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Some observations on typological features of hunter-gatherer languages

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The introduction of agriculture is a major event in human history, and this article offers a preliminary investigation into whether there might be structural features of language correlating with the distinction between languages spoken by hunter-gatherers and agriculturalists. A number of feature values treated in the *World Atlas of Language Structures* suggest promising results, in particular in relation to constituent order, phonology, and lexical typology. Hunter-gatherer languages favor (or agriculturalist languages disfavor) absence of a dominant order of major sentence constituents, absence of adpositions, absence of a dominant constituent order of noun and genitive, presence of subject clitics on a variable host, presence of initial interrogatives; a small vowel inventory, no tone, no voicing opposition in plosives and fricatives; and the lexicalization Finger = Hand ≠ Arm.

1. Introduction

The introduction of agriculture – that is, the replacement of a nomadic hunter-gatherer lifestyle with a sedentary agriculturalist lifestyle – is arguably one of the major events in the history of humanity and led in the immediately premodern period to a rather clear distinction between hunter-gatherer and agricultural populations, referring to the major source of food in each case. For the linguist, an obvious question to ask is whether or not this division into hunter-gatherer and agricultural populations has any significant linguistic correlations. Of course, there will be some predictable differences in vocabulary, as agriculturalists developed new lexical items to denote the new concepts that developed as part of the agriculturalist lifestyle. What we are concerned with here rather are structural features of language, including, in particular, grammar and lexicon – and lexicon only to the extent that one is dealing with the structure of the lexicon in areas that are not directly related to food production.

This paper is an initial exploration of this question. It draws on two projects closely associated with the Max Planck Institute for Evolutionary Anthropology: first, the *World Atlas of Language Structures* (WALS; Haspelmath et al. 2005), which provides the cross-linguistic data on which our analysis is based; second,

the conference "Historical Linguistics and Hunter-Gatherer Populations in Global Perspective," organized by Tom Güldemann in August 2006 and whose proceedings will appear in Güldemann et al. (forthcoming), in particular for the identification of hunter-gatherer languages.

The general aim of this paper is to answer the question of whether there are particular structural linguistic features, from among those included in WALS, that show an unexpected difference between the feature-values for hunter-gatherer languages and those for non-hunter-gatherer languages. The body of the article, Section 3, discusses those features for which we found this to be true – for other features, we either found no significant difference or lack sufficient information.

In order to have a set of hunter-gatherer languages to work with, we made use of the list of languages of hunter-gatherer populations identified by Tom Güldemann and Patrick McConvell as part of the "Historical Linguistics and Hunter-Gatherer Populations in Global Perspective" project (Güldemann et al. forthcoming). The list we used was a preliminary version, and we therefore take all responsibility for any shortcomings. Appendix 1 provides the list of hunter-gatherer languages that we have used and Appendix 2 separately lists those languages whose assignment to hunter-gatherer or agriculturalist populations remains unclear at the present time.

2. Method of typological comparison

The basic comparison we made was between hunter-gatherer languages and non-hunter-gatherer languages. The languages marked as being possible hunter-gatherer languages were considered as a separate group. We further separated Australian languages from the other hunter-gatherer languages because the former are a geographically and ethnologically contiguous group with at least substantial genealogical links. For any correlation to be counted as interesting, at least the same preference should be observed in Australian languages and in other hunter-gatherer languages. We have not consistently checked for other areal patterns, influence of genealogical relatedness, or influence of population size, just to name a few obvious factors that might influence the observations made here. The following observations should just be seen as that: first observations of potentially interesting patterns that need more in-depth investigation.

To look for structural correlates to the sociocultural grouping of languages, we made tables with frequencies of languages for all chapters from WALS, separating the available languages into four groups: Australian languages, other hunter-gatherer languages, languages for which the hunter-gatherer status of their speakers is uncertain, and those languages whose speakers clearly are not hunter-gatherers. To find those correlations that show promising effects, we computed so-called Pearson residuals,

indicating the relative preference of each feature-value.[1] A positive residual indicates that the number of languages is higher than expected, a negative residual that it is lower than expected. We selected the most interesting features from WALS by manually going through the listing of the most extreme residuals. We explicitly decided to not report significance values, because we did not control for obvious factors influencing significance, like genealogy and areality.

The relevant features from WALS will be presented here in the tables giving the raw number of languages. Feature values from WALS are shown as rows, and the four groups of languages as columns. All characteristics that have a residual of greater than one are set in boldface to indicate that these numbers of languages seem to be larger than would be expected statistically. This delimitation at a residual of one is rather arbitrary, and ideally proper significance assessment should be performed. However, various confounding factors as listed above will have to be considered before significance can be assessed. Such a complete analysis fell outside the focus of this paper.

3. Typological peculiarities

The most promising typological peculiarities of hunter-gatherer languages are found in the domain of constituent order, phonology, and lexical structure. These will be discussed in turn.

3.1 Order of meaningful elements

There are various typological differences between hunter-gatherer languages and non-hunter-gatherer languages in the realm of the order of meaningful elements, detailed in Tables 1–7. These preferences can be summarized by saying that hunter-gatherer languages have a statistical preference for the following typological characteristics:

- absence of a dominant constituent order of major sentence constituents
- absence of adpositions
- absence of dominant constituent order of noun and genitive
- when there is a dominant clausal constituent order, then preferably *not* SVO
- when there are adpositions, then preferably postpositions
- when there is a dominant order of noun and genitive, then preferably genitive-noun
- presence of subject clitics on variable host
- presence of initial interrogatives

1. The Pearson residuals are defined here in the context of the chi-squared test statistic as (observed-expected)/sqrt(expected). We used the function chisq.test in R (R Development Core Team 2008) to perform these computations.

This list of generalizations succinctly summarizes the findings, but it should be kept in mind that they are only statistical preferences and not absolute statements. Further, the preferences of hunter-gatherer languages in many cases seem to be better characterized as a *dispreference* for those characteristics by non-hunter-gatherer languages. For example, the preference of hunter-gatherer languages for variable constituent order looks more like a dispreference of non-hunter-gatherer languages for such a language structure. Both in Table 1 (main sentence constituent order) and Table 5 (genitive-noun order), more than 90 percent of the non-hunter-gatherer languages have a strict word order. In contrast, for hunter-gatherer languages the proportion of strict word order languages is only about 65 percent. So the non-hunter-gatherer languages have a strong preference for one possible structural option, while the hunter-gatherer languages are more evenly distributed (i.e. closer to 50 percent). This skewing might be interpreted as showing that hunter-gatherer languages more evenly fill out the space of possible variation of human languages, while non-hunter-gatherer languages have become more selective in their typological diversity.

A similar observation can be made for adpositions (Table 3) and initial interrogatives (Table 7). It is probably not so much the hunter-gatherer languages that show these preferences but rather the non-hunter-gatherer languages that prefer to have some kind of adpositions and frequently allow noninitial interrogatives. More than 90 percent of the non-hunter-gatherer languages have adpositions, while adpositions are only found in about 50 percent of the hunter-gatherer languages. Likewise, noninitial interrogatives are attested in about 75 percent of the non-hunter-gatherer languages but only in 50 percent of the hunter-gatherer languages.

Table 1. Hunter-gatherer languages have relatively many languages with no dominant order of their major sentence constituents (based on Dryer 2005d)

	Australian HG	**Other HG**	**Uncertain**	**Non-HG**
Any strict constituent order	51 (–3.24)	108 (–1.71)	64 (–0.48)	**833** (+1.87)
No dominant constituent order	**42** (+8.03)	**40** (+4.23)	**15** (+1.18)	75 (–4.63)

Table 2. When they do have a regular word-order preference, hunter-gatherer languages disprefer SVO (based on Dryer 2005d)

	Australian HG	**Other HG**	**Uncertain**	**Non-HG**
SVO	13 (–1.75)	16 (–4.27)	7 (–3.77)	**399** (+3.02)
Other strict constituent orders	**38** (+1.46)	**92** (+3.57)	**57** (+3.16)	434 (–2.52)

Both the preference for initial interrogatives (Table 7) and subject clitics (which are typically placed in a Wackernagel-like second position; Table 6) can be analyzed as following a topic-comment sentence structure. So the large proportion of languages with variable word order (Table 1), initial interrogatives (Table 7), and subject clitics on variable hosts (Table 6) indicates that hunter-gatherer languages rely more on contextual clues to disambiguate sentence content, compared with non-hunter-gatherer languages – a kind of linguistic structure that is quite reminiscent of the "pragmatic mode" (Givón 1979, Chapter 5).

