direct objects (see below) or because they are passed over in favour of *s+nó* 'eat (O)' because the latter is better suited excepting when the sense given in one of the specific themes is required.

The *á+t'à* 'eat O up' verbs in (40) and (59) below will continue to be judged as hyponyms. These verbs occupy the specific taxonomy level directly below generic as they carry the generic meaning 'eating' plus an additional descriptor which together creates the 'devour' meaning that makes them hyponyms:

(59)   tłaát'a   áyinìst'ày

         á–yi–ni–s–Ø–s–t'ày

         ADV–3.SG.SBJ>3.SG.OBJ–THM–PFV–3.SG.SBJ–CLF–devour.PFV

all   'he ate it up'

"He ate it all up." (Goddard, 1915, p. 45)

This additional descriptor cannot be explicitly named, but the outcome of it is that the resulting verb forms have meanings with an increased specificity to those that only carry the meaning 'eating' (p. 154).

The *–dál* 'eat berries' verbs also provide a more specific meaning which contains first, the meaning 'eating' inherited from the *s+nó* 'eat (O)' verbs used in (38) and (58) and second, the meaning 'berries' or more generally, 'plural objects' as the object undergoing the main action. They therefore also occupy the hyponym space at the specific taxonomic level to the 'eating' verb hypernyms. Though natural kind terms for verbs are more difficult to verify (Cruse, 1986, p. 142), the *–dál* 'eat berries' verb forms are also well supported in Tsuut'ina as they have cognates in other Dene languages such as Navajo and Jicarilla which also express the same "pseudo-classificatory" division of consumption (S. Rice, 2009, p. 119).

Though there is no current confirmation as to whether or not it can fulfil the diagnostic frame where it indicates *a way of* 'eating', the *–dál* 'eat berries' verbs are supported as being hyponyms of *s+nó* 'eat (O)' verbs because they represent one of two ways the meaning 'eating berries' is expressed in Tsuut'ina. For them, the meaning 'eating berries' is inherent to the verb theme; there are no modifiers which provide an additional aspect of meaning that would otherwise be absent. The alternative way of expressing the level of specificity for that meaning is through

the addition of a syntagmatic modifier *jijá* 'berries' to the *s+nó* 'eat (O)' verb *ísno* 'he-was-eating' as shown in (38).

This sentence is not a case of hyponymy as the generic hypernym verb form with the meaning 'eating' is being used rather than the hyponym *yīīdàł* 'he/she/it will eat berries' that holds the specific meaning 'eating berries' as in (41).

As co-hyponyms of *s+nó* 'eat (O)', the *á+t'à* 'eat O up' and *–dál* 'eat berries' verbs are judged as incompatibles, where if it is the case of the sentence in (37), then it is not the case of the sentence in (39) (Cruse, 1986, p. 93). Though the verbs may be incompatibles in this situation, that does not make them contrary to one another (p. 94), as they do not need to be incompatible with one another such that their only overlap is regarding the meaning they both inherit from the *s+nó* 'eat (O)' verbs. While speaker testing is required to confirm or deny this possibility, it can be the case that the two verbs may co-exist in reference to the same action. Similarly to how the words *novel* and *paperback*, which are hyponyms of *book*, can each refer to the same object in different linguistic contexts (p. 150), the same could be said for these verb forms.

Assuming an elicitation task featuring a frame containing the items discussed as hyponyms and hypernyms together is responded to positively by a native Tsuut'ina speaker, the co-hyponymy of these two specific 'eat' verb forms is then well-attested in the language. Alongside the previous information which so far confirms their roles as hyponyms to *s+nó* 'eat (O)' as their hypernym, the lexical goodness-of-exemplar approach put forth by Cruse to analyse for hyponymy is well constructed to support the possible cases of generic-specific forms in Tsuut'ina, including with verbs. Following this, these verb forms can be tentatively structured in the following hierarchy featuring the verb themes they are inflections of:
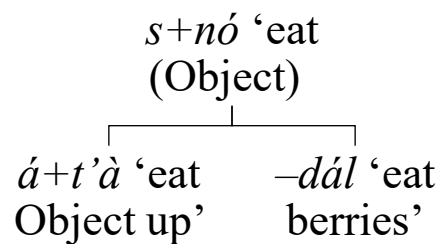
s+nó 'eat
(Object)

á+t'à 'eat   *–dál* 'eat
Object up'   berries'

Figure 5.1: Basic hyponymous hierarchy of 'eating' verbs in Tsuut'ina

Murphy's metalexical approach to lexical relations is expected to have a better outcome with 'eat' verbs than the CHVs because the generic hypernym *s+nó* 'eat (O)' is available to be analysed for asymmetric lexical contrast under the RC-ALC definition (Murphy, 2003, p. 229). This is followed by the specific forms, *á+t'à* 'eat O up' and *–dál* 'eat berries' being analysed for lexical contrast against one another to determine their viability as co-hyponyms according to RC-LC (p. 170).

RC-ALC posits that such a contrast set consists of a subset which is in an asymmetrical lexical contrast with one or more other subsets; at the same time, these subsets are also in lexical contrast with each other; all the subsets differ from one another by one contextually relevant property (Murphy, 2003, p. 229). RC-LC posits that word-concepts have all but one contextually relevant property in common (p. 170). Therefore, there must be an asymmetrical lexical contrast between the subset *s+nó* 'eat (O)' and the subset *á+t'à* 'eat O up' as well as the subset *s+nó* 'eat (O)' and the subset *–dál* 'eat berries'. The subsets *á+t'à* 'eat O up' and *–dál* 'eat berries' must be in lexical contrast with each other.

Beginning with the *s+nó* 'eat (O)' and *á+t'à* 'eat O up' verb forms, in (60) below and (58), two verb forms are given:

(60)   áyīnīst'à

a–yi–ni–Ø–s–t'à

PEG–3.SG.OBJ–THM–3.SG.SBJ–CLF–devour.IPFV

"He/she/it will eat it up." (Starlight, et al., in progress)

Both verbs are conjugated for imperfective aspect and third-person singular person, and both are used as transitive arguments. However, as far as differences in properties, their forms are different from one another, including the verb stem. They also have a slight difference in meaning. But differing properties are only important to the asymmetric lexical contrast if they are contextually relevant. In the case of form, though it is considered relevant alongside meaning in hyponymy, it is not as relevant as it is in synonymy discussions (Murphy, 2003, p. 228). Meaning, therefore, must be considered the key contextually relevant property which differs between hypernym and hyponym. In the case of the *s+nó* 'eat (O)' and *á+t'à* 'eat O up' verbs, verbs with the former theme have a broader meaning than those with the latter theme, so those latter verbs make up a subgroup underneath the former verbs. Meaning being the only contextually relevant properties these two

sets of verb forms do not have common allows a satisfaction of the RC-ALC regarding *s+nó* 'eat (O)' verbs being the main subset to which *á+t'à* 'eat O up' verbs are the hyponym.

Now the relation between the *s+nó* 'eat (O)' and *–dál* 'eat berries' verb candidates. Consider the verbs in (41) and (58) as a sample set. Once again, the verb forms featured share all conjugation properties in common: person = third person, number = singular, aspect = imperfective. The differences again are regarding meaning and form. However, because form is not as relevant to discussion of hyponymy, the key contextually relevant property to consider satisfying RC-ALC is meaning. Again, verbs like *ichíízh* with the *s+nó* 'eat (O)' verb theme have a broader meaning for 'eat' than verbs with the *–dál* 'eat berries' verb theme. Therefore, the *–dál* 'eat berries' verb forms make up a subgroup which belong to the larger group that *s+nó* 'eat (O)' verbs are the head of. In other words, *s+nó* 'eat (O)' verbs are the hypernyms to the *–dál* 'eat berries' verb hyponyms.

Finally, the verbs belonging to the *á+t'à* 'eat O up' and *–dál* 'eat berries' themes must be evaluated for lexical contrast against each other according to RC-LC to determine their relationship to one another is one of co-hyponymy. The same conditions apply as in asymmetrical lexical contrast except that one set of verbs is not expected to be a subgroup of the other set of verbs or vice versa. The two verb groups must have their contextually relevant properties determined, however. Consider the verbs discussed above shown in (41) and (58). They share the same conjugation properties with person being third person, number being singular, and aspect being imperfective—regardless of which these are contextually irrelevant properties. But form and meaning are distinct between the two sets. Form has already been established as less relevant to hyponymy, so there is no concern there. However, the meanings are clearly distinct from one another.

The final organization for 'eating' verb forms regarding hyponymy using the RC approach of minimal difference and RC is identical to that created using Cruse's methodology:

$s+nó$ 'eat (Objects)'
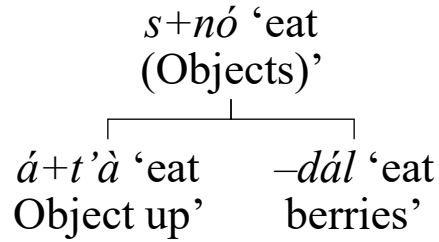
$á+t'à$ 'eat Object up' $–dál$ 'eat berries'

Figure 5.2: Basic hyponymic relations of 'eating' verb forms in Tsuut'ina based on Relation by Contrast approach by Murphy (2003)

The Crusian synonymy scale begins with cognitive synonyms while analyzing the 'eat' verbs as no evaluations are made for absolute synonymy because they are near impossible to find in natural language (Cruse, 1986, p. 268). The verb themes are tested against one another in the following three synonym pairs:

$s+nó$ 'eat (O)' : $á+t'à$ 'eat O up'
$á+t'à$ 'eat O up' : $–dál$ 'eat berries'
$–dál$ 'eat berries' : $s+nó$ 'eat (O)'

Table 5.4: Pairs of Tsuut'ina 'eat' verbs to test for synonymy

Because all these lexical items being tested have propositional mode, they are first tested for the truth conditions that are produced in sentences containing them. Beginning with the first synonym pair, $s+nó$ 'eat (O)' : $á+t'à$ 'eat O up', these two sets of verb forms are only partially syntactically identical. Consider the sentences in (55 b) and (56): both verbs are used in a transitive construction. Transitivity is also implied for both verbs even when there is no direct object to agree with as in the sentences in (36) and (39), respectively. However, the set of verb forms of $s+nó$ 'eat (O)' are also used in intransitive arguments such as in (35).

