

Association of Linguistic Typology 3, Amsterdam, 26-29 August 1999

The Agglutination Hypothesis: A belated empirical investigation

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1. Agglutination and fusion: An ambiguous success story

FRIEDRICH VON SCHLEGEL (1808), AUGUST WILHELM VON SCHLEGEL (1818),
WILHELM VON HUMBOLDT (1822):

isolating (\approx analytic) / **agglutinating** / **flective** / **incorporating**

conflates three different parameters (SAPIR 1921):

- **degree of synthesis** (isolating vs. non-isolating / analytic vs. synthetic)
- **degree of stem combination** (incorporating vs. non-incorporating)
- **degree of agglutination** (agglutinating vs. fusional/flective)

Success: Almost every introduction to linguistics mentions the terms, and they are frequently used in the technical literature:

EVANS (1995:1): “Kayardild is a dependent-marking, **agglutinating**, entirely suffixing language with a free order of phrasal constituents and a rich system of case-marking...”

SLOBIN (1997:281): “... On this account, **agglutinating** languages like Turkish and Japanese have no closed-class morphemes...”

HYMAN (1999): “... In other words, a highly developed paradigmatic system of tonal oppositions appears not to be very compatible with a highly developed syntagmatic system of **agglutinative** morphology”

Failure: Little “official recognition” by general theorists

(but cf. Skalic&ka 1951/1979, Plank 1991, 1999, Plungian 1999, Testelefs 1999):

SPENCER (1991:38): “This typology, though sanctioned by tradition, has been criticized for being both incoherent and useless. It is **useless** because nothing of any interest follows from classifying languages in this way...”

ANDERSON (1985:10): “... nothing much seems to follow from this classification: it has never been shown, for example, that languages with agglutinative properties share other features of a non-accidental sort that are not shared with non-agglutinating languages as well. For these reasons, the traditional terms do **not** seem to constitute any **significant** typology.”

However, both **degree of synthesis** (cf. Greenberg 1954) and **incorporation** (cf. Baker 1996) have been shown to be of great typological interest.

2. The Agglutination Hypothesis: Implicit claims made explicit

Whole languages are usually classified as agglutination/fusional, not just small subsystems! Hence:

First Prediction: Correlation among parts of the morphology

If a language is agglutinating/fusional in one area of its morphology (e.g. in nouns, or in the future tense), it tends to show the same type elsewhere.

Agglutination/fusion is not a primitive feature. But what are the component features?

BLOOMFIELD 1933:207: "*Inflectional* languages show a merging of semantically distinct features either in a single bound form or in closely united bound forms, as when the suffix *-o@* in a Latin form like *amo@* 'I love' expresses the meanings 1ST, SG, PRES, IND."

HJELMSLEV 1963[1968:109]: "... *flektierenden* Typ, bei dem die Grenze zwischen Wurzel und Suffix nicht klar ist, bei dem jedes Suffix oftmals gleichzeitig mehrere verschiedene grammatische Verhältnisse ausdrückt, und bei dem die Wurzel selbst bei der Flexion Veränderungen erfahren kann."

ANDERSON 1985:9: "*(in)flexional* languages have internally complex words which cannot easily be segmented into an exhaustive and non-overlapping string of formatives"

WHALEY 1997:134: "A language is *fusional* if the boundaries between its morphemes are hard to determine. The effect is as if the morphemes were blending, or fusing, together."