Although it is a somewhat speculative concept, when hunter-gatherer languages are interpreted as showing an older stage of the typological distribution of linguistic parameters, then these findings suggest that various word-order parameters might have been much more equally distributed in the past. Further, this could then also be interpreted as showing that human languages in an earlier stage relied less on strict syntactic regularities and more on contextual clues.

Finally, preferences for non-SVO (Table 2), postpositions (Table 4), and genitive-noun order (Table 5) are, of course, typologically correlated. So those hunter-gatherer languages that do have some kind of strict-order syntax prefer left-branching/head-final structures.

Table 3. Hunter-gatherer languages have relatively many cases of no adpositions (based on Bakker 2005; see also Dryer 2005b).[2]

	Australian HG	**Other HG**	**Uncertain**	**Non-HG**
Adpositions	6 (–3.25)	42 (–1.55)	26 (+0.37)	**241** (+1.65)
No adpositions	**19** (+7.27)	**22** (+3.47)	3 (–0.83)	19 (–3.70)

2. The raw numbers from Dryer are rather different, but the statistical preferences are comparable, as shown in the table below. For some reason, Bakker seems to have been more interested in languages without adpositions, so these figures are more interesting here. Bakker's sample has 16.7 percent languages without adpositions, in contrast to Dryer, who only lists 2.6 percent of his sampled languages as having no adpositions.

	Australian HG	**Other HG**	**Uncertain**	**Non-HG**
Adpositions	49 (–1.00)	110 (–0.81)	71 (+0.22)	861 (+0.51)
No adpositions	**9** (+6.09)	**12** (+4.95)	0 (–1.36)	7 (–3.12)

Table 4. When they have adpositions, hunter-gatherer languages prefer postpositions over prepositions (based on Dryer 2005b)

	Australian HG	Other HG	Uncertain	Non-HG
Prepositions	8 (–2.27)	30 (–2.85)	6 (–4.66)	**423** (+2.94)
Postpositions	**29** (+2.15)	**76** (+2.70)	**63** (+4.42)	352 (–2.79)

Table 5. Hunter-gatherer languages prefer genitive-noun order or no dominant order (based on Dryer 2005c)

	Australian HG	Other HG	Uncertain	Non-HG
Noun-genitive	9 (–3.22)	23 (–3.54)	7 (–3.94)	**376** (+3.45)
Genitive-noun	37 (+0.02)	**88** (+2.24)	**63** (+3.49)	420 (–1.91)
No dominant order	**21** (+7.19)	**15** (+1.85)	4 (–0.64)	42 (–2.56)

Table 6. Hunter-gatherer languages have relatively many cases of subject clitics on variable host (based on Dryer 2005a)

	Australian HG	Other HG	Uncertain	Non-HG
Other subject marking	43 (–0.92)	73 (–1.07)	33 (+0.12)	**492** (+2.94)
Subject clitics on variable host	**9** (+4.04)	**14** (+4.72)	1 (–0.52)	9 (–3.14)

Table 7. Hunter-gatherer languages have relatively many cases of initial interrogatives (based on Dryer 2005e)

	Australian HG	Other HG	Uncertain	Non-HG
Noninitial interrogatives	28 (–2.19)	43 (–2.22)	25 (–1.21)	**446** (+1.90)
Initial interrogatives	**33** (+3.28)	**44** (+3.33)	**21** (+1.82)	143 (–2.84)

3.2 Phonology

In the realm of phonology, the following characteristics are found to be particularly prominent in hunter-gatherer languages (as shown in Tables 8–10):

– small vowel inventory (Table 8)
– no tone (Table 9)
– no voicing opposition in plosives and fricatives (Table 10)

Small vowel inventory is known to be typologically linked to not having tone distinctions (Maddieson 2005a). The observation that hunter-gatherer languages prefer small vowel inventories clearly relates to the claim by Hay & Bauer (2007) that the size of a language's phoneme inventory, including also specifically the size of its vowel inventory, tends to vary in direct proportion to the size of the speech community speaking that language. Hunter-gatherer languages are spoken by small speech communities, a direct result of the social implications of this mode of food acquisition. This is thus a case in which it would be particularly interesting to compare the relative significance of hunter-gatherer lifestyle and of speech-community size, by investigating in further detail the size of vowel inventories of non-hunter-gatherer languages spoken by small versus large speech communities. (Note that the claim by Trudgill (2004), based on comparison of different Austronesian-speaking communities, that small speech communities will tend to have either small or large phoneme inventories, while large speech communities will tend to have medium-sized phoneme inventories, relates specifically to the size of the consonant inventory and is thus not directly related to the claim at issue here.)

Further note that for these characteristics, the preference of the Australian languages is much stronger than that of the other hunter-gatherer languages. Of the thirty-three Australian languages, 70 percent have a small vowel inventory, 100 percent have no tone, and 94 percent have no voicing in plosives and fricatives. The percentages for the other hunter-gatherer languages are much lower – namely, 28 percent, 74 percent, and 48 percent, respectively. So for all these characteristics, the strongest effects are among Australian languages. However, when we also remove the Australian languages, the preferences of hunter-gatherer languages against non-hunter-gatherer languages remains significant.

Table 8. Hunter-gatherer languages prefer small vowel inventories (based on Maddieson 2005c)

	Australian HG	**Other HG**	**Uncertain**	**Non-HG**
Small vowel inventory	**23** (+7.53)	**26** (+2.78)	8 (+0.62)	36 (–3.69)
Average vowel inventory	10 (–1.67)	**56** (+1.32)	**25** (+1.14)	197 (–0.51)
Large vowel inventory	0 (–3.27)	10 (–3.63)	6 (–1.87)	**167** (+3.27)

Table 9. Hunter-gatherer languages tend not to have tone (based on Maddieson 2005a)

	Australian HG	Other HG	Uncertain	Non-HG
No tones	**33** (+3.14)	**63** (+1.92)	20 (+0.31)	191 (–1.93)
Simple tone system	0 (–2.88)	19 (–0.50)	10 (+0.70)	103 (+0.88)
Complex tone system	0 (–2.35)	3 (–2.97)	2 (–1.45)	**83** (+2.53)

Table 10. Hunter-gatherer languages often lack voicing opposition in plosives and fricatives (based on Maddieson 2005b)

	Australian HG	Other HG	Uncertain	Non-HG
No voicing in plosives and fricatives	**31** (+6.27)	**44** (+2.66)	10 (–0.71)	97 (–2.85)
Voicing in plosives and/or fricatives	2 (–4.31)	48 (–1.83)	29 (+0.49)	**306** (+1.96)

3.3 Lexicon

Hunter-gatherer languages seem to prefer the lexicalization Finger = Hand ≠ Arm, as shown in Tables 11 and 12. To put this in context, these two preferences are combined in Table 13. The lexicalization Finger = Hand = Arm is extremely uncommon worldwide (both for hunter-gatherer languages and for non-hunter-gatherer languages). In contrast, the tripartite lexicalization Finger ≠ Hand ≠ Arm is extremely common worldwide (again both for hunter-gatherer languages and for non-hunter-gatherer languages). The special situation thus concerns the two other options: Finger = Hand ≠ Arm and Finger ≠ Hand = Arm. For non-hunter-gatherer languages, these two lexicalizations are attested in a proportion of 14:179 (approximately 1:13), while for hunter-gatherer languages the proportion is 38:20 (approximately 2:1). Statistically this is one of the strongest differences between hunter-gatherer languages and non-hunter-gatherer languages that we have observed.

