

***"There is no thermostat in the forest" - Talking about Temperature in  
Anishinaabemowin (Ojibwe)***

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### **1. Introduction<sup>1</sup>**

The last half-century has yielded much on the typology of semantic areas like color, body parts and kinship systems. In the same vein, temperature has emerged as a captivating new area of study in the last decade. Temperature terms do not only directly address the physiological reality of temperature, but also the cultural conceptualization of temperature sensations. Following Koptevskaja Tamm & Rakhilina (2002:1).

”Temperature phenomena are universal, relatively easily perceptible by humans and crucial for them, but their conceptualisation involves a complex interplay between external reality, bodily experience and evaluation of the relevant properties with regard to their functions in the human life. The meanings of temperature terms are, thus, both embodied and perspectival.”

Cross-linguistically, much research remains to be done; are there morphosyntactic universals connected to the semantic field of temperature? How is the temperature semantic domain usually divided – and which, if any, are the cultural and linguistic universals? Do languages spoken in climatically very hot or very cold regions differ in their language use - both in descriptions of the world and in the way they construct metaphors? Currently more data from more language families is sorely needed, and this paper is the first attempt to get this kind of data from a Native American language – specifically the Algonquian language Anishinaabemowin (Eastern Ojibwe). We hope to test current methodologies and conclusions being developed for the study of temperature terms, and encourage other linguists working with Native American languages to carry out and publish similar studies.

### **2. Overview of the Lexical Typology of Temperature**

Temperature is a bodily sensation communicated to the brain by thermoreceptors in the skin, as when we feel the heat on the surface of a teacup or a glass of juice. Temperature is also a mental perception, based on the information communicated by these thermoreceptors and integrated with world knowledge and memories, as when we state that a tea cup is cold but a glass of juice is luke-warm, even if the two objects have the same objective temperature. Temperature is also a factual state in the world, as when the weather forecaster discusses the current temperature in various parts of the world. We can further distinguish between temperature sensation and thermal comfort:

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”[t]emperature sensation is a rational experience that can be described as being directed towards an objective world, as expressed by the statement: ‘It is cold.’ Thermal comfort is an emotional or affective experience referring to the subjective state of the observer as expressed by the statement: ‘I feel cold.’” (Hensel 1981, as cited in Koptjevskaja Tamm & Rakhilina 2002)

Temperature sensations and perceptions are evaluated in contrast to the typical skin temperature (33°C–34°C) – an object at 31–36°C does not trigger any temperature sensation, and in following Koptjevskaja Tamm & Rakhilina we refer to this as the *neutral zone*. Thermal comfort is evaluated in contrast to the body’s inner temperature and can differ several degrees depending on, among other factors, gender, body mass and the temperature environment a person is typically exposed to. As we saw in the case of the cup of tea and glass of juice above, temperature perception is deeply anthropocentric. In everyday reflection and conversation, the objective (thermometer-measured) temperature of an object is generally less noteworthy than the functional temperature that object should have in the life of the human observer. Teacups are supposed to be warmed by almost boiling water; if their surface temperature dips down into the neutral zone, they are cold. On the other hand, glasses of juice are supposed to be cooled by cold juice, and if their surface temperature is within the neutral zone, they are too warm. Discovering the extent to which these psychophysiological facts are reflected in language structure and use is one of the core goals of the study of temperature expressions in human languages. Several recurring patterns of use is evident in published studies, but this field is only just beginning to be explored, so the analysis of semantic categories discussed below should be viewed as provisional.

## 2.1 Tactile and non-tactile temperature

Koptjevskaja Tamm & Rakhilina (2002) show that the crucial semantic difference between the lexemes *žarkij* and *gorjačij*, both usually translated as *hot* in English, is that the latter is experienced by a single part of the body, often the hands (tactile) and the latter is experienced by the whole body (non-tactile, i.e., ambient). Shimotori (2004) shows that a similar difference exists in Japanese. The homonyms *atatakai* (warm, non-tactile) in (1) and *atatakai* (warm, tactile) in (2) are written with different kanji, as can be seen in the two examples below, and thus are evidently distinct.

(1) 暖かい  
atatakai  
warm, non-tactile (e.g room temperature)

(2) 温かい  
atatakai  
warm, tactile (e.g temperature of an object)

While individual languages differ in which exact sensations are deemed tactile and non-tactile, there does appear to be a cross-linguistic tendency for this division to exist in many languages. Typically, non-tactile temperature terms deal with evaluation of particular circumstances – the air in a certain place (e.g., a room) or time (e.g., the summer). Tactile temperature terms deal with the temperatures of objects that can be felt by the hands or other body part.

Some languages have a more detailed subdivision of their warm zone, or their cold zone. In a similar manner, a tactile/non-tactile distinction in the cold zone in a language does not presuppose a similar distinction in the warm zone, as Daniel & Khurshudian (2010) show in Armenian,

where there is one word, 'c'urt'(cold) for COLD<sup>2</sup> that can be used only for tactile sensations, while words for HOT can be used for both tactile and non-tactile sensations<sup>3</sup>. This is the opposite of Koptevskaja Tamm and Rakhilina's (2002) findings for Russian, where a tactile/non-tactile distinction exists for HOT but not for COLD.

## 2.2 Non-tactile temperature – thermal comfort

Languages sometimes have special terms for objects that affect the thermal comfort of humans. A typical example is *warm sweater* in English; though the sweater itself may not be warm, it makes the wearer warm<sup>4</sup>. There are several languages where an object bestowing warmth (or coldness) but which isn't that temperature itself cannot be described as warm or cold - instead alternate descriptions such as "thin", "thick", "heavy" etc. is used.

