The Cantonese dative constructions: implications for processing

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Overview of presentation

• Cantonese word order
• Center-embedding in Cantonese
• Alternative constructions
• The experimental study
• Discussion and conclusion
Cantonese word order

- Cantonese is SVO, with the word order about as rigid as English.

我 [VP 借] [錢]]
ngo5 [VP ze3 [cin2]]
1Sg borrow money
'I borrow money.'
Cantonese NP

- Cantonese NPs are head-final.
- All modifiers are prenominal.

```
[[RC 我 借 嘅 _] 錢 NP]
[[RC ngo5 ze3 ge3 _] cin2 NP]
1Sg      borrow      Prt      money

'The money (that) I borrowed'
```
Cantonese dative

• Order of Cantonese canonical DOC (double object construction): \[V(erb) \ T(heme) \ R(ecipient)]\]

\[
\text{我} \ [VP \畀] \ [錢] \ [你]] \n\text{ngo5} \ [VP \bei2] \ [cin2] \ [nei5]] \n1Sg \ give \ money \ 2Sg \nS \ V \ T \ R
\]
'I give you money.'

• Verbs that occur with DOC are very limited.
Cantonese BA construction

- BA word in Cantonese is zoeng1 將
- [BA T VP]

BA construction of a Cantonese dative

將 [錢] [VP畀] [我]
zoeng1 [cin2] [VP bei2] [ngo5]
BA money give 1Sg
BA T V R

'Give me those money.'
Typological distribution

• Relationship between order of [OV vs. VO] and [NRel vs. RelN] (Dryer, 2005)

[VO + RelN] 'distinctly rare'

• The 5 languages are:
  – Mandarin
  – other varieties of Chinese (Cantonese and Hakka)
  – Bai and Amis (both in close geographical proximity to Chinese).

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>RelN</th>
<th>NRel</th>
</tr>
</thead>
<tbody>
<tr>
<td>OV</td>
<td>109</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>VO</td>
<td>5</td>
<td></td>
<td>370</td>
</tr>
</tbody>
</table>
Center-embedding in Cantonese

• When object is modified by RC, center-embedding occurs.

S [V [[RC] N]]

• This is predicted to cause processing difficulty according to psycholinguistic theories
Minimize Domains

- Minimize Domains (MiD, Hawkins, 2004)
  - closer immediate constituents form smaller domains
  - lower overall complexity
  - easier processing

Canonical English DOC:
I \([_{VP} \text{give} \; [\text{the book that I have borrowed}] \; [\text{to him}]]\]

Example with heavy NP shift (HNPS):
I \([_{VP} \text{give} \; [\text{to him}] \; [\text{the book that I have borrowed}]]\]

Cross-linguistic psycholinguistic support: e.g. Japanese NP fronting (Yamashita & Chang, 2001), English HNPS, etc.
MiD and center-embedding

• Center-embedding is difficult to process according to psycholinguistic accounts (e.g. Minimize Domains, Hawkins, 2004)

'I’m borrowing the funny book that s/he wrote.'

(underlined: domain for main verb ze)

• Center-embedding – separation of verb and head nouns (T and R) in the Cantonese dative VP
The 'Chinese Problem'

- Chinese languages
  - center-embedding which is difficult to process
  - very long VP domain when Theme is complex (Hawkins, 2004)
  - exception to 'VO languages avoid RelN' (Dryer, 2005)
  - Why can Chinese tolerate this?