Table 11. Hunter-gatherer languages prefer to distinguish the word for 'hand' from the word for 'arm' (based on Brown 2005b)

	Australian HG	Other HG	Uncertain	Non-HG
Hand = Arm	1 (–4.50)	26 (–3.34)	11 (–2.49)	**190** (+4.90)
Hand ≠ Arm	**59** (+3.44)	**108** (+2.56)	**51** (+1.91)	171 (–3.75)

Table 12. Non-hunter-gatherer languages prefer to distinguish the words for 'finger' and 'hand' (based on Brown 2005a)

	Australian HG	Other HG	Uncertain	Non-HG
Finger ≠ Hand	21 (–2.73)	111 (–0.46)	54 (+0.06)	**335** (+1.21)
Finger = Hand	**22** (+7.34)	**21** (+1.24)	7 (–0.15)	22 (–3.24)

Table 13. Lexicalization patterns for Finger/Hand/Arm

Pattern	HG	Non-HG	Preference
Finger = Hand = Arm	5 (3%)	8 (2%)	rare in both
Finger ≠ Hand ≠ Arm	111 (64%)	153 (43%)	common in both
Finger = Hand ≠ Arm	38 (22%)	14 (4%)	frequent in HG
Finger ≠ Hand = Arm	20 (11%)	179 (51%)	frequent in non-HG
Total	174 (100%)	354 (100%)	

Brown (2005a) speculates that the preference in hunter-gatherer languages for Finger = Hand is related to the absence of rings in hunter-gatherer societies, making the differentiation between fingers and hand less salient:

> Hunter-gatherer groups may typically differ from agrarians in the extent to which they make use of finger adornment. The major, globally spread, form of finger adornment is the use of rings. Plausibly, the manufacture and use of rings would enhance the salience of the finger as a distinct hand part and would serve to augment the number of contexts in which the finger is specifically referred to, thus promoting a term for finger different from that for hand. Hunter-gatherers traditionally may tend not to make and use finger rings to the degree farmers do. If so, this could figure prominently in an explanation of why foragers tend not to lexically distinguish finger from hand while agrarians do. (Brown 2005a)

In contrast, the preferences of hunter-gatherer languages for Hand ≠ Arm is not discussed by Brown (2005b). Brown speculates that this lexicalization is related to latitudinal location, with Hand ≠ Arm being preferred in languages spoken in nonequatorial zones:

> The presence of tailored clothing covering the arms greatly increases the distinctiveness of arm parts and renders more likely their labeling by separate terms. In addition, ancillary apparel such as gloves and mittens also increases the salience of arm parts. Since nonequatorial zones where cold weather is frequent are usually associated with the presence of tailored clothing and other arm gear, languages spoken in these areas are significantly more inclined to lexically distinguish 'hand' and 'arm' than those spoken in equatorial zones. (Brown 2005b)

However, the equatorial zone encompasses everything between 36^0 North and 10^0 South, according to Brown's definition. Given these limits, hunter-gatherer languages are in their majority nonequatorial (380 nonequatorial versus 87 equatorial). So the attested skewing in the lexicalization for Hand ≠ Arm could be related both to geography and to subsistence. We calculated various regression models to investigate how geography and subsistence interact in this case, but the results vary widely, depending on the details of the definition of the latitudinal parameter and the hunter-gatherer parameter. It is possible to define latitude as the distance from the equator, but then it is mostly not significant. In contrast, when latitude is defined as distance from the line of latitude at 20^0 North, then there is a significant effect. Likewise, when latitude is defined as a binary parameter in accordance with Brown's definition ("equatorial" is between 36^0 North and 10^0 South, "nonequatorial" is everything outside that area), then the parameter is also significant. Similar variation is attested depending on the definition of the hunter-gatherer parameter. When the languages about which we are uncertain are classified as intermediate, then the significance of subsistence improves strongly relative to when these languages are simply omitted. In general both geographical latitude and hunter-gatherer subsistence appear to be significant factors for the distribution of Hand ≠ Arm, although more research is needed to flesh out the details of their interaction.

4. Conclusion and prospects

This paper identifies a number of structural features of language – relating to constituent order, phonology, and lexicon – in which there appears to be a difference between hunter-gatherer and non-hunter-gatherer languages. We emphasize that this paper is just the first stage in the investigation of structural linguistic correlates of the division between hunter-gatherer and agricultural speech communities. Future work will first need to verify the extent to which the hunter-gatherer/agricultural distinction is indeed the relevant significant factor in these structural patterns, versus the relevance of other factors, like genealogical factors, areal patterns, or speech-community size. This article only scratches the surface of this issue by giving separate treatment to Australian and non-Australian hunter-gatherer languages. Second, we need to propose and test potential explanations for the observed discrepancies between hunter-gatherer and non-hunter-gatherer languages. At the moment, we – dual, exclusive – have only speculative ideas why the particular correlations observed here should hold. If the correlations turn out to be robust even when other factors are filtered out, then we – plural, inclusive – have a lot more to learn.

Acknowledgment

The initial impetus for this study came from some informal ideas that Comrie developed on possible correlations between the hunter-gatherer/non-hunter-gatherer distinction and structural complexity of language and presented to the Seminar on Linguistic Complexity held at the University of Sonora, Hermosillo, Mexico, in November 2008; Comrie is grateful to all those who participated in the ensuing discussion. Cysouw redefined the scope of the investigation, extending it to all feature values correlating significantly with the languages of hunter-gatherer communities and excluding the restriction to questions of complexity (which in any event had produced at best meagre results). Cysouw also carried out the statistical analysis reported in the tables. We thank Tom Güldemann for providing us with a (preliminary) list of the hunter-gatherer languages to be published in Güldemann et al. (forthcoming).

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Appendix 1. List of hunter-gatherer languages

WALS code	**Name**	**Genus**	**Family**	**Macroarea**
orw	Oromo (Waata)	Eastern Cushitic	Afro-Asiatic	Africa
dah	Dahalo	Southern Cushitic	Afro-Asiatic	Africa
had	Hadza	Hadza	Hadza	Africa
ani	//Ani	Central Khoisan	Khoisan	Africa
det	Deti	Central Khoisan	Khoisan	Africa
kxo	Kxoe	Central Khoisan	Khoisan	Africa
nro	Nharo	Central Khoisan	Khoisan	Africa
xun	!Xun (Ekoka)	Northern Khoisan	Khoisan	Africa
juh	Ju|'hoan	Northern Khoisan	Khoisan	Africa
sdw	Sandawe	Sandawe	Khoisan	Africa
xoo	!Xóõ	Southern Khoisan	Khoisan	Africa
xam	/Xam	Southern Khoisan	Khoisan	Africa
bak	Baka (in Cameroon)	Adamawa-Ubangian	Niger-Congo	Africa
aka	Aka	Bantoid	Niger-Congo	Africa
shb	Shabo	Shabo	Nilo-Saharan	Africa
koe	Koegu	Surmic	Nilo-Saharan	Africa
ain	Ainu	Ainu	Ainu	Eurasia

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
evn	Even	Tungusic	Altaic	Eurasia
eve	Evenki	Tungusic	Altaic	Eurasia
nai	Nanai	Tungusic	Altaic	Eurasia
neg	Negidal	Tungusic	Altaic	Eurasia
orc	Oroch	Tungusic	Altaic	Eurasia
ork	Orok	Tungusic	Altaic	Eurasia
udh	Udihe	Tungusic	Altaic	Eurasia
ulc	Ulcha	Tungusic	Altaic	Eurasia
dol	Dolgan	Turkic	Altaic	Eurasia
tof	Tofa	Turkic	Altaic	Eurasia
alu	Alutor	Northern Chukotko-Kamchatkan	Chukotko-Kamchatkan	Eurasia
chk	Chukchi	Northern Chukotko-Kamchatkan	Chukotko-Kamchatkan	Eurasia
krq	Kerek	Northern Chukotko-Kamchatkan	Chukotko-Kamchatkan	Eurasia
kry	Koryak	Northern Chukotko-Kamchatkan	Chukotko-Kamchatkan	Eurasia
ite	Itelmen	Southern Chukotko-Kamchatkan	Chukotko-Kamchatkan	Eurasia
ved	Vedda	Indic	Indo-European	Eurasia
kus	Kusunda	Kusunda	Kusunda	Eurasia
niv	Nivkh	Nivkh	Nivkh	Eurasia
nvs	Nivkh (South Sakhalin)	Nivkh	Nivkh	Eurasia
ene	Enets	Samoyedic	Uralic	Eurasia
nga	Nganasan	Samoyedic	Uralic	Eurasia
skp	Selkup	Samoyedic	Uralic	Eurasia
kty	Khanty	Ugric	Uralic	Eurasia
mns	Mansi	Ugric	Uralic	Eurasia
ket	Ket	Yeniseian	Yeniseian	Eurasia
ktt	Kott	Yeniseian	Yeniseian	Eurasia
yug	Yugh	Yeniseian	Yeniseian	Eurasia

