

Do prosody and word order influence the interpretation of German pronouns?

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Roundtable – Prosody of Pronouns

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Pronoun interpretation

- Subject vs. first mention preference (unaccented subject pronouns) (Frederiksen, 1981; Gernsbacher et al., 1989)

The actor called the cook with a cell phone. He was pretty tired.



- Can be disentangled by changing word order (Järvikivi et al., 2005)
- But that changes information structure (Vilkuna, 1995; Frey, 2006)
- Mixed findings on whether focusing affects pronoun resolution, mostly with clefts
- Differences in methods, but mostly do not control prosody

This study

- Eye-tracking experiment
- Manipulating
 - word order (SVO, OVS)
 - information structure marked by prosody (subject focus, object focus)
- in the sentence preceding the pronoun

ITEMS

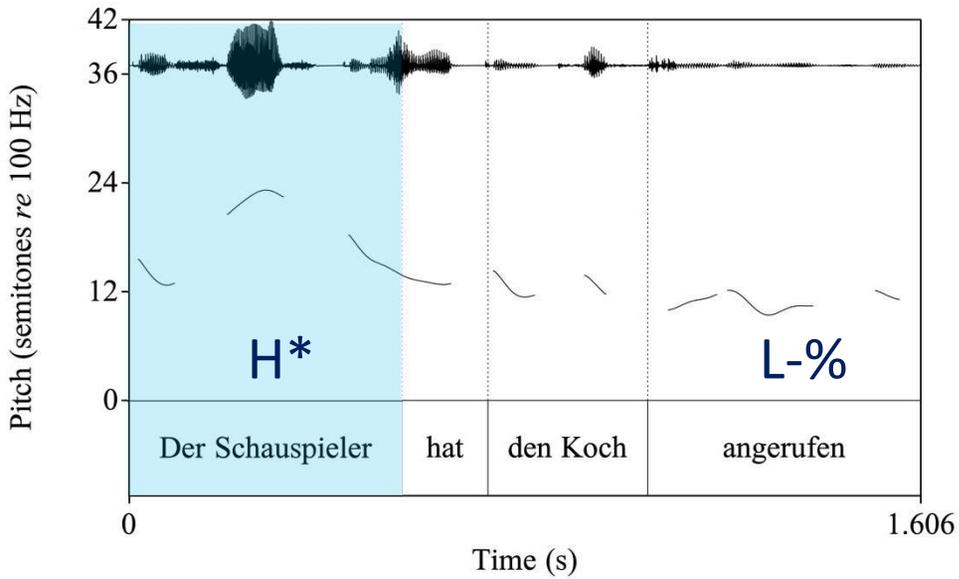


A: Ich habe gerade Ärger in meiner Strickgruppe, in der auch der Koch, der Schauspieler, der Maurer und der Detektiv sind. Wir haben einen Termin verschoben und ziemlich viel rumtelefoniert.

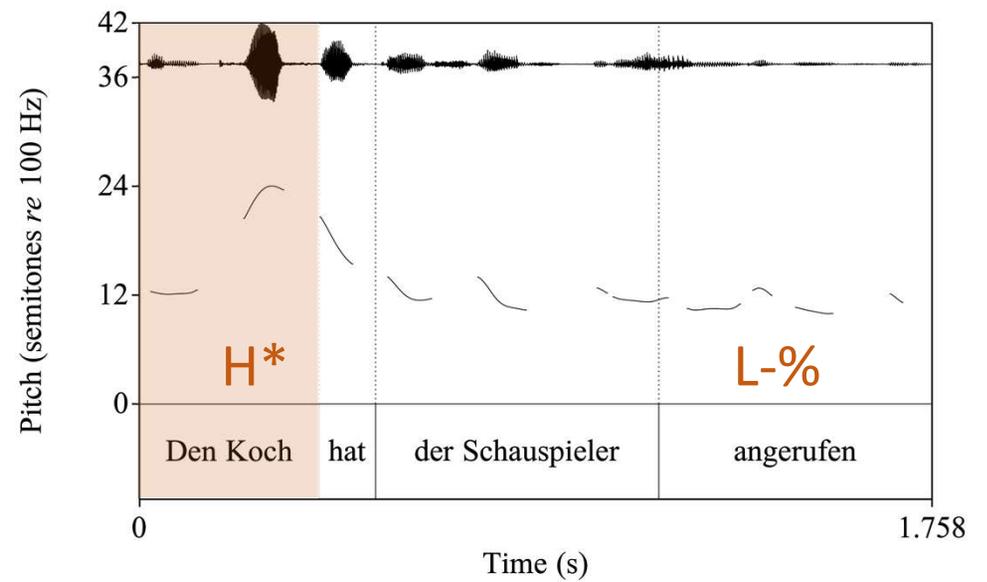
A: I have some problems in my knitting group which also includes the cook, the actor, the bricklayer, and detective. We postponed an appointment and called back and forth.

