Comprehension of Gender-neutral forms and the pseudo-generic masculine in German: a visual world eye tracking study

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Background:
Phenomenon

German: genus language ("grammatical gender")

- masculine

- feminine

- neutral

role nouns: Genus-Gender correlation ("genus-sexus-nexus")

SG   PL

- der Student (masc.SG.) – 'the student' (male)   die Studenten

- die Student**in** (fem.SG.) – 'the student' (female)   die Student**innen**

- das Kind (neut.SG)   – 'the child' (neutral)   die Kinder

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- masculine → ♂
- feminine → ♀
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Background:
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German: genus language with generic masculine

- masculine → ♂ / ♂+♀ / X / ?

- feminine → ♀

- neutral

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Gender-neutral language (inclusive) → ♂+♀ / X / ?
- der / die Studierende – 'the studying one' (fe/male)   die Studierenden

Experiment
Conditions

Conditions	Grammar	auditory – Stimuli – visual	
1) PL-M	Masculine Plural	*-er / -en*	all♂
2) PL-F	Feminine Plural	*-innen*	all♀
3) PL-G	Gender-neutral alternative		♂+♀
	nominalisations	PL *-ierende(n)*	
	compounds	PL *-kräfte / -personen*	
	collectives	SG *-ung / -(i)um / -ion*	

Background:
Motivation

research so far frequently missing from current debates

findings on German:
Braun, Sczesny & Stahlberg 2002 & 2005 / Irmen & Köhncke 1996 / Irmen & Schumann 2011 / Klein 1988 / Rothmund & Scheele 2004 / Steiger & Irmen 2007 / Misersky, Majid & Snijder 2018 / Esaulova et al. 2015 & Reali et al. 2012 / ...

- "gen."Masc. → non- / less inclusive & biased

- higher mental availability of women under femininisation

- challenge objections on GFL

→ add to research and substantiate it

- Gender-neutral forms: inconclusive → inclusive or ineffective?

Thesis:
Aims & Research Questions

compare generic potential of
"gen."Masc. with Gender-neutral alternatives in German

- methodological contribution (no VW ET, but *off-line* and a few *on-line* measures) → timing and size of effects
- when processing genus and Gender information about visually displayed human referents using role nouns, terms for occupations, etc.

- processing of GN forms → valid option for generic reference? (guidelines on non-sexist language)

- Which forms qualify best as a generic (incl. men and women and others alike → elicit a response to mixed Gender group)?

Experiment:
Methods: Stimuli

auditory

      3 practice trials

      48 critical items – in each condition

      60 fillers (with additional comprehension questions)

- recorded by a native German speaker (female)

- same syntactic structure and thematic prominence

visual

      a) all-♂ ,   b) all-♀ ,

      c) mixed ♂+♀ group of referents   d) single protagonist

Experiment:
Methods: Materials – Trial

1. *Das ist Martin.*   'This is Martin.'   / 'This is Tina.'
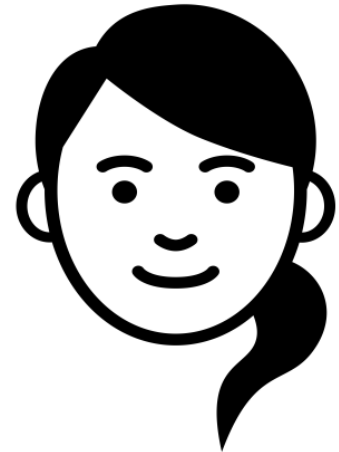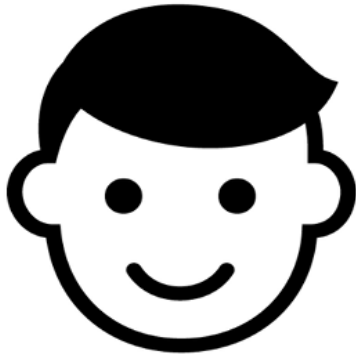
☐ introduced as protagonist