In English, there is a distinction between *I am cold* and *that thing is cold* - the former is a report on a more subjective feeling and the latter is a comment on the objective state of affairs. In other languages, as in Yucatec Maya seen in examples 3 - 5 below, this distinction is also lexicalized, but by the use of different adjectives. Compare (3) where the adjective *síis* (cold) can be used with water (tactile) while its "synonym" *ke'elan* cannot, as seen in example (4). In (5), we see *ke'elan* in its proper environment, that of feelings of thermal comfort. (All examples are from Le Guen 2010)

(3) le **siis** ha'o'  
DET cold water  
the cold water

(4)\*le **ke'el** ha'o'  
DET cold water  
\*the cold water

(5) **ke'el**-en  
cold-AFFIX  
I am cold

## Categories

The difference between tactile and non-tactile temperature terms at least partly rests on the different ways temperature is perceived by humans. As would be expected, many languages also use different temperature terms for different categories of objects - we will see that Ojibwe is a prime example of this when it comes to weather terms. Firsching (2010) finds that Baoulé, spoken in Côte d'Ivoire, recognizes five levels of heat intensity and four different semantic categories with their own set of temperature terms (which Firsching gives as experiencer, weather/environment/sun/wind, body parts, and food/liquids/surfaces/ice/snow/fire).

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<sup>2</sup> Semantic concepts will be written in small CAPITALS.

<sup>3</sup> There are Armenian terms for "very hot" that can only be used for non-tactile terms.

<sup>4</sup> Cf. *cold sweater*, where it is much easier to get the reading that the sweater itself is cold than a sweater that makes the wearer cold.

Apart from the categories of tactile and non-tactile temperature, one of the most prevalent categories is water and liquids: if there is a special word for the temperature of a certain specific kind of substance, rather than just a general term for all tactile temperature sensations, this typically denotes water and/or liquids generally. Water is a substance with many different forms, all of which are necessary for human survival, so it is perhaps not surprising that several of the languages surveyed thus far treat water as a special case linguistically. Returning to Japanese, for instance, the noun *yu* ("hot water") specifically refers to water that already has a certain amount of heat and it is interpreted as "hot/warm water." The (unmodified) noun *mizu* means cold water specifically (Shimotori 2004). Several languages have intensifiers for heat that stem from properties of water: a hot summer's day can be *boiling hot* in English, for example, or the equivalent in Swedish *kok-bett* "boiling-hot."

The number of different categories a language can have is interesting, because the more fine-grained divisions we can find evidence for in language, the more fine-grained psychological categories we can posit. The contents of the different categories is therefore also of prime importance - a long time goal of the typological study of temperature term is to posit universals for which kinds of temperature perceptions are recognized by language and why.

### 2.3 Relative and absolute temperatures

Temperature is not a static property of objects or the environment; it rises and falls, and languages have strategies for expressing these notions. In Tagalog, *mainit* ("warm, warming") indicates a warm temperature that is rising even further, just like *malamig* ("cold, cooling") indicates a cold temperature that is falling (Sutrop 1999). Sutrop names these temperature terms, that indicate both their current and previous state, "relative temperature terms". Those terms that do not encode a change in temperature level are called "absolute temperature terms". Relative temperature terms can be found in many languages, like Chinese, French and Japanese, and as we will see, Ojibwe has its own implementation of this idea.

### 2.4 Anthropocentricity and antonymy

The anthropocentricity that is so prevalent in human perception of temperature is clearly seen in antonymy relations in language - as shown by Koptjevskaja Tamm & Rakhilina (2004) for Russian *xolodnyj* ("cold"). The table below (our Table 1, Koptjevskaja Tamm & Rakhilina's Table 2) shows that the antonym of *xolodnyj* ("cold") is different not only depending on whether *xolodnyj* is describing a tactile or non-tactile perception, but also differs depending on the typical temperature of the object described. House temperatures seldom become hot, *zarkij* ("hot"), while outdoor temperatures do tend to.

Table 1: Anthropocentric antonymy

Table 2: *xolodnyj* and its opposites

	Antonym	Classes of entities	Russian examples
TACTILE USES	<i>gorjačij</i>	courses and drinks water in household and corresponding taps springs treatment (e.g., of metals)	<i>xolodnye vs. gorjačie bljuda, napitki</i> <i>xolodnaja vs. gorjačaja voda,</i> <i>xolodnyj vs. gorjačij kran,</i> <i>xolodnye vs. gorjačie istočniki,</i> <i>xolodnaja vs. gorjačaja obrabotka</i>
	<i>teplyj</i>	only cold-blooded and warm-blooded animals	<i>xolodnokrovnye / teplokrovnye</i> <i>životnye</i>
NON-TACTILE USES	<i>žarkij, znojnyj</i>	Geographic spaces: desert, steppe, plain	<i>xolodnaja vs. žarkaja / zojnaja</i> <i>pustynja, step', ravnina</i>
	<i>teplyj</i>	indoors: peasant house jumper	<i>xolodnaja vs. teplaja izba *</i> <i>xolodnyj vs. teplyj sviter</i>

\* A house or a part of a house which was not heated and could only be used in the late spring, summer and early fall vs. a house or a part of a house which was intended for winters and could therefore be heated.