(*Continued*)

Appendix 1. (Continued)

WALS code	Name	Genus	Family	Macroarea
yko	Yukaghir (Kolyma)	Yukaghir	Yukaghir	Eurasia
apk	A-Pucikwar	Great Andamanese	Andamanese	SE Asia & Oceania
akb	Aka-Biada	Great Andamanese	Andamanese	SE Asia & Oceania
akc	Aka-Cari	Great Andamanese	Andamanese	SE Asia & Oceania
akk	Aka-Kede	Great Andamanese	Andamanese	SE Asia & Oceania
jrw	Jarawa (in Andamans)	South Andamanese	Andamanese	SE Asia & Oceania
ong	Onge	South Andamanese	Andamanese	SE Asia & Oceania
jah	Jahai	Aslian	Austro-Asiatic	SE Asia & Oceania
jun	Juang	Munda	Austro-Asiatic	SE Asia & Oceania
mlm	Mlabri (Minor)	Palaung-Khmuic	Austro-Asiatic	SE Asia & Oceania
bat	Batak	Meso-Philippine	Austronesian	SE Asia & Oceania
mmn	Mamanwa	Meso-Philippine	Austronesian	SE Asia & Oceania
agc	Agta (Central)	Northern Philippines	Austronesian	SE Asia & Oceania
dca	Dumagat (Casiguran)	Northern Philippines	Austronesian	SE Asia & Oceania
baj	Bajau	Sama-Bajaw	Austronesian	SE Asia & Oceania
bik	Biak	South Halmahera–West New Guinea	Austronesian	SE Asia & Oceania
wrp	Waropen	South Halmahera–West New Guinea	Austronesian	SE Asia & Oceania
url	Urak Lawoi'	Sundic	Austronesian	SE Asia & Oceania
bzi	Bauzi	East Geelvink Bay	East Geelvink Bay	New Guinea
kiw	Kiwai	Kiwaian	Kiwaian	New Guinea
isi	Isirawa	Kwerba	Kwerba	New Guinea
kwb	Kwerba	Kwerba	Kwerba	New Guinea
dou	Doutai	Lakes Plain	Lakes Plain	New Guinea
iau	Iau	Lakes Plain	Lakes Plain	New Guinea
kkr	Kirikiri	Lakes Plain	Lakes Plain	New Guinea
skr	Sikaritai	Lakes Plain	Lakes Plain	New Guinea
kbo	Kambot	Botin	Lower Sepik-Ramu	New Guinea
mrk	Murik	Lower Sepik	Lower Sepik-Ramu	New Guinea
yim	Yimas	Lower Sepik	Lower Sepik-Ramu	New Guinea

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
boa	Boazi	Marind Proper	Marind	New Guinea
zim	Zimakani	Marind Proper	Marind	New Guinea
kwo	Kwoma	Middle Sepik	Sepik	New Guinea
ala	Alamblak	Sepik Hill	Sepik	New Guinea
bhn	Bahinemo	Sepik Hill	Sepik	New Guinea
sar	Sare	Sepik Hill	Sepik	New Guinea
brk	Berik	Tor	Tor	New Guinea
one	One	West Wapei	Torricelli	New Guinea
asm	Asmat	Asmat-Kamoro	Trans-New Guinea	New Guinea
kmr	Kamoro	Asmat-Kamoro	Trans-New Guinea	New Guinea
kmb	Kombai	Awju-Dumut	Trans-New Guinea	New Guinea
ann	Anindilyakwa	Anindilyakwa	Australian	Australia
bac	Bachamal	Anson Bay	Australian	Australia
pun	Pungupungu	Anson Bay	Australian	Australia
bnb	Bunuba	Bunuban	Australian	Australia
goo	Gooniyandi	Bunuban	Australian	Australia
bua	Burarra	Burarran	Australian	Australia
grg	Gurr-goni	Burarran	Australian	Australia
kij	Kitja	Djeragan	Australian	Australia
mir	Miriwung	Djeragan	Australian	Australia
kmw	Kamu	Eastern Daly	Australian	Australia
mdl	Madngele	Eastern Daly	Australian	Australia
gaa	Gaagudju	Gaagudju	Australian	Australia
grr	Garrwa	Garrwan	Australian	Australia
bbw	Bininj Gun-Wok	Gunwinygic	Australian	Australia
gnb	Gunbalang	Gunwinygic	Australian	Australia
nkb	Ngalkbun	Gunwinygic	Australian	Australia
iwa	Iwaidja	Iwaidjan	Australian	Australia
mau	Maung	Iwaidjan	Australian	Australia
jam	Jaminjung	Jaminjungan	Australian	Australia
lar	Laragia	Laragiyan	Australian	Australia
lml	Limilngan	Limilngan	Australian	Australia
myi	Mangarrayi	Mangarrayi	Australian	Australia
alw	Alawa	Maran	Australian	Australia

(*Continued*)

Appendix 1. (Continued)

WALS code	Name	Genus	Family	Macroarea
mra	Mara	Maran	Australian	Australia
wrn	Warndarang	Maran	Australian	Australia
mpa	Murrinh-Patha	Murrinh-Patha	Australian	Australia
nkk	Nakkara	Nakkara	Australian	Australia
ndj	Ndjébbana	Ndjébbana	Australian	Australia
ngl	Ngalakan	Ngalakan	Australian	Australia
ngn	Ngandi	Ngandi	Australian	Australia
mlk	Malakmalak	Northern Daly	Australian	Australia
tye	Tyeraity	Northern Daly	Australian	Australia
nug	Nunggubuyu	Nunggubuyu	Australian	Australia
brd	Bardi	Nyulnyulan	Australian	Australia
nyn	Nyigina	Nyulnyulan	Australian	Australia
nyu	Nyulnyul	Nyulnyulan	Australian	Australia
wrw	Warrwa	Nyulnyulan	Australian	Australia
ywr	Yawuru	Nyulnyulan	Australian	Australia
adn	Adynyamathanha	Pama-Nyungan	Australian	Australia
aly	Alyawarra	Pama-Nyungan	Australian	Australia
agt	Anguthimri	Pama-Nyungan	Australian	Australia
abn	Arabana	Pama-Nyungan	Australian	Australia
arr	Arrernte	Pama-Nyungan	Australian	Australia
amp	Arrernte (Mparntwe)	Pama-Nyungan	Australian	Australia
awe	Arrernte (Western)	Pama-Nyungan	Australian	Australia
bdm	Badimaya	Pama-Nyungan	Australian	Australia
bnj	Bandjalang	Pama-Nyungan	Australian	Australia
bca	Bandjalang (Casino)	Pama-Nyungan	Australian	Australia
bwa	Bandjalang (Waalubal)	Pama-Nyungan	Australian	Australia
byu	Bandjalang (Yugumbir)	Pama-Nyungan	Australian	Australia
bnl	Banggarla	Pama-Nyungan	Australian	Australia
bnr	Bilinara	Pama-Nyungan	Australian	Australia

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
bii	Biri	Pama-Nyungan	Australian	Australia
bnu	Bularnu	Pama-Nyungan	Australian	Australia
clc	Colac	Pama-Nyungan	Australian	Australia
dhw	Dharawal	Pama-Nyungan	Australian	Australia
dhr	Dhargari	Pama-Nyungan	Australian	Australia
dhb	Dharumbal	Pama-Nyungan	Australian	Australia
dhu	Dhurga	Pama-Nyungan	Australian	Australia
dda	Dhuwal (Dätiwuy)	Pama-Nyungan	Australian	Australia
diy	Diyari	Pama-Nyungan	Australian	Australia
dja	Djabugay	Pama-Nyungan	Australian	Australia
djm	Djambarrpuyngu	Pama-Nyungan	Australian	Australia
djp	Djapu	Pama-Nyungan	Australian	Australia
djr	Djaru	Pama-Nyungan	Australian	Australia
djn	Djinang	Pama-Nyungan	Australian	Australia
dyi	Dyirbal	Pama-Nyungan	Australian	Australia
glp	Gaalpu	Pama-Nyungan	Australian	Australia
gml	Gamilaraay	Pama-Nyungan	Australian	Australia
gid	Gidabal	Pama-Nyungan	Australian	Australia
gug	Gugada	Pama-Nyungan	Australian	Australia
gmt	Gumatj	Pama-Nyungan	Australian	Australia
gum	Gumbaynggir	Pama-Nyungan	Australian	Australia
gny	Gunya	Pama-Nyungan	Australian	Australia
ggu	Gureng Gureng	Pama-Nyungan	Australian	Australia
gji	Gurindji	Pama-Nyungan	Australian	Australia
guu	Guugu Yimidhirr	Pama-Nyungan	Australian	Australia
jua	Juat	Pama-Nyungan	Australian	Australia
kly	Kala Lagaw Ya	Pama-Nyungan	Australian	Australia
kgu	Kalkatungu	Pama-Nyungan	Australian	Australia
krj	Karadjeri	Pama-Nyungan	Australian	Australia
kaq	Kaurna	Pama-Nyungan	Australian	Australia
knc	Kugu Nganhcara	Pama-Nyungan	Australian	Australia
kya	Kuku-Yalanji	Pama-Nyungan	Australian	Australia
kjn	Kunjen	Pama-Nyungan	Australian	Australia