Experiment:
Methods: Materials – Trial

2. *Martin ist neu an der Universität Potsdam und sucht **die Studenten / Studentinnen / Studierenden**, die die Fachschaft gegründet haben.*

'Martin is new at Potsdam University and is looking for the **students (masc.PL / fem.PL / GN.PL)** who founded the council.'
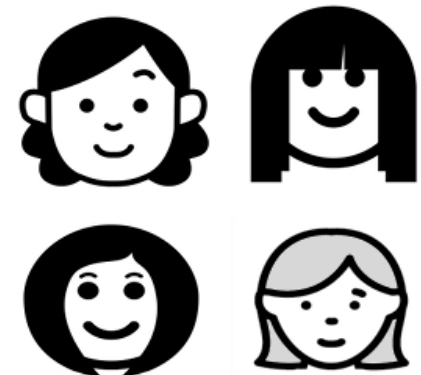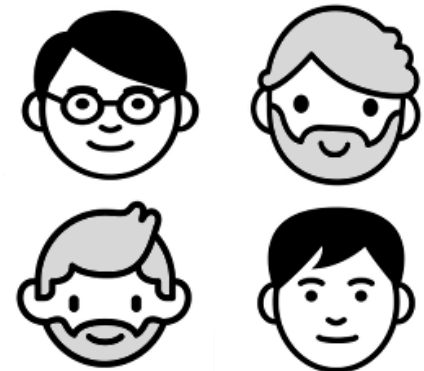
- contextual sentence with critical region (role noun in respective form), followed by relative clause specifying the noun

Experiment:
Methods: Materials – Trial

+
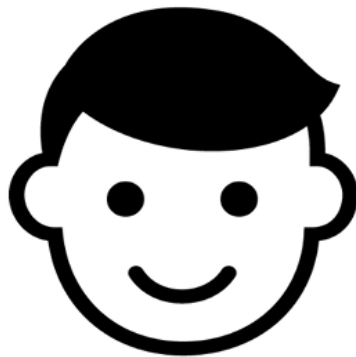
Experiment:
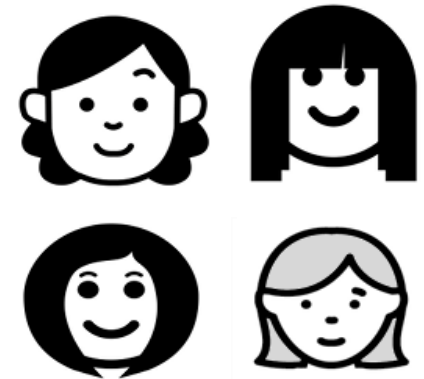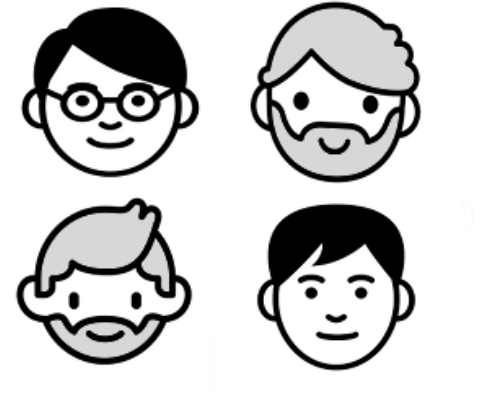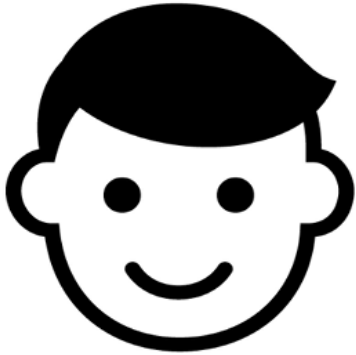## Methods: Materials – Trial

3. *An wen möchte Martin sich wenden?*

'Who does Martin want to talk to?'