## 2.5 Basic temperature terms

Sutrop (1999) presented one of the first typological case studies of temperature, examining the basic temperature terms in several languages of the Baltic area and focusing mainly on Estonian. Sutrop introduced the concept of *basic temperature term*; for a term to be considered basic, it must be applicable in all domains and with all manner of subjects (animate, inanimate, weather etc.), must be psychologically salient and should be morphologically simple and of native origin. He finds languages with no basic temperature terms (all their terms are specialized or do not follow the other criteria mentioned above) and others with several. There doesn't seem to be a constraint on whether it is a HOT or a COLD word that is denoted when a language has only one term, though Sutrop notes that colder regions seem to have a COLD word in a one-term basic system, whereas hotter regions have a HOT word – it remains to be seen if this is carried out in a larger language sample. Sutrop also mentions languages with two, three or four basic terms. The languages mentioned do, of course, have additional temperature terms, but they were not judged to be basic by Sutrop, who further notes that while temperature terms may be adjectives, in some languages they are nominal or verbal. Unfortunately, none of the languages discussed by Sutrop are as highly synthetic as Ojibwe, and we do not know how he would handle languages where most words are morphologically complex.

## 3. Background on Ojibwe

As mentioned above, lexical typology of temperature studies originally focused on relatively isolating languages, but typological theories must hold when tested against a range of linguistic data. American Indian languages in general are known for polysynthesis, and Algonquian languages prove no exception; as such, some information on the languages will be necessary to orient the reader.

### 3.1 Situation and Language Family

A daughter of the Algonquian branch of the Algic language family, Ojibwe is one of a set of varieties known to speakers as *Anishinaabemowin* or *Nishnaabemwin*, an endonym that applies to speakers of other dialects of Ojibwe and even Potawatomi (Bodewadmi), but see Valentine (1994) for a more thorough, sociolinguistic survey of dialectal variation. Suffice it to say here that Mr. Howard Kimewon, our consultant and collaborator, self-identifies as a speaker of Eastern Ojibwe.

(See especially Valentine 2001, Rhodes 1985, Bloomfield 1958.) In Figure 1 below, Ojibwayan varieties can be seen in red, covering Michigan, Ontario, and Manitoba north of Lakes Huron and Superior. Figure 2 gives a tentative dialect grouping of the Anishinaabemowin varieties and a sister, Menominee, for comparison; as visualized through the MultiTree interface.

Figure 1: Distribution of Anishinaabemowin in North America. (Wikimedia Commons)

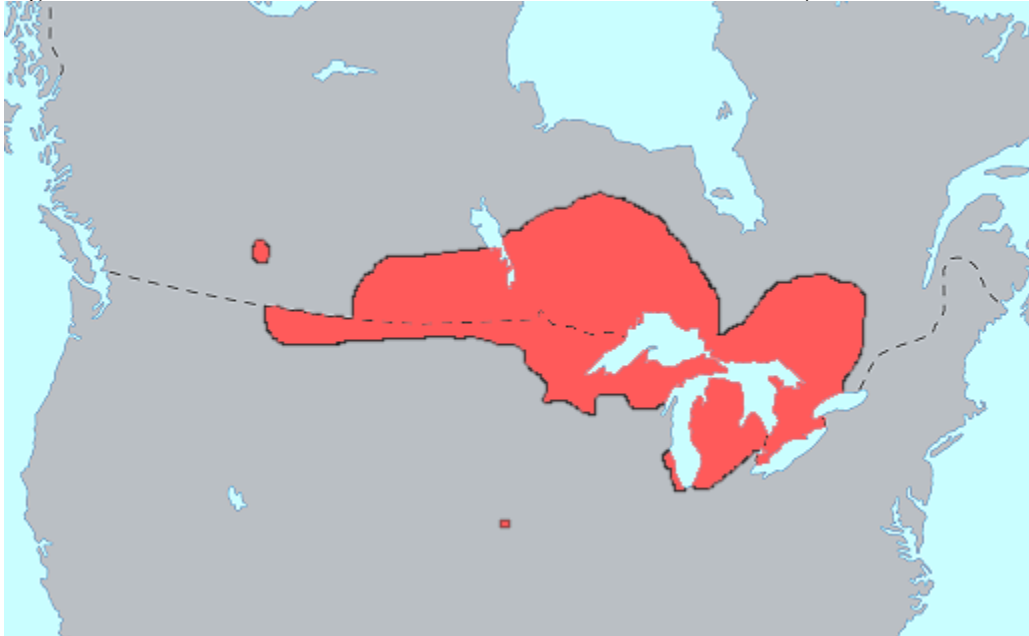
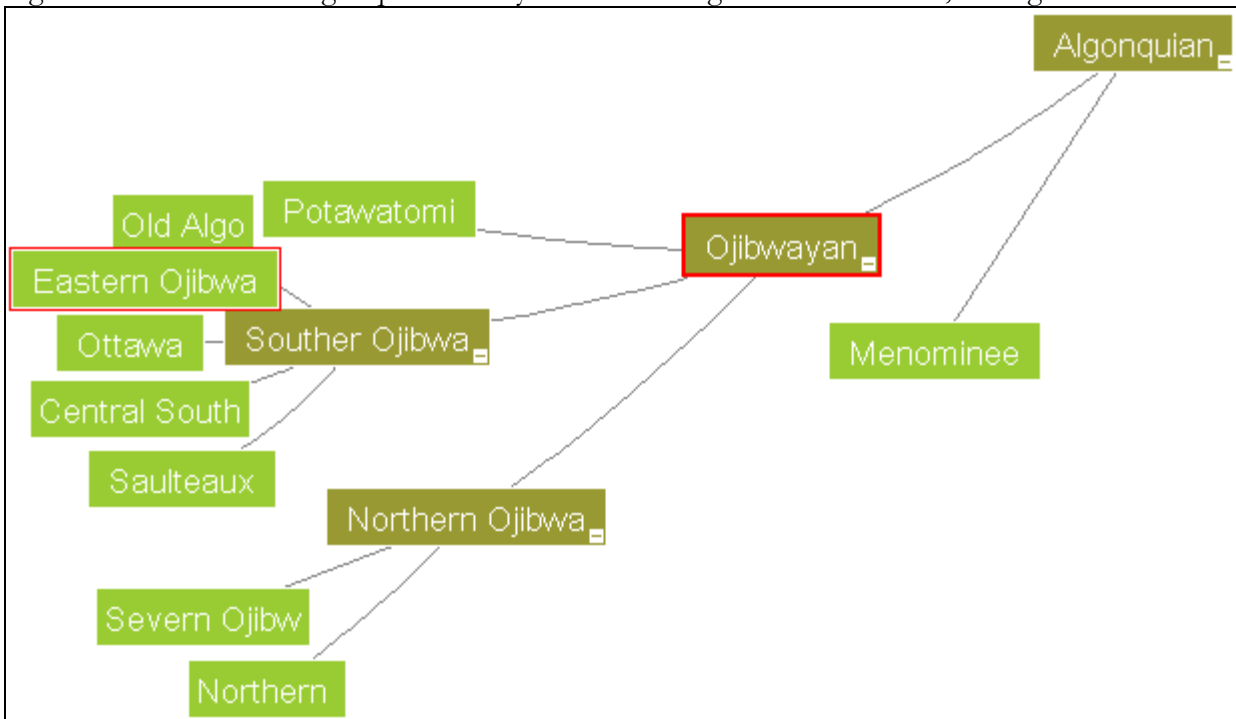