Prosody and word order manipulation

Subject-focus, SVO

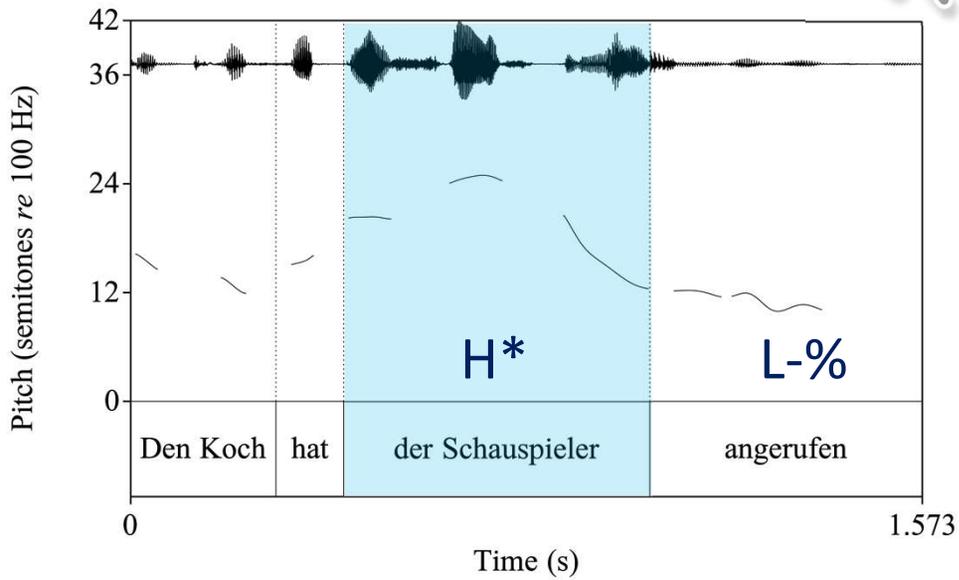


Object-focus, OSV

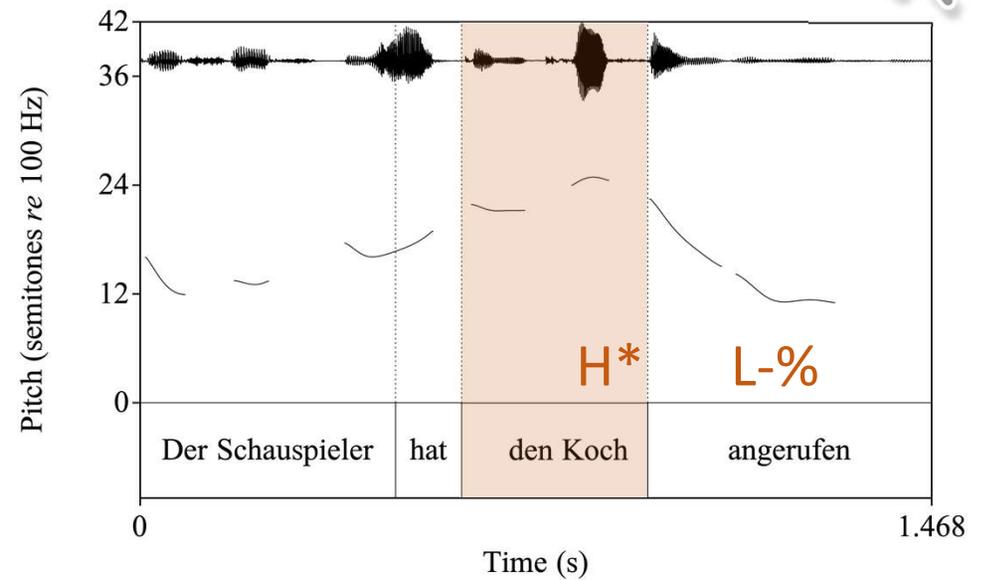


Prosody and word order manipulation

Subject-focus, OVS



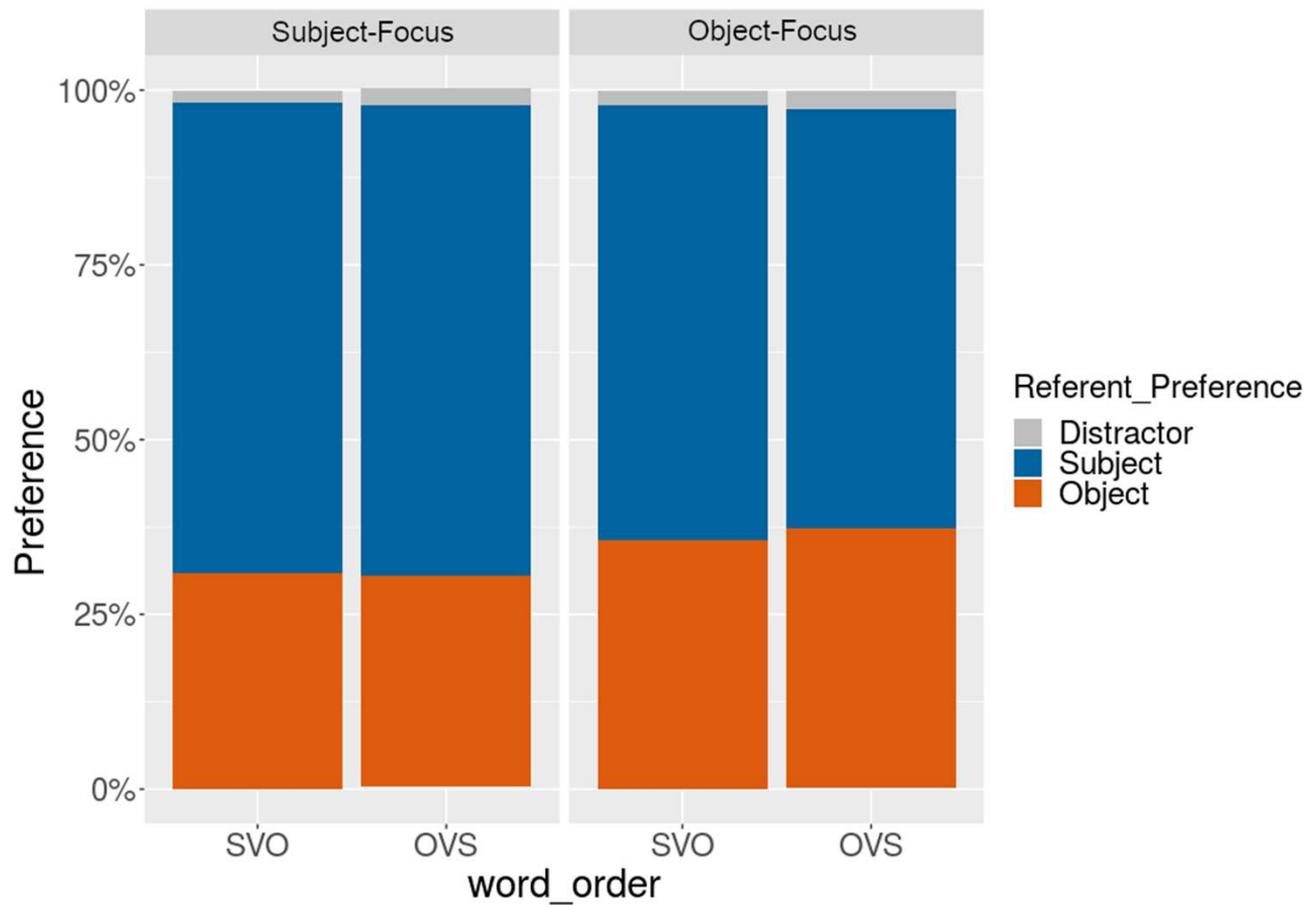
Object-focus, SVO



Methods

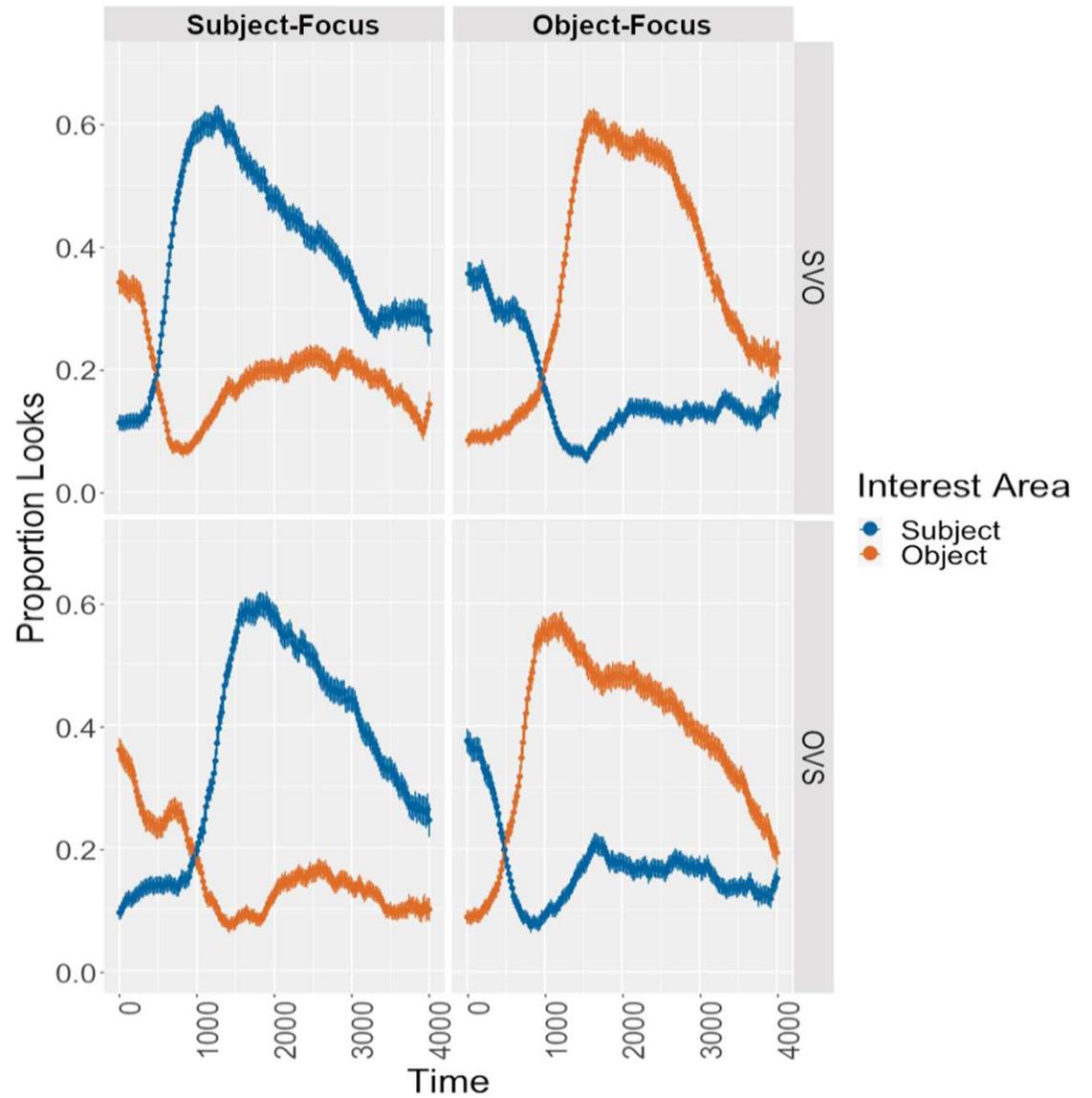
- 40 items x 4 conditions > 4 Lists + 40 fillers
- Participants: 60 German-native speakers from Universities of Konstanz and Oldenburg (44 female, 1 non-binary; age range: 20-33, mean: 24)
- Tracked eye movements while participants listened to dialogues
- Offline question about pronoun's referent
- Analysis with lmer (offline data) using lme (Bates et al., 2020) / GAMMs (eye-gaze data) using mgcv (v. 1.8-31; Wood, 2017) and itsadug (van Rij et al., 2020)