• a question related to the group just introduced – not mentioned again – to prompt a decision (mouse-click on one of the pictures)

Experiment:
Methods: Trial

Experiment
Methods: Procedure

- eye movements during listening and responding recorded with an eye-tracker (calibration, validation); responses to image; time

- familiarisation with the experiment: instructions + practice trials + feedback

- break after half of the trials

- debriefing after the session

Experiment:
Methods: Participants

- 27 subjects
- native speakers of German
- 18-35 years old
- of male, female, 'diverse' Gender
- majority: students (UP, from Potsdam, Berlin)

- acquired via lab participant pool & peer group; could receive credits for participation
- short questionnaire after the experiment on demographic info (age, Gender (identification), ...)

Experiment

Hypotheses [1a] Genericity

condition		clicks on/ looks to visual input	expected	
1) PL-M	→	all♂ **M-male**	60-80%	
		♂+♀ **M-mixed**	20-40%	
2) PL-F	→	all♀ F-fem.	100%	
3) PL-GN	→	♂+♀ **GN-mixed**	75%	?
		all♂ GN-male	20%	?
		all♀ GN-fem.	5%	?

Experiment

Hypotheses [1b] "opaque" Masculines

condition	clicks on/ looks to visual input	expected	
1) PL-M →	all♂ **M-male**	60-80%	
	♂+♀ M-mixed	20-40%	
2) PL-F →	all♀ F-fem.	100%	
3) PL-GN →	**♂+♀ GN-mixed**	75%	?
	all♂ GN-male	20%	?
	all♀ GN-fem.	5%	?

Experiment
Measurements

RoI 1   *RoI 2*

Critical Noun   **Referent Identification Question**

fixations of images (IA)

image (IA) decision –

(male / female / mixed / (PRO))

RT of response to image (IA)

Experiment
Data Analysis

Behavioural data
→ responses to images

→ RT

(→ stereotypicality rating)

Fixation data
→ proportion of
   fixations to images

→ time course of eye
   movements

Experiment
Data Analysis

<u>behavioural data – reaction times and click proportions</u>
- per condition / noun form, image IA, participant Gender, protagonist Gender & name; stereotypicality value, items, trial number → early, mid, and late trials

<u>eye movement data – fixations and proportions</u>
  eyetrackingR package (Dink & Ferguson 2015): window, growth curve, and divergence analyses with R
- models predictions for looks to Target / non-Target IA under different conditions and over defined trial time; calculates t-tests on time-binned data; bootsplines (smooth); cluster statistics (permutation)
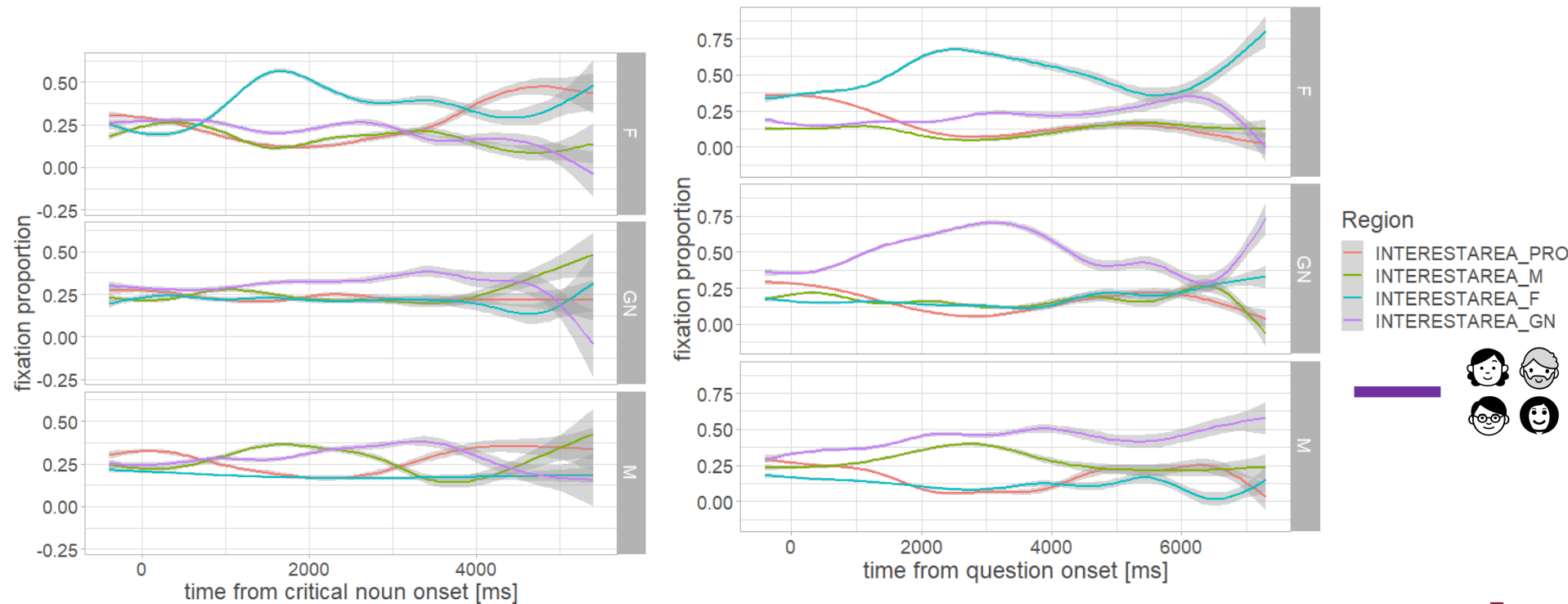
Experiment
Results: Behavioural data (RT, IA responses)

