Reading Comics — Tracking the Process

The Empirical Study of Comics
Bremen, 7-9-Feb. 2017

Olli Philippe Lautenbacher
& Kai Mikkonen
University of Helsinki
GENERAL RESEARCH QUESTION

“How Are Comics Read?”

• How systematic/erratic is reading order?
• Are there any observable tendencies?
• If differences appear in viewing patterns, what might explain them?
INFORMANTS

- 22 Finnish speaking informants
- Students in translation studies
- Background questionnaire:

  - Reading comics...
    - Never 3
    - Once a year 3
    - Once a month 6
    - Once a week 7
    - More 3

  - Type of comics read:
    - Comic albums or magazines (only) 13 (3)
    - Mangas (only) 9 (1)
    - Comic strips (only) 17 (6)
VIEWED MATERIAL

• 12 comic spreads (for a realistic viewing situation and optimal reading distance)

• Spreads of different nature: with and without panels, regular grids, dialogues, text boxes, colours...

• Randomized viewing order
The Z-path as a starting point
Scan path example on *Un ver dans le fruit*: a fully completed Z-path
Areas of Interest (AOIs) on *Un ver dans le fruit*
Reading time and comic reading habits

Sequence Chart for *Un ver dans le fruit*

- Seldom reading participants
- Often reading participants

Median Reading Time: **20.5 sec**

Areas of Interest
The Z-path: a strong tendency

Sequence Chart for Un ver dans le fruit
The Z-path: a strong tendency

Sequence Chart for *Un ver dans le fruit*

7 complete Z-paths out of 22 participants
The Z-path: a strong tendency

Sequence Chart for *Un ver dans le fruit*

[AOI 001, 002, 003...] is the first Z-path segment to be read by 18/22 participants.
“Reading bumps”
Reading bumps

• Orderly segments in the **Sequence Chart** show the importance of the **Z-path**
• But the boundaries of these segments inform us about “reading bumps”:

![Sequence Chart](image)

• These are also observable within the **Transition Matrix**:

<table>
<thead>
<tr>
<th>from/to</th>
<th>AOI 1</th>
<th>AOI 2</th>
<th>AOI 3</th>
<th>AOI 4</th>
<th>...</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOI 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AOI 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AOI 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AOI 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(cf. Tom Foulsham, Dean Wybrow & Neil Cohn 2016)
Reading bumps

Main Transgressions of the Z-path: “Reading bumps”

- Notice all these figures are transitions, not participants
- They do not inform us about the chronology of occurrences
Reading bumps (1)

1. “Search phase”

- A search phase before the viewers get to the first segment
  > “Scanning”? “Erratic viewing”?

- In Un ver dans le fruit, the average number of apparently unordered AOI viewings in the beginning is 4,8 AOIs
Reading bumps (1)

Sequence Chart for *Un ver dans le fruit*

The first Z-path segment is preceded by a “Search phase”
2. “Shortcut stops”

- The layout often causes short fixations during the shortcut transition to the next Z-path picture (i.e. “interruptions”)

AOIs [3-(5)-4]: 5 occurrences/22

AOIs [8-(7/10)-9]: 7 occurrences/22
• This might also explain part of the search at the beginning of the viewing
3. “Path Checking”

• Quick back fixations or quick forward fixations is quite frequent, before proceeding with the Z-path
• These “checking” patterns are so limited in time that they do not necessarily have to be considered as true “bumps” within a given Z-path segment.
4. Quick side fixations

• Some short fixations out of the Z-path can be observed... these will need more scrutiny.
5. See-saw on two images

- Some situations show a strong tendency to back and forth movements between two AOIs

[2-1-2]: 11 cases/22
[1-2-1-2]: 5 cases/22
[2-1-2-1-2]: 2 cases/22

➤ “Path checking”/“Scanning”?

Reading bumps (5)

[5-4-5] or more: 6 cases/22

➤ “Relation grasping” between the two images?
6. See-saw on three or more images

- Back and forth movements between three (or more) AOIs
• Insistent see-sawing might be one of the most relevant measure of a comprehension effort.

• In *Un ver dans le fruit*, the last pictures convey the action.
Back into the Matrix
Transition Matrix percentages explained...

