



Focus and givenness in Turkish Sign Language (TİD)

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Information Structure and Prosodic Structure

Broad Focus

(1) A: What happens?

B: [ECE BANANA EAT]_{BF}

‘Ece eats a banana.’

- Baseline condition, all arguments (maybe the verb) are accented.

Narrow Focus – Presentational Focus

(2) A: Who eats an apple?

B: [ECE]_{PF} BANANA_G EAT_G

‘Ece eats a banana.’

- Focus needs to be maximally prominent (Büiring 2009): higher pitch/duration/intensity values.
- Unless focused, a G-marked constituent is non-prominent (Féry & Samek-Lodovici 2006)

Narrow Focus – Contrastive Focus

(3) A: Does Ece eat an apple or a banana?

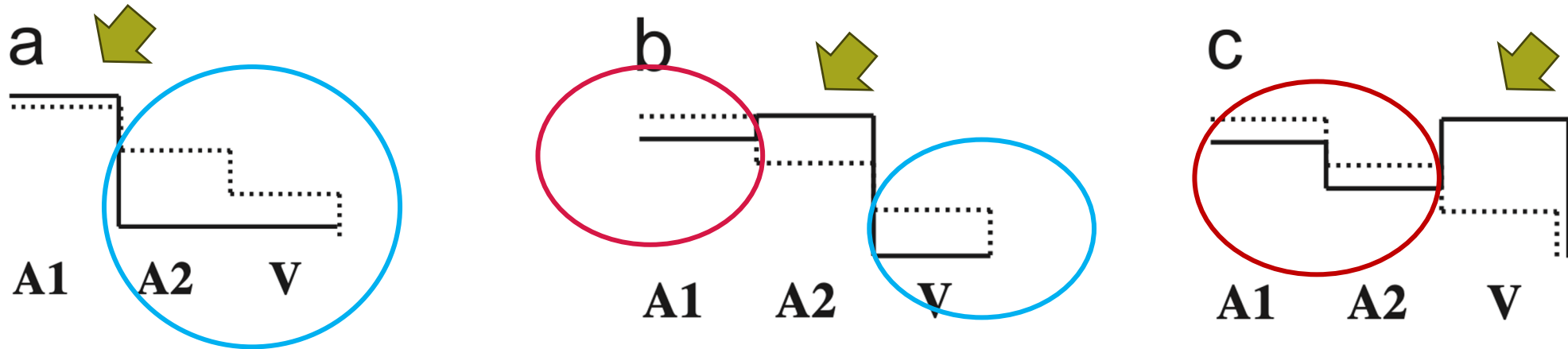
B: ECE_G [BANANA]_{CF} EAT_G

‘Ece eats a banana.’

- Focus needs to be maximally prominent (Büiring 2009): higher pitch/duration/intensity values.
- Unless focused, a G-marked constituent is non-prominent (Féry & Samek-Lodovici 2006)

Information structure shapes the prosodic contour

- Prosodic realization of focus: a trade-off between **boosting** and **de-boosting** strategies.



(Féry & Kügler 2008: 682)

Effects of focus in spoken languages

Pre-focal

German: lowered pitch accents in the pre-focal given domain; (Féry & Kügler 2008)

Hungarian: less prominent pre-focal units; (Genzel, Ishihara and Surányi 2014)

Turkish: greater pitch range when the verb bears focus (İpek 2011)

Focal

German: higher pitch accents for narrowly focused (Féry & Kügler 2008)

Hungarian: higher f₀, greater pitch range, steeper fall, longer duration for narrowly focused constituents (Genzel, Ishihara, and Surányi 2014)

Turkish: higher f₀, longer duration for the subject (İpek 2011; Gürer 2020)

Post-focal

German: deaccentuation in the post-focal domain (Féry & Kügler 2008)

Hungarian: deaccented post-focal elements (Genzel, Ishihara, and Surányi 2014)

Turkish: deaccentuation in the post-focal domain when the subject bears focus (İpek 2011, Gürer 2020)

Effects of focus in sign languages

Pre-focal

???

Focal

- **RSL & NGT & ISL:**
 - manual prosody:** focused manual signs are longer, slower, larger, higher in articulation, and more repetitive than their non-focused counterparts (Kimmelman 2014, Sandler & Lillo-Martin 2006)
 - nonmanual prosody:** head nod in RSL, head tilt in NGT, eyebrow raise, and body lean in RSL and NGT (Kimmelman 2014)
- **TiD:**
 - manual prosody:** the duration of the focused manual signs is longer than their non-focused counterparts; nonmanuals do not necessarily accompany focused signs (Karabüklü & Gürer, in press)
 - nonmanual prosody:**
 - blink in broad focus after the subject (Gökgöz & Keleş 2020)
 - eye closed & brow raised corrective focus

Post-focal

???

Research Questions

- **R1:** What is the default unmarked prosodic contour in the broad focus condition?
- **R2:** Given that narrow focus is realized via an increase in duration in T1D (Karabüklü & Gürer, in press), does a manual sign bearing PF or CF differ from its counterpart in the broad focus condition?
- **R3:** Is there a decrease in duration in the pre-focal domains of PF and CF conditions?
- **R4:** Is there a decrease in duration in the post-focal domains of PF and CF conditions?
- **R5:** Given that narrow focus is not necessarily accompanied by non-manual markers (Karabüklü & Gürer, in press), does a narrow focus differ from its counterpart in the broad focus condition?
- **R6:** Does signing rate and age of acquisition effect focus realization?

Design & Participants

- 3 target sentences x 6 conditions x 2 repetitions
- 54 filler items: 18 yes/no questions, 18 questions of «where» 18 questions of «how many»
- Ten informants were Deaf-of-Deaf (DoD), and 10 Deaf-of-Hearing (DoH). 10 being exposed to TID from birth, ten before age 7.
- 17 female, 3 male
- The mean age of the informants was 34, ranging from 23 to 50

Conditions

a	S _{PF}	O	V	A: WHO BANANA EAT?	B: ECE BANANA EAT.
b	S	O _{PF}	V	A: ECE WHAT EAT?	B: ECE BANANA EAT.
c	S	O	V _{PF}	A: ECE BANANA DO WHAT?	B: ECE BANANA EAT .
d	S _{CF}	O	V	A: WHO BANANA EAT? ECE OR MERT?	B: ECE BANANA EAT.
e	S	O _{CF}	V	A: ECE WHAT EAT? BANANA OR APPLE?	B: ECE BANANA EAT.
f	S	O	V _{CF}	A: ECE BANANA DO WHAT? EAT OR CUT?	B: ECE BANANA EAT .
g	[S	O	V] _{BF}	A: WHAT HAPPEN?	B: ECE BANANA EAT .