Problem is expected to be more serious in datives
(more objects, longer distance between V and NPs)
Alternative constructions

<table>
<thead>
<tr>
<th>Dative construction</th>
<th>Example 'give you the book I wrote'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOC</strong></td>
<td>當[我寫嘅本書]你</td>
</tr>
<tr>
<td></td>
<td>[vp bei2 [ngo se2  go2 bun2 syu1] [nei5]]</td>
</tr>
<tr>
<td></td>
<td>[vp give [1Sg  write Det  CL  book] [2Sg]]</td>
</tr>
<tr>
<td><strong>&quot;Prepositional&quot; Dative &amp; double-bei2</strong></td>
<td>當/拎[我寫嘅本書]畀你</td>
</tr>
<tr>
<td></td>
<td>[vp bei2/ling1  [ngo se2  go2 bun2 syu1]  bei2 [nei5]]</td>
</tr>
<tr>
<td></td>
<td>[vp give/get  [1Sg  write Det CL  book]  give  [2Sg]]</td>
</tr>
<tr>
<td><strong>BA-construction</strong></td>
<td>米[我寫嘅本書]畀你</td>
</tr>
<tr>
<td></td>
<td>[zoeng1 [ngo se2  go2 bun2 syu1]  bei2 [nei5]]</td>
</tr>
<tr>
<td></td>
<td>[BA  [1Sg  write Det CL  book]  give  [2Sg]]</td>
</tr>
<tr>
<td><strong>Right dislocation</strong></td>
<td>當你[啦][我寫嘅本書]</td>
</tr>
<tr>
<td></td>
<td>[vp bei2 [nei5]] (la1) [ngo se2  go2 bun2 syu1]</td>
</tr>
<tr>
<td></td>
<td>[vp give [you]] (SFP) [1Sg  write Det CL  book]</td>
</tr>
<tr>
<td><strong>Topicalization</strong></td>
<td>[我寫嘅本書]畀你</td>
</tr>
<tr>
<td></td>
<td>[ngo se2  go2 bun2 syu1] [vp bei2 [nei5]]</td>
</tr>
<tr>
<td></td>
<td>[1Sg  write Det CL  book] [vp give [2Sg]]</td>
</tr>
<tr>
<td><strong>Extraposition from NP</strong></td>
<td>當本書你,我寫嘅本</td>
</tr>
<tr>
<td></td>
<td>[vp bei2 [bun2 syu1] [nei5]] [ngo se2  go2 bun1]</td>
</tr>
<tr>
<td></td>
<td>[vp give [CL  book] [2Sg]] [1Sg  write Det  CL]</td>
</tr>
</tbody>
</table>
A previous study

• Cheung (2005) elicited a variety of alternative constructions

• Weight effect in Cantonese leading to the use of alternative constructions

<table>
<thead>
<tr>
<th>Frequency (%) in condition</th>
<th>[T]</th>
<th>[Adj T]</th>
<th>[RC T]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOC</td>
<td>238</td>
<td>206</td>
<td>169</td>
</tr>
<tr>
<td>[V T bei2 R]</td>
<td>13</td>
<td>34</td>
<td>51</td>
</tr>
<tr>
<td>BA construction [zoeng1 T bei2 R]</td>
<td>0</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>11</td>
<td>17</td>
</tr>
</tbody>
</table>
The BA construction

• Traditionally called the 'disposal construction', limited to the expression of concrete or abstract motion
• Applicable to transitive and ditransitive verbs

• Low frequency in Cantonese

• Theme of the VP 'preposed'? Scrambling effect?
• Under debate: What is BA?
Traditional accounts: Prediction

- Traditional accounts
  - Semantic/pragmatic/discourse factors
    - Information status
    - Topic-prominence of Chinese
  - Lexical/constructional factors

- Lower frequency than that of the canonical order

- Hypothesis based on traditional accounts:
  Rare construction, scrambling effect expected for the BA construction: the canonical DOC will have better performance in comprehension and production
Maximize On-line Processing

• Maximize On-line Processing (MaOP, Hawkins, 2004)
→ the earlier the properties are correctly assigned, the better
  1. I believe [the boy knows the answer].
  2. I believe that [the boy knows the answer].

• In 2, the processor expects an embedded clause after 'that', and 'the boy' is correctly assigned as the agent of knows.

• As predicted by MaOP, 2 is easier to process even though there is an extra word.
MiD and MaOP: Predictions

• BA construction [zoeng1 T bei2 R] for Cantonese datives

[go3 sai3lou6zai2]  zoeng1 [keoi5 ze3.gan6  go2 bun2 dak1ji3 ge3 syu1]  bei2.zo2 [go3 sin1saang1]
BA  T  V  R

'The child has given the teacher the funny book that he is borrowing.'

