

Non-conservative construals with proportional quantifiers: Theoretical and experimental considerations

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Percentage quantifiers (%Qs)

Ahn and Sauerland (2015a,b, 2017); Pasternak and Sauerland (2022)

► Conservative and non-conservative construals

- (1) a. MIT hired 30% of the women last year. C
b. MIT hired 30% women_F last year. NC
 ~ 30% of the people that MIT hired were women.

Intuition (crude/informal):

- C $D(A)(B) \sim 30\%(\text{the women})(\text{MIT hired})$
NC $D(B)(A) \sim 30\%(\text{MIT hired})(\text{women})$

- ## ► Subject-object asymmetry in some languages: e.g. English vs. German

- (2) a. *30% women work here.
b. 30% Frauen_F arbeiten hier.
 30%.NOM women.NOM work here
 '30% of the people that work here are women.'

Percentages: Cross-linguistic generalizations

Ahn and Sauerland (2015b, 2017)

Table: Marking of non-conservative (vs. conservative) construals

Languages	Morphophonological marking	Subject
English	focus, case (<i>of</i>), definiteness	no
German, Georgian, Greek	focus, case, (definiteness)	yes
French, Italian	focus, definiteness	(yes)
Korean	focus, case, definiteness, overt movement	yes
Mandarin	focus	no

The analyses the authors spell out (for Korean and German):

- ▶ aim at capturing the morphophonological properties (focus, definiteness, case)
e.g. The non-conservative construal involves focus sensitivity.
- ▶ No account of the subject-object asymmetry (and also no detailed discussion)

Focus sensitivity: e.g. German

Pasternak and Sauerland (2022)

- (3) a. 30% [westfälische Studierende]_F arbeiten hier.
30%.NOM Westphalian.NOM students.NOM work here
'30% of the workers here are Westphalian students.'
- b. 30% [westfälische]_F Studierende arbeiten hier.
30%.NOM Westphalian.NOM students.NOM work here
'30% of the student workers here are Westphalian.'

- ▶ We agree with these judgments concerning the truth-conditional difference, and our account will not address this directly. For now, we leave modified cases aside and focus on the general predictions.
- ▶ We will test this empirical point in our experiment on Czech.

Wągiel and Gehrke (2023); Gehrke and Wągiel (2022, 2023) (G&W)

- ▶ How do **languages without definiteness marking** distinguish NC and C readings, in the absence of any morphological cues?

→ most Slavic languages, e.g. Polish:

(4) pięćdziesiąt procent **kobiet**
fifty percent women.GEN

- ▶ Intuition for Polish (and also German): Primary role of **word order**
NC %Qs have to appear low

⇒ Corroborated via questionnaires for

- ▶ Languages with articles/definiteness marking: German, Bulgarian, Macedonian
- ▶ Languages without articles: BCMS, Czech, Polish, Russian, Slovak, Slovenian

⇒ Corroborated by corpus data from Polish, Czech, German

- ▶ Hypothesis: **Subject-object asymmetry** arises in languages with rigid word order [alternatively: those that disallow postverbal subjects].

The neutral cases: German (G&W)

- ▶ Neutral word order + default stress (nuclear stress rule)

C: SVPP, SOV / with V2: SVO

NC: PPVS, SOV / with V2: SVO

- (5) a. 50% der Frauen arbeiten bei KALOMA.
50%.NOM the.GEN women.GEN work at Kaloma
'50% of the women work at Kaloma.'
- b. Bei Kaloma arbeiten 50% FRAUEN.
at Kaloma work 30%.NOM women.NOM
'50% of the employees at Kaloma are women.'
- (6) a. Ketara beschäftigt 50% der FRAUEN.
Ketara.NOM employs 50%.ACC the.GEN women.GEN
'Ketara employs 50% of the women.'
- b. Ketara beschäftigt 50% FRAUEN.
Ketara.NOM employs 50%.ACC women.ACC
'Ketara employs 50% women.'

(similar results for Bulgarian)

Neutral cases: Czech (G&W)

► Intransitive: **SVPP** vs. **PPVS**

- (7) a. 50% žen pracuje ve společnosti SPEDEX.
50%.NOM women.GEN works in company.LOC Spedex
'50% of the women work at the company Spedex.' C
- b. Ve společnosti Spedex pracuje 50% ŽEN.
in company.LOC Spedex works 50%.NOM women.GEN
'50% of the employees at the company Spedex are women.' NC

► Transitive: **OVS** vs. **SVO**

- (8) a. 50% žen zaměstnává společnost SPEDEX.
50%.ACC women.GEN employs company.NOM Spedex
'The company Spedex employs 50% of the women.' C
- b. Společnost Spedex zaměstnává 50% ŽEN.
company.NOM Spedex employs 50%.ACC women.GEN
'The company Spedex employs 50% women.' NC

(similar results for the other Slavic languages, except for Bulgarian)

Corpus studies Polish and Czech (G&W)

- ▶ **National Corpus of Polish** (Przepiórkowski et al., 2012)
 - ▶ Searched string: *procent kobiet* ('percent women.GEN')
 - ▶ Other searches returned too much noise
 - ▶ 101 hits
 - ▶ 6 clear cases of the NC construal
 - ▶ %QP always in postverbal position
 - ▶ 0 instances of the preverbal pattern
- ▶ **Czech National Corpus** (Křen et al., 2012)
 - ▶ Searched string: *procent žen* ('percent women.GEN')
 - ▶ Other searches returned too much noise
 - ▶ 110 hits
 - ▶ 16 clear cases of the non-conservative construal
 - ▶ 15 with %QP in postverbal position
 - ▶ Only 1 instance of the preverbal pattern (see appendix)

⇒ Word order plays a role.

Corpus study German (Gehrke and Wągiel, 2022)

KorAP (<https://korap.ids-mannheim.de/>)

- ▶ Searched string: *Prozent Frauen* 'percent women'
- ▶ 207 hits (quite a few double; quite a few irrelevant)

⇒ No sentence-initial/higher %Q

- ▶ Intransitives:
 - ▶ 10 lower subjects: all with sentence-initial PPs
 - ▶ Restriction on verbs: existentials (more than half), 'live', 'teach', 'work'
- ▶ Transitives:
 - ▶ 2 subjects, none sentence-initial (NOM-DAT)
 - ▶ 7 objects (all low)
 - ▶ Restriction on verbs: HAVE ('belong to', 'have', 'buy', 'invite', 'place')
- ▶ 3 headlines, all with PPs (e.g. *8,3 Prozent Frauen im Aufsichtsrat* '8.3% women in the Supervisory Board')
- ▶ 14 other (PPs, adjuncts etc.) (e.g. *Forderung nach 30 Prozent Frauen in Führungspositionen* 'demand for 30% women in leadership positions')

This paper

- ▶ Is the effect of word order real?
- ▶ If yes, what does it result from?

⇒ Experiments on Czech

This paper: Different hypotheses to be tested

NC readings mediated by

- 1 **Focus** – word order as a possible exponent of focus
~ Sauerland & Co.
- 2 **Definiteness** – common assumption about Slavic: definites tend to be clause-initial, indefinites tend to be clause-final
Empirical issue: no strict correlation between definiteness (in languages with articles) and the meaning conveyed by word order (e.g. Šimík and Demian, 2020; Seres and Borik, 2021)
(we will not pursue this further)
- 3 None of these, because it is a **pure word order effect** (Gehrke and Wągiel, 2023): Direct relation between word order and semantics
NC readings involve semantic incorporation (trans.) or an existential-like construction (intrans.); the %Q operates on the VP and therefore has to stay within the VP.

⇒ **Experiments on Czech**

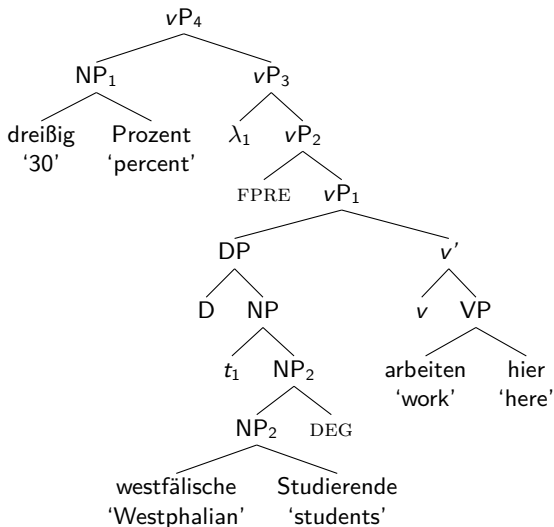
- ▶ To test whether the effect of word order is real
- ▶ To test predictions of hypotheses 1 and 3

Two competing accounts

Pasternak and Sauerland (2022)

Gehrke and Wągiel (2023)

Complete non-conservative syntax (P&S)



Non-conservative semantic analysis (P&S): Informally

- ▶ NP₁ (30%) is a degree quantifier [also under C reading]
NP₁ QRs, leaving a degree-denoting trace
- ▶ Focus generates a set of alternatives (cf. Rooth, 1985, 1992)
- ▶ The %Q operates on the presupposition of this set [FPRE]

(9) 30% [westfälische Studierende]_F arbeiten hier.
30% Westphalian students work here
~ 30% of the individuals working here are Westphalian
students working here.

(10) 30% [westfälische]_F Studierende arbeiten hier.
30% Westphalian students work here
~ 30% of the students working here are Westphalian
students working here.

Non-conservative semantic analysis (P&S)

(See appendix for the formal details.)

