Evidence Connecting Ainu and Na-Dene Languages

Qin Liu[1, 2] [*]

1. Stanford University, California, USA
2. Charité – Universitätsmedizin Berlin, Berlin, Germany

Abstract

Ainu language is traditionally considered as a language isolate. Two main categories of attempts linked Ainu with (1) Altaic or Eurasiatic languages, and (2) Austronesian or Austroasiatic languages. However, these hypotheses have not been widely accepted. The present study argues that Ainu is genealogically connected with the Na-Dene languages in North America. Evidence is presented in three aspects: (1) the existence of many possible cognate etymologies that distributed in body parts, animal-related nouns, artificial objects, and other basic word categories; (2) homologous semantic networks of cognate words and word stems that indicate deep linguistic and cultural intertwines; and (3) regular sound correspondences that are tentatively summarized between Ainu and Na-Dene languages. The position of Ainu in the Dene-Yeniseian and the Dene-Caucasian hypotheses is also discussed. The Ainu-Dene connection, if true, will add an important link between New World and Old World languages, and will shed light on the early migrations of peoples in Beringia and Eurasia.

[*] Corresponding Email: qinliu320@gmail.com

1. Introduction

Ainu is the indigenous people living nowadays in Hokkaido, Japan, and historically also in Honshu, Kuril Islands, and Sakhalin Island (Tamura 2000). The Ainu language is a severely endangered language spoken only by 15 people as of 2011 (Teeter and Okazaki 2011). There have been many attempts to link Ainu with other languages and language families. In early studies, Ainu has been compared with Hebrew (Batchelor 1895), Indo-European languages (Lindquist 1960; Naert 1958, 1961), Basque, Yeniseian languages, and other Eurasian languages (Tailleur 1963, 1968). More recently, the efforts on classifying Ainu mainly focused on the comparison with Altaic, or with Eurasiatic macrofamily including Altaic, Uralic, Indo-European languages, etc. (Greenberg 2000; Jäger 2015; Patrie 1982; Ruhlen 1991), and Austronesian or Austroasiatic languages including Austronesian, Thai-Kadai, and Miao-Yao (Bengtson and Blažek 2009; Sternberg 1929; Vovin 1992). However, none of these assumptions has been widely accepted and Ainu is generally treated as a language isolate.

On the other side of the North Pacific Ocean, Na-Dene languages are a large language family spoken by indigenous peoples in North America. The Na-Dene language family consists of three branches: Tlingit, Eyak (recently extinct), and Athabaskan languages. Tlingit and Eyak are single-language branches, while Athabaskan languages are spoken in Alaska and northwestern Canada (Northern Athabaskan), California and Oregon in the USA (Pacific Coast Athabaskan), and American southwest and northwest Mexico (Southern Athabaskan/Apachean). Haida has been historically included in the Na-Dene language family but now is usually thought to be a language isolate that has been heavily influenced by Na-Dene languages (Vajda 2010b).

The origin of Na-Dene speaking ethnic peoples and potential long-range genealogical links between Na-Dene languages and Old World languages/language families have long been discussed. Sapir suggested that Na-Dene languages are related to Sino-Tibetan languages (for a review, see Bengtson 1994). Starostin proposed a macrofamily that includes Sino-Tibetan languages, North Caucasian languages, and Yeniseian languages (Starostin 1991). Later, Nikolaev added Na-Dene languages (with Haida included) (Nikolaev 1991), and Bengston added Burushaski languages, Vasconic languages, and Sumerian into the macrofamily to form a Dene-Caucasian macrofamily hypothesis (Bengtson 1996, 1997b, 1997a). A three-wave model of America's settlement, originally proposed by Greenberg et al. based on a synthesis of linguistic, dental and genetic evidence, placed Na-Dene ancestry in the second wave of migration from Beringia (Greenberg et al. 1986). Ruhlen supported that Na-Dene speakers represent a distinct migration in between Proto-Amerind speakers and Eskimo-Aleut speaking peoples and he presented etymological evidence between Na-Dene and Yeniseian languages (Ruhlen 1998). Separate research by Fortescue (1998), Werner (2004), and Vajda (2010a, 2010b) supported the Dene-Yeniseian connections. Vajda's analysis found no evidence for Haida to be included in the Dene-Yeniseian hypothesis, which was usually included in previous hypotheses to link Na-Dene languages with Old World language families.

This paper presents evidence that the Ainu language is genealogically linked with Na-Dene languages, especially Athabaskan languages. This hypothesis is aligned with evidence from human genetic studies, which are also reviewed in section 2.5 in this paper. If this Ainu-Dene

61 hypothesis is true, it will shed light on the origin of Ainu and Na-Dene populations, and the early
62 migrations of peoples in Eurasia and Beringia. The linguistic evidence discussed in the present
63 study indicates a more complex migration process of Na-Dene peoples into North American than
64 the traditional theories. The Ainu-Dene link will also add an important link between New World
65 and Old World languages that can provide insights to other theories around Na-Dene languages,
66 such as the Dene-Yeniseian hypothesis and Dene-Caucasian hypothesis.

2. Evidence of a genealogical link between Ainu and Na-Dene languages

68 The following section presents the evidence of a genealogical link between Ainu and Na-Dene
69 languages in three aspects: a significant amount of cognate etymologies distributed in all basic
70 word categories, homologous semantic networks of cognate words and word stems that implies
71 deep linguistic and cultural links, and sound correspondence between Ainu and different
72 branches of Na-Dene languages. In addition, human genetic studies of Eurasian, East Asian, and
73 North American peoples are reviewed which suggested that Ainu has a close relationship with
74 Na-Dene peoples.

2.1 Etymological evidence

76 The cognate list in section 3 consists of 65 words shared by Ainu/Proto-Ainu and Na-Dene
77 languages. These cognates are found from different fundamental categories, such as body parts,
78 animal-related nouns, natural phenomena, numerals, artificial objects, and other basic words. The
79 quantity and distribution of cognate words in different fundamental categories suggest the
80 similarities in etymologies are not likely coincidental.

81 Some of the most strikingly similar cognate words are from the body parts category. The modern
82 Ainu word for "breast" is *to*, and the Proto-Ainu word constructed by Vovin is *tɔ:*. On the Na-
83 Dene side, "breast" is expressed similarly, e.g., Ahtna *t'u:*, Navojo *-t'o*, and in Proto-Athabaskan
84 "suckle" is *t'əq'w*. The word for "face" in Ainu is *nan*, and in Denaʻina *-nan*, and Koyunkon
85 *na:nˀ*. Cognate words with high similarities also include words for eye, mouth, liver, foot, etc. In
86 other fundamental word categories, cognate etymologies of such good phonological similarities
87 have also been observed. With the sound correspondences discussed in section 2.3, more cognate
88 words of Ainu can be found in Na-Dene languages, especially in Athabaskan languages. Section
89 3 presents a list of 65 possible cognates between Ainu and Na-Dene languages. More cognates of
90 Ainu etymologies are found in Athabaskan languages than in Eyak and Tlingit. Words of other
91 languages of interest from Dene-Yeneseian and Dene-Caucasian hypotheses, e.g. Ket, Kott,
92 Sumerian, and Sino-Tibetan languages, are also included for reference in some cases.