(*Continued*)

Appendix 1. (Continued)

WALS code	Name	Genus	Family	Macroarea
kuu	Kuuku Ya'u	Pama-Nyungan	Australian	Australia
lla	Lamu-Lamu	Pama-Nyungan	Australian	Australia
lrd	Lardil	Pama-Nyungan	Australian	Australia
mdm	Madimadi	Pama-Nyungan	Australian	Australia
mnj	Mantjiltjara	Pama-Nyungan	Australian	Australia
mny	Margany	Pama-Nyungan	Australian	Australia
mwa	Martu Wangka	Pama-Nyungan	Australian	Australia
mrt	Martuthunira	Pama-Nyungan	Australian	Australia
myy	Mayi-Yapi	Pama-Nyungan	Australian	Australia
mbb	Mbabaram	Pama-Nyungan	Australian	Australia
mdb	Mudburra	Pama-Nyungan	Australian	Australia
mrw	Muruwari	Pama-Nyungan	Australian	Australia
ntj	Ngaanyatjarra	Pama-Nyungan	Australian	Australia
ngj	Ngadjumaja	Pama-Nyungan	Australian	Australia
ngr	Ngarinyeri	Pama-Nyungan	Australian	Australia
ngy	Ngarinyman	Pama-Nyungan	Australian	Australia
nlu	Ngarluma	Pama-Nyungan	Australian	Australia
ngw	Ngawun	Pama-Nyungan	Australian	Australia
ngi	Ngiyambaa	Pama-Nyungan	Australian	Australia
nha	Nhanda	Pama-Nyungan	Australian	Australia
nyr	Nyangumarda	Pama-Nyungan	Australian	Australia
nya	Nyawaygi	Pama-Nyungan	Australian	Australia
nju	Nyungar	Pama-Nyungan	Australian	Australia
pkn	Paakantyi	Pama-Nyungan	Australian	Australia
pak	Pakanha	Pama-Nyungan	Australian	Australia
pny	Panyjima	Pama-Nyungan	Australian	Australia
pin	Pintupi	Pama-Nyungan	Australian	Australia
pit	Pitjantjatjara	Pama-Nyungan	Australian	Australia
ppi	Pitta Pitta	Pama-Nyungan	Australian	Australia
rit	Ritharngu	Pama-Nyungan	Australian	Australia
thy	Thaayorre	Pama-Nyungan	Australian	Australia
thp	Thaypan	Pama-Nyungan	Australian	Australia
uhi	Uradhi	Pama-Nyungan	Australian	Australia

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
wlm	Walmatjari	Pama-Nyungan	Australian	Australia
wan	Wangkumara	Pama-Nyungan	Australian	Australia
wrl	Warlpiri	Pama-Nyungan	Australian	Australia
wlw	Warluwara	Pama-Nyungan	Australian	Australia
wrg	Warrgamay	Pama-Nyungan	Australian	Australia
wrb	Warrnambool	Pama-Nyungan	Australian	Australia
wgu	Warrungu	Pama-Nyungan	Australian	Australia
wth	Wathawurrung	Pama-Nyungan	Australian	Australia
wat	Watjarri	Pama-Nyungan	Australian	Australia
wem	Wembawemba	Pama-Nyungan	Australian	Australia
wdo	Western Desert (Ooldea)	Pama-Nyungan	Australian	Australia
wmu	Wik Munkan	Pama-Nyungan	Australian	Australia
wn	Wik Ngathana	Pama-Nyungan	Australian	Australia
wir	Wirangu	Pama-Nyungan	Australian	Australia
wwr	Woiwurrung	Pama-Nyungan	Australian	Australia
ynk	Yankuntjatjara	Pama-Nyungan	Australian	Australia
yny	Yanyuwa	Pama-Nyungan	Australian	Australia
yyg	Yaygir	Pama-Nyungan	Australian	Australia
yid	Yidiny	Pama-Nyungan	Australian	Australia
yin	Yindjibarndi	Pama-Nyungan	Australian	Australia
yng	Yingkarta	Pama-Nyungan	Australian	Australia
yir	Yir Yiront	Pama-Nyungan	Australian	Australia
yyo	Yorta Yorta	Pama-Nyungan	Australian	Australia
ylb	Yulparija	Pama-Nyungan	Australian	Australia
yuw	Yuwaalaraay	Pama-Nyungan	Australian	Australia
rmb	Rembarnga	Rembarnga	Australian	Australia
ngg	Ngan'gityemerri	Southern Daly	Australian	Australia
ngk	Ngankikurungkurr	Southern Daly	Australian	Australia
kay	Kayardild	Tangkic	Australian	Australia
yuk	Yukulta	Tangkic	Australian	Australia
tiw	Tiwi	Tiwian	Australian	Australia
wry	Waray (in Australia)	Waray	Australian	Australia
dji	Djingili	West Barkly	Australian	Australia

(*Continued*)

Appendix 1. (Continued)

WALS code	Name	Genus	Family	Macroarea
wam	Wambaya	West Barkly	Australian	Australia
emm	Emmi	Western Daly	Australian	Australia
mku	Maranungku	Western Daly	Australian	Australia
mrr	Maringarr	Western Daly	Australian	Australia
mrh	Marrithiyel	Western Daly	Australian	Australia
gnn	Gunin	Wororan	Australian	Australia
ung	Ungarinjin	Wororan	Australian	Australia
wor	Worora	Wororan	Australian	Australia
wag	Wagiman	Yangmanic	Australian	Australia
wrd	Wardaman	Yangmanic	Australian	Australia
abw	Abenaki (Western)	Algonquian	Algic	North America
alg	Algonquin	Algonquian	Algic	North America
aho	Arapaho	Algonquian	Algic	North America
ati	Atikamekw	Algonquian	Algic	North America
bla	Blackfoot	Algonquian	Algic	North America
cyn	Cheyenne	Algonquian	Algic	North America
cpw	Chippewa (Red Lake and Pillager)	Algonquian	Algic	North America
cea	Cree (Eastern)	Algonquian	Algic	North America
cre	Cree (Plains)	Algonquian	Algic	North America
fox	Fox	Algonquian	Algic	North America
ill	Illinois	Algonquian	Algic	North America
kic	Kickapoo	Algonquian	Algic	North America
men	Menomini	Algonquian	Algic	North America
mic	Micmac	Algonquian	Algic	North America
mtg	Montagnais	Algonquian	Algic	North America
nsk	Naskapi	Algonquian	Algic	North America
oji	Ojibwa (Eastern)	Algonquian	Algic	North America
ojs	Ojibwa (Severn)	Algonquian	Algic	North America
ojm	Ojibwe (Minnesota)	Algonquian	Algic	North America
psm	Passamaquoddy-Maliseet	Algonquian	Algic	North America