The second main property to test for in cognitive synonymy is the truth-conditions of sentences containing these prospective cognitive synonyms. For the $s+nó$ 'eat (O)' : $á+t'à$ 'eat O up' pair, the truth-conditions are difficult to compare without available corpus data with which to conduct a substitution test, i.e., there are no sentences found in the corpora which are wholly identical except for the cognitive synonyms. While the verb senses are distinct from one another, speaker intuition is required to determine if their sentences have the same truth conditions. In lieu

of a substitution test, the closest way to determine cognitive synonymy is based on the semantic co-occurrence restrictions of each member of the set.

There does not seem to be any semantic co-occurrence restrictions which would differentiate *s+nó* 'eat (O)' verbs from *á+t'à* 'eat O up'; the possibility of the former being in an intransitive argument while the latter must be in a transitive argument is a case of a syntactic restriction. However, no corpus data presents any differing selectional or collocational restrictions imposed by either verb theme (Cruse, 1986, pp. 278-279). Both verbs would require their direct object to possess semantic traits such as "consumable" in the barest sense—something could be eaten and thrown up afterwards, or poisonous and therefore medically "inconsumable"—and "organic"—though if there are example sentences with either verb form which features a word for an inorganic object as the direct object, then that restriction is clearly not present.

Prior discussions confirm that sentences containing *á+t'à* 'eat O up' verbs entail sentences with *s+nó* 'eat (O)' verbs, but not vice versa—this is a case of unilateral entailment. Entailment relations do not apply in cognitive synonymy, which leads to the belief that these verb themes are not cognitively synonymous to one another. The next possibility is plesionymy. Cognitive synonyms and plesionyms are differentiated based on their different approaches to truth-conditions and entailment. Given that it is already established there is no mutual entailment, and more specifically unilateral entailment, between *s+nó* 'eat (O)' and *á+t'à* 'eat O up' verbs, which eliminates the possibility of cognitive synonymy, then it also goes to show that sentences with these verbs that are otherwise identical have different truth-conditions, another property of plesionymy (Cruse, 1986, p. 285).

One thing these verb forms are confirmed to have in common are their capital semantic traits, specifically the meaning 'eating'. With regard to other semantic traits, the subordinate traits separate the two, as the *s+nó* 'eat (O)' verbs have no subordinate semantic traits bound to them within the verb, whereas the *á+t'à* 'eat O up' verbs have a subordinate semantic trait reflecting the fast speed at which the action is performed. In the sense translation, this is represented syntagmatically as "up". Speaker verifications would need to confirm the degree to which this subordinate trait is highlighted among *á+t'à* 'eat O up' verbs, as that dictates whether or not the relation between them and *s+nó* 'eat (O)' is truly one of plesionymy or hyponymy, the latter of which is indicated by highlighted subordinate trait(s) (Cruse, 1986, p. 288). Because there are many characteristics which distinguish the verbs in this proposed synonymy set which require

verification by a native speaker, for now the conclusion is that they can either be plesionyms or non-synonyms of one another as proposed in the earlier hyponymy discussion.

The *á+t'à* 'eat O up' and *–dál* 'eat berries' verbs have very distinct meanings and forms from one another. Cognitive synonymy cannot be used to describe the lexical relation between the two because immediately there is a difference in the truth conditions of their sentences. Consider the sentences in (40) and (43)—the information of (43) changes when the verb form *yīdìł* 'he is eating berries' is replaced with *ánìst'ày* 'he ate it up' because the information on what is being eaten is lost. Additionally, the semantic co-occurrence restrictions are different because in the case that the *–dál* 'eat berries' verbs do have a direct object noun to agree with in a sentence, that noun must include the semantic trait "plural", "food", and possibly "berries" as the last is an assumed property described by the verb.

There is no entailment relation between these two verb forms—neither mutual entailment (cognitive synonymy) nor unilateral entailment (hyponymy—non-synonymy). Plesionymy is possible at the surface level when looking at the semantic traits because they have the same capital semantic trait reflected in the 'eat' sense which is included in the meanings of both verb themes. However, they have very different subordinate semantic traits: for the *á+t'à* 'eat O up' verbs, the subordinate trait is the speed characteristic reflected in the sense translation syntagmatically as "up"; for the *–dál* 'eat berries' verbs, the subordinate trait is the specific object type undergoing the 'eating' as described syntagmatically in the sense translation as "berries" or more broadly as "plural objects". These two subordinate semantic traits have no similarity to one another, one refers to a syntagmatic restriction while the other to a modifier to the main action described by the capital semantic trait. Therefore, though a surface-level analysis of semantic traits would judge these two as plesionyms, the clear difference between their subordinate traits pushes back against this. If these verb themes were placed on a synonym string made up of 'eat' verbs, they would not sit adjacent to one another. It is best to analyse them as non-synonyms, or more particularly, as co-hyponyms as discussed previously.

The final set of 'eat' verbs to be analysed is the *–dál* 'eat berries' verbs against the *s+nó* 'eat (O)' verbs. Given that once again the verb themes being investigated consist of one describing a generic action (i.e., *s+nó* 'eat (O)') and another describing a more specific version of the same action with additional information, the main criteria of being syntactically identical and matching truth conditions in sentences for cognitive synonymy cannot be passed. The syntactic structure of

arguments containing either verb theme does not match as *s+nó* 'eat (O)' can appear in both intransitive and transitive arguments where as *–dál* 'eat berries' is restricted to transitive verbs—their syntactic possibilities are not the same. Then the matching of truth-conditions is context-dependent. In a case of substitution, the ability of a *–dál* 'eat berries' verb perfectly replacing an *s+nó* 'eat (O)' verb is dependent on the direct object satisfying the semantic co-occurrence restrictions of *–dál* 'eat berries' (described above).

Because they do not match for truth-conditions, plesionymy is a better possibility for the *s+nó* 'eat (O)' and *–dál* 'eat berries' verbs. There is a unilateral entailment of these sentences where, for the sentence in (38) to be true, then the sentence in (42) must be true, but the reverse is not the case. However, unilateral entailment is a property of hyponymy, not synonymy (p. 285). This moves this set of verb forms away from synonymy as a whole and into the final component of the synonymy scale, non-synonymy, of which hyponymy is a part.

Additional factors which disqualify this verb set from plesionymy are the subordinate and capital semantic traits of each group of verb forms. For instance, for the *–dál* 'eat berries' verbs, the meaning 'berries' which is inherent to the verb forms and otherwise would operate as a syntagmatic modifier is a subordinate trait while the meaning 'eating' is a capital trait because it makes up the "head" of the verb construction—i.e. it is the main action being described, 'berries' being the item being eaten is irrelevant without it (p. 287). For the verb forms with the meaning 'eating', they only have the aforementioned capital semantic trait because any possible subordinate traits are reflected via direct object in a sentence. The *–dál* 'eat berries' verb forms are a case of the subordinate traits, those meaning 'berries', being highlighted to specify the object undergoing the action, a characteristic of taxonomies (pp. 287-288), further proving that the relation between the *s+nó* 'eat (O)' and *–dál* 'eat berries' verbs are in fact not a case of synonymy on the scale Cruse proposes, but instead one of hyponymy where the *s+nó* 'eat (O)' verb forms are superordinate (i.e. hypernyms) and the *–dál* 'eat berries' verb forms are hyponyms.

The Crusian synonymy approach for the most part does not apply for 'eat' verbs as for the most part those are described as non-synonymous to one another, i.e., hyponymous, either as hyponyms and hypernyms or co-hyponyms. The only possibility of any kind of synonymy is between the *s+nó* 'eat (O)' and *á+t'à* 'eat O up' verbs as plesionyms, but they could just as well be hyponym and hypernym to one another. For the other possible pairs, the *s+nó* 'eat (O)' and *–dál* 'eat berries' set is a purely hyponymous relation; *s+nó* 'eat (O)' is the hypernym and *–dál* 'eat

berries' is the hyponym. And the –*dál* 'eat berries' and *á+t'à* 'eat O up' set have a non-synonymous relation, more specifically one of co-hyponymy.

The selection of 'eat' verb candidates for this discussion was done with a focus on ensuring the candidates belonged to verb themes which were entirely distinct from one another—no themes related via derivation. Therefore, the three sets of verb themes are already assessed as having different forms from one another—the requirement put forth by Murphy for RC-S. However, that is not the only contextually relevant property of each verb theme which differs from the other members of the synonym sets.

