EVOLUTIONARY CHANGE IN INDO-EUROPEAN MOTION EVENT ENCODING

Annemarie Verkerk

SCCR 22/25-02-2011
TALMY’S MOTION TYPOLOGY

Spanish (verb-framed)
La botella entró a la cueva flotando
the bottle moved into the cave floating

’The bottle floated into the cave’

Dutch (satellite-framed)
De fles dreef de grot in
the bottle floated the cave into

Talmy (1985: 69)
The Many Ways to Search for a Frog
Linguistic Typology and the Expression of Motion Events

Dan J. Slobin

doi:10.1017/S002222809902722 First published online 30 November 2009

The typology of motion expressions revisited1
JOHN BEAVERS
Department of Linguistics, The University of Texas at Austin

BETH LEVIN
Department of Linguistics, Stanford University

SHIAO WEI THAM
Department of East Asian Languages and Literatures, Wellesley College
(Received 20 March 2008; revised 15 January 2009)

Revising Talmv’s typological classification
of complex event constructions

William Croft, Jóhanna Barðdal, Willem Hollmann,
Violeta Sotirova, and Chiaki Taoka
University of New Mexico, USA, University of Bergen, Norway,
University of Lancaster, UK, University of Nottingham, UK,
and Kobe College, Japan
PARALLEL CORPUS

Alice’s Adventures in Wonderland (Lewis Carroll)

Through the Looking-Glass and what Alice found there

O Alquimista (Paulo Coelho)

308 motion sentences
### MOTION ENCODING STRATEGIES

<table>
<thead>
<tr>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>satellite-framed:</td>
<td>Alice laughed so much at this, that <strong>she had to run back into the wood</strong> for fear of their hearing her;</td>
</tr>
<tr>
<td>verb-framed:</td>
<td>she had to enter the wood running / at a run / quickly</td>
</tr>
<tr>
<td>path-only:</td>
<td>she had to enter the wood</td>
</tr>
<tr>
<td>manner-only:</td>
<td>she had to run in the wood</td>
</tr>
<tr>
<td>deictic:</td>
<td>she had to go into the wood</td>
</tr>
<tr>
<td>coordination:</td>
<td>she had to run and go back into the wood</td>
</tr>
<tr>
<td>subordination:</td>
<td>she had to run to go back into the wood</td>
</tr>
<tr>
<td>manner+path verb:</td>
<td>she had to run+enter the wood</td>
</tr>
<tr>
<td>other:</td>
<td>she was in the wood</td>
</tr>
</tbody>
</table>
MOTION ENCODING IN IE
MOTION ENCODING IN IE

proportion per sentence

path-only
verb-framed
satellite-framed

originals, russian, polish, lithuanian, swedish, german, dutch, latvian, english, irish, serbo-croatian, greek, italian, portuguese, romanian, french, hindi, persian, armenian, albanian, nepali
PHYLOGENETIC COMPARATIVE METHODS
PHYLOGENETIC COMPARATIVE METHODS
65% of the variance is explained by the first principal component.

Take the score of each language on the first principal component.
TESTING HISTORICAL SIGNAL

Phylogenetic trees:
- from Dunn et al. (2011)
- build on lexical data (Swadesh lists)
- estimated using a Bayesian Markov Chain Monte Carlo approach
HISTORICAL SIGNAL
the likelihood of real trees is significantly different from likelihood of trees with zero lambda (p < 0.01)

(Pagel 1999)
the kappa score provided by this analysis shows that historical signal is present.
TESTING FOR HISTORICAL SIGNAL

DONE
ANCESTRAL STATE ESTIMATION
PIE = satellite framed? (Talmy 2007, Acedo Matellán and Mateu 2008)
ANCESTRAL STATE ESTIMATION

Maximum Likelihood transition rate: -0.5 ⇔ 0.5
ANCESTRAL STATE ESTIMATION
ANCESTRAL STATE ESTIMATION

Root estimate PIE: between -0.02 and 0.09
INCORPORATING INFORMATION FROM ANCIENT LANGUAGES

PIE?

French
Portuguese
Italian
Romanian
Latin
Irish
Dutch
German
English
Swedish
Polish
Russian
Serbo-Croatian
Lithuanian
Latvian
Sanskrit
Nepali
Hindi
Persian
Armenian
Albanian
Modern Greek
THE EVOLUTION OF THE PIE PREVERB SYSTEM

PIE

{“Preverb ... Verb”}
{“... Preverb Verb”}

Latin

“Prep.+Noun ... Verb”

“... prefix-Verb”

Romance

“...Verb”

THE EVOLUTION OF THE PIE PREVERB SYSTEM

**Latin**

```
se-que rursus in osti-um dom-us in-ced-ere
3SG.F.REFL.ACC-and back in entrance-N.ACC.SG house-F.GEN.SG in-go-PRS.INF
```

‘and found herself walking in at the front-door again.’

```
in tenebr-as se ab-rip-uit quam cel-emme pot-uit
into darkness-F.ACC.PL 3SG.REFL.ACC away-tear-PFV.3SG how fast-ADV be.able-PFV.3SG
```

‘and skurried away into the darkness as hard as he could go.’
THE EVOLUTION OF THE PIE PREVERB SYSTEM

PIE/Sanskrit

\{ “Preverb ... Verb” \}

“... Preverb Verb”

later Sanskrit

“Prep.+Noun ... Verb”

“Noun+Post. ... Verb”

“... prefix-Verb”

modern lang.