FPRE: Focus-derived presupposition

- ▶ The grand disjunction of the set of alternatives
~ the weakest statement that is true for all of them

$$(11) \quad \llbracket \text{D } t_1 \text{ [westfälische Studierende]}_F \text{ DEG arbeiten hier} \rrbracket_f^{g,c} \approx \left. \begin{array}{l} \text{at least } g(1)\text{-many Westphalian students work here,} \\ \text{at least } g(1)\text{-many Macedonians work here,} \\ \text{at least } g(1)\text{-many individuals work here,} \\ \vdots \end{array} \right\}$$

Non-conservative semantic analysis (P&S)

- ▶ The arguments of *30%* after QR:

(12) (30%) [westfälische Studierende]_F arbeiten hier.
(‘30% of the people that work here are Westphalian students.’)

$\llbracket \lambda_1 \text{FPRE } D \ t_1 \text{ [westfälische Studierende]}_F \text{ DEG arbeiten hier} \rrbracket^c =$
 $= \lambda d : \text{at least } d\text{-many individuals work here .}$
at least d -many Westphalian students work here

(13) (30%) [westfälische]_F Studierende arbeiten hier.
(‘30% of the students that work here are Westphalian.’)

$\llbracket \lambda_1 \text{FPRE } D \ t_1 \text{ [westfälische]}_F \text{ Studierende DEG arbeiten hier} \rrbracket^c =$
 $= \lambda d : \text{at least } d\text{-many students work here .}$
at least d -many Westphalian students work here

Our doubts about P&S's analysis

- ▶ Crucial assumption: Focus within NP₂
- ▶ What happens in cases with 'neutral' stress / word order?
Does it make sense to talk about focus sensitivity here?
- ▶ If NC %Qs are focus-sensitive, shouldn't focus then be somewhere in the NP (e.g. 'Westphalian' or 'students')?
What happens if it is elsewhere?

What about the neutral cases?

- ▶ Let's assume broad focus, e.g. German:

(14) A: Tell me something newsworthy!

B: [Bei Pirapo arbeiten 50% FRAUEN]_F.
at Pirapo work 50%.NOM women.NOM

- ▶ Essential parts of a P&S analysis of (14):

(15) $\llbracket [\text{bei Pirapo arbeiten } D \ t_1 \ \text{Frauen } \text{DEG}]_F \rrbracket_f^{g,c} \approx$
 $\approx \left\{ \begin{array}{l} \lambda w. \text{ at least } g(1)\text{-many women work at Pirapo in } w, \\ \lambda w. \text{ at least } g(1)\text{-many forests burn in Slovakia in } w, \\ \lambda w. \text{ at least } g(1)\text{-many cats walk on Jasna's bed in } w, \\ \vdots \end{array} \right\}$

(16) $\lambda w. \text{ at least } g(1)\text{-many individuals are involved in some eventuality in } w$

What about the neutral cases?

- (17) $\llbracket \lambda_1 \text{ FPRE } [\text{bei Pirapo arbeiten D } t_1 \text{ Frauen DEG}]_F \rrbracket^c \approx$
 $\approx \lambda d : \text{ at least } d\text{-many individuals are involved in some eventuality}$
in @.
at least d -many women work at Pirapo in @

⇒ Wrong prediction:

In a world with 1000 individuals involved in some eventuality, 100 of which workers at Pirapo and 50 of these women, the sentence should intuitively be true but it comes out as false.

Focus elsewhere

- ▶ Examples by informants to improve on preverbal NC %Qs:

(18) Je zajímavé, že **padesát procent žen** zaměstnává
is interesting that fifty.ACC percent women.GEN employs
[společnost EXPOL]_{CF}, a **nikoliv Bustrans**.
company.NOM Expol and not Bustrans
'It is interesting that it is the company Expol that employs 50%
women, and not Bustrans.'
CZECH

(19) **50% Frauen** beschäftigt **nur** [die Firma
50%.ACC women.ACC employs only the.NOM company.NOM
PIRAPO]_F.
Pirapo.NOM
'It is only the company Pirapo that employs 50% women.'

GERMAN

(further examples in the appendix)

Starting point in Gehrke and Wągiel (2023)

Properties of the non-conservative reading

- ▶ Bare plural nominals
- ▶ Proportional quantifiers need to appear low
- ▶ Restricted set of verbal predicates
- ▶ Interpretation of possession or existence at a location

Intransitives

- ▶ Sentence-initial locative expression
- ▶ Verbal predicate \sim existential predicate

Transitives

- ▶ Proportional quantifier phrase \Rightarrow low object
- ▶ Verbal predicate \sim HAVE-predicate

(Sæbø, 2009; Le Bruyn et al., 2016)

Analysis in Gehrke and Wągiel (2023)

Motivation

- ▶ Empirical parallels

Transitives \sim incorporation structures

- ▶ Bare nominals
- ▶ Objects
- ▶ HAVE-predicates

Intransitives \sim existential constructions

- ▶ Definiteness effect
- ▶ Obligatory locative
- ▶ Word order

Transitives (G&W)

Transitive non-conservative construals

- ▶ Semantic incorporation
- ▶ Bare plural noun in object position \Rightarrow verbal predicate
- ▶ The resulting predicate \Rightarrow shifted to a scalar expression
- ▶ The proportional quantifier operates on that expression

(20) Die Firma beschäftigt fünfzig Prozent Frauen.
the.NOM company.NOM employs 50%.ACC women.ACC
'The company employs 50% women.'
~ 'The company women-employs to the extent of 50%.'

(See appendix for the formal details.)

Intransitives (G&W)

Intransitive non-conservative construals

- ▶ Underlyingly existential-like construction
- ▶ Support: intra-linguistic and cross-linguistic parallels

(21) In dieser Firma arbeiten fünfzig Prozent Frauen.
in this company work.3PL 50%.NOM women.NOM
'50% of the workers at this company are women.' GERMAN

(22) There are fifty percent women working at this company.

(23) Im Garten sind Blumen.
in-the garden are.3PL flowers
'There are flowers in the garden.' GERMAN

(24) Ve městě je lékař.
in town.LOC is doctor.NOM
'There is a doctor in town.' CZECH

Intransitives (G&W)

(Again, for the formal details see appendix.)

- (25) $\llbracket \text{fifty percent } \mu_R \text{ women-work} \rrbracket (\llbracket \text{at the company} \rrbracket) =$
 $\exists y_e [\pi_{\text{work}}(y)(atc) \wedge \text{WOMEN}(y) \wedge \#(y) = 50\%(\mathcal{S}_{\text{women-work}})]$
 \sim 'The extent to which there is a working relationship between women and the individuals working at this company is 50% of the maximal degree on the relevant cardinality scale.'

Predictions of the two accounts

▶ Focus account

- ▶ NC readings should not be possible with broad focus.
- ▶ Narrow focus leads to different truth conditions.
- ▶ A priori, word order should not play a role but could be derivative from focus.

▶ Word order account

- ▶ NC reading only with low %Qs and with bare nominals
- ▶ NC reading are restricted to particular predicates (existential-like, HAVE).
- ▶ Focus should not play the primary role.

Experiments on Czech

Experiments and research questions

- ▶ **Exp1** Word order and conservativity
 - Q Is there a relation between quantifier position (word order) and conservativity (keeping IS constant)?
 - H Clause-initial quantifiers should rule out NC readings (Gehrke and Wągiel, 2023)
- ▶ **Exp2** SubNP focus placement and the domain of NC quantification
 - Q Does focus on a subpart of NP (subNP) affect the domain of NC quantification?
 - H Yes (Pasternak and Sauerland, 2022)
- ▶ **Exp3** Broad focus and non-conservativity
 - Q Are NC readings available in broad focus settings?
 - H Probably not (Pasternak and Sauerland, 2022)
 - H Yes (Gehrke and Wągiel, 2023)

Overall design and participants

- ▶ sentence–picture matching paradigm
- ▶ binary dependent variable (Match? ANO 'yes' vs. NE 'no')
- ▶ audio stimuli (short dialogues); answer = target sentence
- ▶ quantifiers used: 50% and *polovina* 'half'
- ▶ 2×2 design in all 3 experiments
- ▶ 16 items per experiment (participant saw 4 stimuli per condition)
- ▶ Latin square distribution of items/conditions
- ▶ the experiments constituted mutual fillers
- ▶ 20 additional fillers
 - other quantifiers than 50% / *polovina*
 - stimuli true/false on any reading (for filtering participants)
- ▶ $16 + 16 + 16 + 20 = 68$ stimuli in total
- ▶ pseudo-randomized and administered using L-Rex (Starschenko and Wierzba, 2022)
- ▶ participants non-linguists; recruited via friends/family and Twitter
- ▶ 77 participants completed the survey; 8 removed for not meeting criteria on fillers (at least 6 out of 8 selected fillers rated in line with expectation); data from 69 participants entered the analysis

Exp1: Word order and conservativity

Manipulated (independent) variables

- ▶ QUANTIFIER POSITION *final vs. initial*
- ▶ CONSERVATIVITY *conservative vs. non-conservative*

Example of linguistic/audio materials (in both conditions)

(26) W: Jaká zvířata sedí na stromech?
which animals sit on trees
'What kind of animals sit on the trees?'

M: (i) *clause-final quantifier*
Na palmě sedí 50% opic.
on palm-tree sit 50% monkeys

(ii) *clause-initial quantifier*
50% opic sedí na palmě.
50% monkeys sit on palm-tree

either '50% of the monkeys sit on the palm tree.'

or 'There are 50% monkeys sitting on the palm tree.'

C

NC

(Context identical for all conditions = information structure constant.)