Offline results

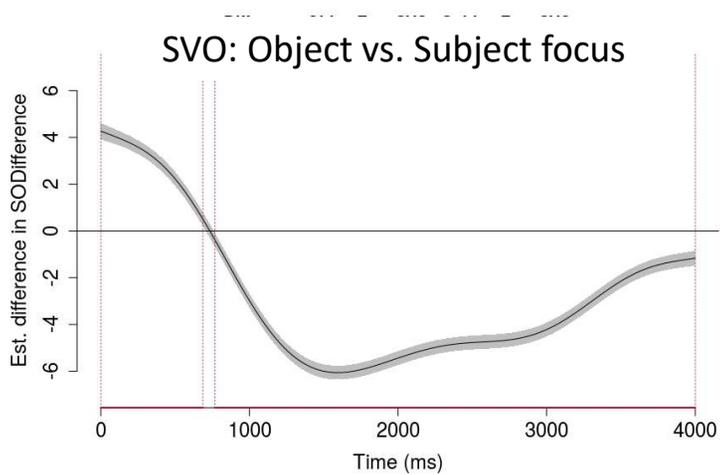


- Significantly more object responses in object focus than in subject focus
- No sign. effect of word order

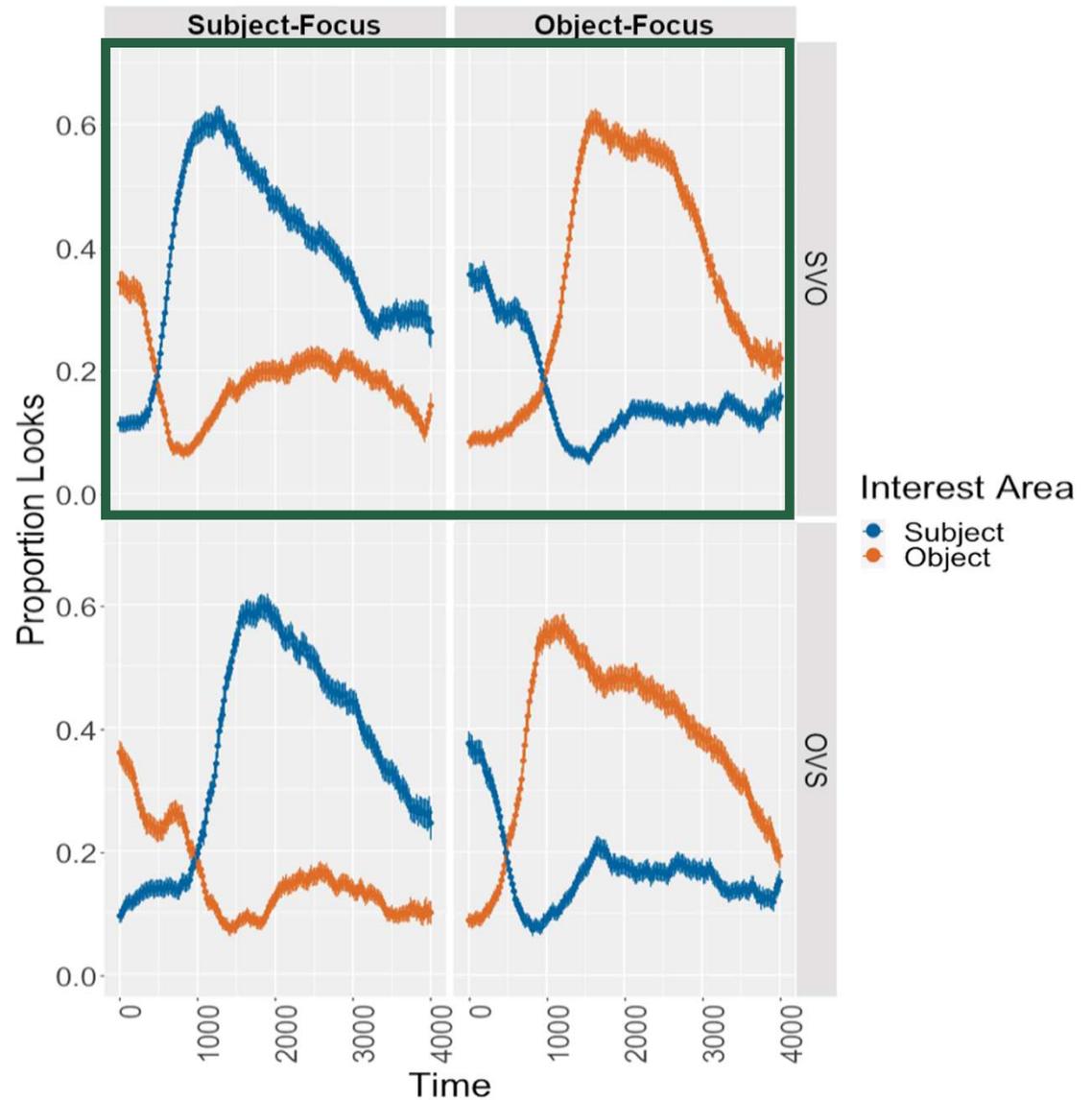
GAZE DATA: Prosody & word order segment



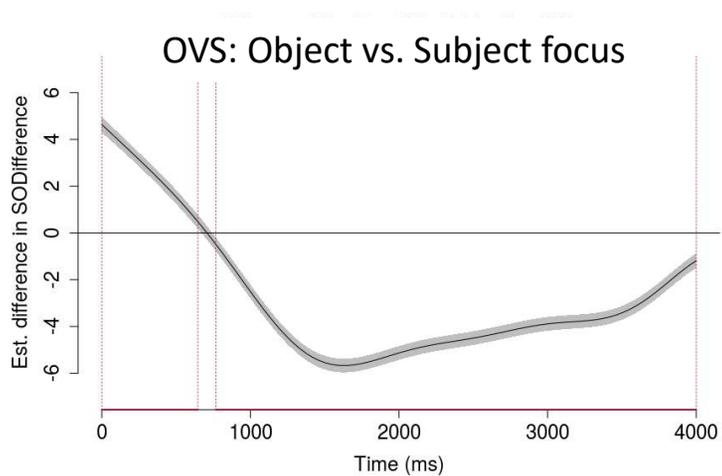
GAZE DATA: Prosody & word order segment



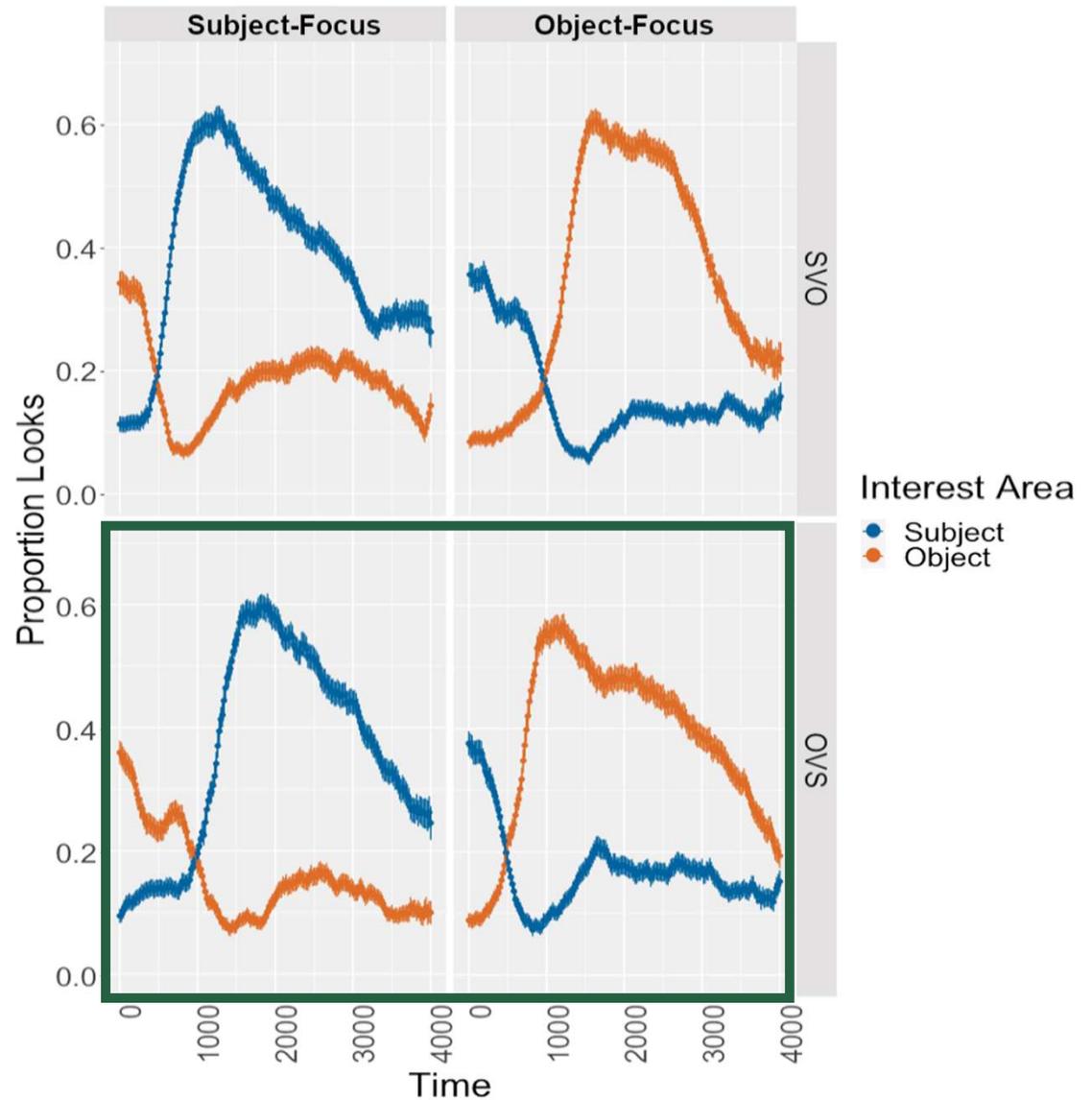
Briefly more, then fewer looks to subject
in object focus than in subject focus