2.2 Homologous semantic networks of shared etymologies

94 Besides etymological evidence based on phonological similarities, more systematic evidence will
95 be needed to rule out similarities by chance. Semantic chains and networks of basic cognate
96 words or word stems can serve as one type of systematic evidence as they contain rich
97 information of etymology, morphology, and culture. If the corresponding semantic networks of
98 languages for comparison have homologous structures and the words or word stems in the
99 networks are cognates, the languages are likely to have deep linguistic and cultural connections.
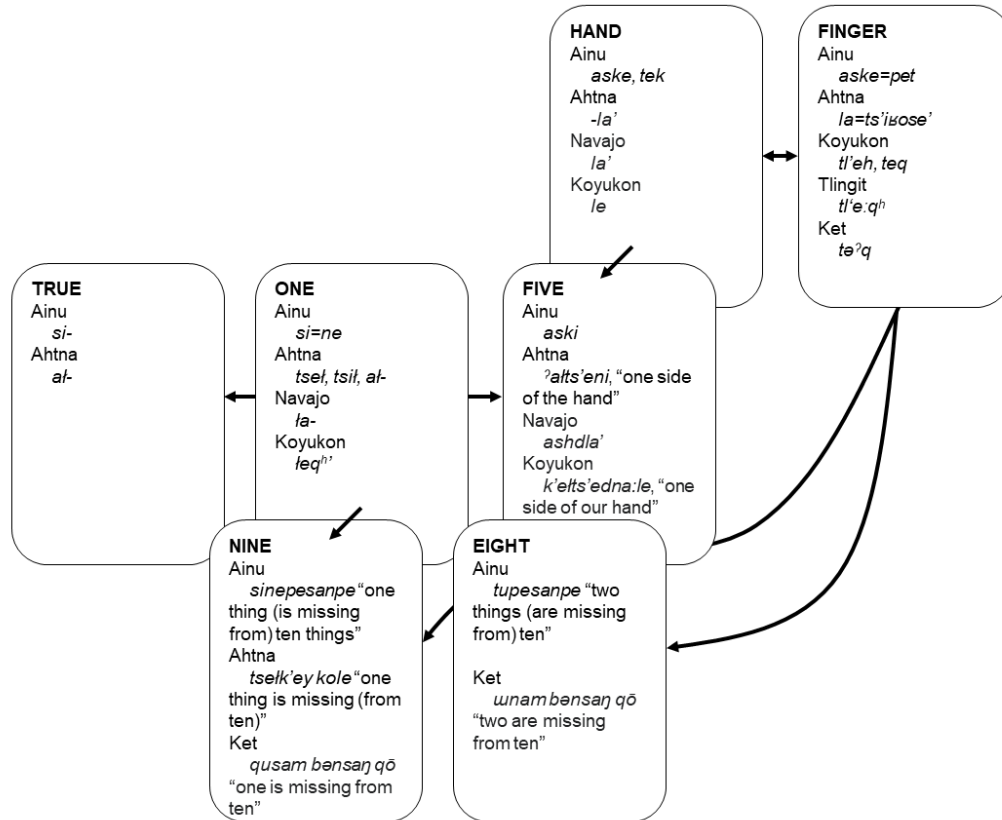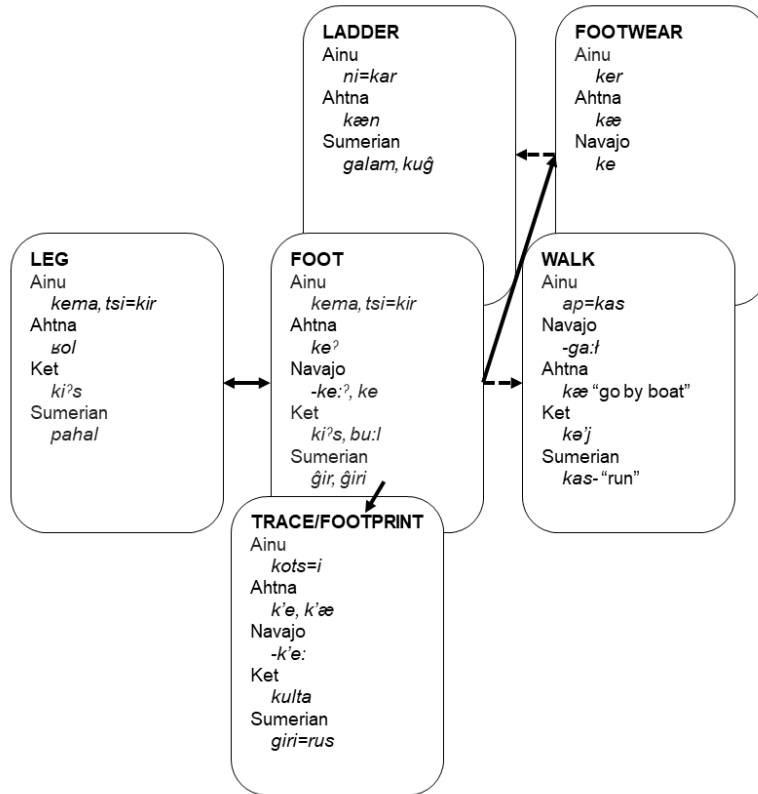
Figure 1 Semantic network of numerals. Ainu, Na-Dene languages (Ahtna, Koyukon), and Yeniseian languages (Ket) share the same way of expressing "nine" as "one thing is missing from ten things/fingers". In Ainu and Na-Dene languages, the words "five" are all related to "hand", although the derivational relationship in Ainu (also in Navajo) is fossilized and lost the original meaning. Ainu and Ahtna both derive the stem "true" from "one".

Semantic shift and variations sometimes cannot be determined by internal evidence, but analysis of homologous semantic network helps to recover the lost information in one language by comparing with the corresponding networks in other languages. Figure 1 to Figure 3 shows three example networks of semantic associations in Ainu and Na-Dene languages. Ket and Sumerian are also included in relevant cases. Solid arrows indicate both semantic and etymological relations and dashed arrows indicate semantic associations but maybe no etymological associations.