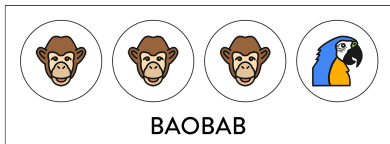
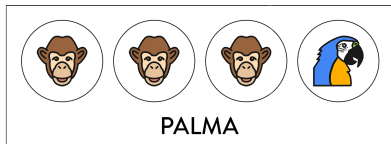
Exp1: Word order and conservativity

Manipulated (independent) variables

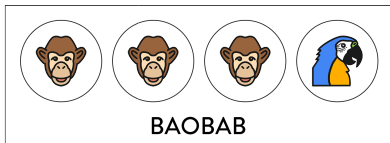
- ▶ QUANTIFIER POSITION *final* vs. *initial*
- ▶ CONSERVATIVITY *conservative* vs. *non-conservative*

Example of pictorial materials (in both conditions)

conservative true (non-conservative false)

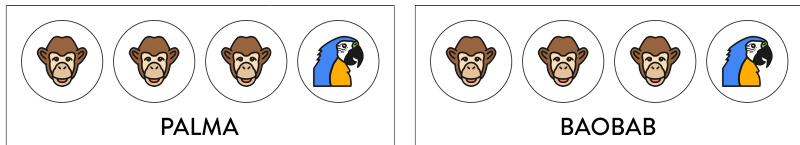


non-conservative true (conservative false)



Exp1: Example of procedure

Picture stimulus – *conservative* scenario:



Audio stimulus (possible to play multiple times) – *final* position:

(27) W: Jaká zvířata sedí na stromech?

which animals sit on trees

M: Na palmě sedí 50% opic.

on palm-tree sit 50% monkeys

Does the answer correspond to the picture?

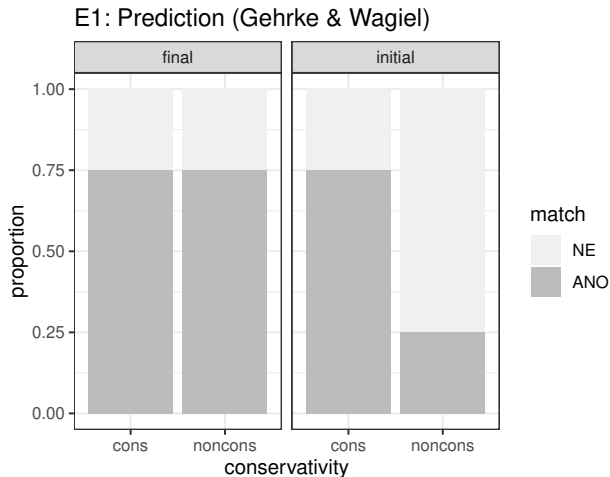
ANO

→ conservative available

NE

→ conservative unavailable

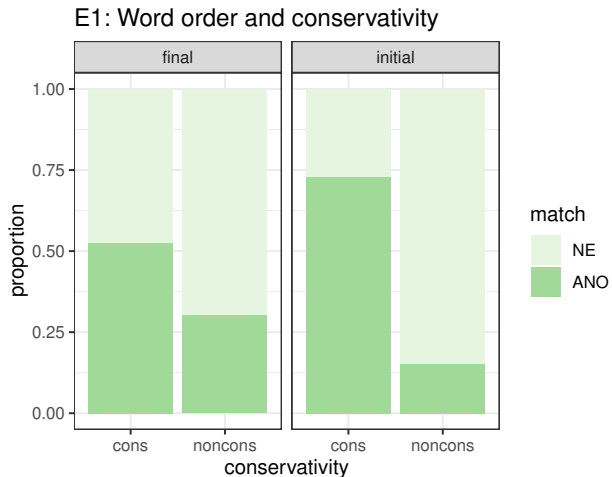
Exp1: Prediction of Gehrke and Wągiel (2023)



Predicting an effect of the interaction between position and conservativity on the dependent variable (match).

NB: Prediction concerns the contrasts, not the absolute values (set to .75 and .25).

Exp1: Results



Exp1: Results and interim discussion

GLMM fit by maximum likelihood (Laplace Approximation); random intercepts for participants and items (more complex models not converging); variables sum-coded

Random effects:

Groups	Name	Variance	Std.Dev.
participant	(Intercept)	0.1142	0.3379
item	(Intercept)	0.3484	0.5903

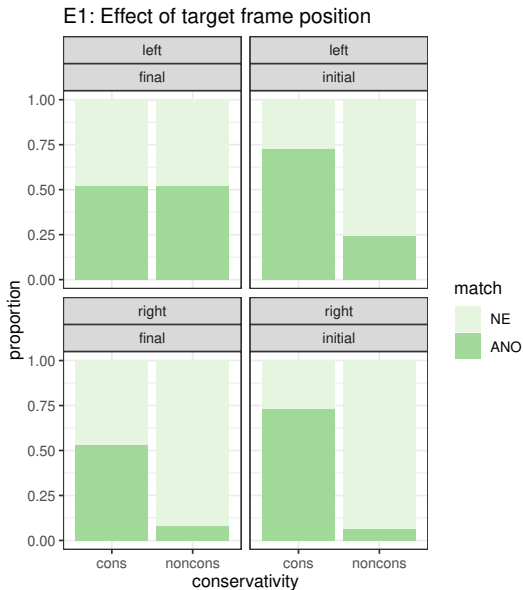
Number of obs: 1104, groups: participant, 69; item, 16

Fixed effects:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.4037	0.1698	-2.378	0.0174 *
conserv1	1.0230	0.0776	13.180	<0.0001 ***
position1	-0.0079	0.0728	-0.108	0.9137
conserv1:position1	-0.4727	0.0734	-6.441	<0.0001 ***

- ▶ The **interaction** is predicted by Gehrke and Wągiel (2023): the non-conservative reading (as compared to the conservative one) is not reliably available for initial quantifiers, but the difference diminishes in the final position.
- ▶ The nested simple effect of position within NC is significant ($z = 4.194, p < .0001$), so is the effect of position within C ($z = -5.043, p < .0001$).
- ▶ What is **unexpected** is the comparatively low availability of the non-conservative reading in the final condition. (NB: The conservative reading is also not available as much as one might expect.)

Exp1: Results – divided by target frame position



Exp2: Sub-NP focus

Manipulated (independent) variables

- ▶ STRESS (FOCUS) *final (NP or subNP focus)* vs. *shifted (subNP focus)*
- ▶ SIZE OF NON-C DOMAIN *NP* vs. *subNP*

Example of linguistic/audio materials (in both conditions)

(28) *final stress (NP or subNP focus)*

- W: (i) *triggering NP focus (≈ NP domain)*
Rozcvičuje se na stadiónu hodně **atletů**?
warm.up REFL on stadium a.lot track&field.athletes
'Are there a lot of track&field athletes warming up at the stadium?'
- (ii) *triggering subNP focus (≈ subNP domain)*
Rozcvičuje se na stadiónu hodně **českých baseballistů**?
warm.up REFL on stadium a.lot Czech baseball.players
'Are there a lot of Czech baseball players warming up at the stadium?'
- M: Na stadiónu se rozcvičuje 50% **českých BĚŽCŮ**.
on stadium REFL warm.up 50% Czech runners
'There are 50% Czech runners warming up at the stadium.'

varied modifier type: APs vs. PPs, e.g. 50% **žen S ČEPICÍ** '50% women with a hat'

Exp2: Sub-NP focus

Manipulated (independent) variables

- ▶ STRESS (FOCUS) *final (NP or subNP focus)* vs. *shifted (subNP focus)*
- ▶ **SIZE OF NON-C DOMAIN *NP* vs. *subNP***

Example of pictorial materials (in both conditions)

NP domain non-conservative true (subNP false)



subNP domain non-conservative true (NP false)



(NB: Conservative reading was always false.)

Exp2: Sub-NP focus

Manipulated (independent) variables

- ▶ STRESS (FOCUS) *final (NP or subNP focus)* vs. *shifted (subNP focus)*
- ▶ SIZE OF NON-C DOMAIN *NP* vs. *subNP*

Example of linguistic/audio materials (in both conditions)

(29) *shifted stress (subNP focus only)*

W: *triggering subNP focus (≈ subNP domain)*

Rozcvičuje se na stadiónu hodně **německých běžců?**

warm.up REFL on stadium a.lot German runners

'Are there a lot of German runners warming up at the stadium?'

M: Na stadiónu se rozcvičuje 50% **ČESKÝCH běžců.**

on stadium REFL warm.up 50% Czech runners

'There are 50% Czech runners warming up at the stadium.'

varied modifier type: APs vs. PPs, e.g. 50% **ŽEN s čepicí** '50% women with a hat'

Exp2: Sub-NP focus

Manipulated (independent) variables

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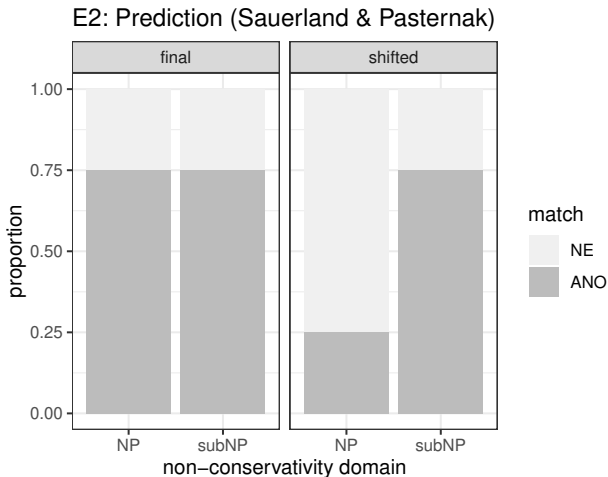


subNP domain non-conservative true (NP false)



(NB: Conservative reading was always false.)

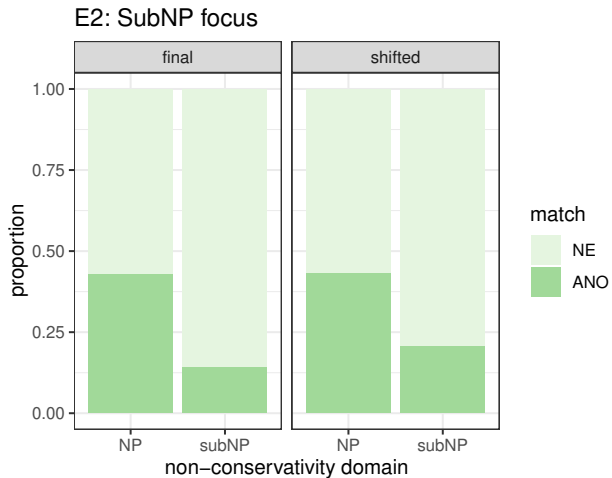
Exp2: Prediction of Pasternak and Sauerland (2022)



Predicting the effect of an interaction between stress and domain on the dependent variable (match).