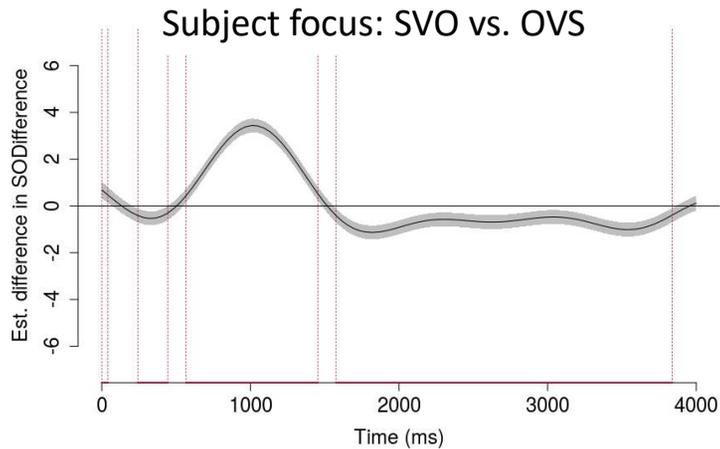
GAZE DATA: Prosody & word order segment



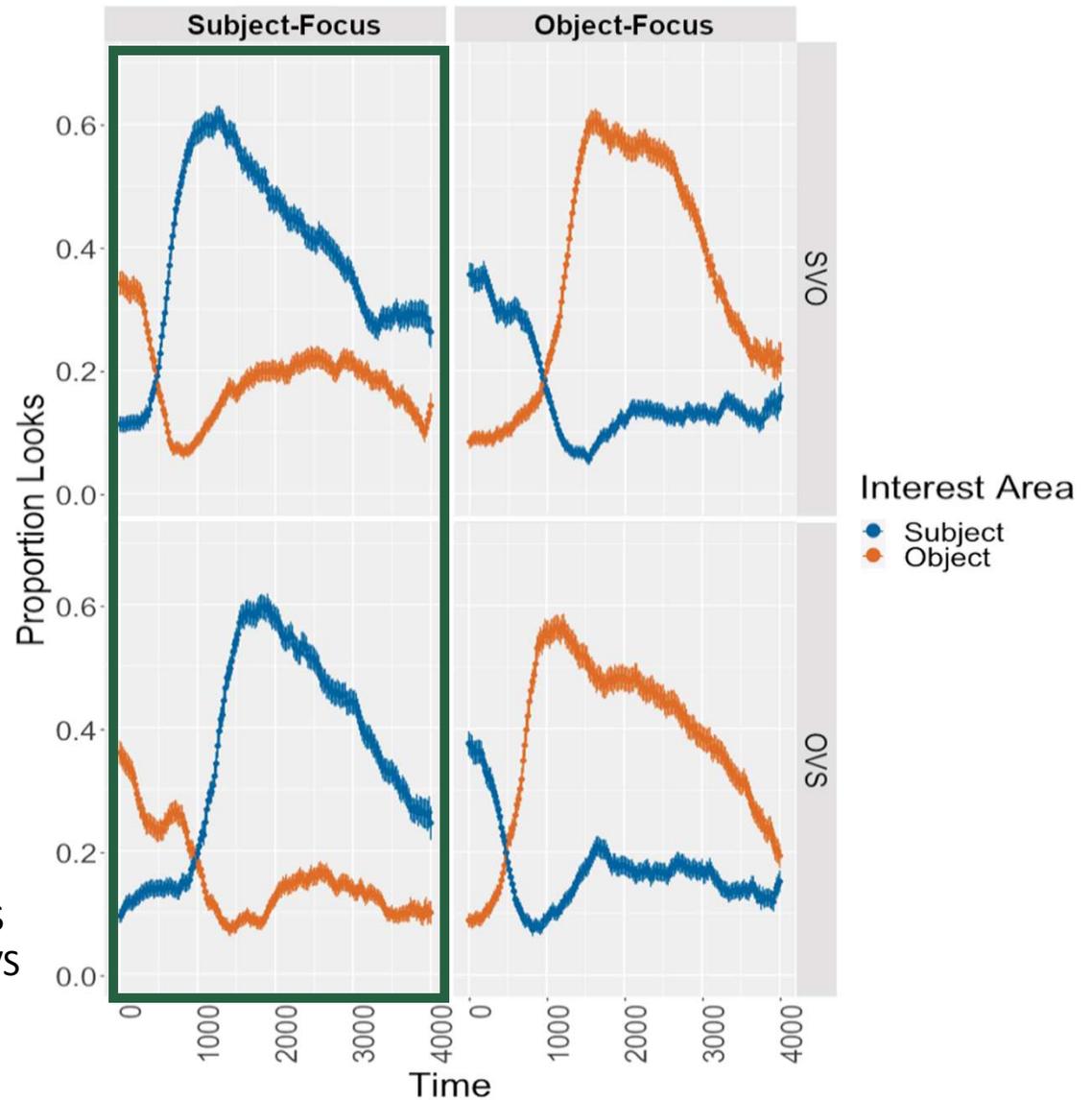
Briefly more, then fewer looks to subject
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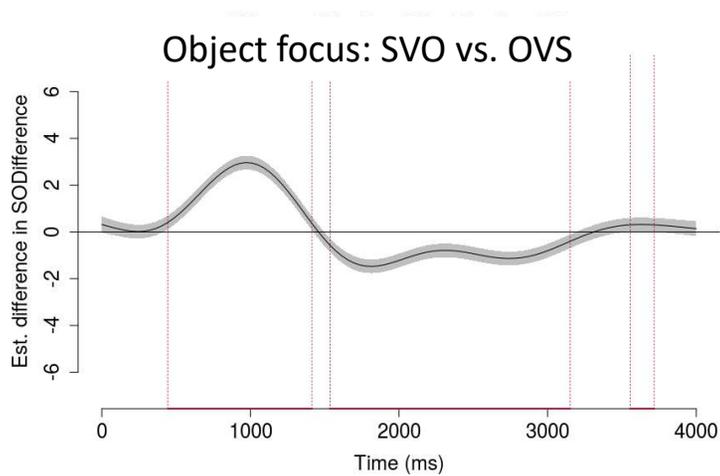
GAZE DATA: Prosody & word order segment



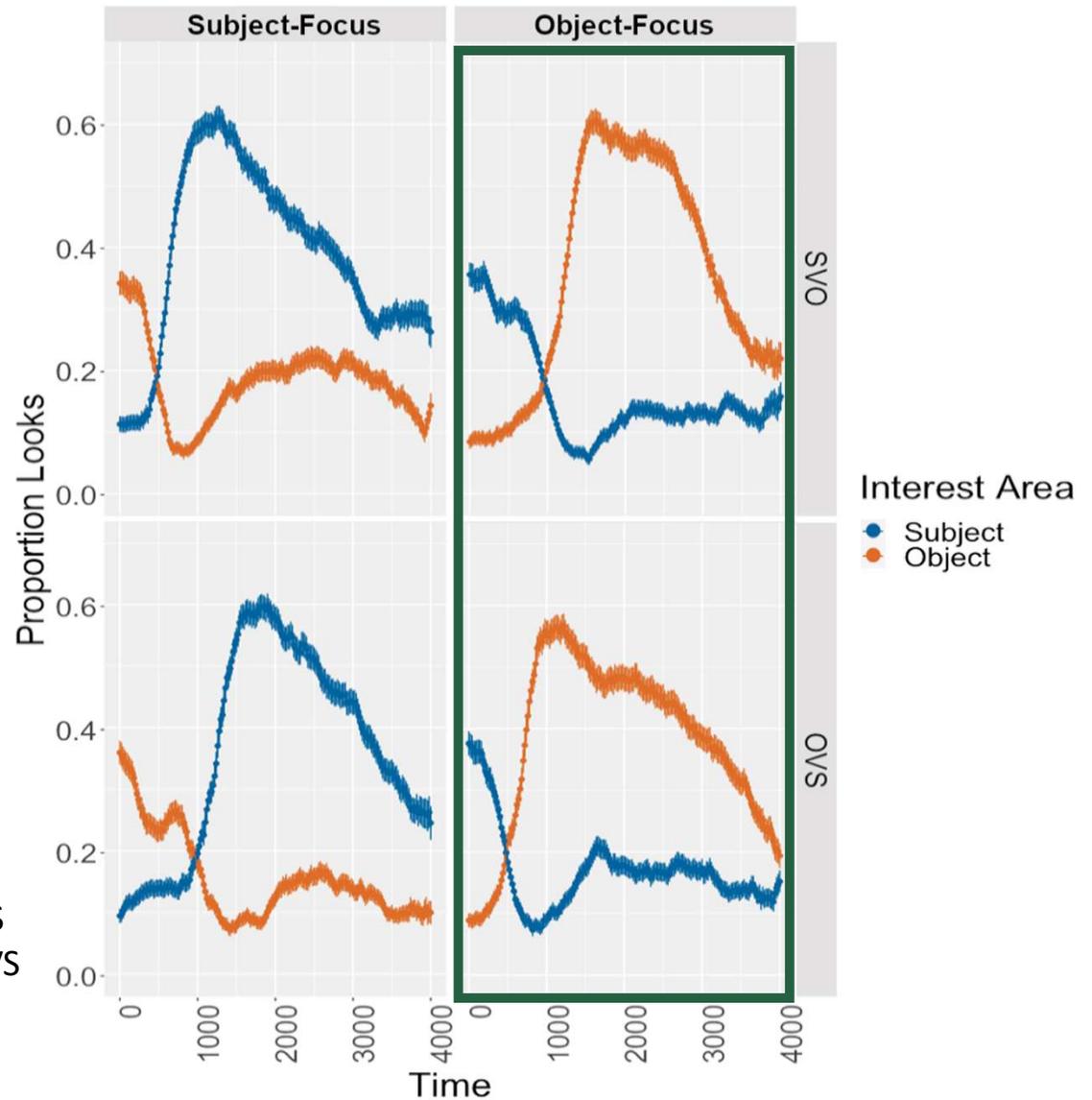
First, more looks to subject in SVO than in OVS
Later, fewer looks to subject in SVO than in OVS