Referring to the list of 'eat' synonym sets proposed above, we begin with the set of *s+nó* 'eat (O)' : *á+t'à* 'eat O up' verbs. Every aspect of form for these two verb themes are completely different from one another, including the extent of the stem set alternations. Refer to Table 4.4. In the PLD, examples are given of *á+t'à* 'eat O up' verbs with imperfective and perfective viewpoint aspect and progressive situation type aspect—no evidence is given of a potential mood or repetitive situation type aspect (Starlight, et al., in progress). Also, they do not have the momentaneous-durative temporal distinction that is present among the *s+nó* 'eat (O)' verbs. However, the meanings of these verbs, as indicated by the sense translations, are different from one another—but are they different enough that it disqualifies a minimal difference? According to RC-S, yes, because their properties must be the *same*, not *similar* to one another (Murphy, 2003, p. 139). The way in which two items in a prospective synonym set differ or to what extent does not matter, as long as the difference is present (p. 140). Therefore, the difference in meaning between *s+nó* 'eat (O)' and *á+t'à* 'eat O up' verbs is enough to disqualify them as potential synonyms according to the RC approach because they do not have a minimal difference: both form and meaning, both of which are contextually relevant properties in synonymy, are different.

The second potential synonym set to be investigated, *á+t'à* 'eat O up' : –*dál* 'eat berries', immediately is disqualified as synonyms according to the RC-S definition: already having a difference in form per the selection process, these verb themes are also very different in their meanings. Though any difference in meaning, no matter the degree of strength, would disqualify a set from fulfilling the requirements of RC-S, in the case of this set, it is because they cannot initially be considered for synonymy. The meaning for *á+t'à* 'eat O up', as shown in sentences like in (39) and (40) requires a certain emphasis of how the main action described, eating, is taking place. This kind of emphasis is entirely absent from the meaning of –*dál* 'eat berries', as shown in

(41) and (43), which in turn includes a specification of the type of object undergoing the action which contextually may be supported by nominal agreement. For *á+t'à* 'eat O up', that specification does not exist—just that the verb itself is transitive. Therefore, regarding the RC-S definition of synonymy, this set also does not contain synonyms.

The final potential set is *–dál* 'eat berries' : *s+nó* 'eat (O)'. For the same reasons described above with the *á+t'à* 'eat O up' : *–dál* 'eat berries' set, the verb forms with these two verb themes cannot be synonyms of one another. The aforementioned object specification of *–dál* 'eat berries' is not present among *s+nó* 'eat (O)' verbs, let alone that an object is required since the latter is also used in intransitive contexts. The reverse, however, is the case, but that is unilateral entailment which can be explained via asymmetrical lexical contrast as a hyponymy-hypernymy relation (RC-ALC) (Murphy, 2003, p. 229). Therefore, once more, there are no synonyms among this set.

5.3 Semantic classifications of Tsuut'ina verbs and nouns

In addition to the analysis featured in the preceding subsections, other work regarding the semantic roles of Tsuut'ina lexical items was conducted. Using the WordNet and Rapid Words semantic domains, semantic classifications were made for the verb and noun forms listed in the PLD. This was conducted as part of the author's assigned work as part of the ALT Lab and was done prior to beginning research on this thesis, so the findings were made independently of any desired outcomes regarding lexical relations. The methodology of each semantic classifications task is described below. Based on these semantic classifications, additional analyses are done in Section 5.3.3 later which show how the English language verb forms and their definitions in WordNet and Rapid Words create possible lexical relations between the Tsuut'ina candidates.

5.3.1 Semantic classifications conducted using the Princeton WordNet

The first round of semantic classifications was conducted using the Princeton WordNet. These classifications were conducted in the same fashion as the manual classification described in Dacanay et al. (2021). The Princeton WordNet operates similarly to most standard online dictionaries. A keyword or key phrase search produces a list of definitions for that item organized by part of speech. Each definition item consists of their part of speech, the full synset which includes the keyword or phrase searched for, the definition, and an example sentence featuring one of the words or phrases from the synset.

For each sense given for the Tsuut'ina form in the PLD, the closest single English word was searched for in WordNet, and the most appropriate definition selected and logged in the database. For example, the Tsuut'ina verb *dīshó* was given the sense "I am going to walk", so the keyword "walk" was entered into the search function in WordNet (WordNet Search – 3.1, n.d.-c). Among the search results, the corresponding definition was found to be the first entry listed under the list of verb definitions (see Figure 5.3). The selected definition was logged as *(v)walk#1* under column 15 labelled "WordNet".

Figure 5.3: Screenshot of noun and verb synsets for 'walk' in WordNet (WordNet Search – 3.1, n.d.-c)

5.3.2 Semantic classifications conducted using Rapid Words

The semantic classifications conducted using the Rapid Words hierarchy were done following the same methodology used for the Rapid Words classifications of Plains Cree (Dacanay et al., 2021, p. 36). Wildcard word searches were made in the SemDom search engine using the closest single English word that applied to the sense translation of the Tsuut'ina verb or noun word. Rather than a list of definitions and synsets like those shown in WordNet, Rapid Words concepts are organized into semantic domains. Each semantic domain includes a list of questions in the frame "What words refer to X?" and under each question is a list of English word(s) or phrases which serve as an answer to that particular question. The respective answer which best corresponds to the sense translation is recorded as part of the numeric itemization of the semantic domain; the assigned number corresponds to the number of the question in the list (the list is manually counted by the classifier—questions are not listed numerically). The number is recorded alongside the itemization of the overarching semantic domain that the smaller domain belongs under—together, they are logged into the column in the PLD labelled "Rapid Words items". The name of the semantic domain is recorded in a second column labelled "Rapid Words labels".

For example, to revisit the semantic classification of *dīshó* "I am going to walk", "walk" is entered into the search engine. One of the top results is for the semantic domain 7.2.1.1 Walk which belongs to the larger domain 7.2 Move (following the convention for semantic classification used by the ALT Lab). Among the list of questions is the first question "What general words refer to walking?" under which is the word "walk" (SIL International, n.d.-e). Other questions and corresponding words and phrases describe more specific forms of walking, but based on the sense translation, the first listed one was most appropriate (SIL International, n.d.-e). Thus, the semantic classification is given with 7.2.1.1.1, 7.2 in the Item column (the 7.2.1.1 Walk classification plus the first set of answers listed under that domain, followed by the itemized classification of Move) and the domain label Walk in the "Rapid Words labels" column.

7.2.1.1 Walk

Use this domain for words related to walking--moving slowly using your legs.

Louw Nida Codes: 15C' Walk, Step x
What general words refer to walking?
walk
What words refer to traveling someplace on foot?
travel by foot, foot it, hoof it, leg it, tramp, strike off on foot
What words refer to walking quickly?
speed walk, step out, stride, pace, rush
What words refer to walking slowly?
walk slowly, stroll, amble, ramble, take a Sunday stroll, meander along, saunter, inch, lumber, plod, poke, slog, toddle, traipse, trudge
What words refer to walking carefully?
walk carefully, watch your step, tread, pick your way, edge
What words refer to walking quietly or secretly?
steal along, walk stealthily, sneak, pad, stalk, creep
What words refer to walking on your toes?
tiptoe, walk on tiptoes
What words refer to walking loudly?
stomp, clump
What words refer to walking like a soldier?
march, parade, goose-step, in step
What words refer to walking in various manners?
walk with a spring in your step, walk jauntily, swagger, flounce, mince, prance, saunter, strut
What words refer to stepping on something?
step on, put foot on/in, tread on, stamp on, underfoot,
What words refer to a single step?
step, footstep, pace,

Figure 5.4: Screenshot of semantic domain of '7.2.1.1 Walk' in RapidWords (SIL International, n.d.-c)

For the semantic classifications of the verb forms, each means of classification (WordNet vs. Rapid Words) took approximately three weeks (assuming a standard 40-hour work week). For the nouns, the semantic classifications took approximately 1-2 weeks total due to their being fewer entries to go through (verbs made up 8,744 entries in the database; nouns made up 604). This author was the sole research assistant tasked with making these semantic classifications, which ensured that the classifications were done following a single methodology. For both the WordNet and Rapid Words semantic classifications, if a sense required more than one classification to specify the meaning indicated, multiple classifications were applied.

The semantic classification conducted above using WordNet and Rapid Words allows for the creation of semantic domains for Tsuut'ina through an ontology. The existence of semantic domains for Tsuut'ina is important as a tool for language teaching and learning. Consider that, in a typical classroom setting, non-native languages are taught using a combination of grammar

instruction and a selection of vocabulary-building topics. For example, a single class may be dedicated to learning about sports and games. This would involve teaching students the different names for sports and games—both those that are widely popular (ex. soccer) and those that are close to the culture the language belongs to—other relevant words and phrases regarding rules, uniforms, and locations, along with relevant verbs and their conjugations (ex. running, jumping, throwing). The formation of semantic domains via a semantic ontology makes it possible for the relevant vocabulary to be combined into a single grouping, thus allowing the easy formation of a learning unit to use in the classroom. It also allows for lexical gaps to be identified, thus creating an avenue for further research.

5.3.3 Lexical relations according to the semantic classifications

An alternative means to investigate lexical relations is using the semantic classifications conducted in the PLD, as described in Section 4, however, with the caveat of these classifications having been conducted based on English senses and translations. The synsets in the Princeton WordNet are organized to reflect English synonymy and are additionally organized next to one another into other lexical relations, including hyponymy. The semantic domains of the Rapid Words Collection require more intuition when determining lexical relations between them, but this can generally be determined based on the hierarchical structure of the domains and the questions each of them contain.

