Directionals as Spatio-Temporal Analogues of Aspect: Evidence from Matsigenka (Arawakan)

Lev Michael (UC Berkeley)

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The grammar of motion has emerged as an important topic across the range of major linguistic traditions:


In recent years, efforts to theorize the semantics of the paths involved in motion events has been especially active.
The Grammar of Motion Events

- The modern ontology of linguistically-encoded facets of motion events largely stems from Talmy (1985, 1991, 2000), who identified the following fundamental notional components:
  - **figure**: the moving entity
  - **ground**: the entity relative to which the figure moves
  - **path**: the spatial trajectory of the figure
  - **manner**: the type of motion experienced by the figure (optional)

(1) The ball rolled towards the hole.
   *Figure*  *Manner*  *Path*  *Ground*
• In this talk, I draw on data from Matsigenka to argue that we need to split the concept of path into path geometry and path viewpoint.
• And that once we do so, we can identify a clear analogy between directionals and aspect.
Matsigenka

- Matsigenka is an Arawakan language of the Kampan branch, spoken by \( \approx 10,000 \) people in southeastern Peruvian Amazonia.

*Figure 1: Arawakan languages (map via Glottolog.org)*
The data presented in this talk comes from:

- A large corpus of Matsigenka texts that I have developed with colleagues (Christine Beier and Zachary O’Hagan)
  - Available in pdf form at http://linguistics.berkeley.edu/~levmichael/research.html^1

- Elicitation-based fieldwork with speakers of Matsigenka and its very closely related sister-language Nanti (1999 - present; recently with Michael Dohn^2)
  - Largely monolingual elicitation.

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^1 If you are interested in a fully searchable FLEX database, please contact me directly.

^2 Skype!
• Matsigenka is strongly head-marking VSO language.
  • Rich verbal morphology expressed in three prefixal and over 30 suffixal positions.
• Mainly nominative-accusative alignment.
  • Traces of the split-intransitive system found in other Kampan languages lingers in a few constructions, e.g. depictives
• Referents are added to clauses with: one of five causative prefixes, two causative suffixes, one of six applicative suffixes, noun or classifier incorporation, or by the single postposition in the language, a locative.
• Obligatory verbal categories: Aspect, reality status (Michael 2014), and person and number agreement (S & O)
Expression of Path in Matsigenka: An Overview

- Matsigenka tends towards a S-framed profile.
- S-framing grammatical resources in Matsigenka include:
  - three dedicated path-denoting applicative suffixes
  - three dedicated AM suffixes
  - seven directional suffixes
  - One postposition, used fairly rarely
    - Largely, to overtly indicate a source, goal, or extremal point for a path

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3 Two directionals additionally exhibit AM interpretations with non-motion verbs.
Table 1: Matsigenka directionals

<table>
<thead>
<tr>
<th>DIRECTIONAL</th>
<th>GLOSS</th>
<th>motion wrt to dx center</th>
</tr>
</thead>
<tbody>
<tr>
<td>-an</td>
<td>ablative (ABL)</td>
<td>away</td>
</tr>
<tr>
<td>-apanu</td>
<td>departive (DEP)</td>
<td>from</td>
</tr>
<tr>
<td>-apah</td>
<td>allative (ALL)</td>
<td>towards</td>
</tr>
<tr>
<td>-ut</td>
<td>returnative (RET)</td>
<td>out and back</td>
</tr>
<tr>
<td>-ah</td>
<td>regressive (REG)</td>
<td>back</td>
</tr>
<tr>
<td>-apanaa</td>
<td>redepartive (RED)</td>
<td>from, after return</td>
</tr>
<tr>
<td>-anah</td>
<td>reverse regressive (RVG)</td>
<td>back away</td>
</tr>
</tbody>
</table>
- Directionals appear in immediately to the left of aspect and reality status
- ...and to the right of derivational morphology, at the right edge of a zone of quasi-inflectional suffixes, as in (2).

(2) o- ar -ag -a -vage -t -an -ak
   3fS- fly -CAUS:SOC -EPV -DUR -EPC -DIR:ABL -PFV
   -i =ri
   -REAL.I =3mO
   ‘She flew away (from the deictic center) with him for a long distance.’