NB: Expectation concerns the contrasts, not the absolute values (set to .75 and .25).

Exp2: Results



Exp2: Results and interim discussion

GLMM fit by maximum likelihood (Laplace Approximation); random intercepts for participants and items (more complex models not converging); variables sum-coded

Random effects:

Groups	Name	Variance	Std.Dev.
participant	(Intercept)	1.2394	1.113
item	(Intercept)	0.5112	0.715

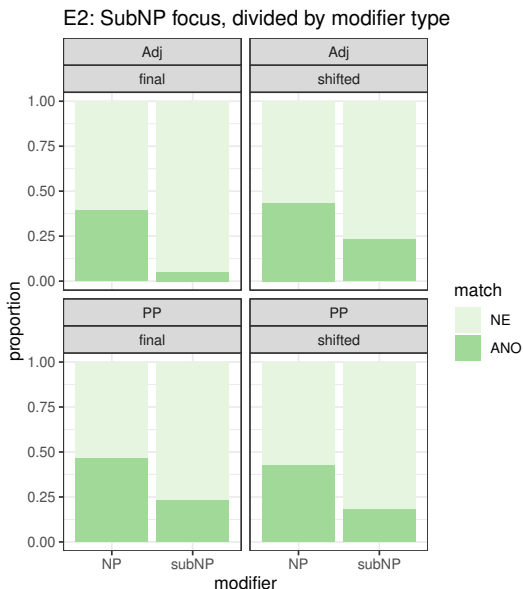
Number of obs: 1104, groups: participant, 69; item, 16

Fixed effects:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.2287	0.2410	-5.099	<0.0001 ***
size1	0.8191	0.0838	9.769	<0.0001 ***
stress1	-0.1481	0.0795	-1.864	0.0623
size1:stress1	0.1340	0.0794	1.689	0.0913

- ▶ Clear main effect of size: NP non-conservativity domain provides a better match, irrespective of stress position (counter to Sauerland & Pasternak's predictions).
- ▶ The predicted interaction between stress (focus) and NC domain is only evident in one half of the data, where stress is shifted to Adj; see next slide. Still, NP NC domain remains a better match (not predicted).

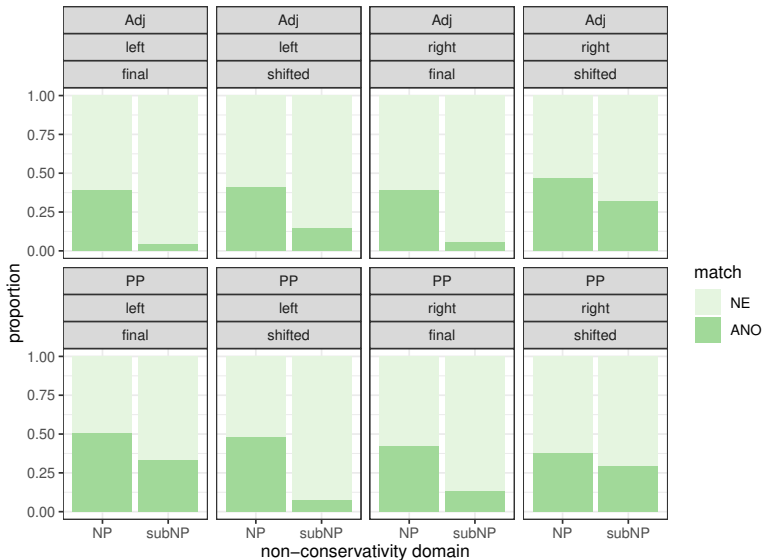
Exp2: Results divided by modifier type



Significant stress–size interaction within Adj ($z = 3.419, p < .001$), not PP.

Exp2: Results divided by mod type & target frame position

E2: Effect of target frame position and modifier type



Exp3: Broad focus and non-conservativity

Manipulated (independent) variables

- ▶ FOCUS SIZE *broad* vs. *NP*
- ▶ CONSERVATIVITY *cons* vs. *noncons*

Example of linguistic/audio materials (in both conditions)

(30) W: (i) *triggering broad focus*

Co **zjistila** prodavačka při inventuře?
what found.out shop.assistant during stocktaking
'What did the shop assistant find out during the stocktaking?'

(ii) *triggering NP focus*

Co **bylo umístěno** na policích?
what was placed on shelves
'What was placed on the shelves?'

M: Na policích bylo umístěno 50% knih.
on shelves was placed 50% books
either 'There were 50% books placed on the shelves.'
or '50% of the books were placed on the shelves.'

NB: Word order was constant (PPVS), only context (focus size) was manipulated.

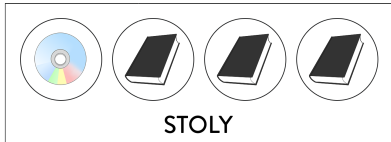
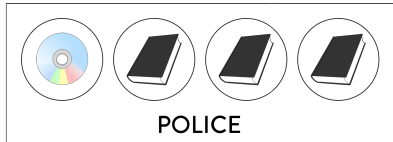
Exp3: Broad focus and non-conservativity

Manipulated (independent) variables

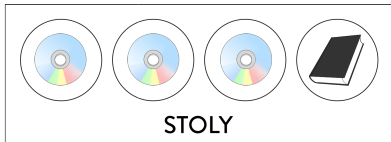
- ▶ FOCUS SIZE *broad* vs. *NP*
- ▶ CONSERVATIVITY *cons* vs. *noncons*

Example of pictorial materials (in both conditions)

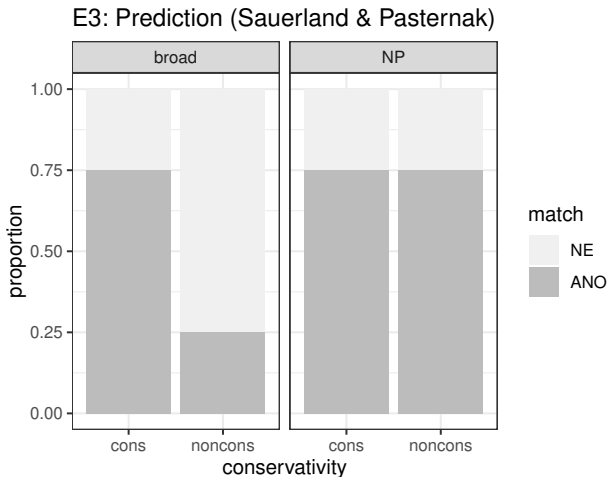
conservative true (*non-conservative false*)



non-conservative true (*conservative false*)



Exp3: Prediction of Pasternak and Sauerland (2022)

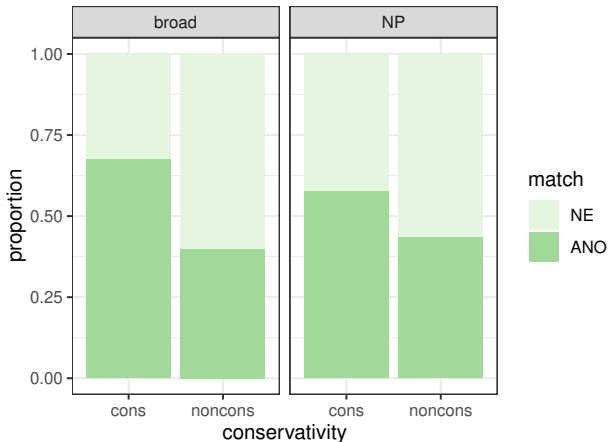


Predicting the effect of an interaction between focus size and conservativity on the dependent variable (match).

NB: Expectation concerns the contrasts, not the absolute values (set to .75 and .25).

Exp3: Result

E3: Non-conservative readings in broad focus



Exp3: Results and interim discussion

GLMM fit by maximum likelihood (Laplace Approximation); random intercepts for participants and items (more complex models not converging); variables sum-coded

Random effects:

Groups	Name	Variance	Std.Dev.
participant	(Intercept)	3.340×10^{-10}	1.828×10^{-5}
item	(Intercept)	1.912×10^{-2}	1.383×10^{-1}

Number of obs: 1104, groups: participant, 69; item, 16

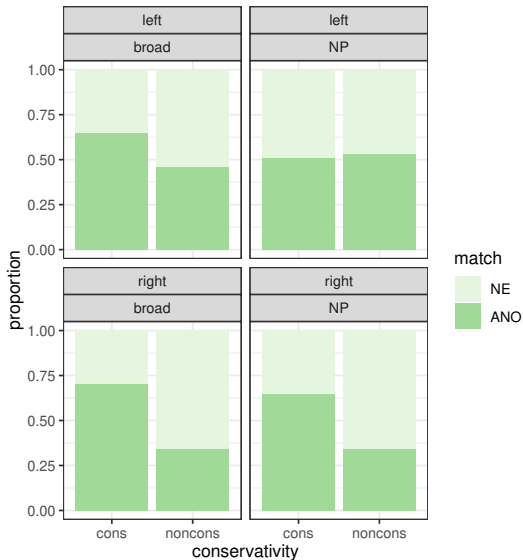
Fixed effects:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	0.0901	0.0710	1.269	0.204	
conserv1	0.4315	0.0624	6.919	<0.0001	***
focus1	0.0677	0.0620	1.092	0.275	
conserv1:focus1	0.1431	0.0620	2.308	0.021	*

- ▶ Interaction predicted by Pasternak and Sauerland (2022) visible in the model.
- ▶ But it is not caused by NC being less available in broad focus (than in NP focus; no simple effect of focus within noncons: $z = -0.870, p = 0.38$), but rather by C being less available in NP focus (than in broad focus; simple effect of focus within cons: $z = 2.377, p = 0.018$).