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
pot	Potawatomi	Algonquian	Algic	North America
shw	Shawnee	Algonquian	Algic	North America
wiy	Wiyot	Wiyot	Algic	North America
yur	Yurok	Yurok	Algic	North America
beo	Beothuk	Beothuk	Beothuk	North America
cmk	Chemakum	Chimakuan	Chimakuan	North America
qui	Quileute	Chimakuan	Chimakuan	North America
ctm	Chitimacha	Chitimacha	Chitimacha	North America
cba	Chumash (Barbareño)	Chumash	Chumash	North America
cin	Chumash (Ineseño)	Chumash	Chumash	North America
ale	Aleut	Eskimo-Aleut	Eskimo-Aleut	North America
aea	Aleut (Eastern)	Eskimo-Aleut	Eskimo-Aleut	North America
atq	Alutiiq	Eskimo-Aleut	Eskimo-Aleut	North America
gre	Greenlandic (East)	Eskimo-Aleut	Eskimo-Aleut	North America
gso	Greenlandic (South)	Eskimo-Aleut	Eskimo-Aleut	North America
grw	Greenlandic (West)	Eskimo-Aleut	Eskimo-Aleut	North America
inu	Iñupiaq	Eskimo-Aleut	Eskimo-Aleut	North America
iql	Inuktitut (Quebec-Labrador)	Eskimo-Aleut	Eskimo-Aleut	North America
inr	Inuktitut (Rankin Inlet)	Eskimo-Aleut	Eskimo-Aleut	North America
ins	Inuktitut (Salluit)	Eskimo-Aleut	Eskimo-Aleut	North America
kgt	Kangiryuarmiut	Eskimo-Aleut	Eskimo-Aleut	North America
ypk	Yup'ik (Central)	Eskimo-Aleut	Eskimo-Aleut	North America
ych	Yup'ik (Chevak)	Eskimo-Aleut	Eskimo-Aleut	North America
yun	Yup'ik (Norton Sound)	Eskimo-Aleut	Eskimo-Aleut	North America
yna	Yupik (Naukan)	Eskimo-Aleut	Eskimo-Aleut	North America
yus	Yupik (Siberian)	Eskimo-Aleut	Eskimo-Aleut	North America
ysi	Yupik (Sirenik)	Eskimo-Aleut	Eskimo-Aleut	North America
ysl	Yupik (St. Lawrence Island)	Eskimo-Aleut	Eskimo-Aleut	North America
ess	Esselen	Esselen	Esselen	North America

(*Continued*)

Appendix 1. (Continued)

WALS code	Name	Genus	Family	Macroarea
hai	Haida	Haida	Haida	North America
hno	Haida (Northern)	Haida	Haida	North America
chi	Chimariko	Chimariko	Hokan	North America
acm	Achumawi	Palaihnihan	Hokan	North America
ats	Atsugewi	Palaihnihan	Hokan	North America
ksh	Kashaya	Pomoan	Hokan	North America
pmc	Pomo (Central)	Pomoan	Hokan	North America
pme	Pomo (Eastern)	Pomoan	Hokan	North America
pmn	Pomo (Northern)	Pomoan	Hokan	North America
pso	Pomo (Southeastern)	Pomoan	Hokan	North America
ser	Seri	Seri	Hokan	North America
shs	Shasta	Shasta	Hokan	North America
yan	Yana	Yana	Hokan	North America
ccp	Cocopa	Yuman	Hokan	North America
klw	Kiliwa	Yuman	Hokan	North America
mar	Maricopa	Yuman	Hokan	North America
moj	Mojave	Yuman	Hokan	North America
que	Quechan	Yuman	Hokan	North America
klp	Kalapuya	Kalapuyan	Kalapuyan	North America
krk	Karok	Karok	Karok	North America
kio	Kiowa	Kiowa-Tanoan	Kiowa-Tanoan	North America
kut	Kutenai	Kutenai	Kutenai	North America
aht	Ahtna	Athapaskan	Na-Dene	North America
apc	Apache (Chiricahua)	Athapaskan	Na-Dene	North America
apj	Apache (Jicarilla)	Athapaskan	Na-Dene	North America
apw	Apache (Western)	Athapaskan	Na-Dene	North America
crq	Carrier	Athapaskan	Na-Dene	North America
chp	Chipewyan	Athapaskan	Na-Dene	North America
dgx	Degexit'an	Athapaskan	Na-Dene	North America
hup	Hupa	Athapaskan	Na-Dene	North America
kto	Kato	Athapaskan	Na-Dene	North America

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
kyn	Koyukon	Athapaskan	Na-Dene	North America
kth	Kutchin	Athapaskan	Na-Dene	North America
mtl	Mattole	Athapaskan	Na-Dene	North America
src	Sarcee	Athapaskan	Na-Dene	North America
sla	Slave	Athapaskan	Na-Dene	North America
slv	Slavey	Athapaskan	Na-Dene	North America
tnc	Tanacross	Athapaskan	Na-Dene	North America
tnj	Tanaina	Athapaskan	Na-Dene	North America
tnl	Tanana (Lower)	Athapaskan	Na-Dene	North America
tut	Tutchone (Northern)	Athapaskan	Na-Dene	North America
uku	Upper Kuskokwim	Athapaskan	Na-Dene	North America
eya	Eyak	Eyak	Na-Dene	North America
tli	Tlingit	Tlingit	Na-Dene	North America
als	Alsea	Alsea	Oregon Coast	North America
coo	Coos (Hanis)	Coosan	Oregon Coast	North America
siu	Siuslaw	Siuslawan	Oregon Coast	North America
ckl	Chinook (Lower)	Chinookan	Penutian	North America
cku	Chinook (Upper)	Chinookan	Penutian	North America
cos	Costanoan	Costanoan	Penutian	North America
mut	Mutsun	Costanoan	Penutian	North America
klm	Klamath	Klamath-Modoc	Penutian	North America
knw	Konkow	Maiduan	Penutian	North America
mne	Maidu (Northeast)	Maiduan	Penutian	North America
nsn	Nisenan	Maiduan	Penutian	North America
mkb	Miwok (Bodega)	Miwok	Penutian	North America
mcs	Miwok (Central Sierra)	Miwok	Penutian	North America
mwl	Miwok (Lake)	Miwok	Penutian	North America
mwn	Miwok (Northern Sierra)	Miwok	Penutian	North America
mwp	Miwok (Plains)	Miwok	Penutian	North America
mss	Miwok (Southern Sierra)	Miwok	Penutian	North America
mll	Molala	Molala	Penutian	North America

(*Continued*)

Appendix 1. (Continued)

WALS code	Name	Genus	Family	Macroarea
nez	Nez Perce	Sahaptian	Penutian	North America
shp	Sahaptin (Northern)	Sahaptian	Penutian	North America
smt	Sahaptin (Umatilla)	Sahaptian	Penutian	North America
git	Gitksan	Tsimshianic	Penutian	North America
nsg	Nisgha	Tsimshianic	Penutian	North America
tsi	Tsimshian (Coast)	Tsimshianic	Penutian	North America
ptw	Patwin	Wintuan	Penutian	North America
win	Wintu	Wintuan	Penutian	North America
wik	Wikchamni	Yokuts	Penutian	North America
ywl	Yawelmani	Yokuts	Penutian	North America
yok	Yokuts (Yaudanchi)	Yokuts	Penutian	North America
sal	Salinan	Salinan	Salinan	North America
bco	Bella Coola	Bella Coola	Salishan	North America
cla	Clallam	Central Salish	Salishan	North America
cmx	Comox	Central Salish	Salishan	North America
hlk	Halkomelem	Central Salish	Salishan	North America
lum	Lummi	Central Salish	Salishan	North America
lus	Lushootseed	Central Salish	Salishan	North America
sch	Saanich	Central Salish	Salishan	North America
sss	Salish (Samish Straits)	Central Salish	Salishan	North America
sps	Salish (Southern Puget Sound)	Central Salish	Salishan	North America
sst	Salish (Straits)	Central Salish	Salishan	North America
sgs	Songish	Central Salish	Salishan	North America
soo	Sooke	Central Salish	Salishan	North America
squ	Squamish	Central Salish	Salishan	North America
twa	Twana	Central Salish	Salishan	North America
coe	Coeur d'Alene	Interior Salish	Salishan	North America
cwe	Columbia-Wenatchi	Interior Salish	Salishan	North America
kls	Kalispel	Interior Salish	Salishan	North America
lil	Lillooet	Interior Salish	Salishan	North America