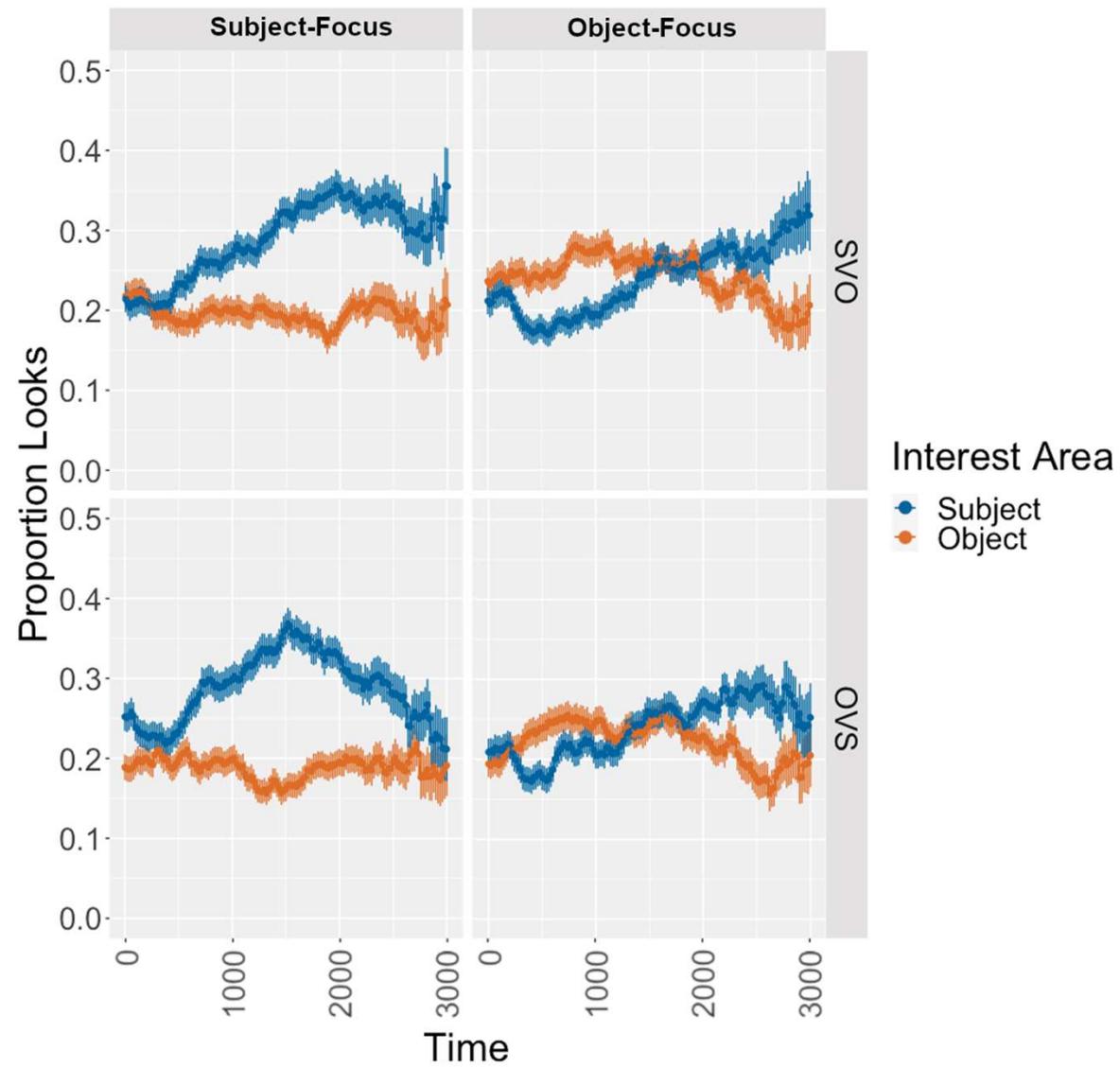
GAZE DATA: Prosody & word order segment



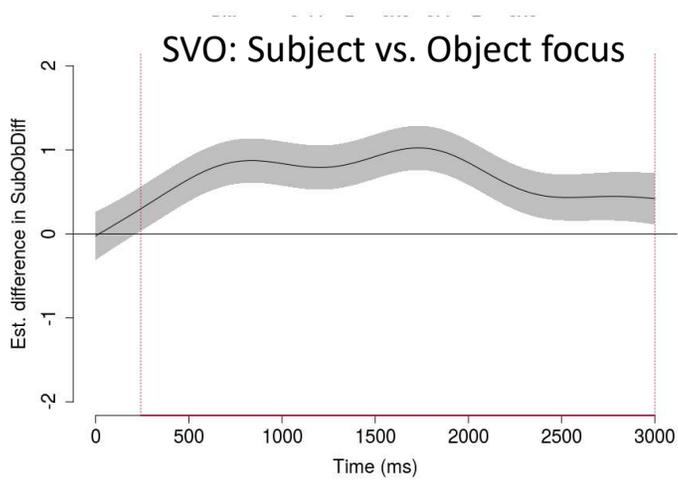
First, more looks to subject in SVO than in OVS
Later, fewer looks to subject in SVO than in OVS