Stimuli



ECE BANANA EAT



AYŞE PENCIL THROW



ASLI BOX OPEN






Procedure

- They sat at a table facing each other, a computer screen in front of them.
- Each character was introduced with their given name signs.



- The research assistant saw the questions, and the participants saw the video files.
- A complete answer based on the video files.
- A short trial session
- All sessions were recorded with three cameras: one for the participant, one for the assistant, and one for both.

Data Annotation & Coding - Manual

				
	<p>Preparation The articulators moving to the initial position of the stroke</p>	<p>The first frame in which the handshape and the location of the sign are fully formed</p>	<p>The last frame in which the handshape and the location of the sign are fully formed</p>	<p>Retraction The articulators move to the initial position of the next sign</p>

Kita, S., van Gijn, I., van der Hulst, H. (1998)

Data Annotation & Coding - Nonmanual

The screenshot displays the ELAN 6.3 interface. The top menu bar includes File, Edit, Annotation, Tier, Type, Search, View, Options, Window, and Help. The main window is divided into several sections:

- Video View:** Shows a woman speaking. The current time is 00:02:43.680. Selection range: 00:02:43.680 - 00:02:43.690. Playback controls and Selection/Loop Mode buttons are visible.
- Focus Annotation Table:**

Nr	Annotation	Begin Time	End Time	Duration
1	CF-V-2	00:02:41.730	00:02:46.465	00:00:04.735
2	BF-3	00:03:38.240	00:03:42.861	00:00:04.621
3	PF-OBJ-1	00:04:10.580	00:04:15.439	00:00:04.859
4	CF-VP-2	00:04:45.950	00:04:49.602	00:00:03.652
5	PF-OBJ-2	00:05:14.070	00:05:17.276	00:00:03.206
6	CF-VP-3	00:05:32.120	00:05:36.194	00:00:04.074
7	PF-V-3	00:06:16.650	00:06:21.083	00:00:04.433
8	CF-V-1	00:06:36.920	00:06:41.208	00:00:04.288
9	PF-SUBJ-2	00:06:50.160	00:06:54.382	00:00:04.222
10	BF-1	00:07:02.350	00:07:06.027	00:00:03.677
11	BF-2	00:07:33.580	00:07:37.140	00:00:03.560
12	CF-SUBJ-1	00:07:51.940	00:07:55.384	00:00:03.444
13	CF-OBJ-1	00:08:09.928	00:08:13.488	00:00:03.560
14	PF-SUBJ-1	00:08:25.380	00:08:28.806	00:00:03.426
15	CF-OBJ-2	00:08:51.418	00:08:54.727	00:00:03.309
- Timeline View:** Shows a detailed timeline from 2:41.000 to 00:02:49.000. The selected segment (00:02:42.000 to 00:02:46.000) contains the following annotations:
 - Turkce [29]:** Ayse kalem alıyor.
 - TID [98]:** DOKTOR | G | DOKTOR | AYSE | KALEM | ATMAK
 - Focus Annotation [28]:** CF-V-2
 - Checkpoint [28]:** (empty)
 - Head (Cervical spine) [22]:** Single | Single | Single
 - Head (Cervical spine): Rotational Movement: Y-Axis (Forwards/Backwards) ("Nod") [15]:** Both-oscillating | Both-os | Both-oscillatin
 - Head (Cervical spine): Rotational Movement: Y-Axis (Forwards/Backwards) ("Nod"): Degree [15]:** Mid | Min | Min
 - Head (Cervical spine): Rotational Movement: Z-Axis (Yaw) ("Shake") [1]:** (empty)
 - Head (Cervical spine): Rotational Movement: Z-Axis (Yaw) ("Shake"): Degree [1]:** (empty)

Kentner, Karabüklü, Wilbur (2022)

Analysis

- Linear mixed-effect models were fitted using R's "lme4" package. Generalized linear models of binomial family for the non-manual marker (discrete, binary) analysis, standard linear models for the duration (continuous) analysis.
- Focus, focus type, syntactic role, age of acquisition and session were treated as fixed effects; Item and Participant as random effects. (for both the duration and NMM analyses)
- Parameter estimates were chosen to optimize the log-likelihood and the models were compared using the likelihood ratio test. (for both the duration and NMM analyses)
- For those factors that significantly improved model fits, we made pairwise comparisons of estimated marginal means using the "emmeans" package in R. Satterthwaite's Method was used for degrees of freedom in t-tests (for the duration analysis).

R1: Broad focus condition vs. narrow focus condition

Main effect of focus type

($\chi^2(2) = 9.32, p < .01$),

and the two-way interactions of
focus and focus type

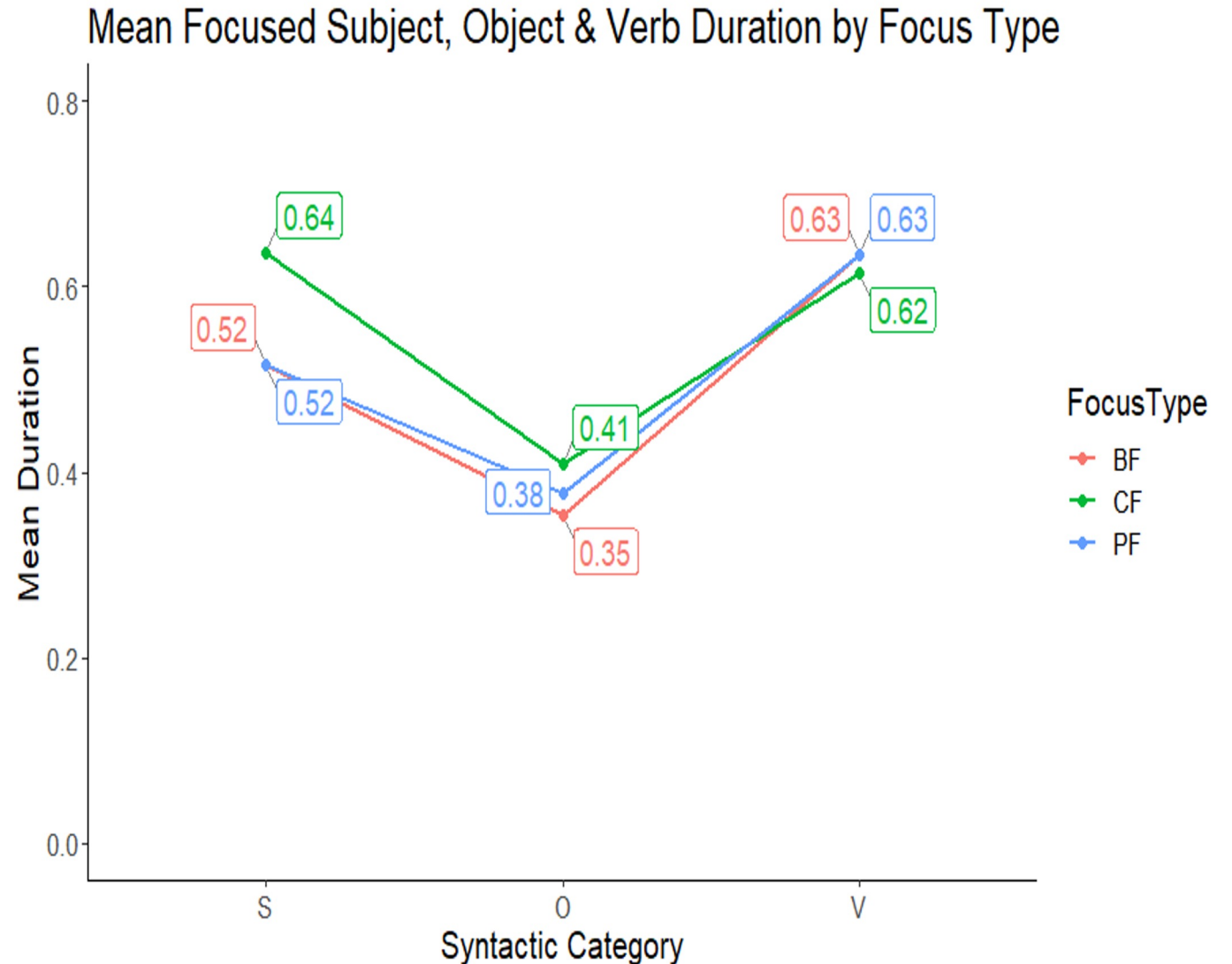
($\chi^2(2) = 8.932, p = .0115$)

