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**More statistical implicational universals in Greenberg's data**

**(another computer-generated article)**

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This paper studies the statistical implicational universals in the 30 languages sample from the classical paper by Joseph Greenberg (1966). Some problems in the universals proposed by Greenberg are shown, as well as 43 previously undiscovered universals of this type. The whole text of the article was generated by the computer program UNIVAUTO (UNIVersals AUthoring TOol) and only the formatting according to the style-sheet of the journal was manually added. A brief description of this program, as well as another article generated by it, were previously published by this journal (*Contrastive Linguistics* 1999, issue 4).

In this article we study the statistical implicational universals in the 30 languages sample of Greenberg 1966. We will show some problems in the analyses proposed by Greenberg and will list further universals that can be uncovered in these data. This paper by Greenberg is considered seminal in the field of language universals (cf. e.g. Comrie 1979, Hawkins 1983, and Dryer 1995).

Language universals express common features shared by all languages ("non-statistical universals") or by most languages ("statistical universals"). Universals may be absolute or implicational. Our concern in this paper will be statistical implicational universals. An implication is a proposition of the logical form "If P then Q", where P is called an antecedent and Q is called a consequent. It is true when both the antecedent P and the consequent Q are true, or the antecedent P is false and the consequent Q is true, or both the antecedent P and the consequent Q are false. It is false

when the antecedent P is true and the consequent Q is false. In what follows, we introduce the following restriction on deriving a universal: we shall take into consideration only implicational universals valid in at least 85 percent of the data, that is in at least 85 percent of the languages where the antecedent (and therefore the consequent) of the implicational universal actually occur.

Greenberg 1966 considers data comprising 30 languages of diverse genetic origin described in terms of 15 word/morpheme ordering features, which we list here as Table 1.

The table employs the following abbreviations:

SOVr=rigid Subject-Object-Verb order

SOVnr=nonrigid Subject-Object-Verb order

VSO=Verb-Subject-Object order

SVO=Subject-Verb-Object order

Pr=preposition

Po=postposition

Rel=relative clause

N=noun

CN=common noun

PN=proper noun

A=adjective

Adj=adjective

G=genitive

D=demonstrative

Num=numeral

Aux=auxiliary

V=verb

MV=main verb

SV=subordinate verb

Adv=adverb

AdjMS=adjective-standard-marker order

Table 1: The 30 languages sample

Languages	V order	Pr/Po	NRel/ RelN	NA/ AN	NG/ GN	ND/ DN	NNum/ NumN	AuxV / VAux	MVSV/ SVMV	AdvAdv/ AdvAdj	AdjMS/ SMAdj	Yes- No Qu. Part.	Wh- word	CNPV/ PNCN	Pref/ Suff
Basque	SOVnr	Po	RelN	NA	GN	ND	NumN	VAux	MVSV	AdvAdj	SMAdj	*	*	PNCN	Suff
Berber	VSO	Pr	NRel	NA	NG	ND	NumN	*	MVSV	*	AdjMS	init	first	*	both
Burmese	SOVr	Po	RelN	NA	GN	DN	NumN	*	SVMV	AdvAdj	SMAdj	fin	*	PNCN	Suff
Burushaski	SOVr	Po	RelN	AN	GN	DN	NumN	VAux	SVMV	AdvAdj	SMAdj	fin	*	PNCN	both
Chibcha	SOVnr	Po	RelN	NA	GN	DN	NNum	VAux	MVSV	AdvAdj	SMAdj	*	*	*	Suff
Finnish	SVO	Po	both	AN	GN	DN	NumN	AuxV	MVSV	AdvAdj	both	*	first	PNCN	Suff
Fulani	SVO	Pr	NRel	NA	NG	ND	NNum	*	MVSV	AdvAdj	AdjMS	*	first	*	both
Greek	SVO	Pr	NRel	AN	NG	DN	NumN	AuxV	MVSV	AdvAdj	AdjMS	*	first	CNPV	both
Guarani	SVO	Po	NRel	NA	GN	DN	both	VAux	MVSV	AdvAdj	SMAdj	*	first	CNPV	both
Hebrew	VSO	Pr	NRel	NA	NG	ND	NumN	*	MVSV	AdvAdj	AdjMS	init	first	*	both
Hindi	SOVr	Po	NRel	AN	GN	DN	NumN	VAux	SVMV	AdvAdj	SMAdj	*	*	*	Suff
Italian	SVO	Pr	NRel	NA	NG	DN	NumN	AuxV	MVSV	AdvAdj	AdjMS	*	first	CNPV	both
Japanese	SOVr	Po	RelN	AN	GN	DN	NumN	*	SVMV	AdvAdj	SMAdj	fin	*	PNCN	Suff
Kannada	SOVr	Po	RelN	AN	GN	DN	NumN	VAux	SVMV	AdvAdj	SMAdj	fin	*	*	Suff
Loritja	SOVnr	Po	*	NA	GN	ND	NNum	*	MVSV	AdvAdj	*	*	*	*	Suff
Malay	SVO	Pr	NRel	NA	NG	ND	NumN	*	MVSV	AdvAdj	AdjMS	*	first	CNPV	both
Maori	VSO	Pr	NRel	NA	NG	DN	NumN	*	MVSV	both	AdjMS	init	first	*	both
Masai	VSO	Pr	NRel	NA	NG	DN	NNum	AuxV	MVSV	*	*	init	first	*	both
Maya	SVO	Pr	NRel	AN	NG	DN	NumN	AuxV	MVSV	AdvAdj	*	*	first	*	both
Norwegian	SVO	Pr	NRel	AN	GN	DN	NumN	AuxV	MVSV	AdvAdj	AdjMS	*	first	PNCN	both
Nubian	SOVnr	Po	both	NA	GN	DN	NNum	VAux	MVSV	*	SMAdj	fin	*	PNCN	Suff
Quechua	SOVnr	Po	NRel	AN	GN	DN	NumN	VAux	MVSV	*	*	*	*	*	Suff
Serbian	SVO	Pr	NRel	AN	NG	DN	NumN	AuxV	MVSV	AdvAdj	AdjMS	*	first	CNPV	both
Songhai	SVO	Po	NRel	NA	GN	ND	NNum	*	MVSV	*	AdjMS	*	*	*	Suff
Swahili	SVO	Pr	NRel	NA	NG	ND	NNum	AuxV	MVSV	AdvAdj	AdjMS	*	*	CNPV	both
Thai	SVO	Pr	NRel	NA	NG	ND	NumN	*	MVSV	AdvAdj	AdjMS	fin	*	CNPV	Pref
Turkish	SOVr	Po	RelN	AN	GN	DN	NumN	VAux	SVMV	AdvAdj	SMAdj	*	*	PNCN	Suff
Welsh	VSO	Pr	NRel	NA	NG	ND	NumN	AuxV	MVSV	both	AdjMS	init	first	CNPV	both
Yoruba	SVO	Pr	NRel	NA	NG	ND	NNum	*	MVSV	AdvAdj	*	fin	first	*	both
Zapotec	VSO	Pr	NRel	NA	NG	ND	NumN	AuxV	MVSV	AdvAdj	AdjMS	*	first	CNPV	both

SMA<sub>adj</sub>=standard-marker-adjective order

Wh=interrogative word or phrase

Pref=prefix

Suff=suffix

init=initial

fin=final

\* =inapplicable or unknown value of a feature

Below we restate, in our wording, the statistical implicational universals of the type studied here which Greenberg 1966 found in these data, preserving for ease of reference their original numeration. If the original formulation expresses a complex implicational statement, it is split into elementary propositions of the type "If P then Q":

[2-a]. With greater than chance frequency, in languages with prepositions the noun precedes the genitive.

[2-b]. With greater than chance frequency, in languages with postpositions the genitive precedes the noun.

[4-a]. If a language has rigid SOV order then, with greater than chance frequency, this language is with postpositions.

[4-b]. With greater than chance frequency, if a language has nonrigid SOV order then this language has postpositions.

[9-a]. With greater than chance frequency, if a language has an initial yes-no question particle then this language has prepositions.

[9-b]. With greater than chance frequency, if a language has a final yes-no question particle then this language has postpositions.

[17]. With greater than chance frequency, if a language has dominant order VSO then the noun precedes the adjective.