- **Cumulation (vs. separation)** (cf. Bloomfield, Hjelmslev):
the expression of several morphological subcategories in one affix
- **Stem alternation (vs. stem invariance)** (cf. Hjelmslev, F. von Schlegel):
the (co-)expression of morphological subcategories by changing, rather than adding to, the stem
- **Affix alternation (vs. affix invariance)**
different morphophonemic variants of affixes, resulting in lack of one-to-one correspondence between meaning and form

| | | | | | |
|---------------|----|---------|----------------|-------------------|------------------|
| (1) Hungarian | | 'house' | 'table' | 'river' | |
| | Sg | Nom | <i>ház</i> | <i>asztal</i> | <i> folyó</i> |
| | | Acc | <i>házat</i> | <i>asztalt</i> | <i> folyót</i> |
| | Pl | Nom | <i>házak</i> | <i>asztalok</i> | <i> folyók</i> |
| | | Acc | <i>házakat</i> | <i>asztalokat</i> | <i> folyókat</i> |

• **Affix suppletion (vs. affix uniformity)** (esp. Skalic&ka)

different variants of affixes that cannot be described morphophonemically; they can be conditioned lexically, morphologically, or phonologically

| | | |
|-------------------------------|-----------------------------|------------------------------|
| (2) <u>lex. conditioning:</u> | <u>morph. conditioning:</u> | <u>phonol. conditioning:</u> |
| Kannada | Latin | Lezgian |
| Pl. <i>-aru</i> /humans | 1sg. <i>-o</i> /Present | Aor. Part. <i>-r</i> /high V |
| <i>-galu</i> /inanimates | <i>-m</i> /Imperfect | <i>-ji</i> /low V |

Second Prediction: Correlation among different component features

If a language is agglutinating/fusional w.r.t. one of the component features (cumulation, (stem/affix) alternation, affix suppletion), it will to behave similarly w.r.t. the other features.

3. Difficulties for an empirical test

(i) Different languages show **different morphological categories** and vary significantly in morphological complexity

=> I only looked at languages with a reasonable amount of inflection, and took into account only the core of nominal and verbal inflection

(ii) **Cumulation** occurs very commonly with person/number affixes in all languages, e.g.

| | | | | | |
|----|----------|-----------------|-------------------|----------------|---------------------|
| | | Hungarian | 'O'odham | Tauya | Lango |
| Sg | 1 | <i>kez-em</i> | <i>ñ-kakkio</i> | <i>ya-neme</i> | <i>pàlà-ná</i> |
| | 2 | <i>kez-ed</i> | <i>m-kakkio</i> | <i>na-neme</i> | <i>pàl 'Ý-ní</i> |
| | 3 | <i>kez-e</i> | <i>kakkio-j</i> | <i>Ø-neme</i> | <i>pàlà-mE/rEfl</i> |
| Pl | 1 | <i>kez-ünk</i> | <i>t-kakkio</i> | <i>se-neme</i> | <i>pàlà-wá</i> |
| | 2 | <i>kez-etek</i> | <i>'em-kakkio</i> | <i>te-neme</i> | <i>pàl 'Ý-wú</i> |
| | <i>a</i> | <i>kez-iik</i> | <i>ha-kakkio</i> | <i>ne-neme</i> | <i>pàlà-gí</i> |
| | | 'my hand etc.' | 'my legs etc.' | 'my head etc.' | 'my knife etc.' |

=> I regarded "person-number(-gender)" as a single supercategory, so that these cases do not count as cumulation

(iii) In tense-aspect-mood, **cumulation** also seems to be common, but it is extremely difficult to identify the categories that are cumulated, and to distinguish cumulation from semantic complexity, cf.

| | | | | | |
|---------------------|-----------------|------------------------|----------------|-----|--------------------|
| | Italian | Lezgian | Pipil | vs. | M. Greek |
| past + perfective | <i>port-ai</i> | <i>qac&u-na</i> | <i>chiw-ki</i> | | <i>é- Vrap-s-e</i> |
| past + imperfective | <i>port-avo</i> | <i>qac&u-zwa-j</i> | | | <i>chiwa-ya</i> |
| <i>e- Vraf-Ø-e</i> | | | | | |
| | 'carried' | 'took' | 'did' | | 'wrote' |

=> I regarded "tense-aspect-mood" as a single supercategory, unless there were very good reasons to separate them

(iv) In most languages, only a subset of lexical items show **stem alternations** (e.g. in German, only strong verbs alternate, and these are a small minority)