- Dedicated AM suffixes compete for these two positions, so that they never co-occur with directionals.
Matsigenka directionals are characterizable in terms of three properties:

- path geometry
- location of deictic center with respect to path
- viewpoint (path segment ‘in view’)

The key lesson that Matsigenka has for us is that we must distinguish viewpoint from path geometry
Path Geometry

- Paths denoted by Matsigenka directionals range from single path segments to elaborate concatenations of segments.
- All points on such paths can be parameterized exclusively in terms of distance from the deictic center.
  - = one spatial parameter (‘radial’ path geometry)
  - → can be modeled with two-dimensional space-time.
Interpreting path diagrams

- We begin by considering the simple expression in (3)

\begin{align*}
\text{(3)} &\quad i- \ anut -\textbf{an} \ -\textbf{ak} \ -i \\
&\quad 3\text{mS- anut -DIR:ABL -PFV -REAL.I} \\
&\quad \text{‘He walked away (from the deictic center)’}
\end{align*}
• The ablative directional -an denotes a path oriented away from the deictic center (circled dot).
  • As a stationary point, the deictic center traces out a horizontal (dashed) world-line
• -an is compatible with, but does not entail, a trajectory that coincides with the deictic center (dotted line)
• -an does not entail anything about the endpoint of path (hence, path headed by arrow)
• The allative -apah is the mirror image to -an with respect to the deictic center.
• -apah denotes a path that is compatible with, but does not entail, reaching the deictic center.
• -apah entails nothing about the origin of the path (hence the arrow tail).
Path Geometry vs. Path Viewpoint

• Path geometry of a directional consists of the totality of the spatial extent and orientation of a path (modulo: open-ended and non-entailed parts of path)
• Directionals in addition denote a specific viewpoint on the path – what part of the path is ‘in view’ – which may consist of a subpart of that path.
• How to empirically determine the portion of the path that is in view?
Probing path viewpoint

• One successful technique:
  • Employ a clause-linking temporal overlap construction to couple the directional-bearing motion verb to another eventuality

  (4) Andrés laughed when the rabbit ran away.

• Then inquire at what points on the path the non-motion eventuality could be realized.
  • i.e. determine what points it is possible for Andrés to have laughed and still have the sentence be acceptable
Distinguishing path viewpoints: *-ut* and *-ah*

- Consider two Matsigenka directionals with identical path geometries, the returnative *-ut* and the regressive *-ah*.

![Path geometry for -ut and -ah](image)

**Figure 2:** Path geometry for *-ut* and *-ah*
• The temporal overlap clause-linking test reveals the difference between the two directionals.

(5) \[i= \text{kabakab} \text{-ak} \text{-a} \quad i= \text{shig} \text{-ut} \]
\[3mS= \text{laugh} \quad -\text{PFV} \quad -\text{REAL.A} \quad 3mS= \text{run} \quad -\text{RET} \]
\[-a \quad =\text{ra} \]
\[-\text{REAL.A} \quad =\text{SUB} \]

‘He laughed while he ran out and back.’

• Compatible with the subject laughing at any point on the path, excluding the deictic center
• This contrasts with what we obtain for the regressive \textit{-ah}.

\begin{equation}
\begin{aligned}
\text{i=} & \quad \text{kabakab -ak -a} & \text{i=} & \quad \text{shig -ah} \\
\text{3mS=} & \quad \text{laugh -PFV -REAL.A} & \text{3mS=} & \quad \text{run -REG} \\
\text{-a} & \quad =\text{ra} & \\
\text{-REAL.A} & \quad =\text{SUB} \\
\end{aligned}
\end{equation}

‘He laughed while he ran back.’

• Compatible with the subject laughing during the return leg of the path only, excluding both the midpoint and the deictic center
For the returnative -ut, the entire round trip trajectory is in view, apart from the deictic center itself.

Figure 3: Path for -ut
For the regressive -ah, only the return leg is in view (excluding the deictic center).