Figure 2: Subset of the Algonquian Family Tree according to Goddard 1996, through MultiTree.



Like other Algonquian languages, there is a deep history of scholarship on Ojibwe, so in preparing elicitation materials and analyzing Mr. Kimewon's responses, we had a number of resources at our disposal. With the widespread usage of the Internet in North American indigenous language communities, many examples can be quickly checked online against pedagogical websites (eg, Kimewon and Noori 2009) and online dictionaries (eg, Weshki-ayaad, Lippert, and Gambill 2009). Such resources were utilized to supplement resources more well-known to Algonquianists (particularly Rhodes 1985 and Valentine 2001). Besides being an unspeakably invaluable resource on the language in general, Valentine (2001) contains an organized list of examples of temperature expressions (ibid. 896-898), which will be discussed in more detail. It was also necessary on occasion to consult older resources, namely Baraga 1878 and Wilson 1875; both contain an excursus on grammar from a missionary's perspective, example sentences, and a fairly accurate dictionary. Even with all these materials, the fortis/lenis contrast in stop consonants and highly synthetic nature of Ojibwe words meant that some words and expressions were difficult to find documented.

### 3.2 Ojibwe Morphosyntax

Ojibwe is known as a head-marking, polysynthetic language with a direct-inverse type of alignment system. Valentine 2001 lists the following parts of speech: nouns, pronouns, verbs, adverbs, numbers, particles, prenouns, and preverbs. Like the other Algonquian languages, nominal gender is animate/inanimate, and following Bloomfield's landmark analyses (eg Bloomfield 1946, Bloomfield 1958), Algonquian verbs are traditionally described as falling into four major categories based on animacy and transitivity: inanimate intransitive verbs (VII), animate intransitive verbs (VAI), inanimate transitive verbs (VTI), and animate transitive verbs (VTA). Importantly, note the lack of an adjectival category in the list above; words that serve an adjectival function are invariably verbs, carrying a reading like 'to be a hot X' rather than 'a hot X.' Due to the nature of temperature expressions and following Koptjevskaja Tamm & Rakhilina (2006), we focus on the intransitive inanimate (VII) and animate intransitive (VAI) verbs<sup>5</sup>.

Prenouns/preverbs are (generally) modifiers that prefix to nouns or verbs, respectively, but are treated as separate parts of speech for reasons beyond the scope of our discussion. Table 2 gives a word template for the class of intransitive inanimate verbs (i.e., intransitive verbs with inanimate subjects), modulo suffixes that are not important here (and person prefixes only applicable to vai). Note the complex stem consisting of initial, medial, and final elements. Typically at least an initial and final element are present in every intransitive verb, but many of the examples we present crucially differ in terms of medials. Valentine 2001:424 notes that "the boundary between the preverb and initial position is relatively porous, and some elements show variable representation depending on the nature of the material they are associated with." In the analysis presented below we make note of such preverb-initial pairs, like the preverb *ggwetanaa-* and the initial *ggwetaan-*, which have essentially the same meaning, "awfully, extremely," but the preverb can optionally be attached to any lexical unit whereas an initial is requisite in constructing a lexical unit. We take up these issues further in the next section.

Table 2: Ojibwe word template (After Valentine 2001:93).

Preverbs/Prenouns	Initial	Medial	Final
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<sup>5</sup> For an exceptionally detailed analysis of intransitive verbs, the reader is referred to Denny 1978 and Valentine 2001, especially chapters 5, 6, 9 and 17.

## Methodology

The current study took as its foundation a questionnaire developed by Professor Koptjevskaja Tamm (Koptjevskaja Tamm 2007). The questionnaire considers the properties of of tactile, non-tactile, experiencer-based and extended (e.g. metaphorical) uses of temperature terms, the relations between these terms when it comes to intensity scales, synonymy and antonymy, and the general characteristics of the temperature terms in the way they are handled morphosyntactically. Based on the questionnaire, we developed plans for four elicitation sessions with Mr. Kimewon. Mr. Kimewon is bilingual in Ojibwe and English, and is now a teacher of Ojibwe at the University of Michigan and a driving force in various language revitalization activities, including Kimewon and Noori (2009).