=> For each supercategory separately, I assigned scores depending on the (estimated) absolute number of lexemes that exhibit stem alternations:

| | |
|-----------|------------------------------------|
| 1 score: | < 10 lexemes with stem alternation |
| 4 scores: | > 10 lexemes |
| 7 scores | > 50 lexemes |
| 10 scores | the majority of (or all) lexemes |

(v) Morphophonemic **affix alternations** are very difficult to distinguish from purely phonologically conditioned alternations;
cf. German plural suffix *-n/-en* (*Straße-n*, *Partikel-n*)

=> I excluded the feature “affix alternation” from consideration -- too difficult!

4. The test

4.1. **Data:** 25 sample languages, each from a different genus (in M. Dryer’s sense):

TABLE 1: THE 25 LANGUAGES OF THE SAMPLE

| | | | |
|------------|-------------|------------------|----------------|
| Arabic | Semitic | Martuthunira | Pama-Nyungan |
| Coptic | Egyptian | Amur Nivkh | Nivkh |
| Evenki | Tungusic | Ossetic | Iranian |
| Finnish | Finnic | Pipil | Aztec |
| German | Germanic | Ponapean | Oceanic |
| Hindi/Urdu | Indic | Huallaga Quechua | Quechua |
| Hungarian | Ugric | Tümpisa Shoshone | Numic |
| Kannada | Dravidian | Swahili | Bantu |
| Krongo | Kordofanian | Tauya | Adelbert Range |
| Lango | Nilotic | Cl. Tibetan | Tibetic |
| Latin | Italic | Turkish | Turkic |
| Lezgian | Lezgian | Tzutujil | Mayan |
| Maricopa | Yuman | | |

- I looked at (1) cumulation/separation, (2) stem alternation/invariance, and (3) affix suppletion/uniformity in each of these languages
- I determined a Cumulation index, an Alternation index, and a Suppletion index for each language, separately for nominal and for verbal inflection (between 0 and 100)
- **Cumulation index** (roughly): percentage of inflected forms that exhibit cumulation
- **Alternation index:** sum of stem alternation scores (cf. §3, (iv)) divided by number of supercategories
- **Suppletion index:** percentage of subcategories that exhibit affix suppletion

4.2. Testing the Second Prediction: Correlation among the three indices?

TABLE 2: INDEX VALUES AND LANGUAGE RANKING FOR EACH INDEX

| Ranking by Cumulation index: | | Ranking by Alternation index: | | Ranking by Suppletion index: | |
|------------------------------------|-----|-------------------------------------|----|------------------------------------|----|
| 1. Krongo | 0 | 1. Hindi-Urdu | 0 | 1. Nivkh | 0 |
| Lango | 0 | Martuthunira | 0 | 2. Tauya | 3 |
| Lezgian | 0 | Nivkh | 0 | 3. Ponapean | 4 |
| Pipil | 0 | Swahili | 0 | 4. Quechua | 10 |
| Ponapean | 0 | Tauya | 0 | 5. Lezgian | 12 |
| Shoshone | 0 | Turkish | 0 | 6. Tibetan | 14 |
| Tibetan | 0 | 7. Evenki | 2 | 7. Coptic | 15 |
| Turkish | 0 | 8. Coptic | 5 | Krongo | 15 |
| Tzutujil | 0 | 9. Latin | 7 | 9. Pipil | 16 |
| 10. Swahili | 0.1 | 10. Tibetan | 9 | 10. Finnish | 18 |
| 11. Maricopa | 0.4 | 11. Krongo | 12 | 11. Maricopa | 19 |
| 12. Tauya | 0.5 | 12. Maricopa | 14 | 12. Hungarian | 23 |
| 13. Coptic | 1.8 | Quechua | 14 | Turkish | 23 |
| 14. German | 2 | 14. Lango | 17 | 14. Martuthunira | 28 |
| 15. Quechua | 2.5 | 15. Tzutujil | 24 | Swahili | 28 |
| 16. Evenki | 5 | 16. Ossetic | 26 | 16. Lango | 37 |
| 17. Ossetic | 6 | Shoshone | 26 | 17. Shoshone | 38 |
| 18. Nivkh | 7 | 18. Finnish | 30 | 18. Evenki | 39 |
| 19. Arabic | 8 | 19. Hungarian | 36 | 19. Hindi/Urdu | 50 |
| 20. Finnish | 13 | 20. Arabic | 42 | 20. Kannada | 51 |
| 21. Kannada | 14 | Kannada | 42 | Ossetic | 51 |
| 22. Hungarian | 18 | 22. Lezgian | 46 | 22. German | 56 |
| 23. Martuthunira | 18 | 23. Pipil | 50 | 23. Arabic | 62 |
| 24. Hindi/Urdu | 50 | 14. German | 52 | 24. Tzutujil | 77 |
| 25. Latin | 66 | 25. Ponapean | 75 | 25. Latin | 84 |