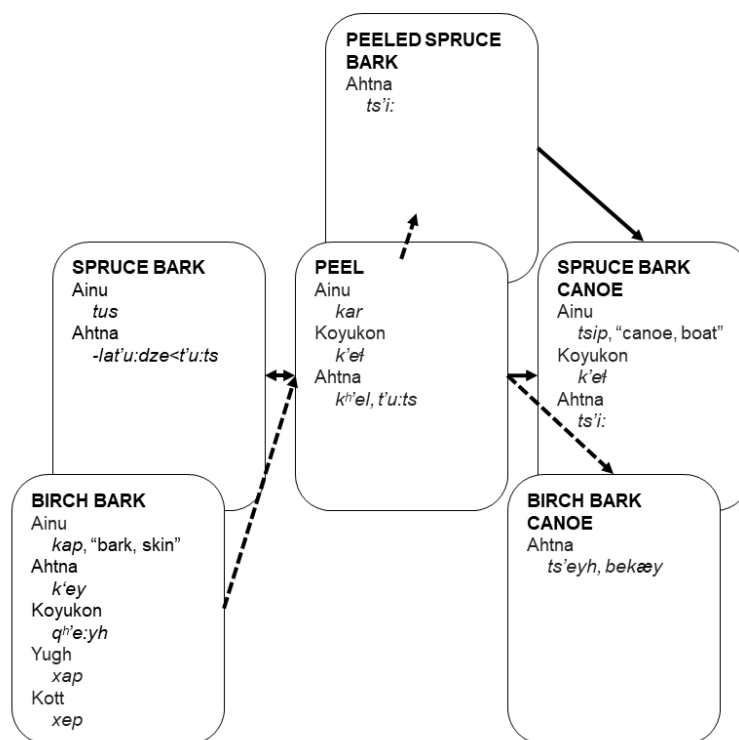The network shown in Fig. 1 exhibits semantic associations of "one", "hand" and other derived words. Ainu and Na-Dene languages share most part of network. In Ainu, "nine" *sinepewan* (Proto-Ainu constructed by Vovin [1993], *si=ne=pe=hdan*) literally means "one thing (is missing from) ten" and "eight" is similarly expressed as "two things (are missing from) ten". In Na-Dene languages, Ahtna expresses "nine" *tsełk'ey kole* as "one thing is missing (from ten things)" and Koyukon "nine (things)" as "one missing from fingers of both hands". Ket shares the same way of expressing "eight" and "nine" with Ainu. The logic behind these expressions is distinct from other Eurasian languages and North American indigenous languages.

LADDER
Ainu
   ni=kar
Ahtna
   kæn
Sumerian
   galam, kuĝ

FOOTWEAR
Ainu
   ker
Ahtna
   kæ
Navajo
   ke

LEG
Ainu
   kema, tsi=kir
Ahtna
   ʁol
Ket
   kiˀs
Sumerian
   pahal

FOOT
Ainu
   kema, tsi=kir
Ahtna
   keˀ
Navajo
   -ke:ˀ, ke
Ket
   kiˀs, bu:l
Sumerian
   ĝir, ĝiri

WALK
Ainu
   ap=kas
Navajo
   -ga:ł
Ahtna
   kæ "go by boat"
Ket
   kəˀj
Sumerian
   kas- "run"

TRACE/FOOTPRINT
Ainu
   kots=i
Ahtna
   k'e, k'æ
Navajo
   -k'e:
Ket
   kulta
Sumerian
   giri=rus

Figure 2 Semantic network around the word "foot". The words for "foot" in Ainu, Na-Dene languages, Ket and Sumerian are likely to be cognate, and these languages share a similar semantic network around the word "foot".

Fig. 2 shows the semantic network centered with "foot", in which Ainu and Na-Dene languages share many possible cognate words. It is striking that Sumerian shares most of the network with great phonological similarities. Fig. 3 displays an interesting semantic chain of "spruce/birch bark → to peel → spruce/birch bark canoe". Na-Dene languages show clear derivational relations along this chain, e.g., Ahtna *t'u:ts* "to peel" → *-lat'u:dze* "spruce bark" and Koyukon *k'eł* "to peel" → *k'eł* "spruce bark canoe". Ainu no longer preserves the derivational etymology associations along this chain, but the phonological forms of the words still can be related to corresponding cognates in Athabaskan languages. The meanings of Ainu words in the semantic network Fig. 3 are all generalized, and this analysis can help to determine the original meanings of these words.

PEELED SPRUCE BARK
Ahtna
ts'i:

SPRUCE BARK
Ainu
tus
Ahtna
-lat'u:dze<t'u:ts

PEEL
Ainu
kar
Koyukon
k'eł
Ahtna
kʰ'el, t'u:ts

SPRUCE BARK CANOE
Ainu
tsip, "canoe, boat"
Koyukon
k'eł
Ahtna
ts'i:

BIRCH BARK
Ainu
kap, "bark, skin"
Ahtna
k'ey
Koyukon
qʰ'e:yh
Yugh
xap
Kott
xep

BIRCH BARK CANOE
Ahtna
ts'eyh, bekæy

133

Figure 3 The semantic flowchart of "bark – peel – canoe". In some Na-Dene languages, the words for "bark", "peel" and "canoe" are interlinked. In Ahtna, "spruce bark" is derived from "peel" and "spruce bark canoe" is derived from "peeled spruce bark". In Koyukon, "spruce bark canoe" is from "peel". Ainu no longer preserves these relationships but the phonological forms indicate that they are cognates of Na-Dene words.

2.3 Sound correspondences

Ainu language possesses a relatively small pool of phonemes, which consists of 11 consonants and 5 vowels. In contrast, Na-Dene languages feature a large set of consonants, especially many ejective consonants, but a general lack of bilabial obstruents (Krauss and Leer 1981). Hence, when discussing the consonant correspondences, it is inevitable that one Ainu consonant would often correspond with multiple Na-Dene consonants.

Several consonant correspondences can be tentatively summarized from the cognate word list in section 3. Table 1 to Table 6 list the consonant correspondences in modern languages. The consonant correspondences in proto-languages are tentatively summarized in Table 7. In general, Ainu consonants have regular correspondences with Athabaskan languages but the correspondences with Tlingit and Eyak are less regular. Some of the cognates discussed below also appeared in Krauss and Leer (1981) and Nikolaev (2014), in which Athabaskan-Tlingit-Eyak sound correspondences are reconstructed. Only consonants are discussed in the present study. In the tables, only cognate words proposed in section 3 are listed for each language. All words are presented in IPA forms. For reconstructed Proto-Ainu words and more discussions on the cognate words used as examples in tables, see section 3.

154 Modern Ainu *t* is descended from the same sound **t* in Proto-Ainu per Vovin's reconstruction.
155 There are multiple corresponding consonants in Na-Dene languages for Ainu *t*. The Ainu-
156 Athabaskan correspondences can be grouped into three main sets. The Tlingit and Eyak
157 correspondences are not as regular as Ainu-Athabaskan correspondences, but most of them are
158 plain or lateral alveolar consonants. In Proto-Ainu, it is likely that the **t* also corresponds with
159 Proto-Athabaskan **t*, **t'*, and **tl'*.