Reaction Times
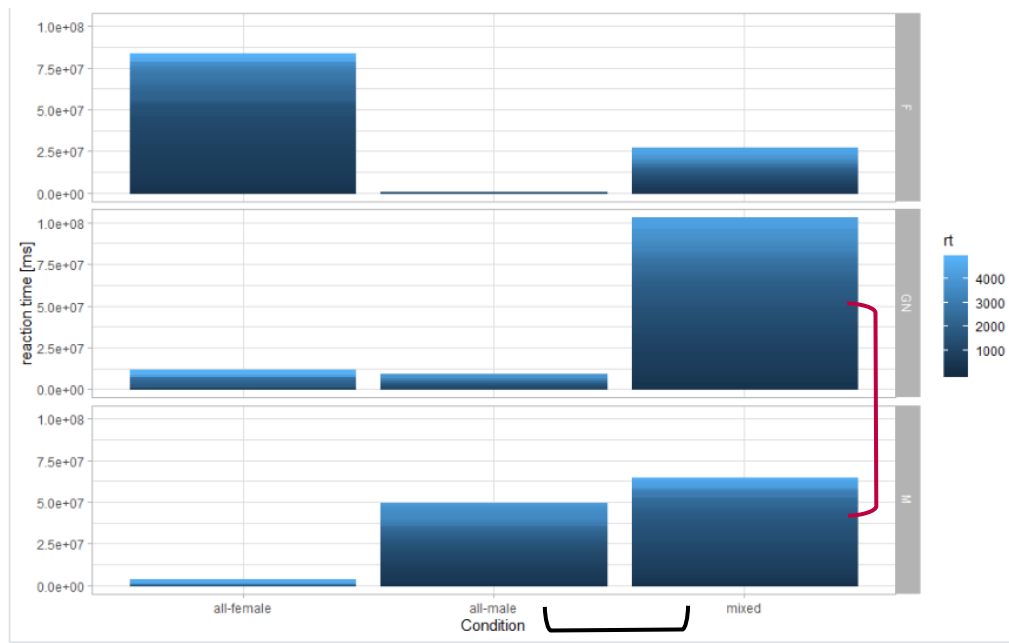
H [1b]