The CHVs are semantically classified exclusively according to the main action included in their senses, with no reference to the noun subclass reflected in the verb stems. Beginning with the stative neuter verbs meaning 'lie down', the semantic classifications are mostly the same. All three stative neuter verb candidates, *sītón* 'LO is lying', *sīʔón* 'SO is lying' , and *sīstsùùz* 'FO is lying', are classified with the classification "(v)lie#2", which is defined in WordNet as "be lying, be prostrate; be in a horizontal position" (WordNet Search – 3.1, n.d.-b). In addition, the latter two verb candidates, *sīʔón* 'SO is lying' and *sīstsùùz* 'FO is lying', are classified with the semantic classification "(v)lie#4", which is defined as "be and remain in a particular state or condition" (WordNet Search – 3.1, n.d.-b). Though it seems that the former classification "(v)lie#2" is more appropriate for these CHVs and their stative neuter senses because it is closer to the 'lie down' meaning whereas "(v)lie#4" refers more to 'lying dormant'. Therefore, only "(v)lie#2" is discussed going forward.

Additionally, all three of these stative neuter verb candidates were classified in Rapid Words with the semantic domain labelled as 7.1.3.3 under the 7.1.3 Lie down domain. The 7.1.3.3 domain refers to lexical items which answer the question "What words refer to being in a lying position?" (SIL International, n.d.-f).

Given that in both the WordNet and Rapid Words ontologies, these verbs are assigned the same semantic classifications, it therefore makes sense that they should be judged as synonymous to one another. However, that judgment is made without the additional information included in the senses of each verb, where the noun agreement is found. Therefore, it is still inaccurate to read the stative neuter CHVs as synonymous. In addition, because both sets of classifications do not include any hyponymous synsets or semantic domains, no judgment can be made regarding hyponymy.

Among the active CHVs, the same issue arises alongside some additional problems. Firstly, the active verb *nádisistsùz* 'I picked FO up' is not found in the PLD—it was instead recovered from Cook (1984)—so no semantic classifications are available for it. For the remaining two active verbs, *nádìsistó* 'I picked LO up' and *nádìsisʔó* 'I picked SO up', in addition to other WordNet semantic classifications, they are both classified as "(v)take#4" meaning "get into one's hands, take physically" (WordNet Search – 3.1, n.d.-d). Given this is a single synset attributed to both verbs, this implies an initial synonym relation between the two. In addition, the *nádìsisʔó* 'I picked SO up' was classified as either "(v)pick_up#2" meaning "take up by hand" or "(v)pick_up#3" meaning "give a passenger or a hitchhiker a lift" (WordNet Search – 3.1, n.d.-e). Each of these synsets are unrelated via hyponymy or any other lexical relation to the "(v)take#4" synset discussed above.

The final WordNet semantic classification found among the active CHVs is the classification "(v)carry#1" assigned to *nádìsistó* 'I picked LO up' and defined as "move while supporting, either in a vehicle or in one's hands or on one's body" (WordNet Search – 3.1, n.d.-f). This synset has no lexical relations with any of the aforementioned synsets. Therefore, there is no semantic connection between any of the different semantic classifications given in the WordNet.

In the Rapid Words Collection, the *nádìsistó* 'I picked LO up' and *nádìsisʔó* 'I picked SO up' were respectively classified with the 7.3.3.2 and 7.3.1.1 semantic domains. The 7.3.3.2 domain belongs under the 7.3.3 Take somewhere domain. It refers to lexical items which answer the question "What words refer to taking something somewhere?" (SIL International, n.d.-g). The 7.3.1.1 domain belongs under the 7.3.1 Carry domain. It refers to lexical items which answer the

question "What general words refer to carrying something?" (SIL International, n.d.-h). Each of these domains belong to the larger domain 7.3 Move something, indicating some distant connection (SIL International, n.d.-i). Though this cannot conclusively be evaluated in Rapid Words, there may be some overlap in meaning between 'carry' and 'take' that would indicate some semantic similarity between the two domains. However, this is not enough to establish the extent of the similarity and what type of lexical relation that similarity reflects.

Once again, though, none of the senses given in any of these semantic classifications include the noun classifications which are part of the active CHVs' senses. Between that and the variation among the semantic classifications which do not have clear connections to one another, a conclusion regarding their lexical relations cannot be made.

Therefore, regarding the CHVs, the WordNet and Rapid Words semantic classifications done in the PLD do not point towards a specific lexical relation taking place between them. The best that can be said is there is semantic similarity between them, with the stative neuter verbs having the same semantic classifications and the active verbs having similar but unconnected classifications.

For the 'eat' verbs, the WordNet semantic classifications all correspond to the same WordNet synset "(v)eat#1" which is defined as "take in solid food" (WordNet Search – 3.1, n.d.-a). For the generic *s+nó* 'eat (O)' verb candidates, this is the sole WordNet semantic classification.

The semantic classification using the Rapid Words Collection appears the same, with all these verbs classified with the semantic domain labelled as 5.2.2.1 under the 5.2.2 Eat domain. The 5.2.2.1 domain refers to lexical items which answer the question "What general words refer to eating food?" (SIL International, n.d.-j). The *s+nó* 'eat (O)' verbs are all only given one classification in both WordNet and Rapid Words; there is no separate verb theme with the same classifications, and therefore senses, which could then be judged as synonymous.

In the case of *–dál* 'eat berries' verbs, in addition to the above WordNet classification, they are also classified with the nominal synset "(n)berry#1", defined as "any of numerous small and pulpy edible fruits; used as desserts or in making jams and jellies and preserves" (WordNet Search – 3.1, n.d.-g). However, this should be judged separately from the aforementioned "(v)eat#1" synset. There is no synset in the WordNet which refers to the eating of a particular type of object like is referenced in *–dál* 'eat berries' verbs in Tsuut'ina.

In the Rapid Words Collection, they are similarly classified with the 5.2.2.1 domain described above and secondarily with the domain labelled as 5.2.3.1.2.1 under the 5.2.3.1.2 Food from fruit domain. The 5.2.3.1.2.1 domain refers to lexical items which answer the question "What types of fruit are eaten?" (SIL International, n.d.-k). Between both the WordNet and Rapid Words semantic classifications, the *–dál* 'eat berries' verbs cannot properly be judged for lexical relations with the other candidates because the exact meaning reflected by these verbs are not singularly reflected in either ontology.

Finally, with the *á+t'à* 'eat O up' verbs, they are again semantically classified with "(v)eat#1" in the PLD (WordNet Search – 3.1, n.d.-a). For now, this may cause them to be judged as synonymous with the *s+nó* 'eat (O)' verbs. Meanwhile, in the Rapid Words Collection, these verbs are classified with the domain labelled as 5.2.2.4.5 under the 5.2.2.4 Manner of eating domain. The 5.2.2.4.5 domain refers to lexical items which answer the question "What words refer to eating fast?" (SIL International, n.d.-l). As the Rapid Words domain label refers to 'manners' of eating, which corresponds to the diagnostic identifier of verbal hyponymy, and the domain question reflects an additional meaning aside from the 'eat' sense found in *s+nó* 'eat (O)', the Rapid Words semantic classification discussed here also reflects a case of hyponymy where *á+t'à* 'eat O up' is the hyponym of *s+nó* 'eat (O)'.

The outcomes of both the WordNet and Rapid Words semantic classifications provide the same results for lexical relations as that given by the theories of Cruse and Murphy. The biggest property which contributes to these results comes from classificatory verbs, including the CHVs and other non-handling classificatory verbs like *–dál* 'eat berries': these verbs include information in their senses in the form of their nominal subclasses which do not have corresponding senses in English as found in either ontology. Therefore, when semantic classifications are done, the resulting lexical relations are incomplete because the senses of the lexical items are incomplete.

6. Discussion

6.1 Lexical relations found among candidates

The outcomes of the analyses conducted on the Tsuut'ina classificatory handling verb and 'eat' verb candidates see both sets of candidates presenting evidence that their verb forms feature a hyponymy relation. These conclusions are consistent with both the Crusian and RC approaches to lexical relations. The analyses done on the CHVs found that the seven verb themes which make up the candidates appear to be hyponyms, hypernyms, and co-hyponyms, though the data is partially incomplete. This was consistent for both approaches used: when applying the Crusian approach, the CHV candidates are found to occupy the space between plesionyms and non-synonyms, or more specifically, hyponyms and hypernyms; and when applying the RC approach by Murphy, they are judged as too different to be synonyms per RC-S, but they could fulfil the requirements of RC-ALC assuming both hyponym and hypernym candidates are found. The 'eat' verbs' analyses, meanwhile, were judged to find that the three sets of candidates are also in a hyponymous lexical relation, where the verb forms of the generic theme *s+nó* 'eat (O)' are the hypernyms of the verbs forms of the themes *–dál* 'eat berries' and *á+t'à* 'eat O up'. This was concluded in the analysis following the Crusian approach by the results of the goodness-of-exemplar features and the incompatibility between the co-hyponym themes, and in the analysis following the RC approach, there is asymmetrical lexical contrast between the hypernym and its hyponyms, lexical contrast between the co-hyponyms, and a named hypernym.

The initial outcomes for the CHV candidates differ from one another because the stative neuter candidates with the meaning 'S is lying' are missing a generic verb candidate to function as a prospective hypernym while the active candidates meaning 'pick O up' include a generic form. As a result, it is not wholly conclusive whether these CHV candidates may be in hyponymous lexical relations based on the existing data. Given the available data taken from the corpora, the stative neuter verbs so far cannot be regarded as hyponyms due to the absence of a hypernym candidate. Without a hypernym, the relation of hyponymy cannot be properly tested for. The possibility of covert categories does not help because it cannot be contextualized like a genuine verb found in the corpora. In Cruse's analysis (1986, 2002), the GoE features cannot be confirmed. Meanwhile, Murphy (2003) still allows a look at lexical contrast between co-hyponym candidates, but RC-LC is very general, applying to all other lexical relations alongside hyponymy (p. 170). RC-ALC, meanwhile, cannot be evaluated, just like the GoE features of Cruse, because there are

no hypernym candidates and because Murphy requires named categories in hyponymy (p. 228). Therefore, there are currently no findings indicating hyponymy for the stative neuter CHV candidates.