“... Verb”

lost

Watkins (1964), Bloch (1965)
THE EVOLUTION OF THE PIE PREVERB SYSTEM

Sanskrit
út pāt-ay-ati pakṣīṇaḥ
away/out fly-CAUS-3PL bird.PL
‘she makes the birds fly away’

Delbrück (1893: 648)
INCORPORATING INFORMATION FROM ANCIENT LANGUAGES

- Albanian
- Persian
- Armenian
- Modern Greek
- Nepali
- Hindi
- Serbo-Croatian
- Russian
- Polish
- Latvian
- Lithuanian
- English
- Swedish
- Dutch
- German
- French
- Portuguese
- Italian
- Romanian
- Latin
- Irish
- Sanskrit
- PIE?

Dendrogram showing the relationships between different languages and PIE (Proto-Indo-European).
CORRELATED EVOLUTION

skim  glide
skurry  crawl
swim  roll  rush
tumble  hurry  soar
jog  float  march
run  saunter  creep
walk  fly  drift

(Slobin 2004)
## CORRELATED EVOLUTION

<table>
<thead>
<tr>
<th>language</th>
<th>encoding</th>
<th>manner verb class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Russian</td>
<td>-0.23</td>
<td>33</td>
</tr>
<tr>
<td>2. Swedish</td>
<td>-0.18</td>
<td>23</td>
</tr>
<tr>
<td>3. Polish</td>
<td>-0.15</td>
<td>26</td>
</tr>
<tr>
<td>4. Lithuanian</td>
<td>-0.14</td>
<td>26</td>
</tr>
<tr>
<td>5. Dutch</td>
<td>-0.14</td>
<td>21</td>
</tr>
<tr>
<td>6. German</td>
<td>-0.12</td>
<td>30</td>
</tr>
<tr>
<td>7. Latvian</td>
<td>-0.09</td>
<td>26</td>
</tr>
<tr>
<td>8. Irish</td>
<td>-0.08</td>
<td>14</td>
</tr>
<tr>
<td>9. English</td>
<td>-0.03</td>
<td>30</td>
</tr>
<tr>
<td>10. Greek</td>
<td>0.09</td>
<td>16</td>
</tr>
<tr>
<td>11. Hindi</td>
<td>0.08</td>
<td>16</td>
</tr>
<tr>
<td>12. Italian</td>
<td>0.13</td>
<td>16</td>
</tr>
<tr>
<td>13. Persian</td>
<td>0.14</td>
<td>15</td>
</tr>
<tr>
<td>14. Portuguese</td>
<td>0.15</td>
<td>20</td>
</tr>
<tr>
<td>15. Armenian</td>
<td>0.15</td>
<td>15</td>
</tr>
<tr>
<td>16. French</td>
<td>0.18</td>
<td>13</td>
</tr>
<tr>
<td>17. Albanian</td>
<td>0.24</td>
<td>11</td>
</tr>
</tbody>
</table>
Phylogenetic Generalized Least Squares
CORRELATED EVOLUTION

$p = 0.05$

probability of slope

frequency
CONCLUSION

An approach to motion events that takes into account patterns of usage gives us a more fine-grained and productive perspective.

Patterns of motion encoding diversity are not random but historically patterned, and comparative analysis needs to take this into account.

In order to take into account this history we need ways to combine traditional historical linguistic methods with phylogenetic comparative methods.
Thank you!
Mantel test (Spearman correlation):
Mantel coefficient 0.095
Two-tailed p-value: 0.369
GEOGRAPHICAL DISTANCE
## CORRELATED EVOLUTION

Coefficients:

|                  | Estimate | Std. Error | t value | Pr(>|t|)       |
|------------------|----------|------------|---------|---------------|
| (Intercept)      | 2.73756  | 0.31165    | 8.7841  | 1.041e-05 *** |
| log(encoding)    | -1.01505 | 0.36695    | -2.7662 | 0.02189 *     |

---

Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.01612 on 9 degrees of freedom
Multiple R-squared: 0.4595, Adjusted R-squared: 0.3995
F-statistic: 7.652 on 2 and 9 DF,  p-value: 0.01144