Click Proportions

- *F-fem:*   *80.4%*

- *M-male:*   *40.9%*
- *M-mixed:*   *56%*

- *GN-mixed: 88.6%*
- *GN-male:*   *4%*

H [1a]

Experiment
Data Analysis

behavioural data – reaction times and click proportions
☐ per condition / noun form, image IA, participant Gender,
protagonist Gender & name; stereotypicality value, items,
trial number → early, mid, and late trials

eye movement data – fixations and proportions

eyetrackingR package (Dink & Ferguson 2015): window,
growth curve, and divergence analyses with R
☐ models predictions for looks to Target / non-Target IA under
different conditions and over defined trial time; calculates t-
tests on time-binned data; bootsplines (smooth); cluster
statistics (permutation)

Experiment
Results: Fixations
Proportions over trial time.

RoI1   vs.   RoI2

Experiment
Results: Fixations
Proportions over trial time.
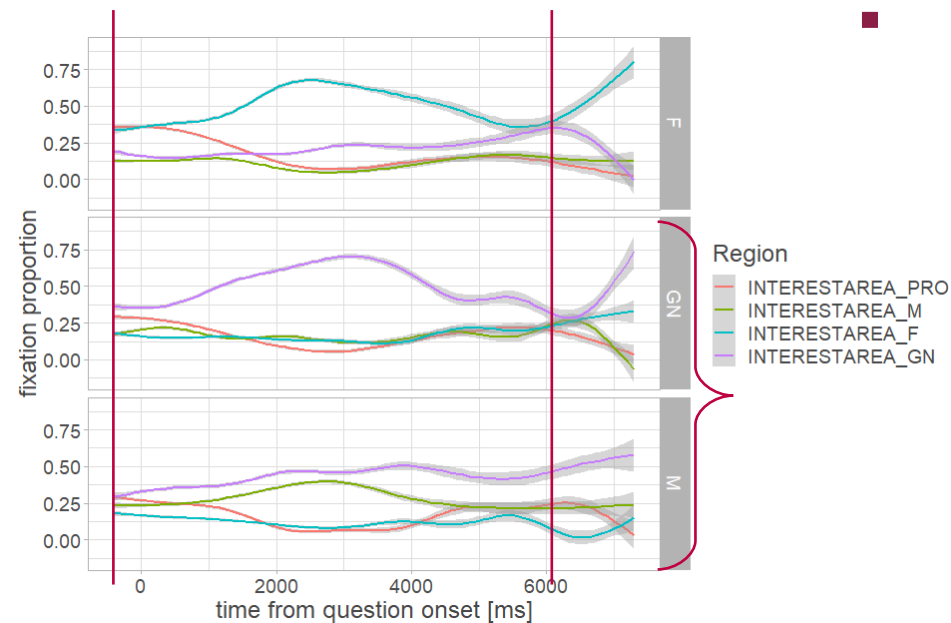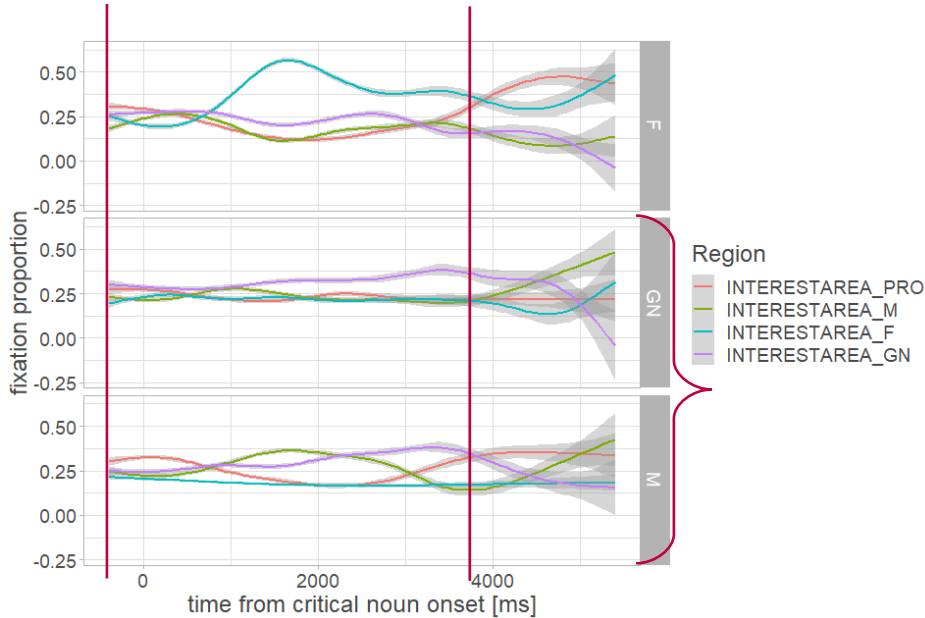
RoI1   vs.   RoI2