Results divided by target frame

E3: Effect of target position



Discussion: Word order and conservativity (Exp1)

- ▶ We see a relation between word order and conservativity (technically: interaction) in Czech, corroborating previous questionnaire results and corpus findings (Wągiel and Gehrke, 2023; Gehrke and Wągiel, 2022, 2023).
- ▶ The interaction comes about as a result of two simple effects – C readings are better for clause-initial quantifiers and NC readings are better for clause-final quantifiers. This is consistent with the questionnaire data collected so far (Wągiel and Gehrke, 2023; Gehrke and Wągiel, 2023) and also with the idea that the two word order options map one-to-one to the two interpretive options.
- ▶ What is surprising is the overall low availability of NC readings; despite them being more available for clause-final quantifiers, these are still preferentially read as conservative.
- ▶ Idea to explore: relatively low frequency of NC readings in corpora.
- ▶ Even more surprising is the effect of and interactions with the positioning of the target frame (which was manipulated between items in our design): target frames placed on the right are effectively ignored for purposes of NC reading computations.

Discussion: Focus and conservativity (Exp2)

- ▶ Counter to the predictions of Pasternak and Sauerland (2022), we see no clear relation between focus and conservativity. SubNP narrow focus does not reliably lead to the computation of the domain of NC quantification.
- ▶ Upon a closer look, we see the pattern predicted by Pasternak and Sauerland (2022) is visible for adjectival modifiers. More particularly, if stress is shifted to the prenominal adjective, the backgrounded noun is interpreted as a part of the domain of NC quantification.
- ▶ As in Exp1, we see surprising effects (and interactions) of target frame ordering: the predicted interaction is found clearly when the target frame is placed on the right, much less so when it is placed on the left.
- ▶ This is the opposite direction to what we see for Exp1 (and 3, in a sense).

Discussion: Focus and conservativity (Exp3)

- ▶ We see an interaction between focus size (broad/sentence focus vs. NP/quantifier focus) and conservativity.
- ▶ Counter to the prediction of Pasternak and Sauerland (2022), the interaction is not caused by the lower availability of the NC reading in broad focus, but rather by the lower availability of the C reading in the NP focus condition.

Conclusion and outlook

Conclusion

- ▶ Our experiments provide new evidence for the relation between word order and (non-)conservative interpretation of proportional quantifiers (Gehrke and Wągiel, 2023). Moreover, this effect seems to be independent of focus.
- ▶ The relation between focus and conservativity, expected by Pasternak and Sauerland (2022), is less clear and consistent, although it is found in some corners of our data.

Open issues/future work

- ▶ How does the truth-conditional difference in P&S's Westphalian example come about (the observed effect of narrow focus with adjectives only and only with stress shift)?
- ▶ Quantitative corpus work, also with parallel corpora
- ▶ %Qs in ditransitives, PPs, datives, adjuncts
Intuition for German ditransitive subjects: NC reading not available
- ▶ Can there be anything else instead of LOC (e.g. temporal PP)? (one German corpus example: 'In 2009')
- ▶ Use different predicates to test whether there is a real restriction to existential-like/HAVE-predicates
- ▶ Different types of nominals in the slot of 'women' (e.g. fake mass nouns and others)
- ▶ Other quantifiers (fractions, *many* etc.)
- ▶ Agreement (relevant for German)

One more thing

We have taken for granted that in languages with definiteness marking, NC vs. C construals correlate with bare vs. definite NPs.

BUT Reactions of some Macedonian speakers suggest that they also get C readings with bare nominals.

BUT 1 example from linguist, German – English:

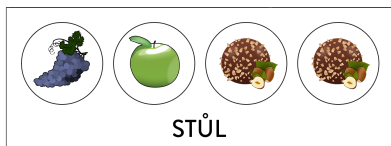
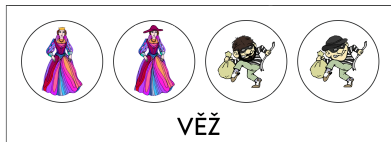
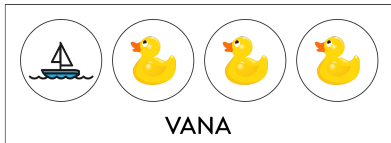
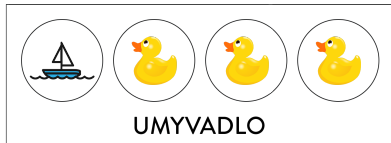
(31) 60 Prozent Frauen in der Kommune können
60.NOM percent.NOM women.NOM in the commune can
weder lesen noch schreiben.
neither read nor write

(32) 60 percent of women in the community are illiterate.

→ feels like C with indefinite-specific ‘women’

Děkujeme!

Thanks to Adéla Výborna and Kateřina Zajíčková for helping with the experiments



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Appendix: All test items and scenarios

(Wągiel and Gehrke, 2023; Gehrke and Wągiel, 2022, 2023)

Appendix: All test items

German: intransitive, bare

▶ sentence-initial

- (33) Es ist interessant, dass fünfzig Prozent Frauen bei
it is interesting that fifty.NOM percent.NOM women.NOM at
der Firma Kaloma arbeiten.
the company Kaloma work

▶ sentence-final

- (34) Es ist interessant, dass bei der Firma Kaloma fünfzig
it is interesting that at the company Kaloma fifty.NOM
Prozent Frauen arbeiten.
percent.NOM women.NOM work
'It is interesting that 50% of the workers at the company Kaloma
are women.'

Appendix: All test items

German: intransitive, definite

▶ sentence-initial

- (35) Es ist interessant, dass fünfzig Prozent der
it is interesting that fifty.NOM percent.NOM the.GEN
Frauen bei der Firma Kaloma arbeiten.
women.GEN at the company Kaloma work

▶ sentence-final

- (36) Es ist interessant, dass bei der Firma Kaloma fünfzig
it is interesting that at the company Kaloma fifty.NOM
Prozent der Frauen arbeiten.
percent.NOM the.GEN women.GEN work
'It is interesting that 50% of the women work at the company
Kaloma.'

Appendix: All test items

German: transitive, bare

► sentence-final

- (37) Es ist interessant, dass die Firma Ketara
it is interesting that the.NOM company.NOM Ketara.NOM
fünfzig Prozent Frauen beschäftigt.
fifty.ACC percent.ACC women.ACC employs

► sentence-initial

- (38) Es ist interessant, dass fünfzig Prozent Frauen
it is interesting that fifty.ACC percent.ACC women.ACC
die Firma Ketara beschäftigt.
the.NOM company.NOM Ketara.NOM employs
'It is interesting that the company Ketara employs 50% women.'

Appendix: All test items

German: transitive, definite

▶ sentence-final

- (39) Es ist interessant, dass die Firma Ketara
it is interesting that the.NOM company.NOM Ketara.NOM
fünfzig Prozent der Frauen beschäftigt.
fifty.ACC percent.ACC the.GEN women.GEN employs

▶ sentence-initial

- (40) Es ist interessant, dass fünfzig Prozent der Frauen
it is interesting that fifty.ACC percent.ACC the.GEN women.GEN
die Firma Ketara beschäftigt.
the.NOM company.NOM Ketara.NOM employs
'It is interesting that the company Ketara employs 50% of the
women.'

Appendix: All test items

German: intransitive, bare

▶ sentence-initial

- (41) Es ist interessant, dass fünfzig Prozent Frauen bei
it is interesting that fifty.NOM percent.NOM women.NOM at
der Firma Kaloma arbeiten.
the company Kaloma work

▶ sentence-final

- (42) Es ist interessant, dass bei der Firma Kaloma fünfzig
it is interesting that at the company Kaloma fifty.NOM
Prozent Frauen arbeiten.
percent.NOM women.NOM work
'It is interesting that 50% of the workers at the company Kaloma
are women.'

Appendix: All test items

German: intransitive, definite

▶ sentence-initial

- (43) Es ist interessant, dass fünfzig Prozent der
it is interesting that fifty.NOM percent.NOM the.GEN
Frauen bei der Firma Kaloma arbeiten.
women.GEN at the company Kaloma work

▶ sentence-final

- (44) Es ist interessant, dass bei der Firma Kaloma fünfzig
it is interesting that at the company Kaloma fifty.NOM
Prozent der Frauen arbeiten.
percent.NOM the.GEN women.GEN work
'It is interesting that 50% of the women work at the company
Kaloma.'

Appendix: All test items

German: transitive, bare

▶ sentence-final

- (45) Es ist interessant, dass die Firma Ketara
it is interesting that the.NOM company.NOM Ketara.NOM
fünfzig Prozent Frauen beschäftigt.
fifty.ACC percent.ACC women.ACC employs

▶ sentence-initial

- (46) Es ist interessant, dass fünfzig Prozent Frauen
it is interesting that fifty.ACC percent.ACC women.ACC
die Firma Ketara beschäftigt.
the.NOM company.NOM Ketara.NOM employs
'It is interesting that the company Ketara employs 50% women.'

Appendix: All test items

German: transitive, definite

► sentence-final

- (47) Es ist interessant, dass die Firma Ketara
it is interesting that the.NOM company.NOM Ketara.NOM
fünfzig Prozent der Frauen beschäftigt.
fifty.ACC percent.ACC the.GEN women.GEN employs

► sentence-initial

- (48) Es ist interessant, dass fünfzig Prozent der Frauen
it is interesting that fifty.ACC percent.ACC the.GEN women.GEN
die Firma Ketara beschäftigt.
the.NOM company.NOM Ketara.NOM employs
'It is interesting that the company Ketara employs 50% of the
women.'