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
oka	Okanagan	Interior Salish	Salishan	North America
shu	Shuswap	Interior Salish	Salishan	North America
spo	Spokane	Interior Salish	Salishan	North America
tho	Thompson	Interior Salish	Salishan	North America
til	Tillamook	Tillamook	Salishan	North America
chl	Chehalis (Upper)	Tsamosan	Salishan	North America
blx	Biloxi	Siouan	Siouan	North America
cro	Crow	Siouan	Siouan	North America
dak	Dakota	Siouan	Siouan	North America
lkt	Lakhota	Siouan	Siouan	North America
omh	Omaha	Siouan	Siouan	North America
osa	Osage	Siouan	Siouan	North America
sto	Stoney	Siouan	Siouan	North America
wnb	Winnebago	Siouan	Siouan	North America
tkl	Takelma	Takelma	Takelma	North America
ton	Tonkawa	Tonkawa	Tonkawa	North America
cmn	Comanche	Numic	Uto-Aztecan	North America
kws	Kawaiisu	Numic	Uto-Aztecan	North America
mno	Mono (in United States)	Numic	Uto-Aztecan	North America
pno	Paiute (Northern)	Numic	Uto-Aztecan	North America
sho	Shoshone	Numic	Uto-Aztecan	North America
swr	Shoshone (Wind River)	Numic	Uto-Aztecan	North America
tsh	Tümpisa Shoshone	Numic	Uto-Aztecan	North America
ute	Ute	Numic	Uto-Aztecan	North America
cah	Cahuilla	Takic	Uto-Aztecan	North America
cup	Cupeño	Takic	Uto-Aztecan	North America
lui	Luiseño	Takic	Uto-Aztecan	North America
srr	Serrano	Takic	Uto-Aztecan	North America
tbb	Tübatulabal	Tubatulabal	Uto-Aztecan	North America
hsl	Haisla	Northern Wakashan	Wakashan	North America
hei	Heiltsuk	Northern Wakashan	Wakashan	North America
kwk	Kwakw'ala	Northern Wakashan	Wakashan	North America
kyq	Kyuquot	Southern Wakashan	Wakashan	North America

(*Continued*)

Appendix 1. (Continued)

WALS code	Name	Genus	Family	Macroarea
mak	Makah	Southern Wakashan	Wakashan	North America
nit	Nitinaht	Southern Wakashan	Wakashan	North America
nuu	Nuuchahnulth	Southern Wakashan	Wakashan	North America
wap	Wappo	Wappo	Wappo-Yukian	North America
yki	Yuki	Yukian	Wappo-Yukian	North America
was	Washo	Washo	Washo	North America
qaw	Qawasqar	Alacalufan	Alacalufan	South America
cac	Cacua	Cacua-Nukak	Cacua-Nukak	South America
nuk	Nukak	Cacua-Nukak	Cacua-Nukak	South America
akw	Akawaio	Cariban	Cariban	South America
kun	Kuna	Kuna	Chibchan	South America
sel	Selknam	Chon Proper	Chon	South America
teh	Tehuelche	Chon Proper	Chon	South America
gku	Gününa Küne	Puelche	Chon	South America
cui	Cuiba	Guahiban	Guahiban	South America
ghb	Guahibo	Guahiban	Guahiban	South America
abi	Abipón	Guaicuruan	Guaicuruan	South America
kdw	Kadiwéu	Guaicuruan	Guaicuruan	South America
mcv	Mocoví	Guaicuruan	Guaicuruan	South America
pga	Pilagá	Guaicuruan	Guaicuruan	South America
tob	Toba	Guaicuruan	Guaicuruan	South America
hmb	Huambisa	Jivaroan	Jivaroan	South America
lul	Lule	Lule-Vilela	Lule-Vilela	South America
mkw	Máku	Máku	Máku	South America
brr	Bororo	Bororo	Macro-Ge	South America
kng	Kaingang	Ge-Kaingang	Macro-Ge	South America
kyp	Kayapó	Ge-Kaingang	Macro-Ge	South America
gto	Guató	Guató	Macro-Ge	South America
gna	Guana	Mascoian	Mascoian	South America
lng	Lengua	Mascoian	Mascoian	South America
crt	Chorote	Matacoan	Matacoan	South America
mca	Maca	Matacoan	Matacoan	South America
wch	Wichí	Matacoan	Matacoan	South America

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
mis	Miskito	Misumalpan	Misumalpan	South America
prh	Pirahã	Mura	Mura	South America
nmb	Nambikuára	Nambikuaran	Nambikuaran	South America
ese	Ese Ejja	Tacanan	Tacanan	South America
ach	Aché	Tupi-Guaraní	Tupian	South America
srn	Sirionó	Tupi-Guaraní	Tupian	South America
daw	Dâw	Vaupés-Japurá	Vaupés-Japurá	South America
hpd	Hupda	Vaupés-Japurá	Vaupés-Japurá	South America
nad	Nadëb	Vaupés-Japurá	Vaupés-Japurá	South America
wao	Waorani	Waorani	Waorani	South America
wra	Warao	Warao	Warao	South America
yah	Yahgan	Yámana	Yámana	South America
snm	Sanuma	Yanomam	Yanomam	South America
shi	Shiriana	Yanomam	Yanomam	South America
yrr	Yaruro	Yaruro	Yaruro	South America

Appendix 2. List of possible hunter-gatherer languages

WALS code	Name	Genus	Family	Macroarea
bsr	Basari	Northern Atlantic	Niger-Congo	Africa
rem	Remo	Munda	Austro-Asiatic	Eurasia
tsp	Tamil (Spoken)	Southern Dravidian	Dravidian	Eurasia
kur	Kurukh	Northern Dravidian	Dravidian	Eurasia
prd	Parji (Dravidian)	Central Dravidian	Dravidian	Eurasia
dul	Dulong	Nungish	Sino-Tibetan	SE Asia & Oceania
jin	Jino	Burmese-Lolo	Sino-Tibetan	SE Asia & Oceania
slg	Sulung	Mirish	Sino-Tibetan	SE Asia & Oceania
lje	Lauje	Sulawesi	Austronesian	SE Asia & Oceania
mkl	Maklew	Bulaka River	Bulaka River	New Guinea
ylm	Yelmek	Bulaka River	Bulaka River	New Guinea
kae	Kaki Ae	Eleman	Eleman	New Guinea
orl	Orokolo	Eleman	Eleman	New Guinea

(*Continued*)

Appendix 2. (Continued)

WALS code	Name	Genus	Family	Macroarea
toa	Toaripi	Eleman	Eleman	New Guinea
tap	Taiap	Gapun	Gapun	New Guinea
kaj	Kaure	Kaure	Kaure	New Guinea
tmg	Tamagario	Kayagar	Kayagar	New Guinea
obk	Obokuitai	Lakes Plain	Lakes Plain	New Guinea
wrm	Warembori	Lower Mamberamo	Lower Mamberamo	New Guinea
rao	Rao	Annaberg	Lower Sepik-Ramu	New Guinea
kai	Kaian	Lower Ramu	Lower Sepik-Ramu	New Guinea
mkr	Mikarew	Lower Ramu	Lower Sepik-Ramu	New Guinea
wtm	Watam	Lower Ramu	Lower Sepik-Ramu	New Guinea
chb	Chambri	Lower Sepik	Lower Sepik-Ramu	New Guinea
kie	Kire	Mikarew	Lower Sepik-Ramu	New Guinea
mrd	Marind	Marind Proper	Marind	New Guinea
yqy	Yaqay	Marind Proper	Marind	New Guinea
ard	Arandai	South Bird's Head	Marind	New Guinea
ina	Inanwatan	South Bird's Head	Marind	New Guinea
mri	Moraori	Morehead and Upper Maro Rivers	Morehead and Upper Maro Rivers	New Guinea
ang	Anggor	Senagi	Senagi	New Guinea
der	Dera	Senagi	Senagi	New Guinea
snt	Sentani	Sentani	Sentani	New Guinea
tbl	Tabla	Sentani	Sentani	New Guinea
amb	Ambulas	Middle Sepik	Sepik	New Guinea
boi	Boiken	Middle Sepik	Sepik	New Guinea
hhu	Hanga Hundi	Middle Sepik	Sepik	New Guinea
iat	Iatmul	Middle Sepik	Sepik	New Guinea
awt	Awtuw	Ram	Sepik	New Guinea
mhk	Mehek	Tama Sepik	Sepik	New Guinea
aba	Abau	Upper Sepik	Sepik	New Guinea
nam	Namia	Yellow River	Sepik	New Guinea
pok	Poko-Rawo	Eastern Sko	Sko	New Guinea
wom	Womo	Eastern Sko	Sko	New Guinea