[18-a]. With greater than chance frequency, if in a language the adjective precedes the noun then the demonstrative precedes the noun.

[18-b]. If in a language the adjective precedes the noun then, with greater than chance frequency, the numeral precedes the noun.

[22-b]. With greater than chance frequency, if a language has adjective-marker-standard order then this language is with prepositions.

[23-b]. If in a language the common noun precedes the proper noun then, with greater than chance frequency, the genitive precedes the noun.

We found that universals [2-a,22-b] are indeed supported in 85 or more percent of the languages in the database.

Universal [9-b] is also a valid statistical universal, however it is below our threshold requiring the presence of at least 85 percent positive examples in the dataset. [9-b] is supported in 5 languages (Burmese, Burushaski, Japanese, Kannada, and Nubian) and is invalidated in 2 languages (Thai and Yoruba), which is 71.43 percent validity.

Universals [2-b,4-a,4-b,9-a,17,18-a,18-b] are in fact non-statistical, rather than statistical universals, since they hold without any exceptions in the investigated database.

Universal [23-b] is not a valid statistical universal. [23-b] is supported in 1 language (Guarani) and is falsified in 8 languages (Greek, Italian, Malay, Serbian, Swahili, Thai, Welsh, and Zapotec), which amounts to 11.11 percent validity.

We found the following previously undiscovered universals in the data.

*Universal 1.* With greater than chance frequency, if in a language the adjective precedes the adverb then the noun precedes the demonstrative.

This universal is supported in 7 languages: Fulani, Hebrew, Malay, Swahili, Thai, Yoruba, and Zapotec. The counterexample is Guarani. The universal is supported in 87.5 % of the data.

*Universal 2.* If in a language the adjective precedes the adverb then, with greater than chance frequency, the noun precedes the genitive.

Positive evidence for this pattern is provided by 7 languages: Fulani, Hebrew, Malay, Swahili, Thai, Yoruba, and Zapotec. The exception is Guarani. The universal is supported in 87.5 % of the data.

*Universal 3.* With greater than chance frequency, if in a language the adjective precedes the adverb then this language is with prepositions.

Positive evidence for this pattern is provided by 7 languages: Fulani, Hebrew, Malay, Swahili, Thai, Yoruba, and Zapotec. The exception is Guarani. The percentage of validity is 87.5 %.

*Universal 4.* With greater than chance frequency, if in a language the adjective precedes the adverb then this language has both prefixes and suffixes.

Positive evidence for this pattern is provided by 7 languages: Fulani, Guarani, Hebrew, Malay, Swahili, Yoruba, and Zapotec. The counterexample is Thai. The percentage of validity is 87.5 %.

*Universal 5.* If in a language the adverb precedes the adjective then, with greater than chance frequency, the demonstrative precedes the noun.

This universal is supported in 13 languages: Burmese, Burushaski, Chibcha, Finnish, Greek, Hindi, Italian, Japanese, Kannada, Maya, Norwegian, Serbian, and Turkish. The counterexamples are Basque and Loritja. The percentage of validity is 86.67 %.

*Universal 6.* With greater than chance frequency, if in a language the adverb precedes the adjective then the numeral precedes the noun.

The following 13 languages support this universal: Basque, Burmese, Burushaski, Finnish, Greek, Hindi, Italian, Japanese, Kannada, Maya, Norwegian, Serbian, and Turkish. The exceptions are Chibcha and Loritja. The validity of the universal is 86.67 %.

*Universal 7.* With greater than chance frequency, in languages with adjective-marker-standard order the noun precedes the genitive.

Examples of this universal are 12 languages: Berber, Fulani, Greek, Hebrew, Italian, Malay, Maori, Serbian, Swahili, Thai, Welsh, and Zapotec. The exceptions are Norwegian and Songhai. The validity of the universal is 85.71 %.

*Universal 8.* If a language has adjective-marker-standard order then, with greater than chance frequency, this language has both prefixes and suffixes.

This universal is supported in 12 languages: Berber, Fulani, Greek, Hebrew, Italian, Malay, Maori, Norwegian, Serbian, Swahili, Welsh, and Zapotec. The counterexamples are Songhai and Thai. The percentage of validity is 85.71 %.