**Figure 4:** Path for -ah
Comparing path geometries and viewpoints for -an and -apanu

- Matsigenka speakers provide very similar glosses for verbs bearing following two directionals

(7) o- shig -apanu -t -a
    3mS- run -DIR:DEP -EPC -REAL.I
    ‘She ran away. (‘Se fue corriendo.’)

(8) o- shig -an -ak -a
    3mS- run -DIR:ABL -PFV -REAL.A
    ‘She ran away.’ (‘Corrió’, ‘Se escapó corriendo.’)
• The temporal overlap test also reveals that the exhibit a subtle path viewpoint difference.

\[
i= \text{kabakab -ak -a} \quad i= \text{shig -apanu} \\
3mS= \text{laugh -PFV -REAL.A} \quad 3mS= \text{run -DEP} \\
-a \quad =ra \\
-\text{REAL.A} =\text{SUB} \\
\]  
‘He laughed while he ran off.’

\[
i= \text{kabakab -ak -a} \quad i= \text{shig -an} \\
3mS= \text{laugh -PFV -REAL.A} \quad 3mS= \text{run -ABL} \\
-a \quad =ra \\
-\text{REAL.A} =\text{SUB} \\
\]  
‘He laughed while he ran away.’
• Consultants comment that (9) means that the subject begins to laugh just as he is lifting up his foot to take the first step.
• In contrast, they observe that (10) is only licit subsequent to that point, e.g., after having taken the first step.
  • This indicates that the deictic center is ‘in view’ in -apanu, but not for -an.
Figure 5: Path for \textit{-apanu}
Figure 6: Path for -an
Directionals and Aspect

• We have seen that the paths expressed by directionals consist of two components:
  • path geometries
  • path viewpoints

→ Directionals can be understood as spatio-temporal analogues of aspects
  • Aspects are usefully understood as encoding ‘viewpoints’ on the temporal extension of eventualities
  • Directionals can likewise be understood as encoding viewpoints of the spatio-temporal extensions (= path geometries) of motion events
Aspect

- Aspectual categories are defined in terms of topological relationships (e.g. containment or precedence) between TSit and TT.
- Consider the imperfective\(^4\) in the bolded target sentence:

**Example**

Andrés looked towards the ridgeline; **the trees were swaying in the wind.**

- TT: the narrow temporal window bracketing the Andrés shift in gaze and perception of the trees
- SitT: the period over which the trees in question swayed in the wind
- Q: What is the relationship between TT and TSit in the bolded utterance?

\(^4\)Specifically, the progressive subtype
In order for the imperfective to be licit, the following must hold:

- The trees must have been swaying at the moment Andrés turned to look at them
- The tree must have continued swaying through the perception event of his looking at them

→ TT is wholly contained by TSit ($TT \subseteq TSit$)

![Figure 7: Topological relationship of TT to TSit in Imperfective](image-url)
- Other aspects express different topological relationships between \( TT \) and \( TS_{it} \).

**Perfect**

\[
\begin{array}{c}
\text{TT} \\
\text{TS}_{it}
\end{array}
\]

**Perfective**

\[
\begin{array}{c}
\text{TT} \\
\text{TS}_{it}
\end{array}
\]

**Figure 8:** Topological relationship of \( TT \) to \( TS_{it} \) in Perfect and Perfective
The directional:aspect analogy

- Directionals and aspects resemble each other in that:
  - both are defined in terms of topological relationships, e.g. precedence or inclusion, between an eventuality
    - the TSit or situation time of an eventuality in the case of aspect
    - the entire path geometry of a motion predicate in the case of directionals
  - and a segment of that eventuality that is ‘in view’
    - TT or topic time in the case of aspect
    - TSeg or topic segment in the case of directionals
• Directionals are thus the spatio-temporal analogues of aspect in that:
  • Aspects express viewpoints on eventualities enduring in time
  • Directionals express viewpoints on motion eventualities tracing our a worldline in time and space
Thanks to

- The speakers of Matsigenka and Nanti who generously and patiently taught me about their languages:
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Thank you!