160 **Table 1. The correspondences of *t* in Ainu with Na-Dene languages**

	Ainu	Athabaskan	Tlingit	Eyak
Ainu *t* – Athabaskan *t'*				
breast	*to*	Ahtna *t'u:* Koyukon *t'uk* Navojo *-t'o*	*ł'a:*	*ts'u*
bark/skin	*tus*	Koyukon *t'o:ts* Ahtna *t'u:ts* Navajo *-asht'o:zh*	*do:k*	*tʰah*
feather	*tap*	Navajo *t'a* Ahtna *t'a:* Koyukon *t'o*	*t'a:w*	*t'ahł*
Ainu *t* – Athabaskan *tl'*				
finger	*tek* "hand"	Koyukon *tl'eh,* *teq*	*tl'e:qʰ*	
rope	*tus*	Navajo *tł'o:ł* Dena'ina *tl'ił* Koyukon *tl'o:ł*	*tix'*	
Ainu *t* – Athabaskan *t*				
lake	*to*	Navajo *to:h* Dogrib *deh* Hupa *to*		
road	*tu*	Navajo *-ti:n* Koyukon *-ten*		*tʰa:*
three	*te=p*	Navajo *ta:'* Ahtna *ta:*		*t'uhłga'*

161

162 In Vovin's reconstruction, *ts* does not exist in Proto-Ainu and modern Ainu *ts* is originated from
163 **t*. However, the Na-Dene correspondences of Ainu *ts* and *t* are regularly different, therefore
164 they are separately listed. The Athabaskan correspondences are mainly alveolar fricated
165 consonants and again, the Tlingit and Eyak correspondences lack regularity. It is plausible to

argue that Proto-Ainu has a *ts* sound and Proto-Athabaskan *ts* and *ts'* are likely merged in Proto-Ainu to *ts*.

Table 2. The correspondences of *ts* in Ainu with Na-Dene languages

	Ainu	Athabaskan	Tlingit	Eyak
Ainu ts – Athabaskan ts/ts'/z				
we	*tsi*	Koyukon *ts'e*		*ta:*
bird	*tsi-*	Navajo *tsid-* Koyukon *tso:y*	*ts'ítskw*	
canoe	*tsip*	Koyukon *ts'i:yh* Ahtna *ts'eyh,* *ts'i:*		
mouth	*tsa*	Ahtna *za:* Dena'ina *-zaqˀ* Navajo *-ze:ˀ*	*χ'a-, k'a-*	*=saˀ*
penis	*tsiye*	Navajo *-ziz* Ahtna *tsokˀ* Koyukon *tsuqʰ*	*ɬ'ili*	
tree	*tsiku-*	Navajo *tsi-, tsin-* Koyukon *ts'eba:*		

Ainu *n* is descended from Proto-Ainu *n* and corresponds with Athabaskan *n* which is shown in Table 3. Proto-Ainu *n* and Proto-Athabaskan *n* should have the same correspondence.

Table 3. The correspondences of *n* in Ainu with Na-Dene languages

	Ainu	Athabaskan	Tlingit	Eyak
face	*nan*	Dena'ina *-nan* Koyunkon *na:nˀ* Navajo *-niˀ*	*ya*	*nda:*
eye	*nu*	Dena'ina *-nuˀu* Hupa *-na:ˀ* Navajo *a=na:ˀ*	*wa:kʰ*	*=la:χ*
hear	*nu*	Dena'ina *nə-x* Ahtna *-ni:kʰ* Koyukon *-ne:k*	*ʔa:χ*	*=ʔu=ʔ=(lə)=tʰa*
man	*a(n)=inu*	Koyukon *de=na:* Navajo *di=ne*		

174 Ainu *k* is descended from Proto-Ainu **k* and corresponds with modern Athabaskan and Eyak
175 front velar or back velar stops *k/q*, *k'/q'*, and probably with Tlingit *x'*.

176 **Table 4. The correspondences of *k* in Ainu with Na-Dene languages**

	Ainu	Athabaskan	Tlingit	Eyak
Ainu *k* – Athabaskan *k/q*				
foot/leg	*-kir*, *kema*	Navajo *-ke:ʔ*, *ke* Dena'ina *-qa* Koyukon *qʰa*	*x'o:s*	*-qʰi:-*, *=k'ahʃ*
footwear	*ker*	Navajo *ke* Koyukon *qʰa:*		
bug	*ki* "louse", *kikir*	Dena'ina *qih* Koyukon *qu:ʔ* Ahtna *qu:χ* Navajo *ch'oʃ*		*kuks-k*
Ainu *k* – Athabaskan *k'/q'*				
bark/skin	*kap*	Ahtna *q'ey* Koyukon *qʰ'e:yh*		*qʰaht-ł*
bow (arrow)	*ku*	Hupa *-q'aʔ* Navajo *-k'a:ʔ*		
fat	*ke*, *kir=po*	Hupa *-q'ah* Navajo *-k'ah* Ahtna *k'aχ*		*q'əχ*

177

178 Per Vovin's reconstruction, Ainu *s* is descended from Proto-Ainu **s* or **g/*h*. Ainu *s* has three
179 correspondences in Athabaskan languages: *s/z*, *ts*, and *ł*.

180 **Table 5. The correspondences of *k* in Ainu with Na-Dene languages**

	Ainu	Athabaskan	Tlingit	Eyak
Ainu *s* – Athabaskan *ts*				
head	*sa*	Navajo *-tsi:ʔ* Hupa *tseʔ* PA *tsiʔ*	*sha*	*-tsiʔ*
tail	*sar*	Navajo *-tse:ʔ* Dena'ina *-ka*	*ł'e:t*	*k=kʰaʔ*
Ainu *s* – Athabaskan *s/z*				
liver	*san=pe*	Navajo *-zid* Hupa *-isitʔ* Ahtna *-zetʔ*	*tl'o:k*	*-saht*

9

summer	*sak*	Koyukon *sa:nh* Navajo *ʃĩ* Ahtna *sæn*		
Ainu *s* – Athabaskan *ł*				
salmon	*sak=i*	Ahtna *ł'u:x* Dena'ina *ło:q'* Hupa *ło:q'* Navajo *ło:ˀ*	*t'a, ł'o:k*	
rope	*tus*	Navajo *tł'ó:ł* Dena'ina *tl'ił* Koyukon *tl'o:ł*	*tix'*	
walk	*ap=kas*	Navajo *-ga:ł*		
one	*si=ne*	Koyukon *łeqʰ'* Navajo *ła-*		*łĩhq-ih*

181

182 There are also a couple of cases shown in section 3 that Ainu *m* corresponds to Athabaskan *m/b*.
183 In the Koyukon language, the upper Koyukon dialect and the lower Koyukon dialect has an *m –*
184 *b* sound correspondence.