syntactic category and focus type

($\chi^2(4) = 25.45, p < .001$)

have significantly improved the model fits.

Confirming that there are differences in duration between BF, CF and PF.

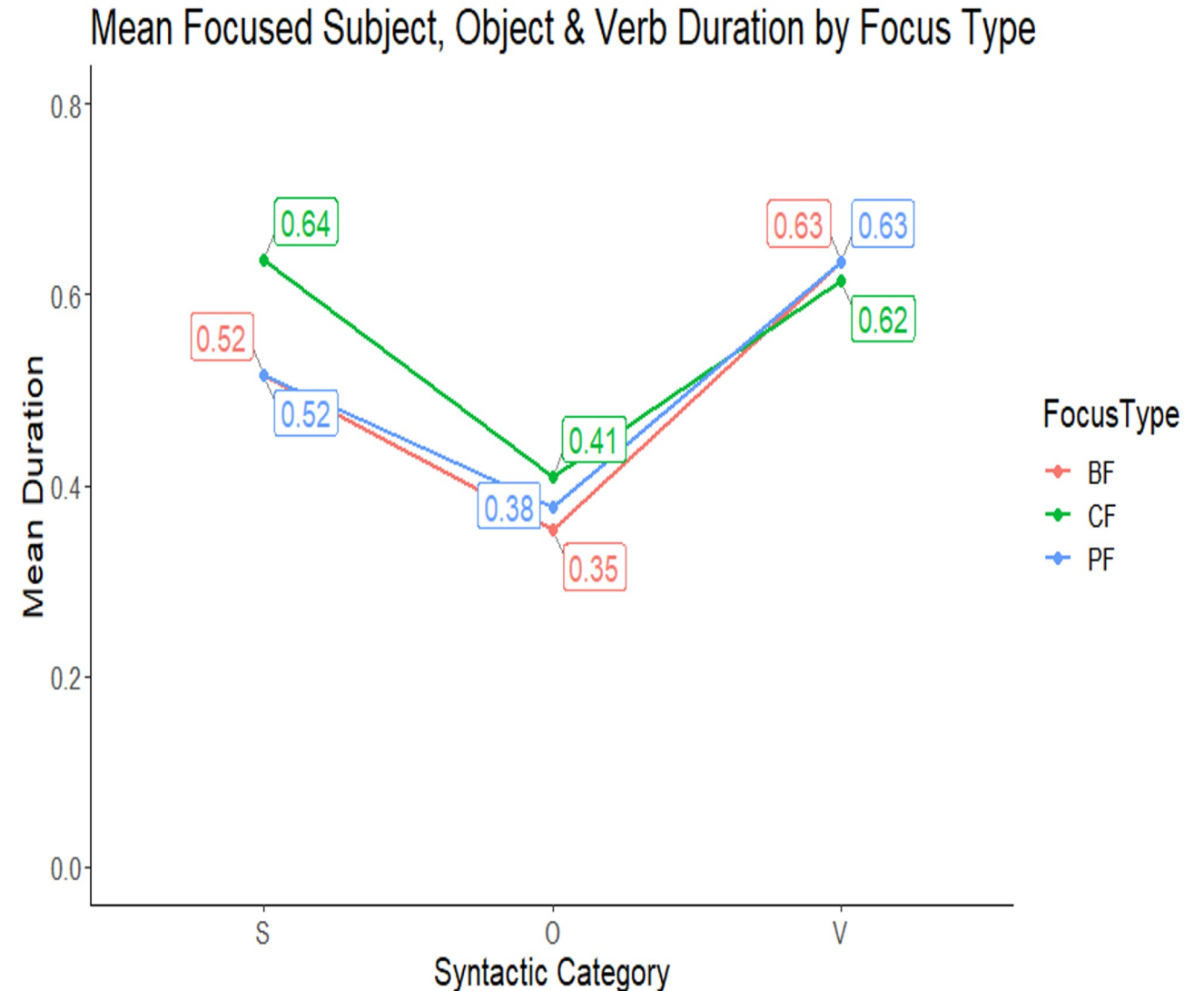


R2: Differences between focus types by syntactic roles

Pairwise comparisons revealed that

1) **CF Subjects** are longer than BF subjects ($p < 0.001$) and PF subjects ($p < 0.001$).