- comparison between the three indices is made difficult by the fact that the index values stand for very different things
- Cumulation values tend to be much lower than Alternation and Suppletion values: cumulation is a rare phenomenon outside Indo-European
- correlation (or non-correlation) of the three indices is difficult to see in Table 2; Table 3 also gives rank numbers

TABLE 3: INDEX VALUES AND RANK NUMBERS FOR EACH LANGUAGE

| | Indices | | | Ranks | | | (Av. Rank) | Ranks (groups of 5) | | |
|------------------|---------|-----|-----|-----------|-----------|-----------|------------|---------------------|----------|----------|
| | Cum | Alt | Sup | CumAlt | Sup | CumAlt | | Sup | | |
| *Turkish | 0 | 0 | 23 | 1 | 1 | 12 | 4.7 | 1 | 1 | 3 |
| Tauya | 0.5 | 0 | 3 | 12 | 1 | 2 | 5.0 | 3 | 1 | 1 |
| <u>Tibetan</u> | 0 | 9 | 14 | 1 | 10 | 6 | 5.7 | 1 | 2 | 2 |
| Krongo | 0 | 12 | 15 | 1 | 11 | 7 | 6.3 | 1 | 3 | 2 |
| *Nivkh | 7 | 0 | 0 | 18 | 1 | 1 | 6.7 | 4 | 1 | 1 |
| *Swahili | 0.1 | 0 | 28 | 10 | 1 | 14 | 8.3 | 2 | 1 | 3 |
| <u>Coptic</u> | 2 | 5 | 15 | 13 | 8 | 7 | 9.3 | 3 | 2 | 2 |
| *Lezgian | 0 | 46 | 12 | 1 | 22 | 5 | 9.3 | 1 | 5 | 2 |
| Ponapean | 0 | 75 | 4 | 1 | 25 | 3 | 9.7 | 1 | 5 | 1 |
| Lango | 0 | 17 | 37 | 1 | 14 | 16 | 10.3 | 1 | 3 | 4 |
| *Quechua | 2.5 | 14 | 10 | 15 | 12 | 4 | 10.3 | 3 | 3 | 1 |
| Pipil | 0 | 50 | 16 | 1 | 23 | 9 | 11.0 | 1 | 5 | 2 |
| <u>Maricopa</u> | 0.4 | 14 | 19 | 11 | 12 | 11 | 11.3 | 3 | 3 | 3 |
| *Shoshone | 0 | 26 | 38 | 1 | 16 | 17 | 11.3 | 1 | 4 | 4 |
| *Martuthunira | 18 | 0 | 28 | 23 | 1 | 14 | 12.7 | 5 | 1 | 3 |
| Tzutujil | 0 | 24 | 77 | 1 | 15 | 24 | 13.3 | 1 | 3 | 5 |
| *Evenki | 5 | 2 | 39 | 16 | 7 | 18 | 13.7 | 4 | 2 | 4 |
| Hindi/Urdu | 50 | 0 | 50 | 24 | 1 | 19 | 14.7 | 5 | 1 | 4 |
| *Finnish | 13 | 30 | 18 | 20 | 18 | 10 | 16.0 | 4 | 4 | 2 |
| *Hungarian | 18 | 36 | 23 | 22 | 19 | 12 | 17.7 | 5 | 4 | 3 |
| <u>Ossetic</u> | 6 | 26 | 51 | 17 | 16 | 20 | 17.7 | 4 | 4 | 4 |
| Latin | 66 | 7 | 84 | 25 | 9 | 25 | 19.7 | 5 | 2 | 5 |
| German | 2 | 52 | 56 | 14 | 24 | 22 | 20.0 | 3 | 5 | 5 |
| * <u>Kannada</u> | 14 | 42 | 51 | 21 | 20 | 20 | 20.3 | 5 | 4 | 4 |
| <u>Arabic</u> | 8 | 42 | 62 | 19 | 20 | 23 | 20.7 | 4 | 4 | 5 |