185 **Table 6. The correspondences of *m* in Ainu with Na-Dene languages**

	Ainu	**Athabaskan**	**Tlingit**	**Eyak**
swim	*ma*	Koyukon *ma:* Hupa *-me'* Navajo *-be*		
bark v.	*me=k*	Koyukon *ma:h* Ahtna *bax*		

186

187 Based on the analysis above, part of Proto-Ainu and Proto-Athabaskan consonant
188 correspondences can be summarized as shown in Table 7. The Ainu-Tlingit and Ainu-Eyak
189 sound correspondences cannot be concluded at this point due to a lack of cognate words.

190 **Table 7. Proto-Ainu and Proto-Athabaskan consonants correspondences**

Proto-Ainu	**n*	**m*	**t*	**ts*	**s*	**k*
Proto-Athabaskan	**n*	**m*	**t, *t', *tl'*	**ts, *ts'*	**s, *ts, *ł*	**k/*q, *k'/*q'*

191

192 **2.4 The position of Ainu in Dene-Yeniseian and Dene-Caucasian hypotheses**

193 The Ainu-Dene connection can provide valuable insights for external questions of Na-Dene
194 languages. Many cognate etymologies argued by Dene-Yeniseian and Dene-Caucasian
195 hypotheses also exist in Ainu, which provides more validity and potential future directions to
196 these theories. Table 8 shows possible cognates shared by Ainu, Na-Dene languages, Yeniseian
197 languages, Sino-Tibetan languages, and Sumerian. Although etymological evidence *per se* is not
198 decisive, the fact that Ainu, as a newly included language of interest in the Dene-
199 Caucasian/Dene-Yeniseian discussion, has such an amount of basic Dene-Caucasian cognates
200 significantly reduces the chance that these similarities are mere coincidence. Only words for
201 body parts are shown in the table as examples. More words are included for reference in section
202 3. Based on the number of cognate etymologies and sound correspondences, Ainu is more
203 closely connected with Na-Dene languages, especially Athabaskan languages, but many possible
204 cognates exist in Ainu with Yeniseian languages and other languages of interest in the Dene-
205 Caucasian hypothesis.

206 Some Ainu words whose corresponding Na-Dene cognate words cannot be located may find
207 cognates in Proto-Tibeto-Burman and Yeniseian languages, e.g., Proto-Ainu *asir* "new" may be
208 cognate with PTB *g-sar* "new", Ainu *urar* "fog, mist" may be cognate with Kott *ura* "wet", and
209 Ainu *to* "that" may be a cognate of Ket *tu:* "that (intermediate distance)". It is worth noting that
210 Ainu/Proto-Ainu and Proto-Tibeto-Burman languages share many cognates in body parts and
211 other word categories. Human genetic studies have long indicated that Ainu people are
212 connected with Tibeto-Burman peoples (Tajima et al. 2004). The high-frequency Y-haplogroups
213 D in Ainu people is infrequently distributed throughout Asia except for Tibeto-Burman speaking
214 groups, Japan, and the Andaman Islands.

215 Ainu and Sumerian share not only a number of etymologies, but also homologous semantic
216 chains based on these shared etymologies. Fig. 2 in section 2.2 already shows that Ainu and
217 Sumerian have a homologous semantic network around cognate "foot". Another example is that
218 "see" in Ainu *nu=kar* can be analyzed as *nu* "eye" + *kar* "turn around" and Sumerian has a
219 similar structure with cognate stems *igi=kar* "see, examine" (*igi* "eye" + *kar* "circle around").
220 The words for "roll/turn around" in Ainu *kiru*/*kar* and in Sumerian *gir*/*gur* are also likely to be
221 cognates. In Sumerian the word "roll" *gur*/*gir* further derives "wheel" *gigir* (reduplicated
222 *gur*/*gir*) which may have been borrowed into many other languages (Bowern 2017).

223 **Table 8. Possible cognates for body parts in Ainu and other languages of interest**

224 PAi, Proto-Ainu; PA, Proto-Athabaskan; PY, Proto-Yeniseian; PTB, Proto-Tibeto-Burman; PTk, Proto-Tangkhulic.

	Ainu	Na-Dene	Yeniseian	Sino-Tibetan	Sumerian
breast	PAi *tɔ:*	PA *t'əqʼʷ* "suckle"	PY *təga*	PTB *tsyuk*, *dzyuk* "suck/kiss/breast/milk"	
eye	PAi *nu:*	Ahtna *næk* Dena'ina *nuˀu*		PTB *s-nuk*	
fat	PAi *ke*, *kir=po*	Navajo -*k'ah* Ahtna *k'aχ*	Ket *kiˀt* Kott *ki:r*	PTB *ku*	*kuruʃ, kuʃ, ku* "sweet, fat, honey"

11

foot	PAi *=kir, *kema	Navajo -ke:ˀ Tlingit xʼo:s	Ket kiˀs	PTB *r-kya-ŋ PTk *kʰo	kir
hand	PAi *tek	Koyukon tlʼeh, teq Tlingit tlʼe:qʰ	Ket təˀq	PTB *dak	ʃu
head	PAi *sa	PA *tsiˀ	PY *tsiˀɢ-		saĝ
heart/liver	PAi *san=pe	Eyak -saht Ahtna -zetˀ	Ket sēŋ	PTB *m-sin	ʃa
mouth	PAi *ta Ainu tsa	Dena'ina -zaqʼ Hupa -daˀ Tlingit kʼa-	Ket qo	PTB *ku(w)	ka
penis	PAi *ti: Ainu tsi=ye	Navajo -ziz Koyukon tsuqʰ		PTB *dzi	

225

2.5 Summary

227 Ainu and Na-Dene languages are all considered as polysynthetic languages that feature complex
228 verb morphology. The current study only focused on etymological and phonological evidence,
229 but it is worthy of noting that Ainu and Na-Dene languages share a number of morphological
230 features, such as many prefixes versus few suffixes, noun incorporation, verbal number (singular
231 or plural) involving suppletion, head marking of clause arguments, etc. (Bugaeva 2014, 2017;
232 Refsing 1986).

233 Genetic, cultural, and archeological studies may provide further evidence for the connection
234 between Ainu and Na-Dene languages. Studies on oral traditions and artifacts have argued Ainu
235 people and Tlingit people have early contacts (Dubreuil 2007). One study on human leukocyte
236 antigen (HLA) of North American indigenous peoples and East Asian peoples (Monsalve, Edin,
237 and Devine 1998) showed that Ainu people and Tlingit people (the only Na-Dene speaking
238 group included in their study) were genetically close and both distanced from Native American
239 groups and Eurasian groups. A later study of HLA (Bannai et al. 2000) found the existence of
240 high-frequency of the haplotype DRB1∗1401/DQB∗05031 in Athabaskans and the Ainu
241 subgroup which indicates a common origin of the two groups. Interestingly, Tlingit people has a
242 very low frequency of DRB1∗1401 and meanwhile, DQB∗05031 is relatively rare among other
243 Native American groups, which indicates there existed a major ancestry line shared by Ainu
244 people and Athabaskan peoples, but not by Tlingit people and other Native American peoples.