Due to the time constraints of the current study we chose not to delve into the metaphorical use of temperature expressions – and at first glance there do not seem to be many metaphors taking temperature expressions as vehicles to express other semantic concepts, but this is a topic for future research (and see Rhodes & Lawler 1981 and Rhodes 1986 for some discussion on metaphors, morphemes and meaning in other domains in Ojibwe). It is possible that there is a very low level of native metaphorizing in Ojibwe as a whole; as Goddard (2004) notes, metaphorizing is not necessarily a universal human illocutionary tool.

The first elicitation session served as an initial exploration of Ojibwe temperature terms, beginning with a free association task where we asked Mr. Kimewon to come up with as many temperature terms as possible to discuss their uses. Following that, we asked him to judge the temperature-related sentences listed in Valentine (2001:896-898). The female speaker cited therein hails from Mr. Kimewon's home island, so we did not expect to see major discrepancies between the speaker and Mr. Kimewon. We will see how this hypothesis fared below.

The second session focused on the various semantic classes that exist in the temperature domain. We noticed that Mr. Kimewon would provide slightly different temperature words for nouns that fit into such categories as metal/stone, liquids, round objects, personal temperature, and ambient temperature, some of which we delve into below. Weather and ambient temperature terminology noticeably differed with respect to not only indoor and outdoor temperature, but also varied based on whether the air was moving, or whether the sun is shining, among other factors. We wrote the forms on small notecards in the Fiero Double Vowel orthography that enjoys popular use among the Ojibwe community (Valentine 2001:29). Mr. Kimewon then rearranged the words to align to a hot-cold scale for each apparent semantic domain.

The third elicitation session focused on relationships between various temperature expressions and on the anthropocentricity of the system – the lexical behavior of qualifiers for naturally hot and cold liquids (tea and juice) were contrasted, for example. Mr. Kimewon then participated in an antonym task, both by looking at the opposites of the temperature words in isolation and by looking at the antonyms of temperature terms modifying noun headwords of different types. The fourth session was devoted to comparatives and to the difference between various kinds of animate beings (chiefly animals and humans) and the way they are described to experience temperature, as well as checking results from previous sessions.



#### 4. Results

As discussed above, the Ojibwe verb stem is complex; in practice this means that each response Mr. Kimewon gives must be analyzed and decomposed not only into words in a sentence but also into the major categories within each individual word. The examples below illustrate the medial classifier stems meaning "liquid" and "metal, inorganic solid" (Valentine 2001) and how prefixes and suffixes work together to contribute to a meaning that is the equivalent of a complete sentence of English.

Table 3: Sample Ojibwe Temperature Terms

Preverb	STEM: Initial	STEM: Medial	STEM: Final	Gloss <sup>6</sup>
(6) Ø-	dk- (cold)	-aagam- (liquid)	-i (VII)	"(The) liquid is cold."
(7) Ø-	gzh- (hot)	-aagam- (liquid)	-ide (heating. VII)	"(The) liquid is hot."
(8) Ø-	Ggwetan- (awfully, extremely)	-aagam- (liquid)	-ide (heating. VII)	"(The) liquid is awfully hot."
(9) mno- (good, nice)	dk- (cold)	-aagam- (liquid)	-i (VII)	"(The) liquid is pleasantly cold; lukecold."
(10) Ø-	giizhoo- (warm)	-aabik- (metal)	-ide (heating. VII)	"(The) metal is warm."
(11) Ø-	msko- (red)	-aabik- (metal)	-ide (heating. VII)	"(The) metal is red hot."
(12) Ø-	dk- (cold)	-Ø-	-aanimad (wind. VII)	"It's cold and windy."

In (6) we see the use of an initial *dk-* (or *dak-*) to indicate coldness, and a simple verbal final element *-i* which serves only a grammatical function, marking an intransitive verb acting on or modifying an inanimate subject (also an experiencer). In (8), Ojibwe uses the initial *ggwetan-* "awfully, extremely" (Rhodes 1985) where in English we see the adverbial modifier "awfully" as an independent lexical unit, and the final in (7), (8), (10), and (11) *-ide* has semantic content on top of serving a grammatical function, indicating heat, contrasting with (6) where the final meant neither hot nor cold. So in (8) *ggwetan-* and *-ide* both contribute to the overall meaning of "awfully hot" where in (6) only the initial *dk-* refers to the cold. In (9) "lukecold metal" the positive evaluative preverb *mno-* is prefixed to (6), and serves to mollify the meaning of (6); the liquid is now cold, but more pleasantly so, the cool end of the neutral zone. In (11) we see the use of the color term *msko-* "red" to mean that the metal in question is red hot - with our common sense and experience we know that substances go through physical (and sometimes chemical) changes in the presence of heat and that metal glows and becomes pliable, which licenses the color preverb. Alternatively, (12) shows us that the initial *dk-* combines with the verb final *-aanimad* that carries the meaning of

<sup>6</sup> In the following tables, glosses will not always be provided in the form of complete English sentences; these forms are generally given as "(liquid/metal/etc.) is (cold/warm/etc.)" – this is meant to indicate the form's requiring a subject/experiencer argument of an appropriate sort (a glass of tea or a metal pole that's been outside all winter, for instance).

windiness with no medial classifier; as we will see below, expressions of ambient temperature in this way behave differently than temperature expressions describing inanimate objects.

After the first elicitation session we were left with a long list of expressions similar to the ones given above. Upon completing the ranking task in the second elicitation session we were presented with a series of scales which was submitted to further analysis in the third and fourth sessions. Below we present the three domains for which the most comprehensive data was obtained; first liquids and metals, and then ambient (weather/climate) temperature. The candidates for basic temperature morphemes will be in bold, the morphemes that are not exclusive to the temperature domain (ast *mno-*, *msko-* and *ggwetan-* above) will be underlined, and the medial classifiers and domain specific expressions will be italicized.