The head nouns of Theme and Recipient are closer to the verb.
• Shorter domain for the V – Good for MiD
The processor is expecting a definite Theme NP occurring immediately after zoeng1
• T is assigned early – Good for MaOP

Summary of the predictions

• **Hypothesis** based on traditional accounts: The canonical DOC will have better performance than the BA construction in comprehension and production.

• **Hypothesis** based on Hawkins (2004): When center-embedding is expected in the DOC, the BA construction will have better performance in comprehension and production.
Experiment: Participants & Items

- 18 naïve participants, L1: Cantonese
- 12 sets of sentences with 6 conditions (2 constructions **DOC** vs. **BA** and 3 different levels of Theme complexity)
- 1 condition seen per construction per set in a random order
- Triple number of fillers in different constructions with comprehension questions to disguise task nature

<table>
<thead>
<tr>
<th>DOC</th>
<th>Unmodified theme [Cl N]</th>
<th>Adj-modified theme [Adj N]</th>
<th>RC-modified theme [RC N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A [bei2 [T] bei2 R]</td>
<td>bun2 <strong>syu1</strong> Cl book 'that book'</td>
<td>bun2 dak1ji3 ge3 <strong>suy1</strong> Cl funny Prt book 'that funny book'</td>
<td>[nei5 ze3] go2 bun2 <strong>suy1</strong> you borrow Det CL book 'the book that you borrowed'</td>
</tr>
<tr>
<td>BA</td>
<td>A [zoeng1 [T] bei2 R]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Item set 1: [T]

- Unmodified Theme, relatively easy to process

DOC

go3 sai3 lou6zai2 [bei2.zo2 [go2 bun2 syu1] [go3 sin1saang1]]
CL child give-PFV Det CL book CL teacher

BA

go3 sai3 lou6zai2 zoeng1 [go2 bun2 syu1] [bei2.zo2 [go3 sin1saang1]]
CL child BA Det CL book give-PFV CL teacher

(both "The kid has given that book to the teacher.")
Item set 1: [Adj T]

• Theme modified by Adj, some processing difficulty

DOC
go3 sai3lou6zai2 bei2.zo2 [go2 bun2 dak1ji3 ge3 syu1] [go3 sin1saang1]  
CL child give-PFV Det CL funny Prt book CL teacher

BA

go3 sai3lou6zai2 zoeng1 [go2 bun2 dak1ji3 ge3 syu1] bei2.zo2 [go3 sin1saang1]  
CL child BA Det CL funny Prt book give-PFV CL teacher

(both "The kid has given that funny book to the teacher.")
Item set 1: [RC T]

- Theme modified by RC, difficult to process

**DOC**

```
GO3 sai3lou6zai2 bei2.zo2 [keoi5 ze3.gan6  GO2 bun2 dak1ji3 ge3 syu1] [GO3 sin1saang1]
CL  child         give-PFV 3Sg borrow-PRG Det CL  funny  Prt book  CL  teacher
```

**BA**

```
GO3 sai3lou6zai2 zoeng1 [keoi5 ze3.gan6  GO2 bun2 dak1ji3 ge3 syu1] bei2.zo2 [GO3 sin1saang1]
CL  child         BA     3Sg  borrow-PRG Det CL  funny  Prt book  give-PFV CL  teacher
```

(both "The kid has given that funny book he is borrowing to the teacher.")
Experiment: dual-task procedures

• Masked moving window reading + elicited imitation
  In each trial, subjects press a key to see the next word
  _ _ _ _ _ _ _ _ _ _ →
  個 _ _ _ _ _ _ _ _ _ →
  _ 細 路 仔 _ _ _ _ _ _ _ _ → etc.
  個 | 細路仔 | 異咗 | 嘅 | 本 | 書 | 個 | 先生
  go sailouzai [_{v_p}bei-zo] [go bun syu] [go sinsaang]]
  CL child [_{v_p}give-PFV [Det CL book] [CL teacher]]
  "The kid gave the teacher that book"