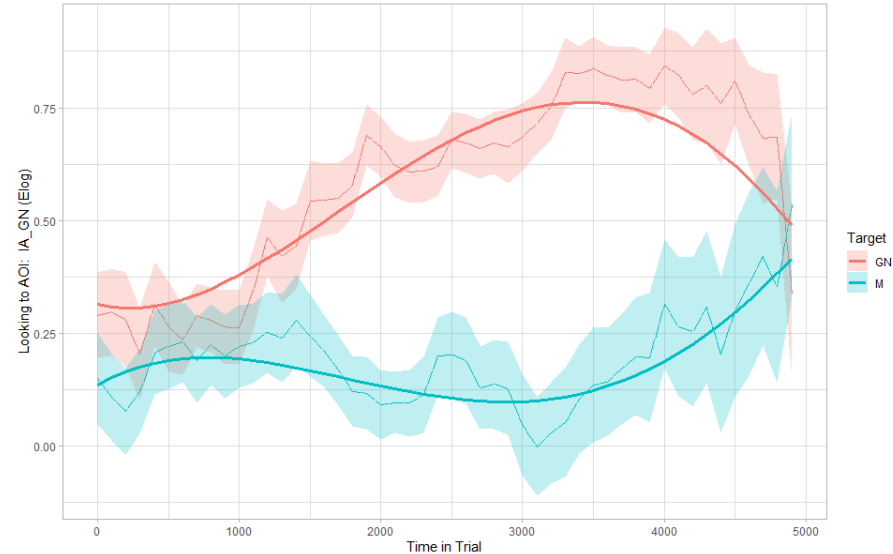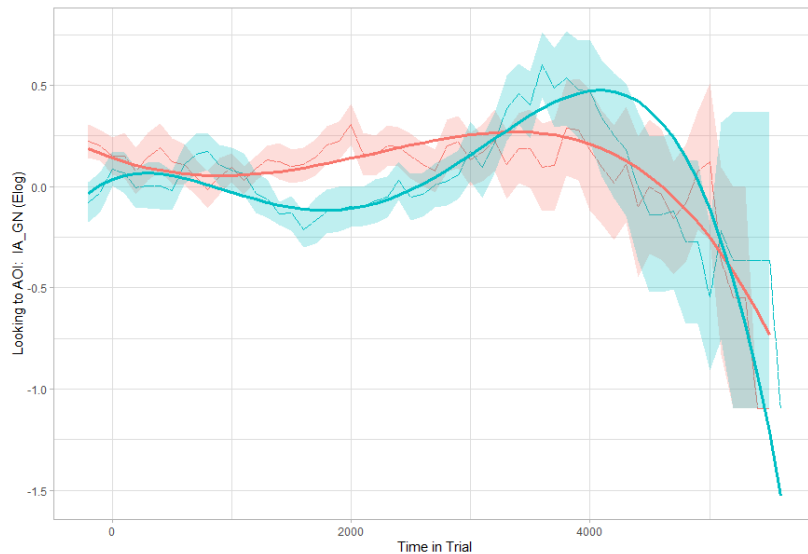-200ms – noun – RC offset   question onset – offset – click

Experiment
Results: Fixations

Growth curve in response window (eyetR.)

