**Research Questions**

- How are the different tense notions expressed in an aspect-prominent language like Mandarin?
- What are the similarities and differences between the temporal systems of tense-modal and aspect-prominent languages?

**Mandarin Aspect Markers** (Xiao & McEnery, 2004: 171-240):

1. **Perfective Aspect Markers**
   - 
     - **Le**: actual marker, e.g. chi-le ‘eat-le’. (Verbal le vs. Sentential le)
     - **Guo**: experiential marker, e.g. kan-guo ‘see-guo’.
     - **RVC: competitive marker, structure ‘simple verb form + resultative complement (verb/adj), e.g. xie-hao ‘write-done’, chi-wan ‘eat-finish’. The complement indicates the result of an action.
     - **Unmarked duplication: declarative marker, simple verbal form is duplicated, e.g. yao-yao ‘shake-shake’.

2. **Imperfective Aspect Markers**
   - **Zhe**: a progressive/state marker, e.g. bao-li-zhe ‘keep-zhe’, and wo-zhe ‘hold-zhe’.
   - **Zai**: a progressive marker, e.g. zai-jiu ‘zai-continue’.

3. **Zero Form**
   - **Actually unmarked verb: simple verb form, e.g. xunhan ‘look for’**. Perfective or Imperfective, dependent on context.

**Methodology (computational methodology from van der Kliis et al. (2017))**

**Parallel Corpus Data** (French, German, Dutch, Spanish, English, Mandarin)

Chapters 3-5 in French novel L’Etranger (approx. 300 sentence examples)

**Step 1: Sentence Tense/Aspect Marker Annotation**

**Example No. 24950**

French: l’ai bu. (passé composé)

Dutch: ik dronk. (o.vt.)

Spanish: bebi. (pretérito indefinido)

English: I drank. (simple past)

Mandarin: 我喝了 (le ‘drink-le’) 喝

**Tense/Aspect Tuple No. 24950**: <passé composé, perfect, o.v.t., pretérito indefinido, simple past, le>

---

**Step 2: Translation Distance Calculation**

**Example No.**

<table>
<thead>
<tr>
<th></th>
<th>German</th>
<th>French</th>
<th>Dutch</th>
<th>Spanish</th>
<th>English</th>
<th>Mandarin</th>
</tr>
</thead>
<tbody>
<tr>
<td>24950</td>
<td>passé composé</td>
<td>perfect</td>
<td>o.v.t.</td>
<td>pretérito indefinido</td>
<td>simple past</td>
<td>le</td>
</tr>
<tr>
<td>25851</td>
<td>passé composé</td>
<td>perfect</td>
<td>v.t.t.</td>
<td>pretérito imperfecto</td>
<td>simple present</td>
<td>le</td>
</tr>
</tbody>
</table>

Translation distance = Total tense/aspect variation between 2 examples

Total variation: 3 (0=0+1+1+4)=6 languages are compared.

The translation distance between Examples 24950 and 25851 is 3/6 (0.5).

**Descriptive statistics are collected:**

* Tense/aspect marker frequency & tuple frequency

---

**Step 3: Mandarin Aspect Form Distribution in Camus Dataset**

**French Map**

**German Map**

**Dutch Map**

**English Map**

---

**Mandarin Aspect Distribution in PERFECT vs. PAST Competition**

**German (Narration)**

Unmarked, le, rv, zhe, duplication (guo, zai, non-verb)

**Dutch (Boundlessness)**

le, unmarked (guo,1,2e), zhe, duplication (zai, non-verb)

**Spanish (Adverbial adverbs)**

le, unmarked, le, rv, zhe, duplication (zai, non-verb)

**English (Classical Perfect)**

le, unmarked (guo,1,2e), zhe, duplication (zai, non-verb)

---

**Mandarin Aspect Form Distribution (among Top 8 EU language tuples in Harry Potter Dataset)**

**Unmarked**

Pt Nart 2 > PRESENT > Pt Impf 3 > Pt Cont 3 > IMPERATIVE

**Rvc: Pt Nart 2 > Pt Impf > IMPERATIVE/PLUPERFECT > PRESENT > Pt Nart 3 > Pt Cont 3 > IMPERATIVE**

**Le1 (verbal le)**

Pt Nart 2 > PRESENT > Pt Impf 3 > Pt Cont 3 > IMPERATIVE

**Non-verb**

Pt Nart 2 > PRESENT > Pt Impf 3 > IMPERATIVE

**AUX: FUTURE > PRESENT**

Pt Nart 2 > Pt Impf 3 > PRESENT

**Zai: PRESENT**

Pt Nart 2 > PRESENT = IMPERATIVE

**Conclusions from 2 Datasets**

- EU languages distinguish PAST/PRESENT/FUTURE, Mandarin distinguishes FUTURE/NON-FUTURE (AUX can mark FUTURE), but not PAST/PRESENT.

- In EU languages, [almost] no variation in PLUPERFECT, PRESENT and FUTURE, but competition in PAST and PERFECT domains.

- Mandarin has rich forms for PAST & PRESENT, but restricted forms for PLUPERFECT & FUTURE, both of which must be marked in Mandarin.

- Mandarin in Mandarin aspect research: unmarked (50% data, Pt Nart 3 > Pt Impf 3 > Pt Cont) IMPERATIVE

- Verbal le: Pt Nart 2 > Pt Impf 3 > PRESENT but also in Pt Cont 3

- Why? Sentential le: Pt Nart 2 > PRESENT > Pt Impf 3 > IMPERATIVE

- Duplication: Pt Nart 2 > Pt Impf 3 > PRESENT

- Zai: few in Narration, more imperfective than zhe

- Guo: reside within European PERFECT & PLUPERFECT

- Non-verb: prefer stronger imperfective contexts