It’s Personal and Disgusting
Extra-Linguistic Information in Language Comprehension

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Department of Linguistics 50th Anniversary - 13 April 2019
individuals use world knowledge & real world context in language comprehension

social context
beliefs & values
personality?
political views?
disgust sensitivity?

Behavioural Immune System

emotional “tag:” disgust

general cognition ➔ out-group stereotyping

~ political/moral views

language processing?

Pupillometry

cognitive effort
mental workload
attention
arousal

Gingras et al. 2015, Goldinger & Papesh 2012, Rondeel et al. 2015, Winn et al. 2018
<table>
<thead>
<tr>
<th>Type of clash</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>morpho-syntactic error</td>
<td>She often <strong>ride</strong> her bike to work in the summer.</td>
</tr>
<tr>
<td>semantic error</td>
<td>People often read <strong>heads</strong> for pleasure before bed.</td>
</tr>
<tr>
<td>socio-cultural clash</td>
<td>![male] I always wear <strong>hair bands</strong> to hold in my bangs.</td>
</tr>
</tbody>
</table>
## Pupillometry Studies

<table>
<thead>
<tr>
<th></th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>participants</td>
<td>33</td>
<td>76</td>
</tr>
<tr>
<td>male/female</td>
<td>11 / 22</td>
<td>18 / 58</td>
</tr>
<tr>
<td>age (yrs) min–max</td>
<td>18 – 23</td>
<td>18 – 83</td>
</tr>
<tr>
<td>age (yrs) mean</td>
<td>19.3</td>
<td>25.0</td>
</tr>
</tbody>
</table>
GAM Modelling

➔ no data lost in time-binning
➔ non-linear relationships

Interaction of interest:

Extra-linguistic variable $\times$ Time $\times$ Average item rating

Random structure:

Participant $\times$ Time random smooth
Item random intercept
Morpho-Syntactic Errors

She often *ride* her bike to work in the summer.

**Best model:**

*Openness* × *Time* × *Average item rating*

\[ n = 1,443,189 \]
\[ R^2 = .10 \]
Morpho–Syntactic Errors

She often ride her bike to work in the summer.

Best model:
Openness × Time × Average item rating

\( n = 1,443,189 \)

\( R^2 = .10 \)
Semantic Errors

People often read heads for pleasure before bed.

Best model:
Extraversion x Time x Average item rating

n = 1,313,761
$R^2 = .103$
Semantic Errors

People often read heads for pleasure before bed.

Best model:
Extraversion x Time x Average item rating

n = 1,313,761
R² = .103
Personality Traits, such as:

- Openness
- Extraversion
- etc.

→ language processing
Socio-Cultural Clashes

I always wear hair bands to hold in my bangs.

Best model:
Disgust sensitivity \times Time \times Average item rating

n = 3,658,077
R^2 = .096
Socio-Cultural Clashes

I always wear hair bands to hold in my bangs.

Best model:
Disgust sensitivity × Time × Average item rating

n = 3,658,077
R² = .096
Behavioural Immune System/Disgust Sensitivity

→ language processing
→ early
Results

- (further) extra-linguistic variables affect online language comprehension
  - Big Five
  - Disgust sensitivity/BIS
  - early
- top-down/mixed models
Open Questions
are effects due to...
➔ more prediction & hence more surprisal?
➔ less exposure?
➔ BIS “alarm bells?”