Appendix: All test items

Russian: intransitive

▶ preverbal

- (49) Interesno, čto v kompanii Kaloma rabotajut pjat'desjat
interesting that in company Kaloma work fifty.NOM
procentov ženščin.
percent.GEN.PL women.GEN

▶ postverbal

- (50) Interesno, čto pjat'desjat procentov ženščin rabotajut
interesting that fifty.NOM percent.GEN.PL women.GEN work
v kompanii Kaloma.
in company Kaloma

Appendix: All test items

Russian: transitive

▶ preverbal

- (51) Interesno, čto kompanija Ketara deržit na službe
interesting that company.NOM Ketara.NOM holds on service
pjat'desjat procentov ženščin.
fifty.ACC percent.GEN.PL women.GEN

▶ preverbal

- (52) Interesno, čto pjat'desjat procentov ženščin deržit na
interesting that fifty.ACC percent.GEN.PL women.GEN holds on
službe kompanija Ketara.
service company.NOM Ketara.NOM

Appendix: All test items

BCMS: intransitive

▶ preverbal

(53) Zanimljivo je da pedeset posto žena radi u
interesting is that fifty.NOM percent women.GEN works in
firmi Spedex.
company.LOC Spedex

▶ postverbal

(54) Zanimljivo je da u firmi Spedex radi pedeset
interesting is that in company.LOC Spedex works fifty.NOM
posto žena.
percent women.GEN

Appendix: All test items

BCMS: transitive

▶ postverbal

(55) Zanimljivo je da firma Spedex zapošljava pedeset
interesting is that company.NOM Spedex employs fifty.ACC
posto žena.
percent women.GEN

▶ preverbal

(56) Zanimljivo je da pedeset posto žena zapošljava
interesting is that fifty.ACC percent women.GEN employs
firma Spedex.
company.NOM Spedex

Appendix: All test items

Slovenian: intransitive

▶ preverbal

- (57) Zanimivo je, da petdeset odstotkov žensk dela v
interesting is that fifty.NOM percent women.GEN works in
podjetju Spedex.
company.LOC Spedex

▶ preverbal

- (58) Zanimivo je, da v podjetju Spedex dela petdeset
interesting is that in company.LOC Spedex works fifty.NOM
odstotkov žensk.
percent women.GEN

Appendix: All test items

Slovenian: transitive

▶ postverbal

- (59) Zanimivo je, da podjetje Spedex zaposluje petdeset
interesting is that company.NOM Spedex employs fifty.ACC
odstotkov žensk.
percent women.GEN

▶ preverbal

- (60) Zanimivo je, da petdeset odstotkov žensk zaposluje
interesting is that fifty.ACC percent women.GEN employs
podjetje Spedex.
company.NOM Spedex

Appendix: All test items

Polish: intransitive

▶ preverbal

(61) To ciekawe, że pięćdziesiąt procent kobiet pracuje w
this interesting that fifty.NOM percent women.GEN works in
firmie Ekspol.
company.LOC Ekspol

▶ postverbal

(62) To ciekawe, że w firmie Ekspol pracuje pięćdziesiąt
this interesting that in company.LOC Ekspol works fifty.NOM
procent kobiet.
percent women.GEN

Appendix: All test items

Polish: partitive

▶ preverbal

- (63) To ciekawe, że pięćdziesiąt procent spośród kobiet
this interesting that fifty.NOM percent among women.GEN
pracuje w firmie Ekspol.
works in company.LOC Ekspol

▶ postverbal

- (64) To ciekawe, że w firmie Ekspol pracuje pięćdziesiąt
this interesting that in company.LOC Ekspol works fifty.NOM
procent spośród kobiet.
percent among women.GEN

Appendix: All test items

Polish: transitive

▶ postverbal

(65) To ciekawe, że firma Ekspol zatrudnia pięćdziesiąt
this interesting that company.NOM Ekspol employs fifty.ACC
procent kobiet.
percent women.GEN

▶ preverbal

(66) To ciekawe, że pięćdziesiąt procent kobiet zatrudnia
this interesting that fifty.ACC percent women.GEN employs
firma Ekspol.
company.NOM Ekspol

Appendix: All test items

Czech: intransitive

▶ preverbal

(67) Je zajímavé, že padesát procent žen pracuje ve
is interesting that fifty.NOM percent women.GEN works in
společnosti Spedex.
company.LOC Spedex

▶ postverbal

(68) Je zajímavé, že ve společnosti Spedex pracuje padesát
is interesting that in company.LOC Spedex works fifty.NOM
procent žen.
percent women.GEN

Appendix: All test items

Czech: partitive

▶ preverbal

(69) Je zajímavé, že padesát procent z žen pracuje ve
is interesting that fifty.NOM percent from women.GEN works in
společnosti Spedex.
company.LOC Spedex

▶ postverbal

(70) Je zajímavé, že ve společnosti Spedex pracuje padesát
is interesting that in company.LOC Spedex works fifty.NOM
procent z žen.
percent from women.GEN

Appendix: All test items

Czech: transitive

▶ postverbal

(71) Je zajímavé, že společnost Spedex zaměstnává padesát
is interesting that company.NOM employs fifty.ACC percent
procent žen.
women.GEN

▶ preverbal

(72) Je zajímavé, že padesát procent žen zaměstnává
is interesting that fifty.ACC percent women.GEN employs
společnost Spedex.
company.NOM

Appendix: All test items

Slovak: intransitive

▶ postverbal

(73) Je zaujímavé, že päťdesiat percent žien pracuje v
is interesting that fifty.NOM percent women.GEN works in
spoločnosti Spedex.
company.LOC Spedex

▶ postverbal

(74) Je zaujímavé, že v spoločnosti Spedex pracuje päťdesiat
is interesting that in company.LOC Spedex works fifty.NOM
percent žien.
percent from women.GEN

Appendix: All test items

Slovak: partitive

▶ preverbal

(75) Je zaujímavé, že päťdesiat percent zo žien pracuje v
is interesting that fifty.NOM percent from women.GEN works in
spoločnosti Spedex.
company.LOC Spedex

▶ postverbal

(76) Je zaujímavé, že v spoločnosti Spedex pracuje päťdesiat
is interesting that in company.LOC Spedex works fifty.NOM
percent zo žien.
percent from women.GEN

Appendix: All test items

Slovak: transitive

▶ postverbal

(77) Je zaujímavé, že spoločnosť Spedex zamestnáva päťdesiat
is interesting that company.NOM Spedex employs fifty.ACC
percent žien.
percent women.GEN

▶ preverbal

(78) Je zaujímavé, že päťdesiat percent žien zamestnáva
is interesting that fifty.ACC percent women.GEN employs
spoločnosť Spedex.
company.NOM Spedex

Appendix: All test items

Bulgarian: intransitive, bare

▶ preverbal

- (79) Interesno, če petdeset procenta ženi rabotjat vāv firma
interesting that fifty percent women work in company
Kaloma.
Kaloma

▶ postverbal

- (80) Interesno, če vāv firma Kaloma rabotjat petdeset procenta
interesting that in company Kaloma work fifty percent
ženi.
women
'It is interesting that 50% of the workers at the company Kaloma
are women.'

Appendix: All test items

Bulgarian: intransitive, definite

▶ preverbal

- (81) Interesno, če petdeset procenta ot ženite rabotjat vǎv
interesting that fifty percent of women.DEF work in
firma Kaloma.
company Kaloma

▶ postverbal

- (82) Interesno, če vǎv firma Kaloma rabotjat petdeset procenta
interesting that in company Kaloma work fifty percent
ot ženite.
of women.DEF
'It is interesting that 50% of the women work at the company
Kaloma.'

Appendix: All test items

Bulgarian: transitive, bare

▶ postverbal

(83) Interesno, če firma Ketara e naela petdeset procenta ženi.
interesting that company Ketara is hired fifty percent women

▶ preverbal

(84) Interesno, če petdeset procenta ženi e naela firma
interesting that fifty percent women is hired company
Ketara.
Ketara
'It is interesting that the company Ketara (has) hired 50% women.'

Appendix: All test items

Bulgarian: transitive, definite

► postverbal

- (85) Interesno, če firma Ketara e naela petdeset procenta ot
interesting that company Ketara is hired fifty percent of
ženite.
women.DEF

► preverbal

- (86) Interesno, če petdeset procenta ot ženite e naela
interesting that fifty percent of women.DEF is hired
firma Ketara.
company Ketara
'It is interesting that the company Ketara (has) hired 50% of the
women.'

Appendix: All test items

Macedonian: intransitive, bare

▶ preverbal

- (87) Interesno e što pedeset procenti ženi rabotat vo firmata
interesting is that fifty percent women work in firm.DEF
Kaloma.
Kaloma

▶ postverbal

- (88) Interesno e što vo firmata Kaloma rabotat pedeset procenti
interesting is that in firm.DEF Kaloma work fifty percent
ženi.
women
'It is interesting that 50% of the people working at the company
Kaloma are women.'

Appendix: All test items

Macedonian: intransitive, definite

▶ pretverbal

- (89) Interesno e što pedeset procenti od ženite rabotat vo
interesting is that fifty percent of women.DEF work in
firmata Kaloma.
firm.DEF Kaloma

▶ postverbal

- (90) Interesno e što vo firmata Kaloma rabotat pedeset procenti
interesting is that in firm.DEF Kaloma work fifty percent
od ženite.
of women.DEF
'It is interesting that 50% of the women work at the company
Kaloma.'

Appendix: All test items

Macedonian: transitive, bare

▶ postverbal

- (91) Interesno e što firmata Ketara vrabotuva pedeset procenti
interesting is that firm.DEF Ketara employs fifty percent
ženi.
women

▶ preverbal

- (92) Interesno e što pedeset procenti ženi vrabotuva firmata
interesting is that fifty percent women employs firm.DEF
Ketara.
Keara
'It is interesting that the company Ketara employs 50% women.'