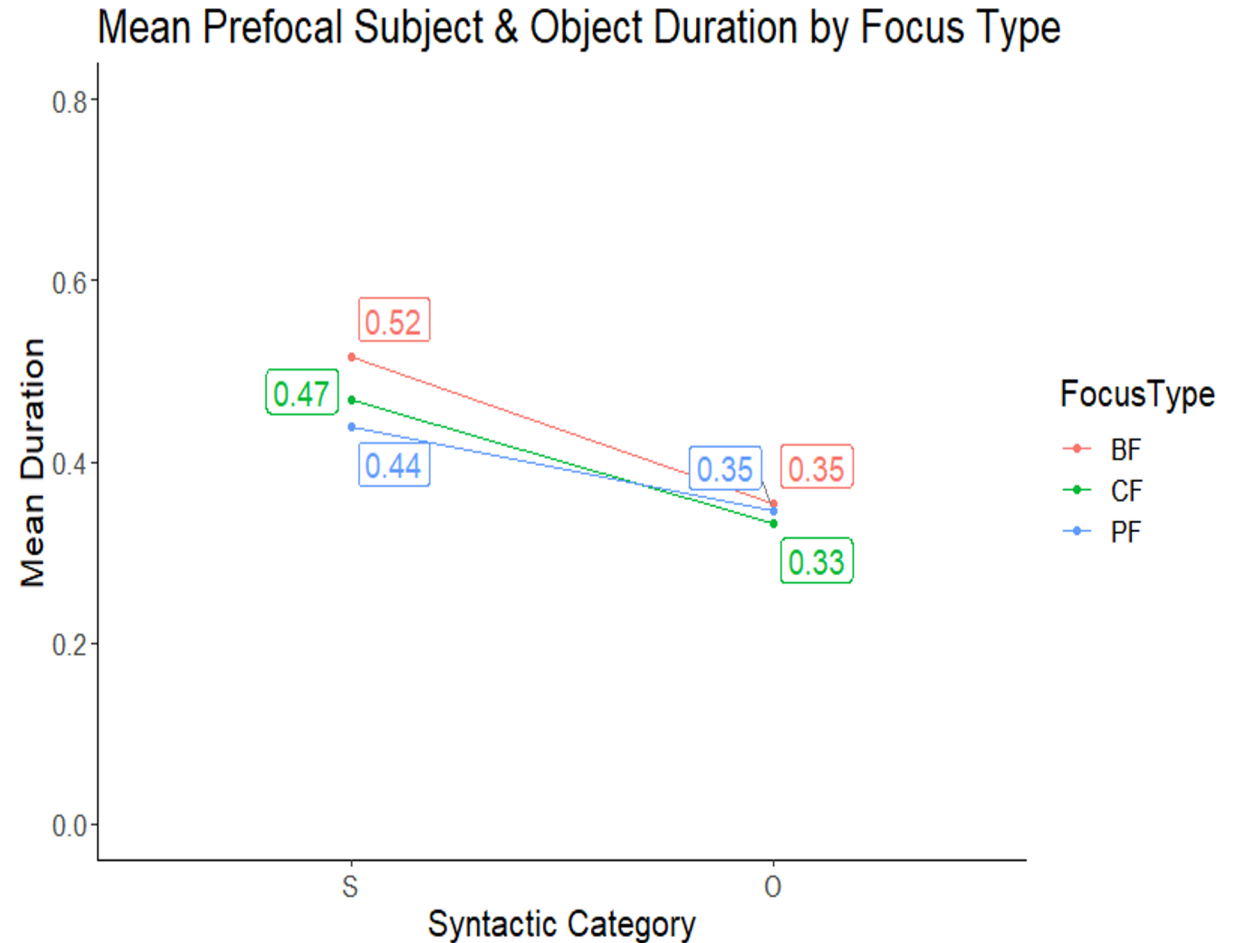
1) **CF Objects** are longer than BF objects ($p = 0.034$).



R3: Decrease in duration in the immediate pre-focal domains of PF



- **Prefocal subjects**, when the object is **PF**, are **significantly shorter** than BF subjects ($p = .0015$). We did not find a similar effect for prefocal CF subjects when the object is focused.
- We did not find a similar effect for prefocal CF or PF objects.