245 In summary, the author proposes that Ainu and Na-Dene languages, especially Athabaskan
246 languages, can be traced to the same proto-language based on the existence of a large number of
247 cognate words in all fundamental word categories, homologous semantic networks of cognates,
248 and regular consonants correspondence. If the Ainu-Dene genealogical link is true, it can
249 potentially solve internal problems on both sides: the etymological evidence and the analysis of
250 semantic networks can serve to recover lost semantic and morphological information; the sound
251 correspondences between Ainu and Na-Dene languages can add a new reference frame that helps

252   to better understand the sound changes between Athabaskan languages and Tlingit/Eyak. In
253   addition, the Ainu-Dene genealogical link provides more insights into the early populations and
254   their migrations in Eurasia and Beringia, as well as other hypotheses to link Na-Dene languages
255   with Old World languages. Combining linguistic and genetic evidence, Ainu language may have
256   a closer relationship with Athabaskan languages than Tlingit and Eyak, which indicates that the
257   migration process of Na-Dene peoples into North American is more complex than the traditional
258   theory. Peoples speaking proto-languages of Ainu, Athabaskan, Tlingit, and Eyak may have
259   already been divided from their common ancestry in Eurasia before migrating to North America.
260   Alternatively, Proto-Ainu speaking people may have migrated back to Asia from Beringia after
261   separation with Na-Dene peoples, or Athabaskan peoples from their common ancestors.

262   **3. List of Cognate Words**

263   The following word list presents 65 possible cognates shared by Ainu and Na-Dene languages.
264   The words are categorized into 5 groups: body parts, animal-related nouns, natural phenomena,
265   artificial objects, and other basic words. In the list, all words are express in IPA forms, and tones
266   are neglected for the current analysis. Proto-Ainu words in the list are from the reconstruction of
267   Vovin (1993). If the modern Ainu forms are the same with Proto-Ainu forms or the differences
268   are not interest of discussion, only Proto-Ainu words are presented. Forms from modern Ainu
269   dialects are cited from *An Ainu Dialect Dictionary* (Hattori 1964) and *A Topical Dictionary of
270   Conversational Ainu* (National Institute for Japanese Language and Linguistics 2015). Sources of
271   Ainu dialects are marked only when significant differences occur among dialects. Pre-Proto-
272   Athasbaskan language, Proto-Athabaskan language words are cited when they are known from
273   Krauss and Leer (1981) and Leer (1982). Evidence is also taken from modern languages. The
274   three branches of Na-Dene languages are all considered. Eyak data are from *The Global
275   Lexicostatistical Database* (Kassian, A. and Starostin, George (ed.) 2011). Tlingit data are from
276   dictionaries (Story 1973; Twitchell 2017). For Athabaskan languages, data are all from
277   dictionaries and grammar books: Ahtna, Dena'ina, and Koyukon are chosen in most entries to
278   represent the northern branch (Jetté and Jones 2000; Kari 1990, 2007; Rice 2011), Hupa to
279   represent the Pacific Coast branch (Golla 1996) and Navajo to represent the southern branch
280   (Young and Morgan 1980). In some cases, other languages or proto-languages from the Dene-
281   Yeniseian and Dene-Caucasian hypotheses are also included for reference (marked with Cf.).
282   Data of languages of interest in the Dene-Caucasian hypothesis are collected from dictionaries,
283   online database, and relevant papers (Bengtson 1996; Halloran 2006; Kotorova and Nefedov
284   2015; Matisoff 2015; Nikolaev 1991; Sjöberg 1984).

285   Following abbreviations are used throughout the word list: PAi, Proto-Ainu; PA, Proto-
286   Athabaskan; PY, Proto-Yeniseian; PTB, Proto-Tibeto-Burman.

287   **Body Parts**

288   BREAST

289   　　　PAi *tɔ:* "nipple, breast", Ainu *to*, Ahtna *t'u:*, Koyukon *t'uk*, Eyak *ts'u* "nipple, women's
290   breast", Tlingit *ɬ'a:*, Hupa *t'ot* "to suck", Navojo -t'o *-ts'õ̃:z* "to suck", PA *-t'əqʷ* "suckle".

291   Cf. PY *təga, Ket tʌga, Yug tʌga, PTB *tsyuk, *dzyuk "suck/kiss/breast/milk"

292 EYE

293   PAi *nu:, Koyukon noh, Ahtna næk, nuʔ "eye of the needle", Dena'ina -nuʔu, Hupa -na:ʔ,
294 Navajo a=na:ʔ, Tlingit wa:qʰ

295   Cf. PTB *s-nuk

296 FACE

297   PAi *nan, Dena'ina -nan, Koyunkon na:nʔ, Ahtna nænʔ, Hupa -niŋʔ, Navajo -ni:ʔ, Eyak
298 nda:

299 FINGER/HAND

300   PAi *tɛk "hand", Ainu: tek "hand", Koyukon tl'eh, teq, Tlingit tl'e:qʰ

301   Cf. Ket təʔq, PTB *dak "hand"

302 FOOT/LEG

303   PAi *kɛma, *ti=kir "foot, leg", Ainu tsi=kir, kema, Eyak -qʰi:-, =k'ahš also "leg",
304 Navajo -ke:ʔ, ke, Dena'ina -qa, Koyukon qʰa, Tlingit x'o:s

305   Cf. Haida q'ulu:, Ket kiʔs, Sumerian ĝir, PTB *r-kya-ŋ, Proto-Tangkhulic *kʰo, Proto-
306 Kuki-Chin *kɛ "foot"

307 HEAD

308   PAi *sa, Tlingit ʃa, Eyak -tsiʔ "neck, originally head", Ahtna -tse, Dena'ina -tsi, Koyukon
309 tle:, Navajo -tsi:ʔ, Hupa tseʔ, PA *tsiʔ

310   Cf. PY *tsiʔɢ-, Ket tɨʔ, Sumerian saĝ

311 KNEE

312   PAi *kokka, *komta "elbow", Tlingit ki:y, Navajo -god, Koyukon ɢut, Eyak ɢuhd, Ahtna
313 ɢotʔ, Hupa -gotʔ, PA *- ɢutʔ
314   Cf. PY *gid, Ket uʎ-git "elbow", Basque u-kando "elbow", Caucasian *q'wəntV "elbow,
315 knee", PTB *s-gyi-t