The active CHV candidates, meanwhile, have more concrete evidence of hyponymy obtained from the corpora. The existence of a hypernym candidate allows the approaches of Cruse and Murphy to be appropriately tested for. Cruse's GoE features produce mostly positive outcomes apart from where further verifications, particularly from native speakers, are required. Additionally, there is evidence of the active CHV candidates qualifying as incompatibles to one another, which makes them analysable as co-hyponyms under *ná+dì+tɬad* 'pick O up' as their shared hypernym. The RC approach is also satisfied, with evidence which supports both RC-ALC and RC-LC to determine the relations between hyponyms, hypernyms, and co-hyponyms, respectively. RC-ALC is found between the potential hypernym candidate *ná+dì+tɬad* 'pick O up' and the three active candidate hyponyms, where they have all but one contextually relevant property in common, which is the noun classification represented by the classificatory verb stem. The verb stem *–tɬad* does not reflect any noun classification, while the candidates have the following classificatory stems: *–tsùùz* classifies for a fabric-like object (FO), *–ʔó(n)* classifies for a solid object (SO), and *–tó(n)* classifies for a stick-like object (LO). This difference in the type of classification is also what separates the classificatory stems and the verbs which include them from one another as co-hyponyms following RC-LC as a noun is realized in context differently depending on the type of classificatory stem it appears with.

Synonymy of the CHV candidates is more difficult to conclude in favour of as the differences between them go beyond what is expected of synonyms. The senses of CHVs are made distinct by the different type of classification featured in the verb stem and imposed on the noun. The Crusian approach to synonymy disqualifies the CHV candidates as cognitive synonyms, firstly, because the difference in classification causes a change to the truth-conditions of a sentence, as shown in basic sentences as in Table 5.1. Then for plesionymy, which next appears in the scale Cruse presents, the capital and subordinate semantic traits of CHVs are organized the same way as for hyponymy: the candidates have the same capital semantic traits—for the active verbs, the meaning 'pick O up' is expressed with the inclusion of the prefixes *ná+dì–* and for the stative neuter verbs, the meaning 'S is lying' is expressed with the inclusion of the prefix *si–*. Meanwhile, the RC approach disqualifies the CHV candidates as synonyms following RC-S: there is a

contextually-relevant difference in form through the different classificatory verb stems, but additionally, their senses are different and Murphy requires that the senses be the same, not similar in order to be full synonyms rather than near-synonyms, for instance (Murphy, 2003, pp. 146-147). However, if near-synonyms have *similar* meanings, what constitutes as similar enough to be judged as near-synonyms, and do the CHV candidates, with their different noun classifications which make up part of the sense, qualify as such? Or are the senses too different to be considered for synonymy at all?

This leaves the CHV candidates leaning more towards being hyponymous, with the actual classificatory verbs being hyponyms, and the generic verb forms which have the same sense but without the noun classification characteristic to CHVs as the hypernym. However, no evidence was found for a hypernym candidate for the stative neuter CHVs, which prevents any deeper analysis towards hyponymy according to Cruse as the GoE features cannot be investigated (Cruse, 2002, p. 10) and rejects it outright by Murphy because hyponymy must consist of "named categories [that] have named subcategories" (Murphy, 2003, p. 228).

The 'eat' candidates have a more consistent representation of hyponymy between them than that given for the CHV candidates. This is supported by their uses in Tsuut'ina. First is the role of the theme *s+nó* 'eat (O)' and its verb forms as the hypernym. Compared to the other two candidates, this theme is often the default verb theme used alongside the object consumed. A sample of the variety of foods of consumption that are used in sentences alongside *s+nó* 'eat (O)' verb forms is summarized in Table 4.5. By comparison, the *á+t'à* 'eat O up' and *–dál* 'eat berries' verb forms are found in the narrative texts with only a few different foods of consumption, summarized below:

Verb theme	Food of consumption	Examples
s+nó 'eat (O)'	UNSPECIFIED	Anything
á+t'à 'eat O up'	Unclear	Fish, (killing) people, children
–dál 'eat berries'	SMALL OBJECTS	Berries, plural objects

Table 6.1: Three Tsuut'ina verb themes of consumption with distinguishing features and examples

While *s+nó* 'eat (O)' is available to be used with many foods of consumption with what appears to be no obvious restrictions, the *á+t'à* 'eat O up' and *–dál* 'eat berries' verbs have more limited uses. These roles and regulations are also found in other Dene languages with their "verb stems of consumption" (S. Rice, 2009, p. 120). Navajo observes 15 verb stems of consumption which are distinguished based on the manner or food of consumption (Young & Morgan, 1987, pp. 251-263; p. 875). Of note among these are the *unspecified* verb stem *–yííh*, used with any food of consumption, the *plural object* stem *–deeł*, used with berries and other grouped objects, and the *'devour by gulping/bolting'* stem *–máál*, used with "single piece[s] of food" (S. Rice, 2009, p. 120). These stems' uses in Navajo strongly correspond to the same senses and general foods of consumption in Tsuut'ina: both *s+nó* and *–yííh* are unspecified and used with any kind of food of consumption; *–dál* and *–deeł* both are used with small objects, most specifically berries; and *á+t'à* and *–máál* have a 'devouring' sense. Though there is no evidence that *á+t'à* 'eat O up' is used with "single piece[s] of food" like *–máál* in Navajo, otherwise the Navajo examples corroborate the roles of the similar forms in Tsuut'ina.

The role of the *s+nó* 'eat (O)' verb themes as it is used with unspecified foods of consumption with no known restrictions supports the assumption that that theme and its verb forms operate as the hypernym and that the *á+t'à* 'eat O up' and *–dál* 'eat berries' verbs operate as the hyponyms. If the generic hypernym *s+nó* 'eat (O)' is judged as the superordinate item, it must include all the possible uses of its hyponym(s) because the hyponyms are subclasses of the superordinate. No examples are available in the data of this extensional understanding existing between *s+nó* 'eat (O)' and *á+t'à* 'eat O up', but with the themes *s+nó* 'eat (O)' and *–dál* 'eat berries', the verbs of the former as the hypernym are used with the same food of consumption, *jijá* 'berries', as the verbs of the latter as the hyponym, as shown in (38) versus (42).

Another signal that *s+nó* 'eat (O)' fulfils the generic role among the 'eat' candidates is that it is included in concrete nouns pertaining to eating and consumption, as shown in the examples below where the nouns are each derived from the imperfective and repetitive durative verb forms of *s+nó* 'eat (O)', respectively (Cook, 1984, p. 70):

Tsuut'ina noun	English sense
mìs íts'ísnoó	utensils
mik'aʔíts'ísnoʔí	table
gúdaʔíts'ísnòshí	drive through

Table 6.2: Tsuut'ina nouns featuring the verb theme *s+nó* 'eat (O)' (Tsuut'ina Gunaha Institute, 2014)

Alternatively, there is also supporting evidence against judging the verbs as synonyms. Recall from Section 4.3.2 that the verb theme *s+nó* 'eat (O)' is made up of two sets of verb stems which are temporally distinct for momentaneous and durative aspect. The alternative interpretation of these verb stems is for them to be part of two separate verb themes, one which represents 'eat (O)' with momentaneous aspect, and the other which represents it with durative aspect. Each of these themes then have paradigmatic gaps that account for the missing viewpoint aspects: durative aspect is missing the potential mood stem and momentaneous aspect is missing the progressive and repetitive aspect stems. Being that this interpretation sees two separate themes with the same meaning, these could thus be evaluated for synonymy. The problem with this, considering just the substitution test before going deeper into the approaches of Cruse and Murphy, is that substitution cannot successfully take place because, in the case of the modes and aspects which have paradigmatic gaps, only one verb form from one theme can appear in a given context. For instance, a sentence which requires the 'eat (O)' reflected with potential mode, only the momentaneous verb form *ichiish* 'he/she/it might eat something' could be used; no verb form in durative aspect could appear because there is a paradigmatic gap for potential mood. This inability to substitute one verb theme for the other disqualifies these items as cognitive synonyms according to Cruse (1986, 2000) because that requires substitution within an otherwise identical sentence without changing the truth-condition of the sentence. In the case of trying to substitute the momentaneous potential *ichiish* 'he/she/it might eat something' with a durative verb with a different aspectual stem, the truth-condition of the sentence would change due to the meaning of the verb form moving away from potential mood. From Murphy's perspective, while the meanings of the themes are identical, per RC-S, the paradigmatic gap creates an additional contextually-relevant property aside from form which differentiates the members of a prospective synonym set from one another. Therefore, they do not qualify as synonyms as minimal difference is not fulfilled.

Ultimately, there is supporting evidence for both sets of candidates indicating their verbs are best analysed as in a hyponymy lexical relation and also evidence that neither set contain candidates for synonymy. This evidence is provided by the analyses conducted using the frameworks of Cruse and Murphy, respectively, as well as how these items are used in the Tsuut'ina language and other Dene languages in the case of the 'eat' candidates.