Appendix: All test items

Macedonian: transitive, definite without clitic

▶ postverbal

- (93) Interesno e što firmata Ketara vrabotuva pedeset procenti od
interesting is that firm.DEF Ketara employs fifty percent of
ženite.
women.DEF

▶ preverbal

- (94) Interesno e što pedeset procenti od ženite vrabotuva
interesting is that fifty percent of women.DEF employs
firmata Ketara.
firm.DEF Ketara
'It is interesting that the company Ketara employs 50% of the
women.'

Appendix: All test items

Macedonian: transitive, definite with clitic

► postverbal

- (95) Interesno e što firmata Ketara gi vrabotuva pedeset procenti
interesting is that firm.DEF Ketara CL employs fifty percent
od ženite.
of women.DEF

► preverbal

- (96) Interesno e što pedeset procenti od ženite gi vrabotuva
interesting is that fifty percent of women.DEF CL employs
firmata Ketara.
firm.DEF Ketara
'It is interesting that the company Ketara employs 50% of the
women.'

Appendix: German scenarios

- (97) C, intransitive: Die Firma Kaloma befindet sich nicht weit weg von einem Dorf, das ansonsten recht abgelegen ist. Kaloma beschäftigt die Hälfte der Frauen aus dem Dorf.
- (98) NC, intransitive: Die Firma Kaloma befindet sich nicht weit weg von einem Dorf, das ansonsten recht abgelegen ist. Einige Leute aus dem Dorf arbeiten dort. Kaloma achtet auf Gendergleichstellung, und die Hälfte ihrer Angestellten sind Frauen.
- (99) C, transitive: Die beiden Firmen Birapo und Ketara befinden sich nicht weit weg von einem Dorf, das ansonsten recht abgelegen ist. Deswegen sind diese beiden Firmen die Hauptarbeitgeber der Dorfbewohnerinnen und -bewohner. Während die meisten Männer aus dem Dorf bei Birapo angestellt sind, arbeitet die Hälfte der Frauen aus dem Dorf bei Ketara.
- (100) NC, transitive: Die beiden konkurrierenden Firmen Birapo und Ketara haben ungefähr gleich viele Beschäftigte. Während die meisten Angestellten bei Birapo männlich sind, ist die Hälfte der Beschäftigten bei Ketara weiblich.

Appendix: Russian scenarios

- (101) C, intransitive: Kompanija Kaloma naxoditsja nedaleko ot derevni, kotoraja udalena ot vsego ostal'nogo. Kompanija predostavljaet rabotu polovine ženščin ètoj derevni.
- (102) NC, intransitive: Kompanija Kaloma naxoditsja nedaleko ot derevni, kotoraja udalena ot vsego ostal'nogo. Neskol'ko čelovek iz derevni rabotajut tam. Kompanija sobljudaet gendernoe ravenstvo, i polovina ee rabotnikov – ženščiny.
- (103) C, transitive: Kompanii Pirapo i Ketara naxodjatsja nedaleko ot derevni, kotoraja udalena ot vsego ostal'nogo. Takim obrazom, Pirapo i Ketara – glavnye rabotodateli dlja žitelej derevni. V tom vremja kak bol'sinstvo mužčin iz derevni rabotaet v kompanii Pirapo, polovina ženščin iz derevni rabotaet v kompanii Ketara.
- (104) NC, transitive: U dvux konkurirujuščix kompanij Pirapo i Ketara odinakovoe količestvo rabotnikov. V to vremja kak bol'sinstvo rabotnikov kompanii Pirapo – mužčiny, polovina rabotnikov kompanii Ketara – ženščiny.

Appendix: Focus elsewhere

(Wągiel and Gehrke, 2023; Gehrke and Wągiel, 2023)

Appendix: Focus elsewhere

Czech corpus study

- (105) CONTEXT: “Currently, we are ranked 78th in the worldwide ranking tracking the representation of women in the parliament,” said Jana Smiggels-Kavková, the head of Fórum 50%.
- Více než 40 procent žen v dolní komoře
more than 40 percent women.GEN in low.LOC chamber.LOC
parlamentu má z evropských zemí
parliament.GEN has from European.PL.GEN countries.GEN
například Švédsko_F...
for-instance Sweden.NOM
- ‘Among the European countries that have more than 40% women in the low chamber of the parliament there is, for instance, Sweden ...’ (CNC)

Appendix: Focus elsewhere

Czech corpus study

- ▶ Previous discourse: proportions of women in EU parliaments
 - ▶ Marked information structure:
 - ▶ New information focus on 'Sweden', the rest is backgrounded
 - ▶ New information/focused element appears sentence-finally
- This seems to go against Sauerland & Co.'s (implicit?) empirical claim that (part of) the NP after %Q needs to be focused for the NC reading to arise.

Appendix: Focus elsewhere

- ▶ Examples by informants to improve on preverbal NC %Qs:

(106) Je zajímavé, že **padesát procent žen** zaměstnává
is interesting that fifty.ACC percent women.GEN employs
[společnost EXPOL]_{CF}, a **nikoliv Bustrans**.
company.NOM Expol and not Bustrans

CZECH

(107) **50% Frauen** beschäftigt **nur** [die Firma
50%.ACC women.ACC employs only the.NOM company.NOM
Pirapo]_F.
Pirapo.NOM

'It is only the company Pirapo that employs 50% women.'

GERMAN

Appendix: Further doubts about the role of focus

- ▶ NC possible even with fronting/topicalization of the NP:

(108) [Kobiet]_T to w firmie Ekspol pracuje pięćdziesiąt
women.GEN TOP in company.LOC Ekspol works fifty.NOM
procent.
percent

'As for women, they make up fifty percent of the people working
at the company Ekspol.'

POLISH

Appendix: Results for Slavic languages

(Wągiel and Gehrke, 2023; Gehrke and Wągiel, 2023)

Appendix: Results for Bulgarian and Macedonian

Table: Results for Bulgarian

	INTRANSITIVE		TRANSITIVE	
	C	NC	C	NC
PREV.	✓	marked	very marked/#	#
POSTV.	marked/✓	✓	✓	✓

Table: Results for Macedonian

	INTRANSITIVE		TRANSITIVE	
	C	NC	C	NC
PREV.	✓	#	✓ w/clitic	marked/#
POSTV.	marked	✓	✓ w/o clitic	✓

Appendix: Bulgarian and Macedonian: Discussion

- ▶ Macedonian: NC requires postverbal position categorically
(not just a tendency, as in German)
Transitive NC: Additional remarks about explicit contrasts/
surprise improving on preverbal %Q
- ▶ Bulgarian:
 - ▶ Transitive NC requires postverbal position (~ Macedonian)
 - ▶ Intransitive NC prefers postverbal position (~ German)
- ▶ Transitive C:
 - ▶ Bulgarian: like German; preverbal ok with passives
 - ▶ Macedonian: depends on the clitic, best preverbal
(unlike German)

Appendix: Results for Polish, Czech, Slovak & discussion

Table: Results for Polish, Czech, Slovak

	INTRANSITIVE		TRANSITIVE	
	C	NC	C	NC
PREVERBAL	✓	#	✓	#
POSTVERBAL	#	✓	marked	✓

- ▶ Categorical pattern:
 - ▶ NC requires postverbal %Q: PPVS & SVO
 - ▶ C requires preverbal %Q in intransitives: SVPP
(preverbal NC %Q object facilitated by explicit contrasts)
- ▶ C prefers preverbal %Q in transitives: OVS

Appendix: Similar results in Russian, BCMS, Slovenian

Table: Results for Russian

	INTRANSITIVE		TRANSITIVE	
	C	NC	C	NC
PREVERBAL	✓	#	inconclusive/✓	#
POSTVERBAL	#	✓	inconclusive	✓

Table: Results for Serbian (BCMS)

	INTRANSITIVE		TRANSITIVE	
	C	NC	C	NC
PREVERBAL	✓	# (ok w/ CT for 2)	✓	# (ok for 1 ¹)
POSTVERBAL	#	✓	marked	✓

Table: Results for Slovenian

	INTRANSITIVE		TRANSITIVE	
	C	NC	C	NC
PREVERBAL	✓	#	✓	#/dispreferred
POSTVERBAL	marked	✓	marked	✓

¹ One Serbian speaker preferred to express NC differently, so they might only have C construals (to be explored).

Appendix: Other languages

(Ahn and Sauerland, 2015a,b, 2017)

Korean

Ahn and Sauerland (2015a,b, 2017)

- ▶ Focus + case marking + overt movement (+ definiteness in the table)

- (109) a. Hyosa-ka [yeca-(uy) osip-phulo]-lul
company-NOM woman-GEN fifty-percent-ACC
ceyyonghayssta.
hired
'The company hired fifty percent of the women.' C
- b. Hyosa-ka yeca_F-lul osip-phulo ceyyonghayssta.
company-NOM woman-ACC fifty-percent hired
'The company hired fifty percent women.' NC

Ahn and Sauerland (2015a,b, 2017)

► Focus + definiteness marking

- (110) a. Ce film a été vu par **deux tiers des journalistes**.
this movie has been seen by two thirds of.the journalists
'Two thirds of the journalists have seen this movie.' C
- b. Ce film a été vu par **deux tiers de journalistes_F**.
this movie has been seen by two thirds of journalists
'Two thirds of the people who have seen this movie are
journalists.' NC

Ahn and Sauerland (2015a,b, 2017)

► Definiteness marking (+ focus)

(111) a. Gianni ha parlato a un terzo delle donne.

Gianni has talked to a third of the women

'Gianni has talked to a third of the women.'

C

b. Gianni ha parlato a un terzo di donne.

Gianni has talked to a third of women

'A third of those that Gianni talked to were women.'