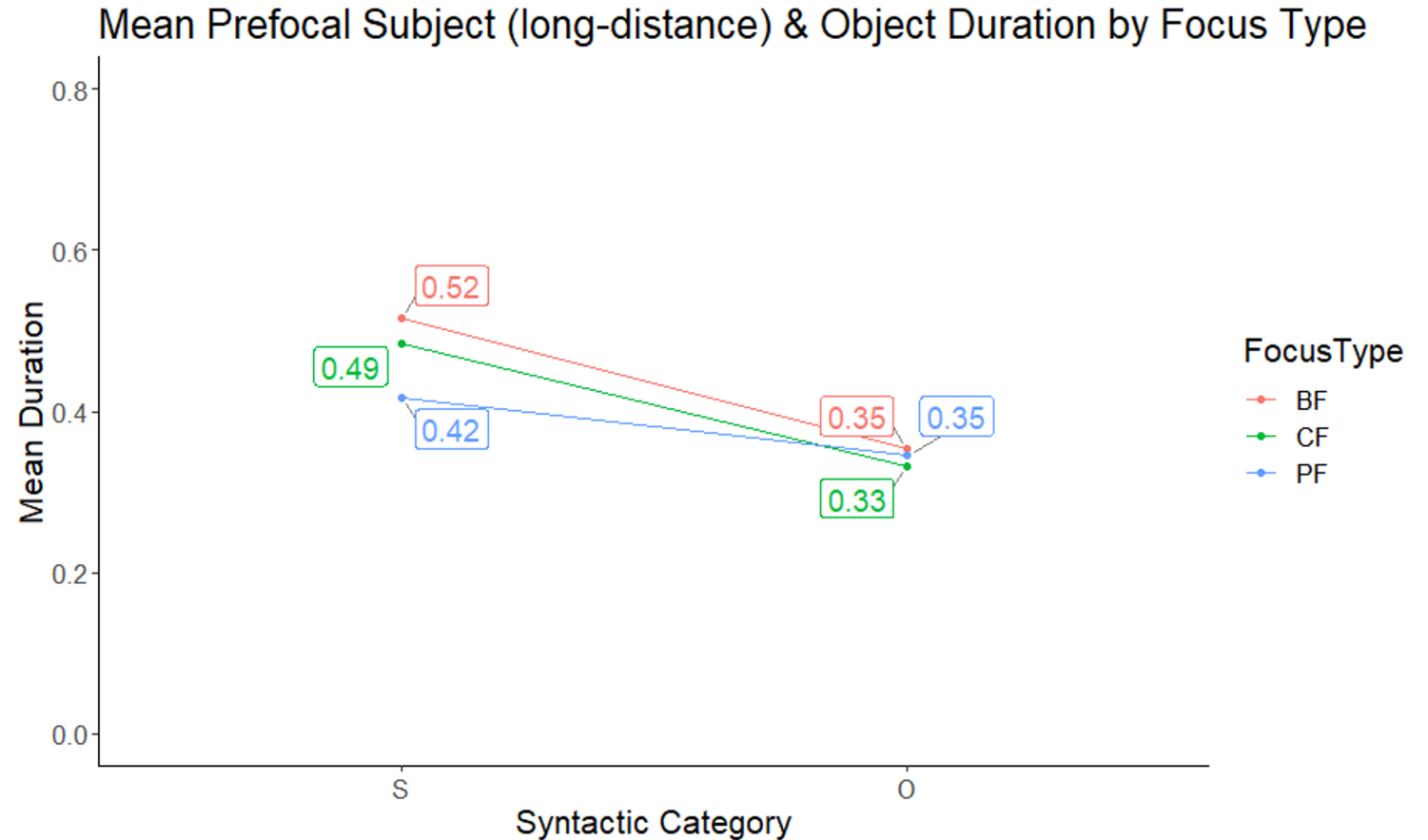


R3: Decrease in duration in the long-distance pre-focal domains of PF



S O V_{PF/CF} [SOV]_{BF}

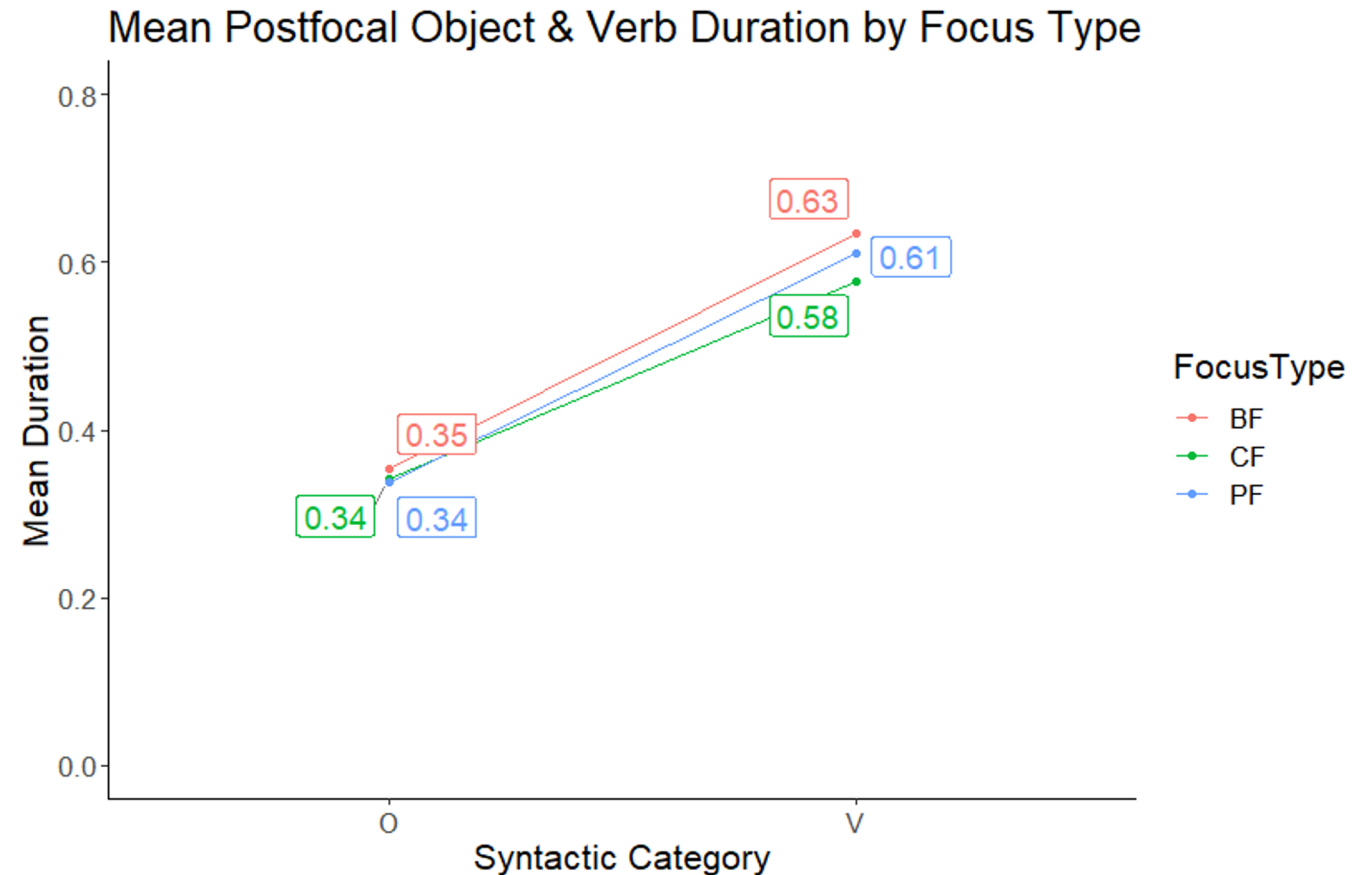
- **Prefocal subjects**, when the verb is **PF**, are **significantly shorter** than BF subjects ($p = .0013$). We did not find a similar effect for prefocal CF subjects when the verb is focused.



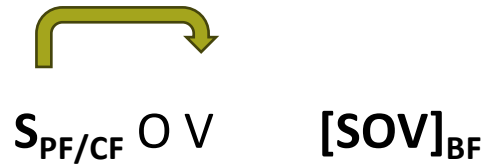
R4: No change in duration in the immediate post-focal domains