We see several patterns in Tables 4-6: words describing the temperature of objects like liquids and metals require medial classifiers that differ depending on the type of object described. Ambient temperature words cannot take medial classifiers. All the ambient temperature expressions and the hot non-climate temperature expressions take suffixes that carry semantic information, summed up in Table 7.

Table 4: Temperature of Liquids

	Ojibwe	English
HOT	(13) <u>wiisag</u> - <i>aagam-ide</i>	“liquid is painfully, seriously hot”
	(14) <u>ggwetaan</u> - <i>aagam-ide</i>	“liquid is awfully hot”
	(15) <b>gzh</b> - <i>aagam-ide</i>	“liquid is hot”
	(16) <b>giizhoo</b> - <i>aagam-ide</i>	“liquid is warm”
NEUTRAL	(17) <u>mno</u> - <u>piit</u> - <i>aagam-ide</i>	“liquid is lukewarm”
	(18) <u>mno</u> - <i>aagam-ide</i>	“liquid is lukewarm”
	(19) <u>mno</u> - <b>dk</b> - <i>aagam-i</i>	“liquid is lukecold, cool”
COLD	(20) <b>dk</b> - <i>aagam-i</i>	“liquid is cold”
	(21) <i>mkomiv</i> - <i>aagam-i</i>	“liquid is ice cold, frozen”

In this table we see clearly defined above normal, neutral temperature and below normal levels of intensity; the different is above normal temperatures are defined by the final *-ide* in examples (13) – (18) and also the initials *gzh-* and *giizhoo-*, ‘hot’ and ‘warm’ respectively, and ‘cold’ is indicated with the initial *dk-*. The neutral zone shows the verb final *-ide* ‘heating’ as well as the perverb *dk-* ‘cold’ in different combinations with the initial/preverb *mno-* ‘good, well, fine, nice’ (see examples (17) - (19)). Initials that alternate with preverbs of the type discussed in §5.2 are underlined in e.g. (13) and (14); *wiisag-* and *ggwetaan-* can serve as initials as they do in these examples, but speakers can also attach the corresponding free standing preverb, as in:

(14')  
 ggwetaanaa ggwetaan-aagam-ide  
 very very-liquid-hot.VII  
 “(the liquid) is really, awfully hot.”

(21) is entirely italicized because it is relatively domain specific; use of the initial *mkomiv-* is restricted to those situations where ice is actually present.

Table 5: Temperature of Metal, Stone, and Inorganic Solids

	Ojibwe	English
HOT	(22) <i>misko-aabik-ide</i>	“metal is red hot”
	(23) <i>wiisag-aabik-ide</i>	“metal is painfully, seriously hot”
	(24) <i>ggwetaan-aabik-ide</i>	“metal is awfully hot”
	(25) <i>gzh-aabik-ide</i>	“metal is hot”
	(26) <i>giizhoo-aabik-ide</i>	“metal is warm”
NEUTRAL	(27) <i>mno-piit-aabik-ide</i>	“metal is lukewarm”
	(28) <i>mno-aabik-ide</i>	“metal is lukewarm”
	(29) <i>mno-dk-aabik-i</i>	“metal is lukecold, cool”
COLD		
	(30) <i>dk-aabik-i</i>	“metal is cold”
	(31) <i>?mkomiv-aabik-i<sup>7</sup></i>	“metal is frozen”

Table 5 shows much the same pattern for metal/stone/inorganic solids as liquids above, including the domain-specific (22) *misko'aabikide* “metal is red hot” (cf. Denny 1978 p301 for a more detailed analysis that involves breaking down finals like *-ide* and the ones presented below ). Table 6 below shows a slightly different pattern; no medials and more specific, environmental verbal finals in place of *-ide*.

<sup>7</sup> This expression is reportedly only acceptable if the metal actually has ice on it.

Table 6: Weather & Ambient Temperature, non-personal

	Ojibwe	English
HOT	(32) <b>gzh-inaamde</b>	“it’s hot and humid”
	(33) <b>gzh-aate</b>	“it’s hot and sunny”
NEUTRAL	(34) <b>giizhoo-aanimad</b>	“it’s warm and windy”
	(35) <b>mno-gzh-ide</b>	“it’s comfortably warm”
COLD	(36) <b>mno-dkate</b> <sup>8</sup>	“it’s comfortably cool”
	(37) <b>dk-asin</b>	“it’s cooling off; it’s cold”
	(38) <b>gsin-aa</b>	“it’s cold”
	(39) <b>dk-aanimad</b>	“it’s cold and windy”

In every domain we see well-defined hot, cold, and neutral zones. We see in tables 4 and 5 that non-climatic temperature expressions require medial classifiers that index the type of material being described, and in table 6 we see that these medial classifiers are not allowed for climate expressions. There is only one suffix in tables 4 and 5 that carried temperature information, namely, *-ide*, which meant ‘hot’, but there are several different kinds of verbal finals present in Table 6. They have to do with the weather or ambient/atmospheric conditions, except in the case of example 37, which we will discuss below. We see *-inaamde* (Example 32), referencing the humidity, and *-aate*, referring to the sun (example 33). The suffix *-aanimad* can be used when the air is circulating, by wind or air conditioner, and is the only verbal suffix that we find used for both the hot and cold domain (examples 34 and 39) – in which case it is the lowest temperature on both the hot and cold scale. Our discussion in §4 showed that some languages, e.g. Russian, expresses hot and sunny temperatures with its own temperature expression *zarkij* (“hot and sunny”). Both English and Swedish have temperature expressions which must denote humidity: *clammy* and *rått*, for example, both meaning cold, humid, and unpleasant, and *muggy* in English meaning warm and humid. It may

<sup>8</sup> Cf. Rhodes 1985 *dkate* “be cold in a room/house” – note that ‘-ate’ is different from the ‘-aate’ ending which is also discussed in this chapter.

well be that sun, wind and humidity are the three most common temperature sources in the weather domain, and that they therefore will be the ones most often given their own vocabulary.

