

## **An exploration of the underlying semantic features of masculine generics in German**

Masculine generics in German have long been considered to be sex- or gender-neutral (Doleschal, 2002). Take, for example, the grammatically masculine role noun *Anwalt* 'lawyer', which can be used to refer to lawyers of any sex or gender. However, despite their usage, research of the last decades has repeatedly shown that masculine generics apparently are not neutral but biased towards a masculine reading (e.g. Gygax et al., 2008; Irmen & Kurovskaja, 2010; Koch, 2021; Misersky et al., 2019; Stahlberg & Sczesny, 2001). Thus, while *Anwalt* is used to refer to lawyers of any sex or gender, its masculine bias leads to a predominantly male interpretation. But what semantic features of masculine generics lead to this masculine bias?

We explored this question in an approach novel to this area of research, which thus far has mostly seen behavioural methods: linear discriminative learning (LDL; e.g. Baayen et al., 2019). LDL follows a discriminative perspective on language, arguing that the relation between form and meaning is fundamentally discriminative (cf. Rescorla & Wagner, 1972; Wagner & Rescorla, 1972). Thus, a word's semantics emerges by its resonance with the entire lexicon. For our implementation of LDL, semantic vectors created on a corpus of German news websites with 7,511 dimensions computed via naive discriminative learning (e.g. Baayen & Ramscar, 2015) were used.

To account for influences of what is potentially not contained within the lexicon, target items for the present paper were taken from a study by Gabriel et al. (2008). In their study, the authors elicited stereotypicality ratings for German role nouns, allowing the present analysis to control for potentially confounding effects of stereotypicality. For each role noun, a so-called target item paradigm was considered. Each paradigm consisted of a word's masculine generic form in the singular and the plural (e.g. *Anwalt* 'lawyer' and *Anwälte* 'lawyers'), and a word's masculine and feminine explicit form in the singular and the plural (e.g. *Anwalt* 'male lawyer' and *Anwälte* 'male lawyers'; *Anwältin* 'female lawyer' and *Anwältinnen* 'female lawyers').

Using measures extracted from the LDL implementation as well as the stereotypicality ratings, a multinomial regression analysis was conducted. The type of paradigm member (e.g. singular masculine generic) was used as dependent variable, while stereotypicality ratings and principal components derived from the highly correlated LDL measures were incorporated as predictor variables. For stereotypicality, no significant effect was found. The LDL measures, however, showed significant effects. Masculine forms, i.e. masculine generics and explicit forms, come with significantly higher comprehension quality and denser semantic neighbourhoods. Feminine forms, on the other hand, showed significantly higher levels of semantic activation diversity in the singular and significantly lower levels of semantic activation diversity in the plural. Overall, masculine and feminine forms are significantly different in their semantic features, while masculine generics and explicit forms are highly similar.

Our results indicate that the masculine bias of the masculine generic is due to its underlying semantic features which are shared with masculine explicit forms. A role noun's stereotypicality, in contrast, does not account for its bias. Thus, even though the use of masculine generics might be intended as semantically generic, their resonance with the lexicon, that is more specifically their semantic similarity with masculine explicit forms, results in an overall biased reading towards the masculine.

## References

- Baayen, R. H., Chuang, Y.-Y., Shafaei-Bajestan, E., & Blevins, J. P. (2019). The discriminative Lexicon: A unified computational model for the lexicon and lexical processing in comprehension and production grounded not in (de)composition but in linear discriminative learning. *Complexity*, 2019, 1–39. <https://doi.org/10.1155/2019/4895891>
- Baayen, R. H., & Ramscar, M. (2015). Abstraction, storage and naive discriminative learning. *Handbook of Cognitive Linguistics*, 39, 100–120. <https://doi.org/10.1515/9783110292022-006>
- Doleschal, U. (2002). Das generische Maskulinum im Deutschen. Ein historischer Spaziergang durch die deutsche Grammatikschreibung von der Renaissance bis zur Postmoderne. *Linguistik Online*, 11(2). <https://doi.org/10.13092/lo.11.915>
- Gabriel, U., Gygax, P., Sarrasin, O., Garnham, A., & Oakhill, J. (2008). Au pairs are rarely male: Norms on the gender perception of role names across English, French, and German. *Behavior Research Methods*, 40(1), 206–212. <https://doi.org/10.3758/BRM.40.1.206>
- Gygax, P., Gabriel, U., Sarrasin, O., Oakhill, J., & Garnham, A. (2008). Generically intended, but specifically interpreted: When beauticians, musicians, and mechanics are all men. *Language and Cognitive Processes*, 23(3), 464–485. <https://doi.org/10.1080/01690960701702035>
- Irmen, L., & Kurovskaja, J. (2010). On the semantic content of grammatical gender and its impact on the representation of human referents. *Experimental Psychology*, 57(5), 367–375. <https://doi.org/10.1027/1618-3169/a000044>
- Koch, M. (2021). *Kognitive Effekte des generischen Maskulinums und genderneutraler Alternativen im Deutschen – eine empirische Untersuchung* [Master's Thesis]. Technische Universität Braunschweig.
- Misersky, J., Majid, A., & Snijders, T. M. (2019). Grammatical Gender in German Influences How Role-Nouns Are Interpreted: Evidence from ERPs. *Discourse Processes*, 56(8), 643–654. <https://doi.org/10.1080/0163853X.2018.1541382>
- Rescorla, R. A., & Wagner, A. R. (1972). A theory of pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In A. H. Black & W. F. Prokasy (Eds.), *Classical conditioning II: Current research and theory* (pp. 64–99). Appleton-Century-Crofts.
- Stahlberg, D., & Sczesny, S. (2001). Effekte des generischen Maskulinums und alternativer Sprachformen auf den gedanklichen Einbezug von Frauen. *Psychologische Rundschau*, 52(3), 131–140. <https://doi.org/10.1026//0033-3042.52.3.131>
- Wagner, A. R., & Rescorla, R. A. (1972). Inhibition in pavlovian conditioning: Application of a theory. In R. A. Boakes & M. S. Halliday (Eds.), *Inhibition and learning* (pp. 301–334). Academic Press Inc.