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
isa	I'saka	Krisa	Sko	New Guinea
dum	Dumo	Western Sko	Sko	New Guinea
sko	Sko	Western Sko	Sko	New Guinea
paw	Pawaian	Pawaian	Teberan-Pawaian	New Guinea
ory	Orya	Tor	Tor	New Guinea
au	Au	Wapei-Palei	Torricelli	New Guinea
omi	Ömie	Koiarian	Trans-New Guinea	New Guinea
baa	Barai	Koiarian	Trans-New Guinea	New Guinea
kmo	Koiali (Mountain)	Koiarian	Trans-New Guinea	New Guinea
koi	Koiari	Koiarian	Trans-New Guinea	New Guinea
kta	Koita	Koiarian	Trans-New Guinea	New Guinea
har	Haruai	Upper Yuat	Upper Yuat	New Guinea
nag	Nagatman	Yale	Yale	New Guinea
mhc	Mahican	Algonquian	Algic	North America
mtt	Massachusett	Algonquian	Algic	North America
mcf	Michif	Algonquian	Algic	North America
mse	Munsee	Algonquian	Algic	North America
nnt	Nanticoke	Algonquian	Algic	North America
pow	Powhatan	Algonquian	Algic	North America
unm	Unami	Algonquian	Algic	North America
atk	Atakapa	Atakapa	Atakapa	North America
pwn	Pawnee	Caddoan	Caddoan	North America
coa	Coahuilteco	Coahuiltecan	Coahuiltecan	North America
cmc	Comecrudo	Comecrudan	Comecrudan	North America
hve	Huave (San Mateo del Mar)	Huavean	Huavean	North America
kkw	Karankawa	Karankawa	Karankawa	North America
cco	Chasta Costa	Athapaskan	Na-Dene	North America
tmc	Timucua	Timucua	Timucua	North America
adk	Andoke	Andoke	Andoke	South America
bna	Banawá	Arauan	Arauan	South America
cul	Culina	Arauan	Arauan	South America
den	Dení	Arauan	Arauan	South America
jmm	Jamamadi	Arauan	Arauan	South America

(*Continued*)

Appendix 2. (Continued)

WALS code	Name	Genus	Family	Macroarea
jwr	Jarawara	Arauan	Arauan	South America
pau	Paumarí	Arauan	Arauan	South America
aik	Aikaná	Arawakan	Arawakan	South America
ign	Ignaciano	Arawakan	Arawakan	South America
irx	Iranxe	Arawakan	Arawakan	South America
bti	Betoi	Betoi	Betoi	South America
chy	Chayahuita	Cahuapanan	Cahuapanan	South America
jeb	Jebero	Cahuapanan	Cahuapanan	South America
can	Candoshi	Candoshi	Candoshi	South America
apl	Apalaí	Cariban	Cariban	South America
bki	Bakairí	Cariban	Cariban	South America
car	Carib	Cariban	Cariban	South America
cde	Carib (De'kwana)	Cariban	Cariban	South America
crj	Carijona	Cariban	Cariban	South America
guq	Guaque	Cariban	Cariban	South America
hia	Hianacoto	Cariban	Cariban	South America
hix	Hixkaryana	Cariban	Cariban	South America
jpr	Japreria	Cariban	Cariban	South America
mac	Macushi	Cariban	Cariban	South America
mpy	Mapoyo	Cariban	Cariban	South America
pnr	Panare	Cariban	Cariban	South America
pem	Pemon	Cariban	Cariban	South America
tir	Tiriyo	Cariban	Cariban	South America
umu	Umaua	Cariban	Cariban	South America
wai	Wai Wai	Cariban	Cariban	South America
wyn	Wayana	Cariban	Cariban	South America
ykp	Yukpa	Cariban	Cariban	South America
cat	Catio	Choco	Choco	South America
emb	Embera	Choco	Choco	South America
emc	Embera Chami	Choco	Choco	South America
epe	Epena Pedee	Choco	Choco	South America
wau	Waunana	Choco	Choco	South America

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
cln	Cholon	Cholon	Cholon	South America
cof	Cofán	Cofán	Cofán	South America
gyb	Guayabero	Guahiban	Guahiban	South America
mcg	Macaguán	Guahiban	Guahiban	South America
pla	Playero	Guahiban	Guahiban	South America
skn	Sikuani	Guahiban	Guahiban	South America
amk	Amarakaeri	Harakmbet	Harakmbet	South America
mui	Muinane	Boran	Huitotoan	South America
bor	Bora	Huitoto	Huitotoan	South America
htt	Huitoto	Huitoto	Huitotoan	South America
hmi	Huitoto (Minica)	Huitoto	Huitotoan	South America
hmu	Huitoto (Muinane)	Huitoto	Huitotoan	South America
hum	Huitoto (Murui)	Huitoto	Huitotoan	South America
oca	Ocaina	Huitoto	Huitotoan	South America
ito	Itonama	Itonama	Itonama	South America
jbt	Jabutí	Jabutí	Jabutí	South America
acu	Achuar	Jivaroan	Jivaroan	South America
agr	Aguaruna	Jivaroan	Jivaroan	South America
cnm	Canamarí	Katukinan	Katukinan	South America
kwz	Kwazá	Kwaza	Kwaza	South America
xav	Xavánte	Ge-Kaingang	Macro-Ge	South America
rik	Rikbaktsa	Rikbaktsa	Macro-Ge	South America
chu	Chulupí	Matacoan	Matacoan	South America
mov	Movima	Movima	Movima	South America
amc	Amahuaca	Panoan	Panoan	South America
cap	Capanahua	Panoan	Panoan	South America
cas	Cashibo	Panoan	Panoan	South America
csh	Cashinahua	Panoan	Panoan	South America
cbo	Chácobo	Panoan	Panoan	South America
kdg	Karipuna do Guapore	Panoan	Panoan	South America
mts	Matis	Panoan	Panoan	South America
myr	Matsés	Panoan	Panoan	South America
shh	Sharanahua	Panoan	Panoan	South America

(*Continued*)

Appendix 2. (Continued)

WALS code	Name	Genus	Family	Macroarea
shk	Shipibo-Konibo	Panoan	Panoan	South America
yam	Yaminahua	Panoan	Panoan	South America
yag	Yagua	Peba-Yaguan	Peba-Yaguan	South America
pui	Puinave	Puinave	Puinave	South America
esm	Esmeraldeño	Tacame	Tacame	South America
ana	Araona	Tacanan	Tacanan	South America
cav	Cavineña	Tacanan	Tacanan	South America
tac	Tacana	Tacanan	Tacanan	South America
tsr	Taushiro	Taushiro	Taushiro	South America
tic	Ticuna	Ticuna	Ticuna	South America
tru	Trumai	Trumai	Trumai	South America
brs	Barasano	Tucanoan	Tucanoan	South America
bno	Barasano (Northern)	Tucanoan	Tucanoan	South America
crp	Carapana	Tucanoan	Tucanoan	South America
cub	Cubeo	Tucanoan	Tucanoan	South America
des	Desano	Tucanoan	Tucanoan	South America
gno	Guanano	Tucanoan	Tucanoan	South America
kje	Koreguaje	Tucanoan	Tucanoan	South America
mcn	Macuna	Tucanoan	Tucanoan	South America
ore	Orejón	Tucanoan	Tucanoan	South America
prt	Piratapuyo	Tucanoan	Tucanoan	South America
ret	Retuarã	Tucanoan	Tucanoan	South America
sec	Secoya	Tucanoan	Tucanoan	South America
sin	Siona	Tucanoan	Tucanoan	South America
sri	Siriano	Tucanoan	Tucanoan	South America
tty	Tatuyo	Tucanoan	Tucanoan	South America
tuc	Tucano	Tucanoan	Tucanoan	South America
tuy	Tuyuca	Tucanoan	Tucanoan	South America
yrt	Yuruti	Tucanoan	Tucanoan	South America
urn	Urarina	Urarina	Urarina	South America

(*Continued*)

WALS code	Name	Genus	Family	Macroarea
uru	Uru	Uru-Chipaya	Uru-Chipaya	South America
ynm	Yanomámi	Yanomam	Yanomam	South America
ayr	Ayoreo	Zamucoan	Zamucoan	South America
arb	Arabela	Zaparoan	Zaparoan	South America
iqu	Iquito	Zaparoan	Zaparoan	South America
zpr	Zaparo	Zaparoan	Zaparoan	South America