*Universal 9.* If a language has standard-adjective-marker order then, with greater than chance frequency, the demonstrative precedes the noun.

Examples of this universal are 9 languages: Burmese, Burushaski, Chibcha, Guarani, Hindi, Japanese, Kannada, Nubian, and Turkish. The exception is Basque. The percentage of validity is 90.0 %.

*Universal 10.* With greater than chance frequency, if in a language the inflected auxiliary precedes the verb then the noun precedes the relative expression.

This universal is supported in 9 languages: Greek, Italian, Masai, Maya, Norwegian, Serbian, Swahili, Welsh, and Zapotec. The exception is Finnish. The percentage of validity is 90.0 %.

*Universal 11.* If in a language the inflected auxiliary precedes the verb then, with greater than chance frequency, this language has prepositions.

This universal is supported in 9 languages: Greek, Italian, Masai, Maya, Norwegian, Serbian, Swahili, Welsh, and Zapotec. The counterexample is Finnish. The universal holds in 90.0 % of the languages.

*Universal 12.* With greater than chance frequency, if in a language the inflected auxiliary precedes the verb then this language is with both prefixes and suffixes.

Positive evidence for this pattern is provided by 9 languages: Greek, Italian, Masai, Maya, Norwegian, Serbian, Swahili, Welsh, and Zapotec. The exception is Finnish. The validity of the universal is 90.0 %.

*Universal 13.* If in a language the inflected auxiliary precedes the verb then, with greater than chance frequency, this language has the question word or phrase placed first in an interrogative word question.

Positive evidence for this pattern is provided by 9 languages: Finnish, Greek, Italian, Masai, Maya, Norwegian, Serbian, Welsh, and Zapotec. The exception is Swahili. The validity of the universal is 90.0 %.

*Universal 14.* With greater than chance frequency, if in a language the verb precedes the inflected auxiliary then this language has standard-adjective-marker order.

Examples of this universal are 8 languages: Basque, Burushaski, Chibcha, Guarani, Hindi, Kannada, Nubian, and Turkish. The exception is Quechua. The universal holds in 88.89 % of the languages.

*Universal 15.* With greater than chance frequency, if in a language the verb precedes the inflected auxiliary then the demonstrative precedes the noun.

Examples of this universal are 8 languages: Burushaski, Chibcha, Guarani, Hindi, Kannada, Nubian, Quechua, and Turkish. The counterexample is Basque. The validity of the universal is 88.89 %.

*Universal 16.* If in a language the common noun precedes the proper noun then, with greater than chance frequency, this language has adjective-marker-standard order.

Examples of this universal are 8 languages: Greek, Italian, Malay, Serbian, Swahili, Thai, Welsh, and Zapotec. The counterexample is Guarani. The universal is supported in 88.89 % of the data.

*Universal 17.* If in a language the common noun precedes the proper noun then, with greater than chance frequency, the noun precedes the genitive.

Positive evidence for this pattern is provided by 8 languages: Greek, Italian, Malay, Serbian, Swahili, Thai, Welsh, and Zapotec. The exception is Guarani. The validity of the universal is 88.89 %.

*Universal 18.* If in a language the common noun precedes the proper noun then, with greater than chance frequency, this language is with prepositions.

Positive evidence for this pattern is provided by 8 languages: Greek, Italian, Malay, Serbian, Swahili, Thai, Welsh, and Zapotec. The counterexample is Guarani. The universal is supported in 88.89 % of the data.

*Universal 19.* If in a language the common noun precedes the proper noun then, with greater than chance frequency, this language has both prefixes and suffixes.

Examples of this universal are 8 languages: Greek, Guarani, Italian, Malay, Serbian, Swahili, Welsh, and Zapotec. The counterexample is Thai. The validity of the universal is 88.89 %.

*Universal 20.* If in a language the proper noun precedes the common noun then, with greater than chance frequency, the adverb precedes the adjective.

The following 7 languages support this universal: Basque, Burmese, Burushaski, Finnish, Japanese, Norwegian, and Turkish. The exception is Nubian. The validity of the universal is 87.5 %.

*Universal 21.* If in a language the proper noun precedes the common noun then, with greater than chance frequency, the demonstrative precedes the noun.