6.2 Outcomes of using corpus data

Using corpus data as the primary source to extract examples of lexical relations in a language can produce some results, but gaps are still probably inevitable. The corpora of this thesis were the preliminary lexical database of Onespot-Sapir glossary entries, the stories from *Tsuut'ina Narratives* and *Sarsi texts*, and the occasional examples taken from *A Sarcee Grammar*. Together, these gave nearly enough information to conduct analyses of lexical relations following the Crusian and Murphian approaches. However, the information was still limited. Firstly, for the CHV candidates, there were not enough candidates to fully analyse some for hyponymy. Second, and more broadly, both hyponymy and synonymy, regardless of approach, require the input of native speakers of Tsuut'ina to determine whether the candidates display such relations and how lexical relations are realized in general in the language.

Questions are left unanswered by the missing corpus data. Most importantly, there is no hypernym candidate for the stative neuter CHVs with the sense 'S is lying'. This prevents any hyponymy analysis from being conducted for the stative neuter CHVs outside of the relation between co-hyponyms, which also cannot be confirmed due to the lack of hypernym. The non-propositional properties, discussed in the fifth GoE feature of Cruse (Cruse, 2002, p. 10), are not accounted for because the available corpora do not refer to them. The most common way to diagnose synonymy between lexical items is through a substitution test, but none of the sentences found in the corpora could be used to perform that test. Also, there is no confirmation of a diagnostic frame with which to connect hyponyms and hypernyms in a single sentence, especially. Personal communication with Tsuut'ina elder Bruce Starlight offered the subordinating suffix *–gù* to be used in verbal hyponymy, but no confirmation that it may be used in a similar manner to the *X-ing is a way of Y-ing* frame offered by Cruse for verbs in English. The *–gù* suffix also has several other uses, as discussed in Section 4.1.2, which adds to the speculation of the role it performs when in sentences with a hyponym and hypernym verb form. Would it actually reflect a hyponymous

relation similar to that expressed in *X-ing is a way of Y-ing* or reflect a different relation between the verb forms?

Therefore, while a detailed discussion of lexical relations among Tsuut'ina verbs using the candidates selected was able to take place, there were many gaps due to the corpus data used. Future research conducted to answer these questions with more certainty requires additional corpora, preferably with more examples of Tsuut'ina sentences like in *Tsuut'ina Narratives* and *Sarsi texts*. Alternatively, data may be acquired with the aid of a native Tsuut'ina speaker by conducting a linguistic interview or elicitation task.

7. Conclusion

The lexical semantic theories of Cruse and Murphy each provide their own definition of the lexical relations synonymy and hyponymy according to lexical and metalexical approaches, respectively. The grammar of Tsuut'ina verbs features properties unique to the Dene language family such as its overall morphological structure including multiple inflectional prefixes, the concept of verb themes and verb theme categories, and the classificatory verb system. Given that Cruse's and Murphy's (and others') theories of lexical relations are based on data almost exclusively from English and an otherwise topologically restricted range of European languages, grammatical and semantic structures that are unique to Dene or other North American Indigenous languages are not accounted for when describing those relations.

The results of analysing the Tsuut'ina verb candidates—the classificatory handling verbs meaning 'pick O up' and 'S is lying' and the non-classificatory verbs meaning 'eat'—using Cruse's and Murphy's frameworks found that, for both sets of candidates, there was some evidence pointing towards hyponymy between the candidates. Some of these findings are inconclusive due to information not available in the corpora from which the data was obtained. Most especially, no concrete conclusion is made regarding hyponymy among the classificatory handling verbs, as the stative neuter verb candidates, with the meaning 'S is lying' did not include a candidate to be the hypernym. Aside from this, the active classificatory candidates meaning 'pick O up' and the non-classificatory candidates meaning 'eat' had more conclusive evidence of hyponymy, but more information is still needed to definitively determine this.

The overall findings done using Cruse's (1986, 2000, 2002) and Murphy's (2003) approaches to lexical relations were supported by results of semantic classification work done with the Princeton WordNet and Rapid Words by SIL International. However, those classifications only map the English definitions of the Tsuut'ina verbs against English node words or domain names in these two ontologies, so one should not take for granted that the same ontological relations between the English node words or domains in question (e.g., hypernymy, hyponymy, and synonymy) will hold for Tsuut'ina or other languages.

Ultimately, corpora were useful for extracting examples of hyponymy in Tsuut'ina. It may also be the case that synonymy can be found this way, but no examples were found among the candidates used here. Some information is still missing to definitively conclude that hyponymy is connecting the candidates discussed here. For future research into this topic, more data is required,

obtained either from other corpora or from consultations with native speakers of Tsuut'ina. It may also expand into more examples of synonymy or other types of lexical relations such as antonymy or meronymy.

8. References

21st Century Tools for Indigenous Languages. (2022). *About Our Partnership*. https://21c.tools/

Alberta Language Technology Lab. (2022). *Alberta Language Technology Lab (ALT Lab)*. https://altlab.ualberta.ca/

Arppe, A. (2008). *Univariate, bivariate, and multivariate methods in corpus-based lexicography—a study of synonymy* (Publication No. 44) [Doctoral dissertation, University of Helsinki]. https://sites.ualberta.ca/~arppe/Publications/Arppe_Dissertation_Final_Full

Arppe, A., Cox, C., Hulden, M., Lachler, J., Moshagen, S. N., Silfverberg, M., & Trosterud, T. (2017). Computational Modeling of Verbs in Dene Languages: The Case of Tsuut'ina. *Working Papers in Athabaskan (Dene) Languages (Alaska Native Language Center Working Papers), 13*, 51-69.

Buffalo Treaty. (n.d.-a). *Relationships*. https://www.buffalotreaty.com/relationships

Buffalo Treaty. (n.d.-b). *Treaty*. https://www.buffalotreaty.com/treaty

Bugenhagen, R. D. (1994). The Exponents of Semantic Primitives in Mangap-Mbula. *Semantic and Lexical Universals: Theory and Empirical Findings* (C. Goddard & A. Wierzbicka, Ed.)*, 87-108.

Cole, Y. (2018, May 28). *'Emotional day' for '60s Scoop survivors as Alberta offers apology*. Calgary Herald. https://calgaryherald.com/news/local-news/emotional-day-for-sixties-scoop-survivors-as-alberta-offers-apology

Cook, E. (1972). *Sarcee Verb Paradigms*. Ethnology Division, National Museum of Man, National Museums of Canada.

Cook, E. (1984). *A Sarcee Grammar*. University of British Columbia Press.

Cook, E. (1996). Third-person plural subject prefix in Northern Athapaskan. *International Journal of American Linguistics*, *82*, 86-110.

Cook, E. (2020). Tsuut'ina (Sarcee). In *The Canadian Encyclopedia*. https://www.thecanadianencyclopedia.ca/en/article/sarcee-tsuu-tina

Cox, P. (2021, June 15). Asleep no more: Tsuut'ina language awakened. *University of Victoria International*. https://www.uvic.ca/international/home/news/stories/2021+asleep-no-more+news

Crown-Indigenous Relations and Northern Affairs Canada. (2022). *Registered Population.*
https://fnp-ppn.aadnc-
aandc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=432&lang=eng

Cruse, D. A. (1986). *Lexical semantics*. Cambridge University Press.

Cruse, D. A. (1994). Prototype theory and lexical relations. *Rivista di Linguistica, 6,* 167-188.

Cruse, D. A. (2000). *Meaning in Language: An Introduction to Semantics and Pragmatics.*
Oxford University Press.

Cruse, D. A. (2002). Hyponymy and its Varieties. (Green, R., Bean, C.A., & Myaeng, S.H., Eds.)
The Semantics of Relationships. Information Science and Knowledge Management, 3,
Springer, Dordrecht.

Curtis, E. S. (1928). *The North American Indian: Being a Series of Volumes Picturing and
Describing the Indians of the United States, the Dominion of Canada and Alaska – Vol.
18: The Chipewyan. The Western woods Cree. The Sarsi.* Norwood.

Dacanay, D., Arppe, A., & Harrigan, A. (2021). Computational Analysis versus Human
Intuition: A Critical Comparison of Vector Semantics with Manual Semantic
Classification in the Context of Plains Cree. *Proceedings of the 4th Workshop on the Use
of Computational Methods in the Study of Endangered Languages, 1*, 33-43.

Dempsey, H. A. (2019). *Blackfoot Confederacy*. The Canadian Encyclopedia.
https://www.thecanadianencyclopedia.ca/en/article/blackfoot-nation

Dippel, S. (2018, May 21). *'Making wolf': How Calgary and Tsuut'ina can move forward,
together.* CBC News. https://www.cbc.ca/news/canada/calgary/tsuutina-chief-crowchild-
making-wolf-calgary-1.4657549

Divjak, D. S., & Gries, S. T. (2009). Clusters in the mind? Converging Evidence from Near-
Synonymy in Russian. *The Mental Lexicon, 3*(2), 188-213.
https://doi.org/10.1075/ml.3.2.03div

Encyclopædia Brittanica. (2009). *Athabaskan languages* [Image].
https://www.britannica.com/topic/Athabaskan-language-family#/media/1/40564/133265

Evans, N. (1994). Kayardild. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical
Universals: Theory and Empirical Findings,* 203-228.

Fellbaum, C. (1990). English Verbs as a Semantic Net. From *Five Papers on WordNet*.
Available online at https://wordnetcode.princeton.edu/5papers.pdf.

Fellbaum, C., & Miller, G. A. (1990). Folk psychology or semantic entailment? Comment on Rips and Conrad (1989). *Psychological Review, 97*(4), 565–570. https://doi.org/10.1037/0033-295X.97.4.565

Gibbon, D., Moore, R., & Winski, R. (1997). *Handbook of Standards and Resources for Spoken Language Systems: Vol. 2. Spoken Language Characterization.* De Gruyter Mouton. https://doi.org/10.1515/9783110804041

Gladue Rights Research Database. (n.d.). *The Niitsítapi (Blackfoot Confederacy).* Gladue Rights Research Database, University of Saskatchewan. https://gladue.usask.ca/Blackfoot_Confederacy

Goddard, C. (1994a). Lexical primitives in Yankunytjatjara. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical Universals: Theory and Empirical Findings,* 229-262.