316 LIVER

317   PAi *san=pe "liver, heart", Eyak -saht, Dena'ina zetʔ, Ahtna -zetʔ, Navajo -zid, Hupa -
318 isitʔ, Tlingit tl'o:k

319   Cf. Ket sēŋ, PTB *m-sin "liver, heart", Sumerian ʃa "heart"

320 MOUTH

321 PAi *ta, Ainu tsa, Eyak =saˀ, Ahtna za:, Dena'ina -zaqʾ, Navajo -ze:ˀ, Hupa -daˀ, Tlingit
322 kʾa-, χʾé, χʾa-

323 Cf. Ket qo, Sumerian ka, PTB *ku(w), Tibetan kha

324 PENIS

325 PAi *ti:, Ainu: tsi(=ye), Navajo -ziz, Ahtna tsokˀ, Koyukon tsuqʰ, Hupa dzeˀ, Tlingit tʾili

326 Cf. PTB *dzi

327 **Animal-Related Nouns**

328 BIRD

329 PAi *ti-, Ainu tsi=p, Koyukon tso:y, Tlingit tsʾitskʷʰ, Navajo tsid-

330 BUG, INSECT

331 PAi *ki "louse", *kiki(=)r, "bug/insect", Dena'ina qih, Koyukon qu:ˀ, Ahtna qu: χ,
332 Navajo chʾoʃ, Eyak kuks-k

333 Cf. Haida kʾa:m, Kott ikʾi "louse", Sino-Tibetan: Burmese khu "caterpillar", Ahom ku,
334 Proto Kuki-Naga *ku:

335 BONE

336 PAi *kequ, Ainu kew, Tlingit sʾa:k, xa:k, Navajo tsʾin, Eyak tsʾəl "anatomy", qʾahʃ
337 "bones in meat, fish"

338 Cf. Haida kuts, PTB *g-rus

339 FAT

340 PAi *kɛ, *kir=po (may be analyzed as kir "marrow" and -po diminutive suffix), Eyak
341 qʾəχ , Hupa -qʾah, Navajo -kʾah, Dena'ina kʾeqʾeh, Ahtna kʾaχ, Koyukon qʰʉh

342 Cf. Ket kiˀt, kɨˀt, Kott ki:r, PTB *ku, Sumerian kuruʃ, kuʃ, ku "sweet, fat, honey"

343 DOG

344 PAi *gita/*sita, Ainu seta, Ahtna ɬi-, Dena'ina ɬĩ

345 Cf. Kott al=ʃip, Ket tip

346 FEATHER

347 PAi *tap, Ahtna tʾa:, Koyukon tʾo, Navajo tʾa "wing", Eyak tʾahɬ also "leaf", Tlingit
348 tʾa:w

349 Cf. Haida tʾa:ʾwu:, PTB *m-dap "feather/wing"

350 SALMON

PAi *sak=i, "spring/summer salmon", Ahtna *ł'u:x*, Dena'ina *ło:q'* also a generic term for "fish", Hupa *ło:q'* also a generic term for "fish, Navajo *ło:ˀ* "fish", Tlingit *t'a*, *ł'o:k*

TAIL

PAi *sar*, Nairo Ainu *=tsara*, Tlingit *ł'eet*, Navajo *-tse:ˀ*, Dena'ina *-ka*, Ahtna *-kʰeˀ*, Eyak *k=kʰaˀ* "tail (of bird)"

Artificial Objects

BOW

PAi *ku:*, PA *-q'aˀ* "arrow", Ahtna *k'a:* "arrow", Koyukon *qʰ'oˀ* "arrow", Hupa *-q'aˀ* "arrow", Navajo *-k'a:ˀ* "arrow"

Cf. Ket *qiˀt*, Yugh *qiˀt'*

CANOE

PAi *tip*, Ainu *tsip*, Koyukon *ts'i:yh*, Ahtna *ts'eyh* "birchbark canoe", *ts'i:* "peeled spruce bark, spruce bark canoe", Dena'ina *ch'iy* "birchbark canoe"

Cf. Haida *tlu:*

FOOTWEAR/SHOE

PAi *ker*, Navajo *ke*, Ahtna *kæ*, Koyukon *qʰa:*

KNIFE

PAi *makiri*, Tlingit *kʷala:*

Cf. Sumerian *ĝiri*

LADDER

Ainu *ni=kar*, Ahtna *kæ=n*

Cf. PTB *s-ka* "stairs/rung (ladder)", Sumerian *galam*, *kuĝ*

ROAD

PAi *tru:* Ainu *tu*, Eyak *tʰa:*, Ahtna *ten*, Koyukon *ten*, Navajo *-ti:n*, Hupa *thin*

Cf. Sumerian *dus*

ROAST/COOK

PAi *ti:*, Navajo *t'e:s*, Ahtna *t'æs*, Koyukon *t'a(ł)*, Tlingit *siˀe:*

ROPE/STRING

PAi *tus*, Tlingit *tix'*, Navajo *tł'o:ł*, Dena'ina *tl'ił*, Koyukon *tl'o:ł*

380   Cf. Sino-Tibetan: Tibetan *thig* "carpenter's cord, marking string, a line", *thig-u*, *thag-u*
381 "short cord or rope, string, twine"

382 **Natural Phenomena**

383 BARK 1

384   PAi **tus*, Koyukon *t'o:ts*, Ahtna *t'u:ts* "to peel bark", Navajo *-aʃt'o:zh*, Tlingit *du:k*,
385 Eyak *=tʰah*

386 BARK 2

387   PAi **kap*, also "skin", PA **q'əy* "birch, birch bark", Ahtna *q'ey* "birch bark", Koyukon
388 *qʰ'e:yh* "birchbark", Eyak *qʰaht-ɬ*

389   Cf. PY **qäp*, Yugh *xap*, Kott *xep*

390 DUST

391   PAi **tur*, PA **ɬetʃ*, Koyukon *ɬa:ts*, Ahtna *ɬæts*, Navajo *ɬe:ʒ*

392   Cf. PY **dar*, PTB **tal*

393 ICE

394   PAi **du=p*, Eyak *t'it*, Koyukon *ten*, Navajo *tin*, Hupa *ten*

395 LAKE

396   PAi **tɔ:*, Navajo *to:h*, Dogrib *deh*, Slave *deh*, Chipewyan *de* "river flowing out of lake",
397 Hupa *to*

398   Cf. PY **deʔɢ*, Ket *dɛʔ*, Yugh *dɛʔ*

399 SOIL

400   PAi **toy*, Eyak *ts'aʔ* "mud", Ahtna *ts'æk'* "clay", Tlingit *s'a* "clay"

401   Cf. PY **təq-*, Ket *tagar*, *tuɣit* "smear with clay," Yug *təx*

402 SUMMER

403   Ainu *sah*, *sak*, PA **ʃen*, Ahtna *sæn*, Koyukon *sa:nh*, Navajo *ʃĩ*

404   Cf. PY **sir-*, Ket *sil*, Yug *sir*, Arin *ʃil*

405 SUMMIT

406   PAi **tu*, Koyukon *-tla:*, *tle:* "head, on top of, summit", Ahtna *-da:* "top", *tada:'a*, *tl'a-*
407 *da:-k'e* "summit, top of hill"