* = language has been referred to as “agglutinating” in the literature

– languages are ordered by “average rank”:

Turkish is the “most agglutinating”, Arabic the “most fusional” language

– have linguists unconsciously tended to define *agglutinating* as “Turkish-like” and *fusional* as “Latin-like”?

– no statistical tests for significance applied here

– underlined (“well-behaved”) languages are those whose rank numbers differ from each other by less than 10 points (Tibetan, Coptic, Maricopa, Ossetic, Kannada, Arabic)

– most languages are not well-behaved

4.3. Testing the First Prediction: Correlation among nominal and verbal inflection?

TABLE 4: INDEX VALUES AND RANK NUMBERS, SEPARATELY FOR NOUNS (N) AND VERBS (V)

| | Cumulation | | | | Alternation | | | | Suppletion | | | |
|--------------|------------|-----|-----------|-----------|-------------|----|-----------|-----------|------------|----|-----------|-----------|
| | index | | rank | | index | | rank | | index | | rank | |
| | N | V | N | V | N | V | N | V | N | V | N | V |
| Arabic | 15 | 0 | <u>20</u> | <u>1</u> | 33 | 50 | <u>17</u> | <u>23</u> | 44 | 80 | <u>20</u> | <u>25</u> |
| Coptic | 0.6 | 3 | <u>18</u> | <u>15</u> | 10 | 0 | <u>13</u> | <u>1</u> | 6 | 24 | <u>5</u> | <u>11</u> |
| Evenki | 0 | 10 | <u>1</u> | <u>19</u> | 3 | 0 | <u>11</u> | <u>1</u> | 19 | 59 | <u>12</u> | <u>21</u> |
| Finnish | 19 | 7 | <u>21</u> | <u>18</u> | 42 | 18 | <u>19</u> | <u>14</u> | 21 | 14 | <u>14</u> | <u>8</u> |
| German | 0 | 4 | <u>1</u> | <u>16</u> | 35 | 70 | <u>18</u> | <u>25</u> | 67 | 45 | <u>22</u> | <u>19</u> |
| Hindi/Urdu | 100 | 0 | <u>22</u> | <u>1</u> | 0 | 0 | <u>1</u> | <u>1</u> | 100 | 0 | <u>24</u> | <u>1</u> |
| Hungarian | 1 | 36 | <u>19</u> | <u>24</u> | 60 | 13 | <u>23</u> | <u>12</u> | 13 | 33 | <u>10</u> | <u>16</u> |
| Kannada | 0 | 27 | <u>1</u> | <u>22</u> | 50 | 35 | <u>21</u> | <u>20</u> | 25 | 77 | <u>16</u> | <u>24</u> |
| Krongo | 0 | 0 | <u>1</u> | <u>1</u> | 0 | 25 | <u>1</u> | <u>16</u> | 20 | 10 | <u>13</u> | <u>6</u> |
| Lango | 0 | 0 | <u>1</u> | <u>1</u> | 0 | 33 | <u>1</u> | <u>17</u> | 27 | 47 | <u>18</u> | <u>20</u> |
| Latin | 100 | 33 | <u>22</u> | <u>23</u> | 0 | 14 | <u>1</u> | <u>13</u> | 100 | 69 | <u>24</u> | <u>22</u> |