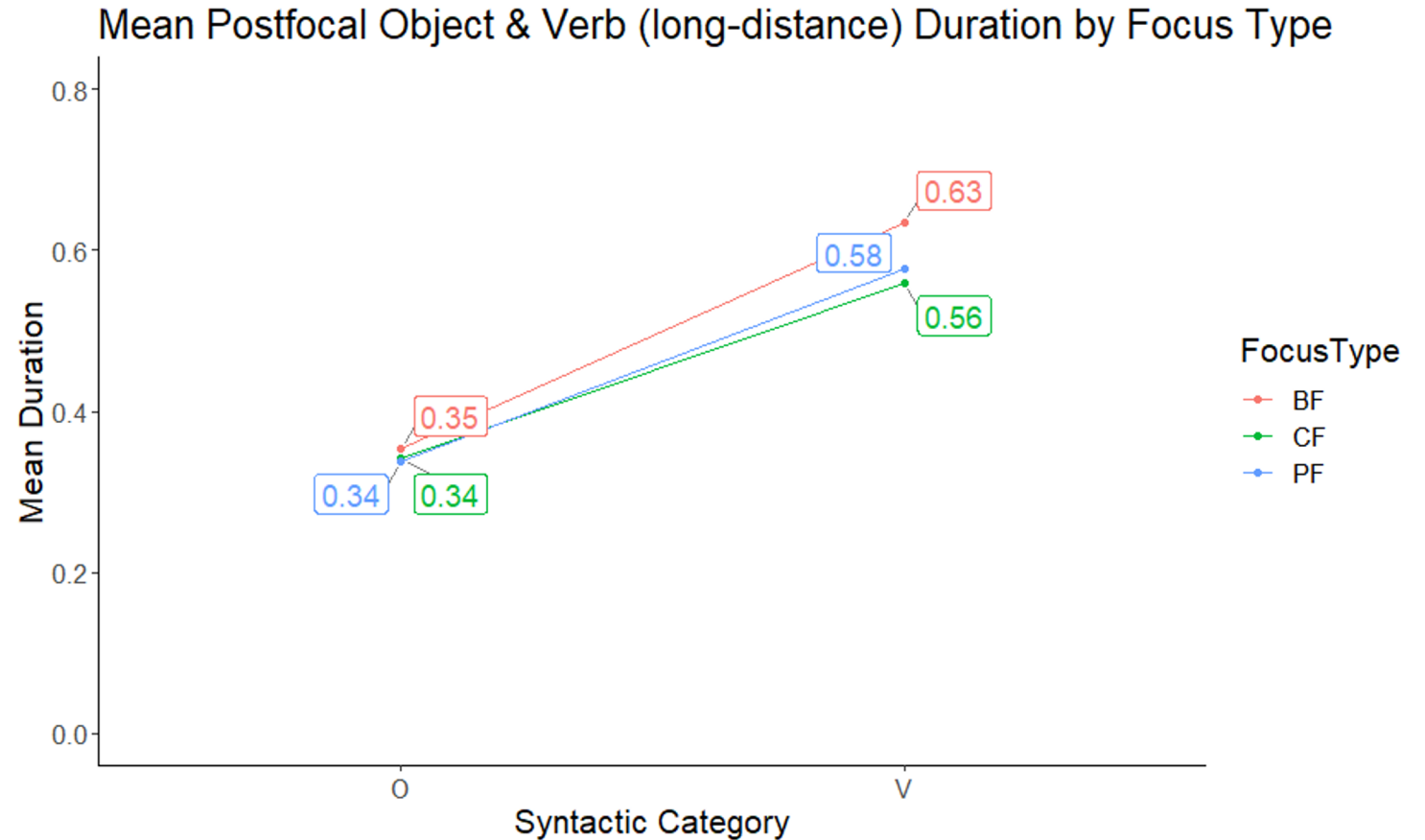
- We did not find a significant difference between Postfocal CF or PF objects, and BF objects when the subject is focused.
- We did not find a significant difference between Postfocal CF or PF verbs, and BF verbs when the object is focused.



R4: Decrease in duration in the long-distance post-focal domain of CF



- **Postfocal verbs**, when the subject is **CF**, are **significantly shorter** than BF verbs ($p = .006$).



R5: Non-manual markers do not necessarily accompany focus

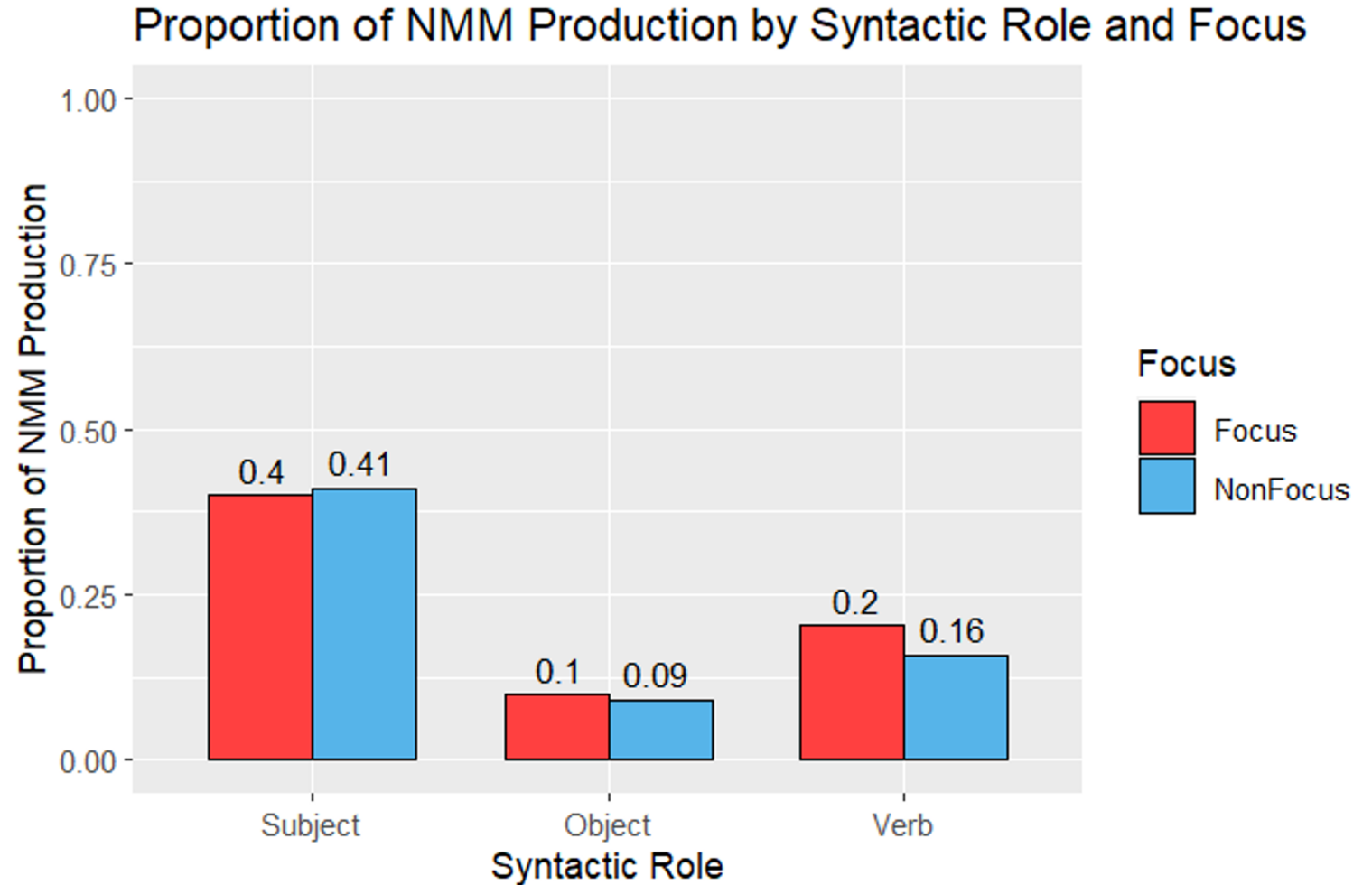
Neither a main effect of focus ($\chi^2(1)=0.818$, $p = .36$) nor any of its interactions have significantly improved the model fits.