408 TREE

409   PAi **tiku-*, Ainu *tsiku-*, Navajo *tsi-*, *tsin-*, Koyukon *ts'eba:*, Ahtna *ts'abæli*

410   Cf. Kott *atči*

411 **Numerals**

412 ONE

413   PAi **si=nɛ*, Ahtna *tseł, ał-*, Dena'ina *ts'i:ł-*, Koyukon *łeqʰ'*, Navajo *ła-, ła:ʔi:* (see Sound
414 Correspondence section …), Hupa *łaʔ*, Eyak *łĩhq-ih*, Tlingit *tle:x'*

415   Cf. Sumerian a*ʃ, dil*, Proto-Tangkhulic **si*

416 THREE

417   PAi **dɛ=*, Nairo Ainu *te=*, Ahtna *ta:, ta:k*, Koyukon *toqʰ*, Navajo *ta:ʔ*, Hupa *ta:q'*, Slave
418 *tai*, Eyak *t'uhłgaʔ*

419 Cf. Kott *to:nga*, Ket *doʔŋ*

420 FIVE

421   PAi **aski*, possibly related to **aske* "hand", Ahtna *ʔałts'eni*, lit. "one side of the hand",
422 Navajo *ashdla'*, Koyukon *k'ełts'edna:le* lit. "one side of our hands"

423 **Other Basics Words**

424 BARK v.

425   PAi **mɛ(=)k*, Koyukon *ma:h, ba:h* "cry loudly, fox barks", Ahtna *bax*

426 CUT 1

427   PAi **tuye*, Hupa *t'us*, Ahtna *tsa:ʔł, tsa:t*, Koyukon *tsot* "cut quickly, slash"

428   Cf. Ket *do:*

429 CUT 2

430   PAi **mes* "to cut off, break, peel", PA **wesh* "knife", Chipewyan *bes* "knife", Navajo
431 *be:ʃ* "knife"

432   Cf. Sumerian *peʃ* "to cut into, slice"

433 DIE

434   PAi **day* "death", Nairo Ainu *tay*, Pre-PA **tsa*, PA **tsa-nʸ*, Koyukon *-ta:*, Ahtna *-tl'a:*,
435 Navajo *-tsa*

436 DRY

437   PAi **sat*, Navajo *-tsei:*, Hupa *-tsa:y*, Ahtna *-tses*, Koyukon *ts'o:ts* "dry, desiccated,
438 overly dry and hard"

439   Cf. Kott *ʃì:=gal*

440 HEAR

441   PAi **nu:*, Dena'ina *nə-x*, Ahtna *-ni:kʰ*, Koyukon *-ne:k*, Tlingit *ʔa:χ*, Eyak *=ʔu=ʔ=(lə)=tʰa*,
442 "listen to, find out"

443   Cf. PTB **r/g-na*, Proto-Tangkhulic **na*

444 HIT

445   PAi **kik*, Koyukon *-kus*, Navajo *-ka:ł*, Hupa *-kis* (also "fist"), Tlingit *-qe:ch*

446 I

447   PAi **ku*, Eyak *xu:*, Tlingit *xa-*, Koyukon *se:*, Ahtna *si:*

448   Cf. PTB **ka* ⋇ *ŋa*

449 MAN/MALE

450   PAi **ɔkkay*, Tlingit *ka:*, Ahtna *kʰi:ł*, "(young) male", Koyukon *ke:le*

451 MAN

452   PAi **a(n)=inu*, *kur*, Navajo *di=ne*, Koyukon *de=na:*

453   Ket *keʔt*

454 NOW

455   PAi **ta=*, Tlingit *de*

456 ON/ABOVE

457   PAi **ka*, Navajo *-ka:*, Tlingit *ʃaki:*, Dena'ina *q'ech'*, Koyukon *qʰ'e*

458 PEEL

459   PAi **kar*, Koyukon *k'eł*, Ahtna *kʰ'el*

460   Cf. Sumerian *guruʃ*, *guguru*, PTB **kur* "scrape, scoop, scratch"

461 PLAY

462   Ainu *-not*, Koyukon *-ʔotl*, *-ʔoł*, Navajo *-ne*, Hupa *ne:l*

463 SCRATCH

464   PAi **ki:(=)ki:*, Pre-PA **kʷ'ɨt'*, PA **tʃʷ'ɨł'*, Navajo *ch'id*, Ahtna *ʁa:ts*

465   Cf. Ket *inkit*, PTB **ki(/u)t* "scratch/itch/scrape"

466 SEE

467   PAi *nu=kar (may be analyzed as *nu* "eye" + *kar* "turn around"/ "peel"), Eyak =ʔe, =ʔã,
468 Dena'ina =ʔan, Koyukon -ʔa:n

469   Cf. Sumerian *igi=kar* "see, examine" (*igi* "eye" + *kar-kar* "circle around")

470 SHORT

471   PAi *tak, Eyak =tik', =tək', Navajo -ts'i:si

472   Cf. Kott *tʰu:ki*

473 SISTER

474   PAi *sa Tlingit *ʃatχ'* Ahtna *adæ*, Koyukon *da:ts* "younger sister", Navajo *a=di*

475   Cf. PTB *dzar, Proto-Tangkhulic *tsar

476 STICK

477   PAi *kuhda, ?*kusa, Ainu *kuwa*, Tlingit *qʰa:s'*, Eyak *t=kʰĩh*, Ahtna -qʰak', Koyukon -
478 *ken*, Navajo *gish*, -gizh. Vovin reconstructed modern Ainu *w* as *hd in Proto-Ainu, based on the
479 fact that *w* sound is very rare in modern Ainu and *s* sounds are replaced with *w* in some
480 compounding forms in modern dialects.

481 SWIM

482   PAi *ma:, Koyukon *ma:* (lower Koyukon dialect), *ba:* (upper Koyukon dialect) Ahtna
483 *bæ*, Hupa -me?, Navajo *be*, Eyak =we, *ma* "lake"

484 THIS

485   PAi *ta, Dena'ina *te:*, Koyukon *da:*, Navajo *di:*

486 TRACE

487   PAi *kɔt, Ainu *kots=i*, PA *-ke, Ahtna -kæ, Navajo -ka:

488   Cf. Ket *kulta*

489 TURN AROUND/ROLL

490   PAi *kir=u, *kar*, Navajo -gha:ł (to roll, to move by rolling), -hał, -his (roll slowly)

491   Cf. Sumerian *kir, hal, kar-kar* "circle around", PTB *s-ki:r(/l)

492 WALK

493   PAi *ap=kas, Navajo -ga:ł

494   Cf. *Ket *kə'j*, Proto-Kuku-Chin *kal, Sumerian *kas* "run"

495 WE

496   PAi *ti, Eyak *ta:*, Koyukon *ts'e*

497 WET

498   PAi *tɛɣ, Navajo -tłe:ʔ, Tlingit -tl'a:k', Koyukon ts'eł, (t'eqʰ, tl'eh "soaking wet")

499 WIDE

500   PAi *tep, PA *tel, Navajo -te:l, Koyukon -tloł "place (river) is wide"

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