| Lezgian | 0 | 0 | <u>1</u> | <u>1</u> | 50 | 42 | <u>21</u> | <u>21</u> | 8 | 17 | <u>9</u> | <u>9</u> |
| Maricopa | 0 | 0.7 | <u>1</u> | <u>13</u> | 17 | 12 | <u>14</u> | <u>11</u> | 6 | 32 | <u>5</u> | <u>15</u> |
| Martuthunira | 0 | 37 | <u>1</u> | <u>25</u> | 0 | 0 | <u>1</u> | <u>1</u> | 24 | 33 | <u>15</u> | <u>16</u> |
| Nivkh | 0 | 14 | <u>1</u> | <u>21</u> | 0 | 0 | <u>1</u> | <u>1</u> | 0 | 0 | <u>1</u> | <u>1</u> |
| Ossetic | 0 | 11 | <u>1</u> | <u>20</u> | 20 | 33 | <u>15</u> | <u>17</u> | 27 | 75 | <u>16</u> | <u>23</u> |
| Pipil | 0 | 0 | <u>1</u> | <u>1</u> | 66 | 33 | <u>24</u> | <u>17</u> | 7 | 24 | <u>8</u> | <u>11</u> |
| Ponapean | – | 0 | – | <u>1</u> | 100 | 50 | <u>25</u> | <u>23</u> | 0 | 7 | <u>1</u> | <u>4</u> |
| Quechua | 0 | 5 | <u>1</u> | <u>17</u> | 29 | 0 | <u>16</u> | <u>1</u> | 0 | 20 | <u>1</u> | <u>10</u> |
| Shoshone | 0 | 0 | <u>1</u> | <u>1</u> | 5 | 47 | <u>12</u> | <u>22</u> | 67 | 10 | <u>22</u> | <u>6</u> |
| Swahili | 0 | 0.1 | <u>1</u> | <u>12</u> | 0 | 0 | <u>1</u> | <u>1</u> | 50 | 6 | <u>21</u> | <u>4</u> |
| Tauya | 0 | 1 | <u>1</u> | <u>14</u> | 0 | 0 | <u>1</u> | <u>1</u> | 6 | 0 | <u>5</u> | <u>1</u> |
| Tibetan | – | 0 | – | <u>1</u> | 0 | 18 | <u>1</u> | <u>14</u> | 0 | 27 | <u>1</u> | <u>13</u> |
| Turkish | 0 | 0 | <u>1</u> | <u>1</u> | 0 | 0 | <u>1</u> | <u>1</u> | 15 | 31 | <u>11</u> | <u>14</u> |
| Tzutujil | 0 | 0 | <u>1</u> | <u>1</u> | 47 | 0 | <u>20</u> | <u>1</u> | 33 | 44 | <u>19</u> | <u>18</u> |

(11 lgg. of 23)

(15 lgg.)

(20 lgg.)

- underlined rank numbers: rank numbers differ from each other by less than 10 points
- for Alternation and especially Suppletion, there does seem to be a tendency for nouns and verbs to pattern similarly

5. Conclusions

- it is indeed possible, if difficult, to test the Agglutination Hypothesis empirically
- at most a very weak tendency for Cumulation, Alternation and Suppletion to correlate
- at least for cumulation: weak evidence that nouns and verbs pattern alike
- we cannot simply take the truth of the Agglutination Hypothesis for granted
- we should be more careful in applying the terms “agglutinating” and “fusional”

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