Goddard, C. (1994b). Semantic theory and semantic universals. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical Universals: Theory and Empirical Findings,* 7-29.

Goddard, C., & Wierzbicka, A. (1994a). Introducing Lexical Primitives. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical Universals: Theory and Empirical Findings,* 31-54.

Goddard, C. & Wierzbicka, A. (Eds.). (1994b). *Semantic and Lexical Universals: Theory and Empirical Findings.* John Benjamins Publishing Company.

Goddard, C., & Wierzbicka, A. (2014a). Semantic fieldwork and lexical universals. *Studies in Language (Foundations of Language), 38*(1), 80-127. https://doi.org/10.1075/sl.38.1.03god

Goddard, C., & Wierzbicka, A. (2014b). *Words and Meanings: Lexical Semantics Across Domains, Languages, and Cultures.* Oxford University Press.

Goddard, P. E. (1915). Sarsi texts. *University of California Publications in American Archaeology and Ethnology, 11*, 189-277.

Golla, V. (1970). *Hupa Grammar*. [Doctoral dissertation, University of California, Berkeley]. https://escholarship.org/uc/item/6z0634f2

Google. (n.d.). [Google Map of Tsuu T'ina Nation 145]. https://www.google.com/maps/place/Tsuu+T'ina+Nation+145,+Rocky+View,+AB/@50. 9665042,-

114.353933,11.07z/data=!4m5!3m4!1s0x53711291b78cd345:0x211fd1eb6e0be673!8m2!
3d50.9561015!4d-114.3629877

Hale, K. (1994). Preliminary Observations on Lexical and Semantic Primitives in the Misumalpan Languages of Nicaragua. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical Universals: Theory and Empirical Findings*, 263-283.

Harkins, J., & Wilkins, D. P. (1994). Mparntwe Arrernte and the search for lexical universals. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical Universals: Theory and Empirical Findings*, 285-310.

Hill, D. (1994). Longgu. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical Universals: Theory and Empirical Findings*, 311-329.

Hjørland, B. (2015). Are relations in thesauri "context-free, definitional, and true in all possible worlds"?. *Journal for the Association of Information Science and Technology, 66*, 1367-1373. https://doi.org/10.1002/asi.23253

Hoijer, H. (1963). The Athapaskan languages. *Studies in the Athapaskan Languages (University of California Publications in Linguistics), 29*, 1-29.

Holden, J. (2019). Semantic primes in Dënësųłinë: In search of some lexical "universals". *International Journal of American Linguistics, 85*(1), 75-121.

Holden, J., Cox, C., & Arppe, A. (2022). An Expanded Finite-State Transducer for Tsuut'ina Verbs. *Proceedings of the 13th Conference on Language Resources and Evaluation (LREC 2022)*, 5143–5152. https://aclanthology.org/2022.lrec-1.551/

Kari, J. (1979). Athabaskan Verb Theme Categories: Ahtna. *Alaskan Native Languages Center Research Papers, 2*.

Kari, J. (1990). *Ahtna Athabaskan Dictionary.* Alaska Native Language Center.

Kari, J. (2007). *Dena'ina Topical Dictionary*. Alaska Native Language Center.

Krauss, M. E. (1973). Na-Dene. *Current Trends in Linguistics*, *10,* 903–978.

Li, F-K. (1930). A Study of Sarcee Verb-Stems. *International Journal of American Linguistics, 6*(1), 3-27.

Lovick, O. (2020). *A Grammar of Upper Tanana: Volume 1: Phonology, lexical classes, morphology.* University of Nebraska Press.

Lovick, O. (2023). *A Grammar of Upper Tanana: Volume 2: Semantics, syntax, discourse.* University of Nebraska Press.

Marconi, D. (1997). *Lexical competence.* The MIT Press.

Miller, G. A., Beckwith, R., Fellbaum, C., Gross, D., & Miller, K. (1993). Introduction to WordNet: An On-line Lexical Database. From *Five Papers on WordNet.* Available online at https://wordnetcode.princeton.edu/5papers.pdf.

Miller, G. A. & Charles, W. G. (1991). Contextual correlates of semantic similarity. *Language and Cognitive Processes, 6*(1), 1-28.

Miller, J. R. (2023). *Residential Schools in Canada.* The Canadian Encyclopedia. https://www.thecanadianencyclopedia.ca/en/article/residential-schools

Moe, R. (2003). Compiling Dictionaries Using Semantic Domains. *Seventh International Conference of the African Association for Lexicography*, Rhodes University, 215-223.

Morgan, J. L. (2012). *Classificatory Verbs in Plains Apache.* [Master's thesis, University of Oklahoma].

Morin, B. (2018, March 1). *Alberta officials' role in 60s Scoop sessions was to 'shut up and listen' to survivors, says minister.* CBC News. https://www.cbc.ca/news/indigenous/alberta-final-engagement-session-sixties-scoop-apology-1.4558056

Mosel, U. (1994). Samoan. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical Universals: Theory and Empirical Findings,* 331-360.

Murphy, M. L. (2003). *Semantic relations and the lexicon: antonymy, synonymy, and other paradigms.* Cambridge University Press.

National Centre for Truth and Reconciliation. (n.d.). *Sarcee (St. Barnabas) - NCTR.* National Centre for Truth and Reconciliation. https://nctr.ca/residential-schools/alberta/sarcee-st-barnabas/

Native Land Digital. (2022, July 31). *Tsuu T'ina.* Native-land.ca. https://native-land.ca/maps/territories/tsuu-tina/

Omniglot. (2023, April 21). *Tsuut'ina language, alphabet, and pronunciation.* https://www.omniglot.com/writing/tsuutina.htm

Pawley, A. (1994). Kalam Exponents of Lexical and Semantic Primitives. In C. Goddard & A. Wierzbicka (Eds.), *Semantic and Lexical Universals: Theory and Empirical Findings,* 387-421.

Preston, R. J. (2021). *Cree*. The Canadian Encyclopedia.

    https://www.thecanadianencyclopedia.ca/en/article/cree

Reule, T. (2018). *Elicitation and Speech Acts in the Maskwačis Spoken Cree Dictionary Project.*

    [Bachelor's thesis, University of Alberta].

Rice, K. (2000). *Morpheme Order and Semantic Scope.* Cambridge University Press.

Rice, K. (2020). Morphology in Dene Languages. *Oxford Research Encyclopedia, Linguistics*,

    https://doi.org/10.1093/acrefore/9780199384655.013.629

Rice, S. (2009). Athabaskan eating and drinking verbs and constructions. *The Linguistics of*

    Eating and Drinking (John Newman, Ed.), 109-152.

Rosch, E. H. (1973). Natural categories. *Cognitive Psychology, 4*(3), 328-350.

Rubenstein, H., & Goodenough, J. B. (1965). Contextual correlates of synonymy. *Cognitive*

    Linguistics, 8(10), 627-633.

Salus, J [@jessesalus]. (2021, May 31). I'm also reminded this isn't something that happened

    'somewhere else'. St. Barnabas residential school was located on the Tsuut'ina Nation

    [Tweet]. Twitter. https://mobile.twitter.com/jessesalus/status/1399380829843775494

Sapir, E. & Hoijer, H. (1967). *The Phonology and Morphology of the Navaho Language.*

    University of California Press.

SIL International. (n.d.-a). *Semantic Domains.* https://semdom.org/

SIL International. (n.d.-b). *How was this list of domains developed?*

    https://semdom.org/development

SIL International. (n.d.-c). *How are semantic domains used?* https://semdom.org/usage

SIL International. (n.d.-d). *RapidWords.net* http://rapidwords.net/

SIL International. (n.d.-e). *7.2.1.1 Walk.* https://semdom.org/v4/7.2.1.1

SIL International. (n.d.-f). *7.1.3 Lie down.* https://semdom.org/v4/7.1.3

SIL International. (n.d.-g). *7.3.3 Take somewhere.* https://semdom.org/v4/7.3.3

SIL International. (n.d.-h). *7.3.1 Carry.* https://semdom.org/v4/7.3.1

SIL International. (n.d.-i). *7.3 Move something.* https://semdom.org/v4/7.3

SIL International. (n.d.-j). *5.2.2 Eat.* https://semdom.org/v4/5.2.2

SIL International. (n.d.-k). *5.2.3.2 Food from fruit.* https://semdom.org/v4/5.2.3.1.2

SIL International. (n.d.-l). *5.2.2.4 Manner of eating.* https://semdom.org/v4/5.2.2.4

Smith, C. (1997). *The Parameter of Aspect. Studies in Linguistics and Philosophy, 43.* Springer, Dordrecht. https://doi.org/10.1007/978-94-011-5606-6_1

Snoek, C. & Stang, M. (2016). How similar are Dene languages? Proceedings of the 11th High Desert Linguistics Society Conference.

Starlight, B., Donovan, G., Cox, C., Holden, J., Antonsen, K., & Arppe, A. (in progress). *Preliminary Lexical Database.* 21st Century Tools for Indigenous Languages Partnership project. Unpublished digital source.