<table>
<thead>
<tr>
<th></th>
<th>AOI 001</th>
<th>AOI 002</th>
<th>AOI 003</th>
<th>AOI 004</th>
<th>AOI 005</th>
<th>AOI 006</th>
<th>AOI 007</th>
<th>AOI 008</th>
<th>AOI 009</th>
<th>AOI 010</th>
<th>AOI 011</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOI 001</td>
<td>0</td>
<td>90%</td>
<td>3%</td>
<td>3%</td>
<td>0</td>
<td>0</td>
<td>3%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 002</td>
<td>41%</td>
<td>0</td>
<td>41%</td>
<td>10%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>AOI 003</td>
<td>9%</td>
<td>21%</td>
<td>0</td>
<td>35%</td>
<td>16%</td>
<td>0</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>AOI 004</td>
<td>3%</td>
<td>6%</td>
<td>6%</td>
<td>0</td>
<td>81%</td>
<td>3%</td>
<td>0</td>
<td>0</td>
<td>3%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 005</td>
<td>4%</td>
<td>4%</td>
<td>8%</td>
<td>22%</td>
<td>0</td>
<td>42%</td>
<td>2%</td>
<td>2%</td>
<td>14%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>AOI 006</td>
<td>0</td>
<td>4%</td>
<td>12%</td>
<td>2%</td>
<td>10%</td>
<td>0</td>
<td>50%</td>
<td>6%</td>
<td>12%</td>
<td>0</td>
<td>4%</td>
</tr>
<tr>
<td>AOI 007</td>
<td>0</td>
<td>3%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8%</td>
<td>0</td>
<td>74%</td>
<td>8%</td>
<td>5%</td>
<td>0</td>
</tr>
<tr>
<td>AOI 008</td>
<td>0</td>
<td>0</td>
<td>3%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11%</td>
<td>22%</td>
<td>46%</td>
<td>11%</td>
<td>8%</td>
</tr>
<tr>
<td>AOI 009</td>
<td>0</td>
<td>9%</td>
<td>7%</td>
<td>0</td>
<td>6%</td>
<td>11%</td>
<td>3%</td>
<td>4%</td>
<td>42%</td>
<td>42%</td>
<td>18%</td>
</tr>
<tr>
<td>AOI 010</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>12%</td>
<td>2%</td>
<td>2%</td>
<td>55%</td>
<td>0</td>
</tr>
<tr>
<td>AOI 011</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>29%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Un ver dans le fruit

- Search phase
- Shortcut stops
- Side fixations
- Relation Grasping
- Event Sequence Comprehension
Impact of Layout
Impact of Layout

Le voyage en Italie
Impact of Layout

AOIs on *Le voyage en Italie*
## Impact of Layout

**Un ver dans le fruit** | **Le voyage en Italie**
---|---
- AOIs: | 11 | 14
- Median Reading Time: | 20,5 s | 31,5 s
- Complete Z-paths: | 7 /22 | 1 /22
- Average Scanning before 1st segment: | 4,8 | 5,3
- First segment [1-2-3]: | 18 /22 | 13 /22
Strong disturbance caused by AOI 012:
- [10-13-12-11]: 9 cases /22
- [10-12-13-11]: 3 cases /22
- A significant amount of see-sawing within the four (4) last pictures [11-14]: 17 strong occurrences out of 22 viewers
### Impact of Layout

#### Shortcut stops

<table>
<thead>
<tr>
<th>AOI</th>
<th>AOI 001</th>
<th>AOI 002</th>
<th>AOI 003</th>
<th>AOI 004</th>
<th>AOI 005</th>
<th>AOI 006</th>
<th>AOI 007</th>
<th>AOI 008</th>
<th>AOI 009</th>
<th>AOI 010</th>
<th>AOI 011</th>
<th>AOI 012</th>
<th>AOI 013</th>
<th>AOI 014</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOI 001</td>
<td>48%</td>
<td>41%</td>
<td>4%</td>
<td>0</td>
<td>0</td>
<td>4%</td>
<td>0</td>
<td>0</td>
<td>4%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4%</td>
<td>0</td>
</tr>
<tr>
<td>AOI 002</td>
<td>0</td>
<td>9%</td>
<td>50%</td>
<td>26%</td>
<td>6%</td>
<td>4%</td>
<td>0</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2%</td>
<td>0</td>
</tr>
<tr>
<td>AOI 003</td>
<td>9%</td>
<td>0</td>
<td>34%</td>
<td>0</td>
<td>3%</td>
<td>4%</td>
<td>1%</td>
<td>0</td>
<td>0</td>
<td>1%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>0</td>
</tr>
<tr>
<td>AOI 004</td>
<td>0</td>
<td>0</td>
<td>34%</td>
<td>9%</td>
<td>0</td>
<td>1%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 005</td>
<td>0</td>
<td>7%</td>
<td>11%</td>
<td>19%</td>
<td>0</td>
<td>58%</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>2%</td>
<td>0</td>
</tr>
<tr>
<td>AOI 006</td>
<td>0</td>
<td>0</td>
<td>3%</td>
<td>0</td>
<td>3%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 007</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 008</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 009</td>
<td>1%</td>
<td>0</td>
<td>13%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>40%</td>
<td>0</td>
<td>36%</td>
<td>22%</td>
<td>0</td>
<td>0</td>
<td>22%</td>
<td>0</td>
</tr>
<tr>
<td>AOI 010</td>
<td>1%</td>
<td>0</td>
<td>11%</td>
<td>6%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 011</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4%</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 012</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4%</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 013</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2%</td>
<td>4%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AOI 014</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2%</td>
<td>4%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Search phase

#### Relation Grasping (Overlap situation)

#### Event Sequence Comprehension (Complex structure reread)
Thank you for your attention!