GAZE DATA: Pronoun segment



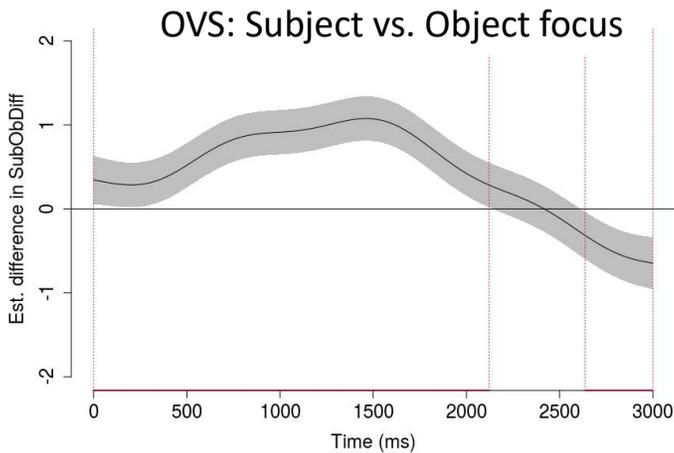
GAZE DATA: Pronoun segment



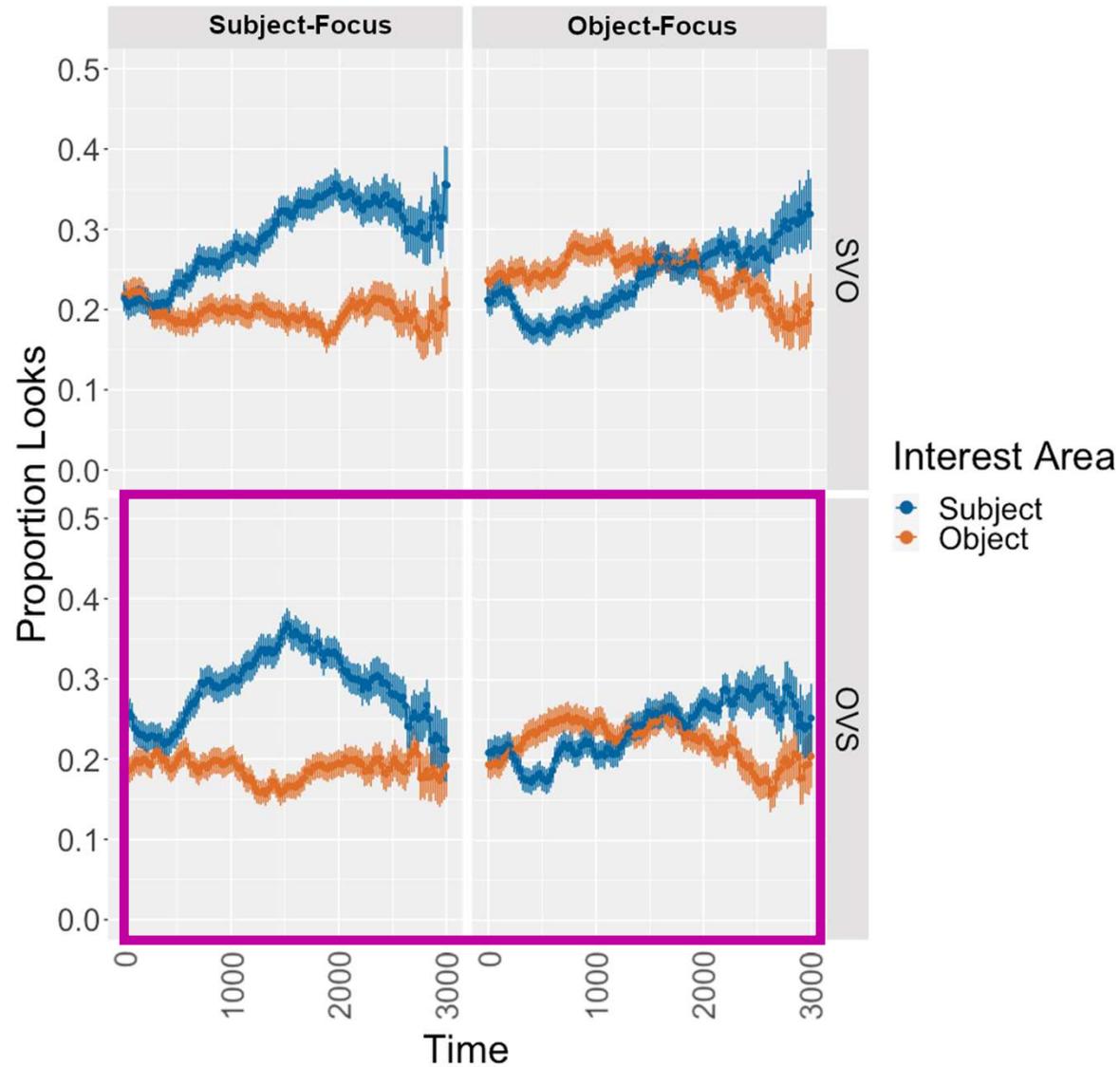
More looks to subject in subject focus
than in object focus



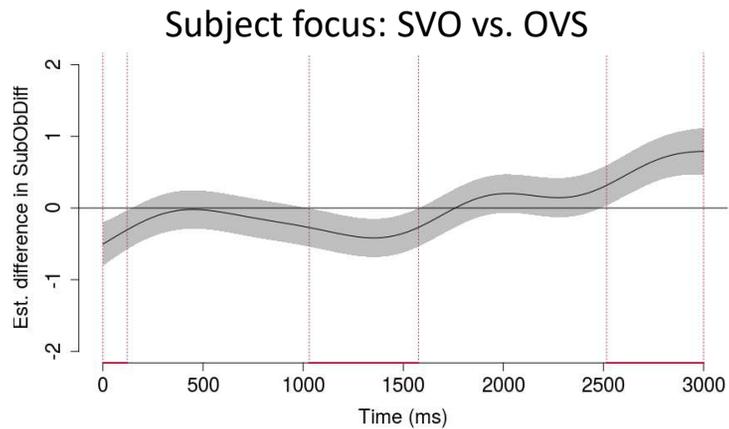
GAZE DATA: Pronoun segment



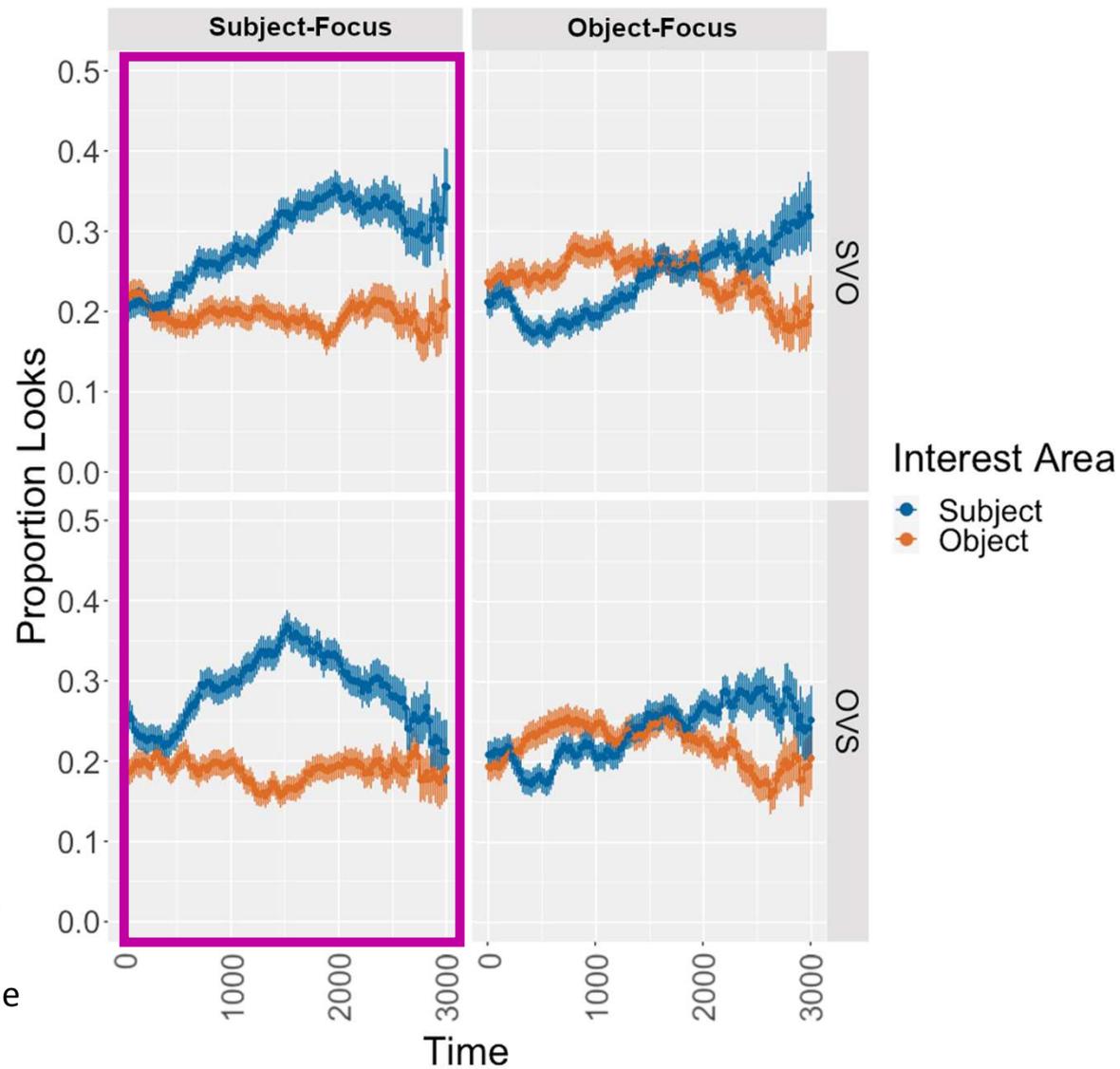
More looks to subject in subject focus than in object focus, but late time window with fewer looks to subject in subject focus