22.5% of the manual signs accompanied by NMMs

23.3% of focused manual signs accompanied by NMMs

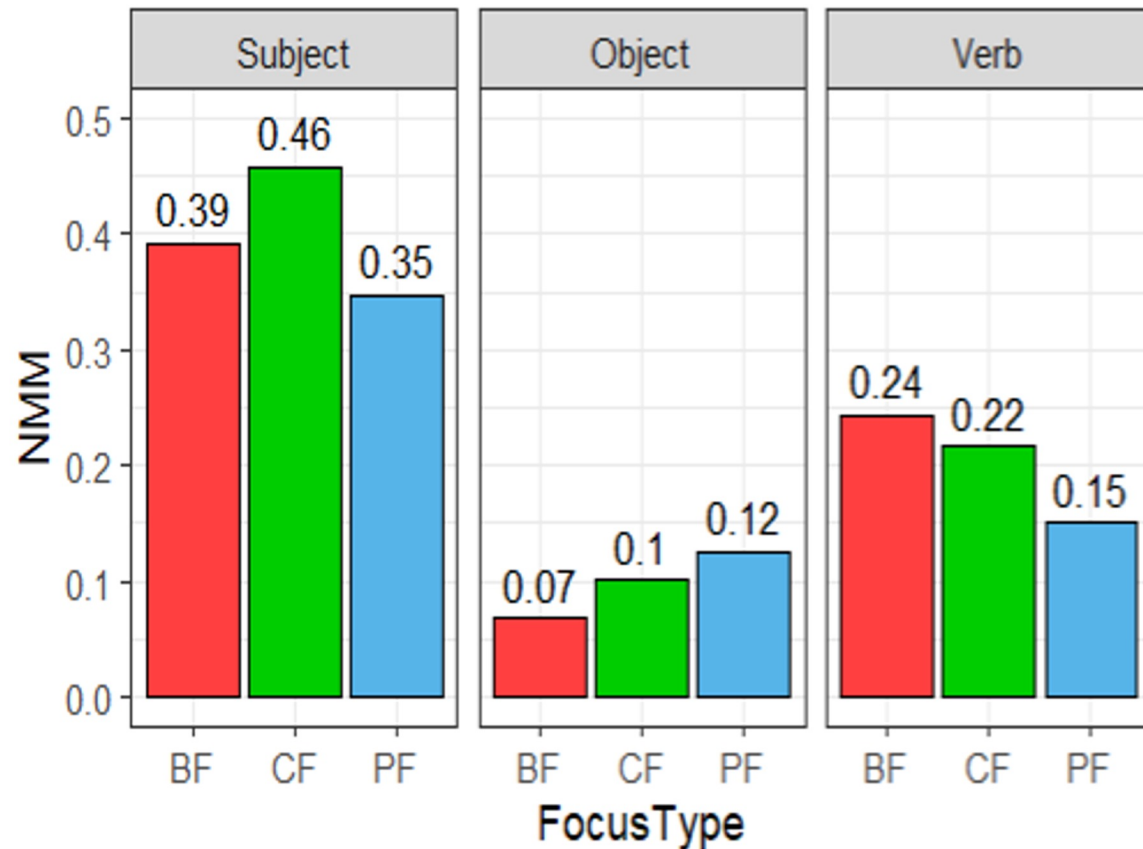
21.9% of non-focused manual signs accompanied by NMMs

However, the factors of syntactic role, focus type, and their interaction have significantly improved the model.

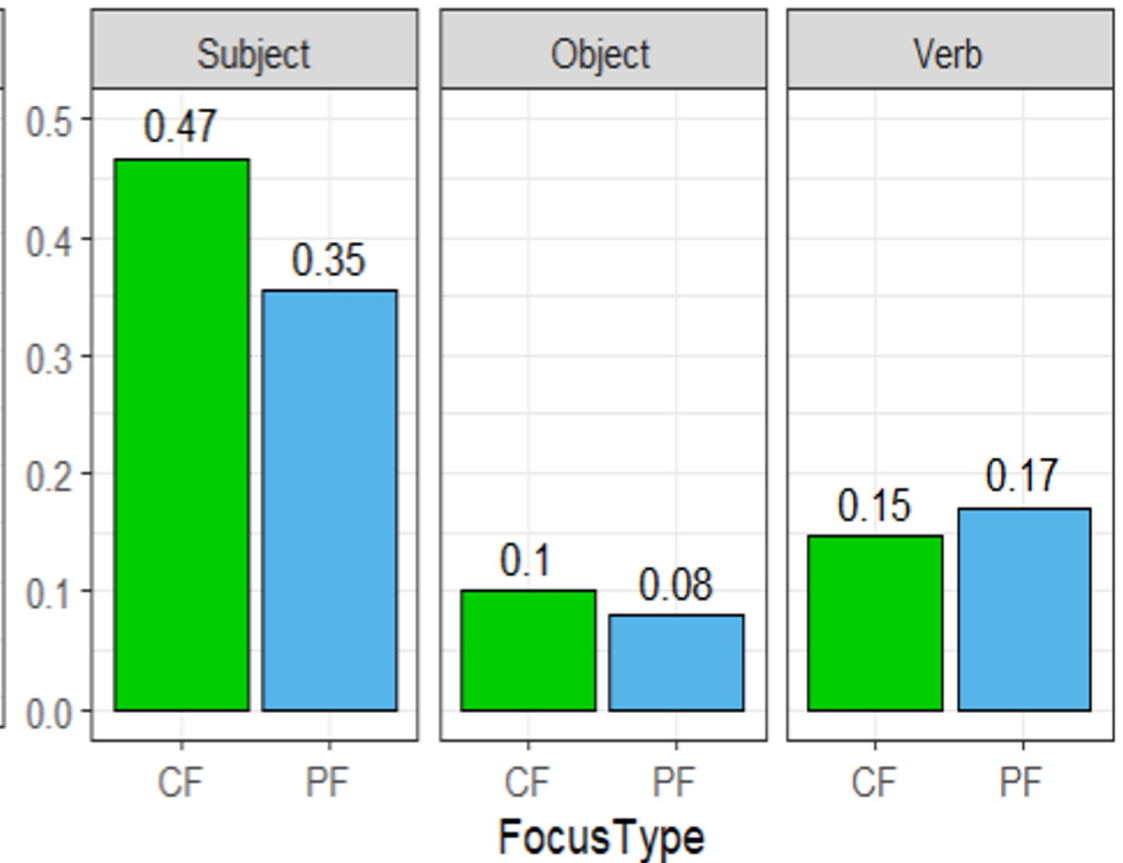


R5: Non-manual markers, Syntactic Role & Focus type

NMM Proportion in Focused Constituents



NMM Proportion in Non-Focused Constituents



R5: Non-manual markers, Syntactic Role & Focus type

- Main effect of syntactic role ($\chi^2(2) = 269.08$, $p < .001$), focus type ($\chi^2(2)=6.523$, $p = .0383$), and the two-way interaction of syntactic role and focus type ($\chi^2(4) = 9.5907$, $p = .048$) have significantly improved the model fits.