• RT for each window is recorded automatically.
• A probe appears after an item to ask the participant to repeat the sentence. (Fillers: question or probe)
個 ___ ___ ___ ___ ___ ___ ___ ___
__細路仔___________
個细路仔畀咗啲啲佢
本
書  ___ ___
先生
REPEAT
Average reading time

Both factors significant

<table>
<thead>
<tr>
<th></th>
<th>DOC</th>
<th>Adj T</th>
<th>RC T</th>
</tr>
</thead>
<tbody>
<tr>
<td>[T]</td>
<td>407.55</td>
<td>398.44</td>
<td>438.25</td>
</tr>
<tr>
<td>BA</td>
<td>387.34</td>
<td>389.97</td>
<td>422.59</td>
</tr>
</tbody>
</table>

Average RT (ms)
Elicited imitation

Qualitative data: errors

- **DOC** when the target is **BA**
- **BA** construction when target is **DOC**
- **Double-** bei2 construction \([\text{bei2T} \text{ bei2R}]\)

**Example:**

\[
\text{個細路仔} \quad \text{畀咗} \quad \text{佢} \quad \text{借緊} \quad \text{嗰} \quad \text{本} \quad \text{得意嘅} \quad \text{書} \quad \text{畀咗} \quad \text{個} \quad \text{先生}
\]

\[
\text{go sailouzai} \quad \text{CL child} \quad \text{bei-zo} \quad \text{keoi ze-gan} \quad \text{go bun dakji ge syu} \quad \text{bei-zo} \quad \text{go sinsaang}\]

give-PFV 3Sg borrow-PRG Det CL funny Prt book give-PFV CL teacher

**V T V R**

- **Others**
  - Other alternative constructions, such as topicalization
  - Multiple repairs/restarts
  - Missing arguments, giving up, etc.
Response accuracy

<table>
<thead>
<tr>
<th></th>
<th>[T]</th>
<th>[Adj T]</th>
<th>[RC T]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOC</td>
<td>80.56%</td>
<td>72.22%</td>
<td>54.17%</td>
</tr>
<tr>
<td>BA</td>
<td>95.83%</td>
<td>94.44%</td>
<td>86.11%</td>
</tr>
</tbody>
</table>

Both factors significant
Discussion

• The **BA construction** is easier to process than the canonical **DOC** in terms of reading time and accuracy.

• Theme complexity effect: performance suffers when complexity increases...

• Both factors *Construction* and *Theme complexity* are significant, lending **support** to the processing principles MiD and MaOP in Hawkins (2004).

• Partial correlations (factoring out *Theme complexity*) reveal that both the performance in comprehension and production are significantly correlated
  → **What is difficult to parse is also difficult to produce** (at least for Cantonese)
  → Supports the claim that language comprehension and production are related.
  → More investigation of the role of priming is needed.
More questions

• Is there a cost associated with choosing a rarely used alternative construction? Scrambling?
  Little support from this study as the BA construction is not read slower than the DOC, even for the bare Theme NP. The BA construction is read significantly faster (anti-scrambling?).

• What is BA? Verb? Coverb? Preposition? Case Marker? Does it matter for the processor? It knows that BA only occurs with the BA construction. It assigns the Theme to the following NP, which is good for MaOP.

• Language comprehension and production seem to be related: Are they affected differently? How to test it better?
Conclusion

• The processing factors proposed in Hawkins (2004) make the correct predictions for the experimental results.
  → **Performance** may affect the choice of construction used in a sentence (cf. Hawkins, 2004).
  → **Processing demands** may be one of the reasons for alternatives in Chinese like topicalization to be used.
  → Center-embedding avoided in performance

**Alternative constructions** such as the BA construction can **facilitate** processing and avoid center-embedding. Also, RCs are not frequent in colloquial speech. These may help Cantonese retain a typologically rare configuration.
Key references