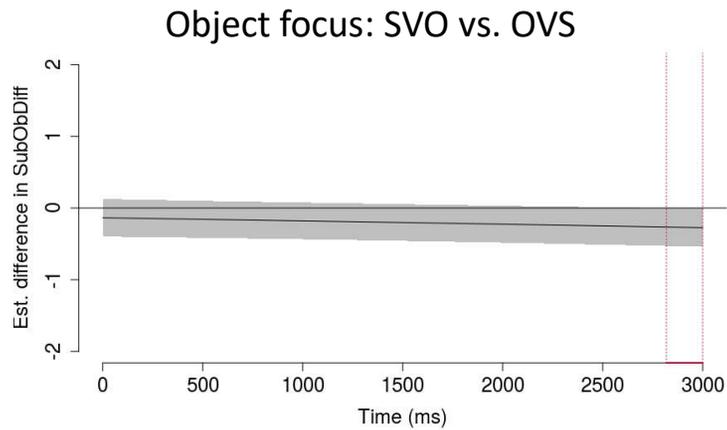
GAZE DATA: Pronoun segment



Fewer looks to subject SVO than in OVS in two earlier time windows
More looks to subject in SVO than in OVS at the end



GAZE DATA: Pronoun segment



No systematic differences



Summary

- Prosody guides attention to focused referent
- Persistent subject preference for offline interpretation, but slightly modulated by focus
- No effect of word order on offline interpretation, no consistent effects in online processing

- Subject vs. first mention preference
 - Subject preference (in German)

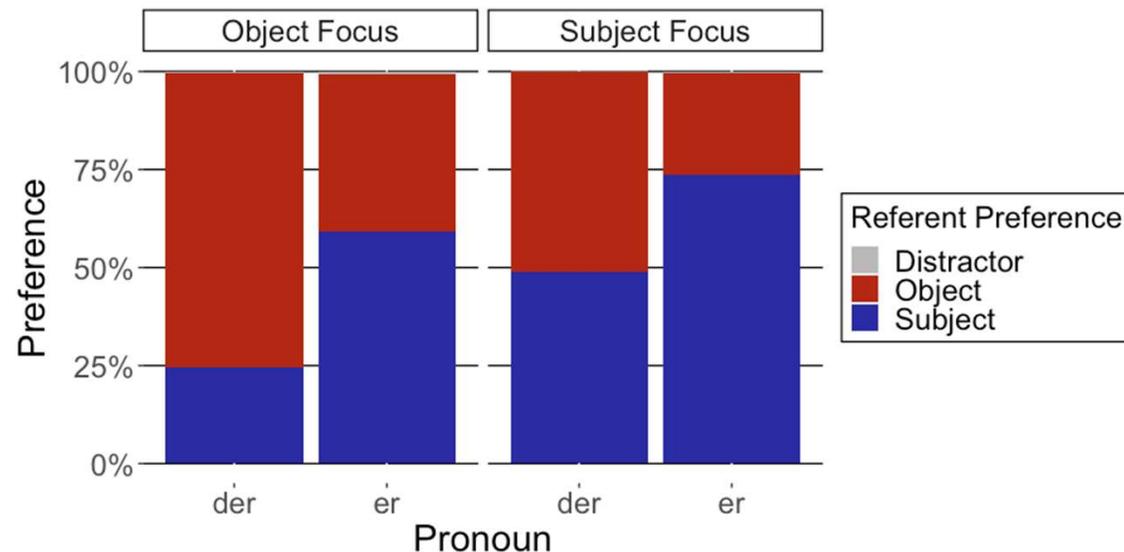
Future research

Using same design and materials to investigate:

- Additional information structure: Contrastive topic – focus
- Variation in pronoun: *der* vs. *er*, unaccented vs. accented
- L1 and L2 speakers of different dialects

Future research: Sneak peak

- Internet-based study collecting only offline pronoun interpretation
- Only SVO, manipulated information structure (subject/object focus) and pronoun (*der/er*, always unaccented)
- 107 monolingual L1 speakers = 4280 data points
- Sign. effects of pronoun*, prosody/focus and sign. interaction
- So far no effect of dialect



* Cf. Bader & Portele (2019)

Thanks for listening!

And to...

- Caroline Féry for hosting and supporting stimulus recordings
- Henning Cromm for speaking and cutting stimuli
- Elizabeth Ellehoj for help with stimulus creation
- Bettina Braun for hosting eye-tracking data collection in Konstanz
- Everyone who forwarded the link to our internet-based study

References

- Bader, M., & Portele, Y. (2019). Givenness and the licensing of object-first order in German: The effect of referential form. In A. Gattner, R. Hörning, M. Störzer, & S. Featherston (Eds.), *Proceedings of linguistic evidence 2018: Experimental data drives linguistic theory* (pp. 208–228). Tübingen: University of Tübingen.
- Bates, D., Maechler, M., Bolker, B., Walker, S., Christensen, R. H. B., Singmann, H., Dai, B., Scheipl, F., Grothendieck, G., Green, P., & Fox, J. (2020). *lme4: Linear Mixed-Effects Models using “Eigen” and S4. R package version 1.1-23*.
- Frederiksen, J. R. (1981). Understanding anaphora: Rules used by readers in assigning pronominal referents. *Discourse Processes*, 4, 323–347. <https://doi.org/10.1080/01638538109544525>
- Frey, W. (2011). Contrast and movement to the German prefield. In Valéria Molnár & S. Winkler (Eds.), *The architecture of focus* (pp. 235–264). Mouton de Gruyter. <https://doi.org/10.1515/9783110922011.235>
- Gernsbacher, M. A., Hargreaves, D. J., & Beeman, M. (1989). Building and accessing clausal representations: The advantage of first mention versus the advantage of clause recency. *Journal of Memory and Language*, 28, 735–755. [https://doi.org/10.1016/0749-596X\(89\)90006-5](https://doi.org/10.1016/0749-596X(89)90006-5)
- Järvikivi, J., van Gompel, R. P. G., Hyönä, J., & Bertram, R. (2005). Ambiguous pronoun resolution: contrasting the first-mention and subject-preference accounts. *Psychological Science*, 16(4), 260–264. <https://doi.org/10.1111/j.0956-7976.2005.01525.x>
- van Rij, J., Wieling, M., Baayen, R. H., van Rijn, H. (2020). *itsadug: Interpreting Time Series and Autocorrelated Data Using GAMMs. R package version 2.3*.
- Vilkuna, M. (1995). Discourse configurationality in Finnish. In K. É. Kiss (Ed.), *Discourse configurational languages* (pp. 244–268). Oxford University Press.
- Wood, S. (2017). *Generalized Additive Models: An Introduction with R*, 2nd edition. Chapman and Hall/CRC.