Examples of this universal are 7 languages: Burmese, Burushaski, Finnish, Japanese, Norwegian, Nubian, and Turkish. The counterexample is Basque. The universal is supported in 87.5 % of the data.

*Universal 22.* With greater than chance frequency, if in a language the proper noun precedes the common noun then the numeral precedes the noun.

This universal is supported in 7 languages: Basque, Burmese, Burushaski, Finnish, Japanese, Norwegian, and Turkish. The exception is Nubian. The percentage of validity is 87.5 %.

*Universal 23.* If in a language the proper noun precedes the common noun then, with greater than chance frequency, this language has postpositions.

This universal is supported in 7 languages: Basque, Burmese, Burushaski, Finnish, Japanese, Nubian, and Turkish. The counterexample is Norwegian. The percentage of validity is 87.5 %.

*Universal 24.* With greater than chance frequency, if in a language the adjective precedes the noun then the adverb precedes the adjective.

Examples of this universal are 10 languages: Burushaski, Finnish, Greek, Hindi, Japanese, Kannada, Maya, Norwegian, Serbian, and Turkish. The counterexample is Quechua. The validity of the universal is 90.91 %.

*Universal 25.* If in a language the noun precedes the adjective then, with greater than chance frequency, the main verb precedes the subordinate verb.

Positive evidence for this pattern is provided by 18 languages: Basque, Berber, Chibcha, Fulani, Guarani, Hebrew, Italian, Loritja, Malay, Maori, Masai, Nubian, Songhai, Swahili, Thai, Welsh, Yoruba, and Zapotec. The exception is Burmese. The percentage of validity is 94.74 %.

*Universal 26.* With greater than chance frequency, if in a language the genitive precedes the noun then this language is with postpositions.

Examples of this universal are 14 languages: Basque, Burmese, Burushaski, Chibcha, Finnish, Guarani, Hindi, Japanese, Kannada, Loritja, Nubian, Quechua, Songhai, and Turkish. The exception is Norwegian. The universal holds in 93.33 % of the languages.

*Universal 27.* If in a language the noun precedes the genitive then, with greater than chance frequency, this language is with both prefixes and suffixes.

Positive evidence for this pattern is provided by 14 languages: Berber, Fulani, Greek, Hebrew, Italian, Malay, Maori, Masai, Maya, Serbian, Swahili, Welsh, Yoruba, and Zapotec. The counterexample is Thai. The validity of the universal is 93.33 %.

*Universal 28.* With greater than chance frequency, if in a language the noun precedes the genitive then this language has the question word or phrase placed first in an interrogative word question.

Positive evidence for this pattern is provided by 13 languages: Berber, Fulani, Greek, Hebrew, Italian, Malay, Maori, Masai, Maya, Serbian, Welsh, Yoruba, and Zapotec. The exceptions are Swahili and Thai. The universal holds in 86.67 % of the languages.

*Universal 29.* If in a language the noun precedes the relative expression then, with greater than chance frequency, the main verb precedes the subordinate verb.

The following 19 languages support this universal: Berber, Fulani, Greek, Guarani, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Quechua, Serbian, Songhai, Swahili, Thai, Welsh, Yoruba, and Zapotec. The exception is Hindi. The universal holds in 95.0 % of the languages.

*Universal 30.* If in a language the relative expression precedes the noun then, with greater than chance frequency, the demonstrative precedes the noun.

Positive evidence for this pattern is provided by 6 languages: Burmese, Burushaski, Chibcha, Japanese, Kannada, and Turkish. The exception is Basque. The universal holds in 85.71 % of the languages.

*Universal 31.* If in a language the relative expression precedes the noun then, with greater than chance frequency, the numeral precedes the noun.

Positive evidence for this pattern is provided by 6 languages: Basque, Burmese, Burushaski, Japanese, Kannada, and Turkish. The counterexample is Chibcha. The percentage of validity is 85.71 %.

*Universal 32.* If in a language the relative expression precedes the noun then, with greater than chance frequency, this language has suffixes.

Examples of this universal are 6 languages: Basque, Burmese, Chibcha, Japanese, Kannada, and Turkish. The exception is Burushaski. The percentage of validity is 85.71 %.