RoI1   vs.   RoI2

☐ looks to mixed Gender group image (IA ♂+♀ 👧👴👦👩)

☐ condition (Target): **G**ender-**N**eutral vs. **M**asculine

Experiment
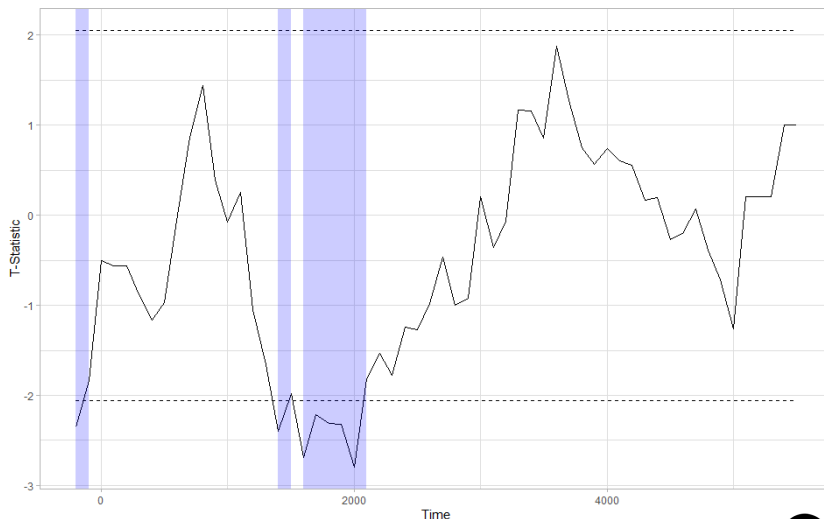# Results: Fixations

Significant cluster under the divergence analysis (eyetR.)

RoI1   vs.   RoI2

looks away from the ♂+♀ IA
(mixed Gender group)
when **M** was Target (masculine condition)

looks to the ♂+♀ IA
(mixed Gender group)
under GN condition (when **GN** Target)

effects to be expected

late after critical noun (1600-2100ms)   at question word and 1500s after onset

28

Conclusion

- activation and identification of group constellation dependent on noun form – determines Gender-inclusivity

- analyses of eye movements / fixations indicates different mental representations and re-processing (*RoI1* vs. *RoI2*: initial activation vs. conscious decision)

- analysis of responses: shift over course of trials; reliance on stereotypical intuitions; strategic patterns

Conclusion

- VW ET method applicable, highly informative of processing Gender-(un)marked reference

- phenomenon requires time-locked measures to capture when an initially activated mental representation is updated / rejected

- even a rather explicit task design revealed biases

- stereotypes of nominal referential expressions impact comprehension and referent Gender assignment

Discussion
Implications: Masculine vs. GN Generics

Which forms qualify best as a generic?

- "gen."Masc. function is not genuinely generic
  – *not as generic as Gender-neutral alternatives* –

- shift in generic functionality due to introduction of another form that intended to include different Genders?

- GNL alternatives indicative of group constellations other than male or female only (awareness and marker, especially nom.Part., Bülow & Harnisch 2015; Stahlberg & Sczesny 2001)
  → increase female presence and plurality in groups

- lack of grammatical Gender-specific cues and abstraction / depersonalisation → effective, yet not immediately processed

References
Studies

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- Bülow, L. & Harnisch, R. (2015): A Process of Exaptation. The Reanalysis of German *-end* as a Marker of Gender-Sensitive Language Use. *JournaLIPP* 4. 85–96.

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- Misersky, J., Gygax, P. M., Canal, P., Gabriel, U., Garnham, A., Braun, F., ... & Sczesny, S. (2014): Norms on the gender perception of role nouns in Czech, English, French, German, Italian, Norwegian, and Slovak. *Behavior research methods*, 46 (3). 841-871.

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