- Pairwise comparisons showed that:

there are significantly more occurrences of NMMs in subjects than verbs ($z=8.725$ $p<.0001$), and more occurrences of NMMs in verbs than objects ($z=5.549$, $p<.0001$)

for subjects only, there are significantly more occurrences of NMMs in CF conditions than PF conditions ($z=3.243$, $p=.0034$), across focus levels (focused and nonfocused).

R6: Faster signing rate but the same strategy

Longer signing duration with DoH

- Signing rate:
 - shorter durations in the 2nd session ($t=6.205$, $p<.0001$) - focus & non-focus distinction is robust
 - fewer nonmanuals in the 2nd session ($z=2.442$ $p=0.0146$)
- AoA:
 - DoH overall longer durations than DoD ($t=2.090$, $p=0.0496$)

BF vs. Narrow focus (CF/PF)

- Narrowly focused PF constituents do not differ from the BF condition; the unmarked focus type is in line with the baseline condition.

The Focus-Marking Implication:

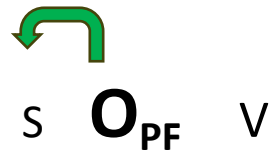
If a noncanonical grammatical strategy is used in order to mark information focus (on a grammatical category α), it is also used to mark contrastive focus on α , but not vice versa.

(Zimmermann 2011: 1994)

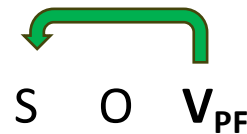
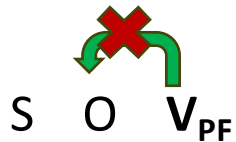
- Narrowly focused CF subjects and objects differ from their counterparts in the BF condition, but not the verb; verbs in sign languages undergo phrase final lengthening (Wilbur 1999) and hence no significant difference.

Focus type (PF) - Prefocal domain

- Narrowly focused PF objects yield compression in the prefocal subject domain.



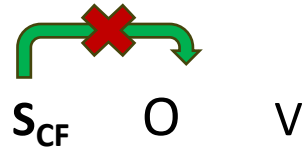
- Narrowly focused CF/PF verbs do not yield compression in the prefocal object domain, but PF verbs yield compression in the subject domain.



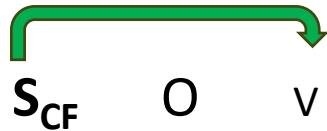
- The immediate and the long-distance «given» constituents do not differ regarding duration.

Focus Type (CF) - Postfocal domains

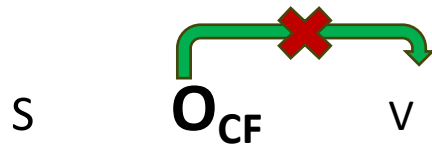
- Narrowly focused subjects do not yield compression in the postfocal object domain.



- Narrowly focused subjects yield compression in the postfocal verb domain.



- Narrowly focused CF objects do not yield compression in the postfocal verb domain.



- The object never undergoes compression in the prefocal or postfocal domains. Given that objects have the shortest duration in the sentence, T1D may preserve the scaling in duration, the reference line, by not applying compression in this domain.

Compression due to Givenness or Focus?

- The observed compression effects cannot be explained based on «givenness» only because, in some conditions, given constituents do not undergo compression when followed or preceded by a focal unit.



Conclusion

- Similar to spoken languages, T1D marks focus on the focused constituent and the prefocal and postfocal domains.
- Boosting effect: focus intonation is expressed as an increase in duration
- Lowering effect: given constituents preceding and following focused phrases are marked via a decrease in duration. However, there are categorial restrictions.

Remaining Questions

- **The nuclear/default «accent» in the BF condition:** Object because it never undergoes compression, it is the position that is the least likely to be accompanied by a non-manual marker and hence the default position;

Verb is the longest constituent, and if duration is the strategy to mark focus, then it is the verb & this is the only position in which CF does not differ from the BF condition.

- **Non-manual markers:** They are not necessarily focus markers; as fewer non-manual markers appear in the second session, can we take them as markers of boundaries? The signs will be grouped together when the signing rate increases and, hence, fewer non-manuals.

[ECE]_{PPh} [BANANA EAT]_{PPh} or [ECE]_{PPh} [BANANA]_{PPh} [EAT]_{PPh}

vs.

[ECE BANANA EAT]_{PPh}

Thanks

We thank all our participants!

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References

- Büring, D. (2009). Towards a typology of focus realization. In M. Zimmermann and C. Féry (Eds.), *Information Structure: Theoretical, Typological, and Experimental Perspectives*. 177–205. Oxford: Oxford University Press.
- Féry, C. & Samek-Lodovici, V. (2006) Focus Projection and Prosodic Prominence in Nested Foci. *Language* 82(1): 131–150.
- Féry, C. & F. Kügler (2008): Pitch accent scaling on given, new and focused constituents in German. *Journal of Phonetics* 36.4.
- Genzel, S., Ishihara, S. & Surányi, B. (2014). The prosodic expression of focus, contrast and givenness: A production study of Hungarian. *Lingua* 165. 183–204.
- Gürer, A. (2020). *Information structure within interfaces: Consequences for the phrase structure*. Berlin & New York: Mouton de Gruyter.
- Ipek, C. (2011). Phonetic realization of focus with on-focus pitch range expansion in Turkish. In Wai-Sum Lee & Eric Zee (eds.), *Proceedings of the 17th international congress of phonetic sciences*, 140–143. Hong Kong : City University of Hong Kong.
- Karabüklü, S. & Gürer, A. (under review). Prosody of focus in Turkish Sign Language.
- Kimmelman, V. (2014). *Information Structure in Russian Sign Language and Sign Language of the Netherlands*. Ph.D. dissertation, University of Amsterdam.
- Kita, S., van Gijn, I., van der Hulst, H. (1998). Movement phases in signs and co-speech gestures, and their transcription by human coders. <https://doi.org/10.1007/BFb0052986>
- Sandler, W. & Lillo-Martin, D. (2006). *Sign Language and Linguistic Universals*. Cambridge University Press.
- Wilbur, R. (1999) Stress in ASL: Empirical evidence and linguistic issues. *Language and Speech* 42, 229–250
- Zimmermann M (2011) The grammatical expression of focus in West Chadic: Variation and uniformity in and across languages. *Linguistics* 49(5), 1163-1213. <https://doi.org/10.1515/ling.2011.032>