Example 37, *dkasin* ("It's cooling off") is our one example of a relative temperature term - it has the semantic feature of falling temperature. We have not been able to find the 'gsin-' initial in example 38, 'gsinaa'(it is cold), in any other expression.

The personal feeling temperature terms in Ojibwe pattern closely after the weather temperature terms morphosyntactically, but with different verb endings, as can be seen in Table 7 below.

Table 7. Personal feeling temperature terms in Ojibwe

(40)gzh-ayaa	I feel hot/it is hot [in this place]
(41)gizhoo-ayaa	I feel warm/it is warm [in this place]
(42)mno-zhayaa	I feel good, comfortable
(43) <b>dk</b> -aayaa	I feel cold/it is cold [in this place]
(44) biing-ej	I feel cold/it is cold [in this place]
(45) mshkaw-ninji-wj-i (cf. Valentine 2001:385-8)	He has frozen, frostbitten hands

Examples (40), (41) and (43) are fairly straight forward – they take no medial classifiers, they use the verbal ending –ayaa which loosely translates to “I feel”, and they take a temperature preverb (gzh-, gizhoo- and dk-). Example (42) is not a temperature term in the strictest sense – but it is the most common elicited response to the question “how do you say, ‘I feel warm’”. The phrase can be used to comment on health as well, or mood, and it therefore not exclusive to the temperature domain. Finally example (44) is a very common term indicating that the speaker feels cold. It uses a to us unfamiliar preverb, ‘biing-’, and a verbal ending ‘-ej’. An allomorph of this verbal ending can also be seen when temperature information is incorporated into body part terms, as in example (45).

We have chosen not to treat every single kind of weather temperature as its own semantic domain – they can be abstracted to a common template, presented in table 8 below, where parantheses indicate optionality. As seen in Table 8, the main distinction we have evidence for in the Ojibwe temperature system is between ambient and personal feeling temperature on the one hand and non-ambient expressions on the other. This division is similar, but not identical, to the Japanese distinction. For instance, in Japanese, the temperature that clothing bestows on the bearer is denoted with the same expressions as ambient temperature, while in Ojibwe clothing temperature is denoted with the same expressions as are non-ambient perceptions. Yet the same basic distinction, between temperature perceivable through one body part, and temperature perceivable by the whole body remains, with different nuances and minor differences in the two languages. The fact that no classifier is necessary for weather expressions merits further semantic studies – an initial hypothesis is that this indicates the presence of a greater degree of agency present in the weather terms than in non-weather terms. The other object of interest in table 7 is that hot and cold non-ambient

expressions are treated morphosyntactically different. For non-climate expressions, there is a verbal ending with the semantic feature HOT, but no such corresponding ending expresses COLD. The fact that such a HOT suffix exists leads to greater flexibility with the use of preverbs – it is possible to skip the preverb expressing HOT and substitute a degree preverb, as long as the heat is expressed in the verbal ending.

Table 8: Template for Temperature Expressions

Domain	Preverb	Prefix	Medial	Suffix
<b>Non-ambient: Hot</b>	(Degree/Evaluative- AND/OR HOT-)		Classifier	-HOT.VII
<b>Non-ambient: Cold</b>	(Degree/Evaluative)	COLD-	Classifier	-VII
<b>Weather: Hot</b>	(Degree Evaluative)	HOT-	∅	SOURCE. VII
<b>Weather: Cold</b>	(Degree/Evaluative)	COLD-	∅	SOURCE. VII
<b>Personal feeling: Hot</b>	(Degree Evaluative)	HOT-	∅	-to experience.VII
<b>Personal feeling: Cold</b>	(Degree/Evaluative)	COLD-	∅	-to experience VII

## 5 Discussion & Conclusion

Every additional language which has its temperature term system studied brings new linguistic data and insight, whether by confirming existing theories or by showing us new ways that the human mind can perceptualize temperature sensations. When the language is from a family that hitherto has not been studied from this angle, as is the case with Ojibwe at present, it has an even greater potential to offer new insights. As seen from a typological perspective, the data from Ojibwe reinforces the theory that the division between ambient and non-ambient kinds of temperature is fundamental in many languages and cultures. As we would have expected, the distinction is not clear cut across languages – what exactly counts as a tactile and non-tactile temperature sensation is different in different languages and communities.

### 5.1 Weather terms

The present study has made us very interested in the way that temperature terms and weather terms interact. In Ojibwe, speakers have to choose in which way non-tactile weather temperatures reached their specific temperature level. Was the greatest factor the sun shining, the wind blowing or the humidity in the air? Having seen how clearly Ojibwe recognizes these weather factors, we can look at other languages and see that while e.g. Swedish has a simpler temperature system than Ojibwe (in that it does not recognize the tactile/non-tactile distinction other than in certain specialized words) it does, however, have certain words that can only be used to describe the weather (or be used metaphorically), such as *kylig* ("chilly"), *mild* ("mild"), *kvalmig* ("unpleasantly hot and humid") and *rått* ("unpleasantly cold and humid"). Weather temperature can also be indicated by reference to the source of the heat, as in the adjective *solig* ("sunny and warm"), or *frisk* ("fresh, cool and invigorating"). *Frisk* is a complex word, which probably has a primary meaning of invigorating, but also carries a sense of coolness with it when applied to places or times – *en frisk dag* ("a fresh day") is noticeably cool, but in a pleasant, energetic way. The temperature information can also be incorporated into nouns, as it is in *bris* ("breeze"), which denotes a breeze that has a natural, pleasant coolness to it.