Statistics Canada. (2017). *Canada [Country] and Canada [Country]* (table). *Census Profile.* 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E

Statistics Canada. (2022a). (table). *Census Profile.* 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released August 17, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E

Statistics Canada. (2022b). *Mother tongue.* Dictionary, Census of Population, 2021. https://www12.statcan.gc.ca/census-recensement/2021/ref/dict/az/definition-eng.cfm?ID=pop095

Tsuut'ina Gunaha Institute. (2019, July 23). *Tsuut'ina Gunaha Institute - International Year of Indigenous Languages 2019.* [Video]. YouTube. https://www.youtube.com/watch?v=rJLRUPJA7N0&t=460s

Tuttle, S. & Hargus, S. (2004). Explaining variability in affix order: The Athabaskan areal and third person prefixes. *Working Papers in Athabaskan Languages, 4*, 70–98.

Vendler, Z. (1967). *Linguistics in Philosophy.* Cornell University Press.

Vincze, V., and Almási, A. (2014). Non-Lexicalized Concepts in Wordnets: A Case Study of English and Hungarian. *Proceedings of the Seventh Global Wordnet Conference,* University of Tartu Press, 118-126. https://aclanthology.org/W14-0116/

Wierzbicka, A. (1994). Semantic Primitives Across Languages: A Critical Review. *Semantic and Lexical Universals: Theory and Empirical Findings* (C. Goddard & A. Wierzbicka, Eds.), 445-500.

WordNet. (2022). *What is WordNet?* (2022). https://wordnet.princeton.edu/

Wordnet Search – 3.1. (n.d.-a). Eat. In *Wordnetweb.princeton.edu.*
http://wordnetweb.princeton.edu/perl/webwn?s=eat&sub=Search+WordNet&o2=&o0=1&o8=1&o1=1&o7=&o5=&o9=&o6=&o3=&o4=&h=

WordNet Search – 3.1. (n.d.-b). Lie. In *Wordnetweb.princeton.edu.*
http://wordnetweb.princeton.edu/perl/webwn?s=lie&sub=Search+WordNet&o2=&o0=1&o8=1&o1=1&o7=&o5=&o9=&o6=&o3=&o4=&h=000000

WordNet Search – 3.1. (n.d.-c). Walk. In *Wordnetweb.princeton.edu*.
http://wordnetweb.princeton.edu/perl/webwn?s=walk&sub=Search+WordNet&o2=&o0=1&o8=1&o1=1&o7=&o5=&o9=&o6=&o3=&o4=&h=

WordNet Search – 3.1. (n.d.-d). Take. In *Wordnetweb.princeton.edu.*
http://wordnetweb.princeton.edu/perl/webwn?s=take&sub=Search+WordNet&o2=&o0=1&o8=1&o1=1&o7=&o5=&o9=&o6=&o3=&o4=&h=0000000000

WordNet Search – 3.1. (n.d.-e). Pick up. In *Wordnetweb.princeton.edu.*
http://wordnetweb.princeton.edu/perl/webwn?s=pick+up&sub=Search+WordNet&o2=&o0=1&o8=1&o1=1&o7=&o5=&o9=&o6=&o3=&o4=&h=000000000000000000000000000000000000000000

WordNet Search – 3.1. (n.d.-f). Carry. In *Wordnetweb.princeton.edu.*
http://wordnetweb.princeton.edu/perl/webwn?s=carry&sub=Search+WordNet&o2=&o0=1&o8=1&o1=1&o7=&o5=&o9=&o6=&o3=&o4=&h=0000000000000000

WordNet Search – 3.1. (n.d.-g). Berry. In *Wordnetweb.princeton.edu.*
http://wordnetweb.princeton.edu/perl/webwn?s=berry&sub=Search+WordNet&o2=&o0=1&o8=1&o1=1&o7=&o5=&o9=&o6=&o3=&o4=&h=000000000000000000000000000000000000000

Young, R. W. & Morgan, W. (1987). *The Navajo Language: A Grammar and Colloquial Dictionary.* University of New Mexico Press.

Appendix—Excerpts from *Tsuut'ina Narratives*
From "Spotted Eagle and Crow Flag and the Medicine Pipe", p. 2

Ách'á ìsīnā nūwí xàkījī mīts'àyā īnōghā álàg-là.

It-so-happened it-must-have-been over-there Chief his-wife romance he-made-it-was.

And, after a while, he became romantically involved with the Chief Factor's wife.

Ùwāt'īyī ìsīnā mágūts'īshōn-là.

And-then it-must-have-been him-like-someone-knows-it-was.

The Chief Factor knew what was going on.

Ùwāt'īyī ìsīnā nú ts'ì gīmìsílā ts'īdískín-là.

And-then it-must-have-been island towards them-with someone (pl)-sailed-it-was.

They sailed to an island with them.

Ùwāt'īyī ìts'ísnó ghà nàts'īyídál-là.

And-then someone (pl)-is-eating at to-a-point-someone-(pl)-walked-it-was.

They went to where everyone was eating.

K'áts'ínísnò gūwā dīk'ānáts'ìdìł-là.

Finished-someone(pl)-ate that-time-to on-to-again-someone (pl)-all-walks-it-was.

When they finished eating, they all boarded the boat.

Ùwāt'īyī Ts'ōósí Xāyīsʔōō xāsts'īní-là,

And-then Crow Flag this-is-how-to him-someone-says-it-was,

Someone said, to Crow Flag

"Jìjá ínímō," īsts'īní-là.

"Berries it-you-pick," it-someone-to-him-is-saying-it-was.

"Go pick some berries."

From "Thrown Behind the Liner and Thrown Into the Water", pp. 126-127

Ùwāt' īyī ìsīnā ts'īstł'á kìdà yòghà nìschùd-là.

And-then it-must-have-been a-dish inside him-at she-fed-it-was.

And then, the woman fed him in a dish.

Ùwāt'īyī xāní-là,

And-then this-is-how-he-says-it-was,

And then, he said,

"Dúxàt'à kìdà ìsnòshi át'à."

"Not-that-kind inside I-something-eat it-is".

"I do not eat in those things."

Dīkà kìdà ìst'á yòghà náánīschùd-là.

Her-own-moccasins inside next him-to again-she-fed-it-was.

Next, the woman gave him food in her moccasins,

Ùwāt'īyī ásdānádīyínì-là. Ùwāt'īyī

And-then same-again-he-say-it-was. And-then

And then, the man said the same thing again.

dístłà kìdà ìst'á yōghanáníschùd nádlí-là.

her-own-leggings inside next him-at-again-she-fed again-it-was-it-was.

When she gave him food again, this time in her leggings, the man said,

"Xāʔí k'āsdīnāghā-gù," ìsní-là.

"That-is-how almost-like," he-says-it-was.

"You are almost there," he said.

Ùwāt'īyī dīk'íyījà kìdà ìst'á yōghanáníschùd nádlí(n)-là.

And-then her-own-dress in next him-at-again-she-fed again-it-was-it-was.

And then, when the woman fed him in her dress, he said the same thing again,

"Xāʔí k'àsdīnàghā-gù," nádīyīní-là.

"That-is-how almost-like", again-he-says-it-was.

"You are almost there."

Ùwāt'īyī ìsīnā tàlànìstīn-la

And-then it-must-have-been on-her-back-she-lay-down-it-was

And then, she lay down on her back.

ùwāt'īyī dīmìk'á yòghà nìschùd-là.

and-then on-her-own-stomach him-at she-fed-it-was.

And then, she gave him food on her stomach.

"Ūwà dīt'īyī xàt'á k'ázá ísno át'à"

"Now this-precisely this-is-how-it-is that-only I-am-eating it-is."

"Now this way, I am in the habit of eating," said the man."

Ùwāt'īyī ísno-là.

And-then he-is-eating-it-was.

And then, he was eating,

Xānìdá ìsīnā tīyā ìdìsgúdí ínídzà

This-is-how-after-a-time it-must-have-been hard he-began-to-stab during-that-time

And then he made a hand stab at the food.

From "Old Man Burns His Buttocks After Losing His Meat to Coyote", pp. 164-165

"Īsú īī dōō nīsúnà.

"Grandmother the. Here your-dried-meat

"Grandmother! Here is your dried meat.

nīk'à nàyīts'īdí," ìsnìsh-là.

Behind-you down-it-fell," he-says-repeatedly.

It fell down behind you," he kept saying.

Xānìdá ìsīnā, "Tsá ghà

This-is-how-after-a-time it-must-have-been, "Stone at

After a while, "I am talking to a rock and

dú sīts'ì nàzīts'ìts'ì.

not me-towards to-a-point-someone-makes-noise.

no one is responding to me.

Īschíísh,"

It-I-am-going-to-eat,"

I am going to eat it,"

ìsní-là. Ùwāt'īyī yísnó-là.

he-says-it-was and-then it-he-is-eating-it-was.

he said. And then, he was eating it.

ìts'óòsk'àgí ìsīnā

Bird-it-is-runted-(Chickadee) it-must-have-been

A Chickadee

xāyìsní-là, "Ádágù-láá,

this-is-how-to-him-he-says-it-was truly-like-it-is-so,

said to him, "Truly,

Gútł'ō lúdà náts'īsnō," yìsnìsh-là.

Someone's-buttock scab again-someone-is-eating," to-him-he-kept-saying-it-was.

the scab of the buttocks is being eaten again," he kept on saying to him.

"Tłàsì níyīsxàłí ìsà ádíníí.

"Very-hard you-I will-club maybe you-are-saying.

"I may club you very hard for saying that.

Ìsú súnà it'īyī," ìsní-là.

Grandmother's dried-meat-it it-is", he-says-it-was.

It is my grandmother's dried meat," he said.