*Universal 33.* If a language has postpositions then, with greater than chance frequency, this language has suffixes.

Examples of this universal are 12 languages: Basque, Burmese, Chibcha, Finnish, Hindi, Japanese, Kannada, Loritja, Nubian, Quechua, Songhai, and Turkish. The counterexamples are Burushaski and Guarani. The universal holds in 85.71 % of the languages.

*Universal 34.* With greater than chance frequency, if a language has prepositions then this language is with both prefixes and suffixes.

Positive evidence for this pattern is provided by 15 languages: Berber, Fulani, Greek, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Swahili, Welsh, Yoruba, and Zapotec. The exception is Thai. The universal is supported in 93.75 % of the data.

*Universal 35.* With greater than chance frequency, if a language has prepositions then this language has the question word or phrase placed first in an interrogative word question.

The following 14 languages support this universal: Berber, Fulani, Greek, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Welsh, Yoruba, and Zapotec. The exceptions are Swahili and Thai. The universal is supported in 87.5 % of the data.

*Universal 36.* With greater than chance frequency, if a language has both prefixes and suffixes then the main verb precedes the subordinate verb.

This universal is supported in 16 languages: Berber, Fulani, Greek, Guarani, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Swahili, Welsh, Yoruba, and Zapotec. The exception is Burushaski. The validity of the universal is 94.12 %.

*Universal 37.* With greater than chance frequency, in languages with both prefixes and suffixes the noun precedes the relative expression.

This universal is supported in 16 languages: Berber, Fulani, Greek, Guarani, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Swahili, Welsh, Yoruba, and Zapotec. The counterexample is Burushaski. The universal is supported in 94.12 % of the data.

*Universal 38.* If a language has both prefixes and suffixes then, with greater than chance frequency, this language has prepositions.

The following 15 languages support this universal: Berber, Fulani, Greek, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Swahili, Welsh, Yoruba, and Zapotec. The exceptions are Burushaski and Guarani. The universal holds in 88.24 % of the languages.

*Universal 39.* With greater than chance frequency, if a language has both prefixes and suffixes then this language is with the question word or phrase placed first in an interrogative word question.

This universal is supported in 15 languages: Berber, Fulani, Greek, Guarani, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Welsh, Yoruba, and Zapotec. The counterexamples are Burushaski and Swahili. The validity of the universal is 88.24 %.

*Universal 40.* With greater than chance frequency, in languages with dominant order SVO the noun precedes the relative expression.

Positive evidence for this pattern is provided by 12 languages: Fulani, Greek, Guarani, Italian, Malay, Maya, Norwegian, Serbian, Songhai, Swahili, Thai, and Yoruba. The exception is Finnish. The validity of the universal is 92.31 %.

*Universal 41.* With greater than chance frequency, if a language has the question word or phrase placed first in an interrogative word question then the noun precedes the relative expression.

Examples of this universal are 15 languages: Berber, Fulani, Greek, Guarani, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Welsh, Yoruba, and Zapotec. The counterexample is Finnish. The universal holds in 93.75 % of the languages.

*Universal 42.* If a language has the question word or phrase placed first in an interrogative word question then, with greater than chance frequency, this language has prepositions.

This universal is supported in 14 languages: Berber, Fulani, Greek, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Welsh, Yoruba, and Zapotec. The exceptions are Finnish and Guarani. The universal holds in 87.5 % of the languages.

*Universal 43.* With greater than chance frequency, if a language has the question word or phrase placed first in an interrogative word question then this language has both prefixes and suffixes.

The following 15 languages support this universal: Berber, Fulani, Greek, Guarani, Hebrew, Italian, Malay, Maori, Masai, Maya, Norwegian, Serbian, Welsh, Yoruba, and Zapotec. The counterexample is Finnish. The percentage of validity is 93.75 %.

Our findings can be summarized as follows. We confirmed the validity of 3 of Greenberg's universals, but noted that 1 of these is supported in less than 85 percent of the languages, a plausibility requirement we set up at the beginning of this article. 7 universals were seen to be non-statistical, i.e. holding without exceptions, rather than statistical. One universal was shown to be invalid. Finally, 43 novel previously undiscovered universals were found to hold in the data.

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