The Swedish temperature term system clearly recognizes the effect of the sun, moving air and humidity on the resulting temperatures – though this fact was hard to notice until we were made aware of this possibility through the Ojibwe data. This raises further questions, of course, about whether there are universal weather factors encoded in the world's temperature term systems, or if there are culturally or climatically driven patterns as to which kinds of weather factors are embedded in lexemes.

## 5.2 The question of basicness

One of the criteria proposed by Sutrop (1998) is that the basic terms be morphologically simple; languages with a higher morpheme-to-word ratio illustrate the need for a shift in how basic temperature terms are to be discovered in languages. This is the first study of the semantic temperature domain in an Algonquian language, and in lexical typology it is of course crucial to gather data from as many language families as possible. Our hope is that this study can serve as a stepping stone to similar studies in other American Indian languages and other endangered languages before it is too late.

Even if the recognition of basic colour terms has been a good tool in the study of color term systems in the world's languages, it is not necessarily the case that the same is true for other perception-reporting linguistic systems.<sup>9</sup> Sutrop (1999) lists grammatical complexity, cross-semantic applicability and nativeness as the main criteria for temperature basicness. We have already mentioned that grammatical complexity is a hard criteria to meet for a synthetic language where temperature is expressed through affixes. Tied to this is, in the case of Ojibwe, the issue with the cross-semantic applicability. In the examples below we could say that the bound preverb *gʒb-* is applicable both for weather related temperature terms (46) and for tactile terms (47).

(46) *gʒb- Ø -inaamde* "it's hot and humid"

(47) *gʒb-aagam-ide* "some liquid is hot"

But in (46), *gʒb-* alone cannot indicate temperature level; it must be combined with the verbal ending *-ide*, which also carries the semantic feature HOT. Unlike *ide-*, *gʒb-* is not mandatory for non-ambient temperature terms; it can be swapped out with a different initial as long as *-ide* is present. On the other hand, for ambient temperature terms and personal feeling expressions *-ide* is not allowed, while *gʒb-* or *dk-* are mandatory. In short - there are no cross-semantically applicable morphemes for temperature, and thus, on previously accepted definitions, no basic temperature terms.

We question the definition of the criteria of basic temperature terms if there are many more languages like Ojibwe which, due to their lexical structure, can never qualify for basic temperature terms under now-accepted definitions. The definition of cross-semantic applicability should be further refined. To accomplish this, it will be necessary to study more languages where temperature features are expressed in bound morphemes before the question of cross-semantic applicability can be revisited in a fruitful manner. But it may be that there are other tools than basicness which will reveal more about the typology of temperature expressions - such as the semantic categories that can be recognized in languages. There are many languages which, if they have two semantic categories,

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<sup>9</sup> See e.g. Lucy 1997:299-300 and Levinson 2001.

recognize the difference between ambient/weather and non-ambient/non-weather perceptions of temperature – or between personal feeling temperatures and other temperatures. Likewise, it would be interesting to see which kinds of temperature-related weather phenomena are lexicalized in languages; we have seen sun, wind and humidity so far in Ojibwe. Bergström (2010) introduces the term "temperature bearer" for concepts which, like 'wind', 'fire' or sun', are often the etymological root of temperature expressions.

### 5.3 A note on sociolinguistics

As indicated above, Valentine 2001 presents a list of temperature expressions in Ojibwe (ibid. 896-8) which were important in our preparing for and carrying out this study. As we noted in the Methodology section, we did not expect Mr. Kimewon's productions to veer too far from what was set out in Valentine 2001. While also demonstrating the use of medial classifiers for "liquid" and "metal" described above in detail, Valentine 2001 contains expressions like the following (both provided by a college-educated female speaker):

(48) Aaniish epiichi-gsinaag?  
"How cold is the weather?" (ibid. 896, #126)

(49) Niizhtanaa piichi-gsinaa  
"It's 20 *degrees* cold." (ibid. 896, #127, *emph. added*)

These sentences were met with some measure of surprise by Mr. Kimewon because of the italicized preverb, a particular type of relative root, in Algonquianist terminology an element that "may serve to indicate the predicate's source, reason, manner, location, quantity, degree, or extent" (ibid. 421). Valentine glosses this particular relative root, /apiit/, as "extent; particular amount," and in this usage it explicitly refers to the numerical degree of temperature (*niizhtanaa*, "20") as shown in (43). Using numbers to describe temperature is a relatively modern contrivance; before the invention of the numerical thermometer in the 17th century there was no way to discuss temperature in terms of numbers, and the development of the consistent numerical scales (Kelvin, Celsius, and Fahrenheit) that we now take for granted are matters of the history of the physical sciences.

Apparently as a result of English intrusion there are gender, educational, and/or generational differences in acceptability judgments of temperature words vis-à-vis the use of numbers. Deep-seated changes to indigenous perspectives came about as a result of American expansion and missionary activity, and individuals undertaking this type of work on American Indian languages must always bear this in mind. As Howard Kimewon reminded us: "You would be looking at the thermostat, asking this. There is no thermostat in the woods (...) You know, they never used numbers (...) before in the language. The settlers came around, they started using numbers on how cold it was."



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