NC

Ahn and Sauerland (2015a,b, 2017)

► Case + definiteness marking (+ focus)

- (112) a. I eteria proselave 30% ton dopion.
the company hired 30% the.GEN locals.GEN
'The company hired 30% of the locals.' C
- b. I eteria proselave 30% dopius.
the company hired 30% locals.ACC
'The company hired 30% locals.' NC

Georgian

Ahn and Sauerland (2015a,b, 2017)

- ▶ Case marking + word order (+ focus)
(their claim in the table: focus + definiteness + case marking)

(113) a. **Profesorebi-s erti-mesamed-i** movida.
professor-GEN one-third-NOM came
'One-third of the professors came.'

C

- b. **Erti-mesamed-i profesoreb-i** movida.
one-third-NOM professor.PL-NOM came
'One-third professors came.'

NC

Ahn and Sauerland (2015a,b, 2017)

- ▶ Only focus; in (114) on ‘local person’

(114) Tāmen lùyòng le 5% de běndì-rén
3.PL hire PERF 5% DE local-person

- ‘They hired 5% of the locals.’
- ‘5% of the persons they hired are locals.’

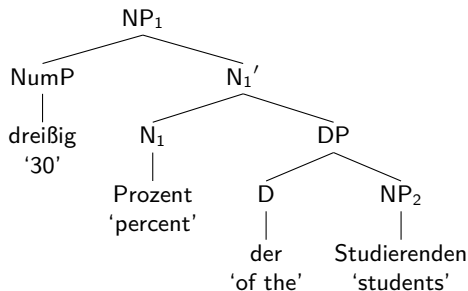
C
NC

Appendix:
Pasternak and Sauerland (2022)

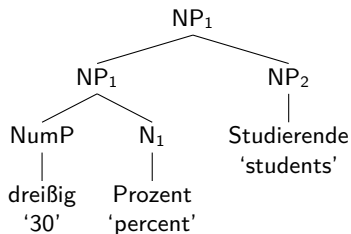
Syntactic analysis in Pasternak and Sauerland (2022)

similar in Ahn and Sauerland (2015a,b, 2017)

Conservative

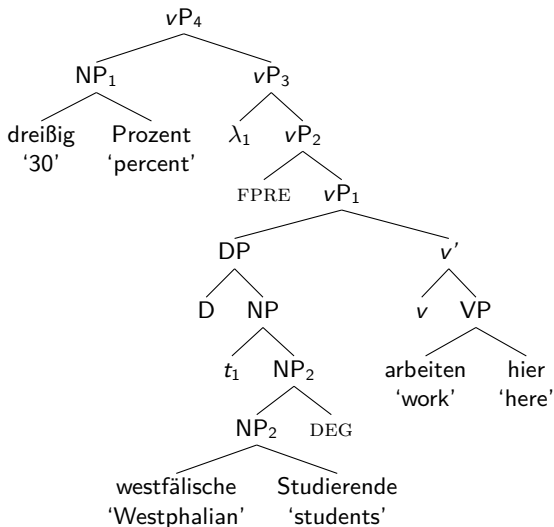


Non-conservative



GERMAN

Complete non-conservative syntax (P&S)



Non-conservative semantic analysis (P&S): Informally

- ▶ NP₁ (30%) is a degree quantifier [also under C reading]
NP₁ QRs, leaving a degree-denoting trace
- ▶ Focus generates a set of alternatives (cf. Rooth, 1985, 1992)
- ▶ The %Q operates on the presupposition of this set [FPRE]

(115) 30% [westfälische Studierende]_F arbeiten hier.
30% Westphalian students work here
~ 30% of the individuals working here are Westphalian
students working here.

(116) 30% [westfälische]_F Studierende arbeiten hier.
30% Westphalian students work here
~ 30% of the students working here are Westphalian
students working here.

Non-conservative semantic analysis (P&S): Formally

$$(117) \quad \llbracket \text{Prozent} \rrbracket = \lambda n \lambda D. \text{MAX}(D) \geq \frac{n}{100} \times \text{MAX}(\text{DOM}(D))$$

$$(118) \quad \llbracket \text{DEG} \rrbracket^c = \lambda P \lambda d \lambda x. P(x) \wedge \mu^c(x) \geq d$$

$$(119) \quad \llbracket \text{D } t_1 \text{ [westfälische Studierende]}_F \text{ DEG arbeiten hier} \rrbracket^{g,c} = \\ = \llbracket \text{D } t_1 \text{ [westfälische]}_F \text{ Studierende DEG arbeiten hier} \rrbracket^{g,c} \approx \\ \approx \text{at least } g(1)\text{-many Westphalian students work here}$$

$$(120) \quad \llbracket \text{D } t_1 \text{ [westfälische Studierende]}_F \text{ DEG arbeiten hier} \rrbracket_f^{g,c} \approx \\ \approx \left\{ \begin{array}{l} \text{at least } g(1)\text{-many Westphalian students work here,} \\ \text{at least } g(1)\text{-many Macedonians work here,} \\ \text{at least } g(1)\text{-many individuals work here,} \\ \vdots \end{array} \right\}$$

$$(121) \quad \llbracket \text{FPRE X} \rrbracket \text{ is defined if } \bigvee \llbracket \text{X} \rrbracket_f \text{ is true;} \\ \text{where defined, } \llbracket \text{FPRE X} \rrbracket = \llbracket \text{X} \rrbracket$$

(FPRE: Focus-derived presupposition)

Non-conservative semantic analysis (P&S): Formally

- ▶ The arguments of 30% after QR:

(122) (30%) [westfälische Studierende]_F arbeiten hier.
(‘30% of the people that work here are Westphalian students.’)

$\llbracket \lambda_1 \text{ FPRE } D \ t_1 \text{ [westfälische Studierende]}_F \text{ DEG arbeiten hier} \rrbracket^c =$
 $= \lambda d : \text{at least } d\text{-many individuals work here .}$
at least d -many Westphalian students work here (henceforth D_α)

(123) (30%) [westfälische]_F Studierende arbeiten hier.
(‘30% of the students that work here are Westphalian.’)

$\llbracket \lambda_1 \text{ FPRE } D \ t_1 \text{ [westfälische]}_F \text{ Studierende DEG arbeiten hier} \rrbracket^c =$
 $= \lambda d : \text{at least } d\text{-many students work here .}$
at least d -many Westphalian students work here (henceforth D_β)

- ▶ End result for, e.g., (123):

$\llbracket \text{dreißig Prozent [westfälische]}_F \text{ Studierende DEG arbeiten hier} \rrbracket^c =$
 $= \text{MAX}(D_\beta) \geq \frac{30}{100} \times \text{MAX}(\text{DOM}(D_\beta))$

Appendix:
Gehrke and Wągiel (2023)

Starting point in Gehrke and Wągiel (2023)

Properties of the non-conservative reading

- ▶ Bare plural nominals
- ▶ Proportional quantifiers need to appear low
- ▶ Restricted set of verbal predicates
- ▶ Interpretation of possession or existence at a location

Intransitives

- ▶ Sentence-initial locative expression
- ▶ Verbal predicate \sim existential predicate

Transitives

- ▶ Proportional quantifier phrase \Rightarrow low object
- ▶ Verbal predicate \sim HAVE-predicate

(Sæbø, 2009; Le Bruyn et al., 2016)

Analysis in Gehrke and Wągiel (2023)

Motivation

- ▶ Empirical parallels

Transitives \sim incorporation structures

- ▶ Bare nominals
- ▶ Objects
- ▶ HAVE-predicates

Intransitives \sim existential constructions

- ▶ Definiteness effect
- ▶ Obligatory locative
- ▶ Word order

Transitives (G&W)

Transitive non-conservative construals

- ▶ Semantic incorporation
- ▶ Bare plural noun in object position \Rightarrow verbal predicate
- ▶ The resulting predicate \Rightarrow shifted to a scalar expression
- ▶ The proportional quantifier operates on that expression

(124) Die Firma beschäftigt fünfzig Prozent Frauen.
the.NOM company.NOM employs 50%.ACC women.ACC
'The company employs 50% women.'
~ 'The company women-employs to the extent of 50%.'

Transitives (G&W)

Semantic incorporation

Chung and Ladusaw (2004)

- ▶ Plural bare noun \Rightarrow verbal predicate
- ▶ RESTRICT mode of composition

$$(125) \quad \llbracket \text{women-employ} \rrbracket = \\ \text{RESTRICT}(\lambda x_e \lambda y_e [\text{EMPLOY}(x)(y)], \lambda z_e [\text{WOMEN}(z)]) = \\ \lambda x_e \lambda y_e [\text{EMPLOY}(x)(y) \wedge \text{WOMEN}(x)]$$

Shift to a gradable property

Bochnak (2010)

- ▶ Fully closed cardinality-based scale
- ▶ Parallel: cross-categorial uses of *half*

(126) The glass is {half / fifty percent} full.

Transitives (G&W)

Proportional quantifiers

- ▶ Numeral \Rightarrow name of a natural number (type d)
- ▶ 'percent' \Rightarrow function to a scalar modifier $\langle\langle d, \langle e, t \rangle \rangle, \langle e, t \rangle \rangle$
- ▶ $G \Rightarrow$ gradable predicate $\langle d, \langle e, t \rangle \rangle$
- ▶ $S_G \Rightarrow$ fully closed scale encoded by G
- ▶ MAX returns the maximal degree on S_G

$$(127) \quad \llbracket \text{fifty} \rrbracket = 50$$

$$(128) \quad \llbracket \text{percent} \rrbracket = \lambda d_d \lambda G_{\langle d, \langle e, t \rangle \rangle} \lambda x_e [G(x) \left(\frac{d}{100} \times \text{MAX}(S_G) \right)]$$

$$(129) \quad \llbracket \text{fifty percent} \rrbracket = \lambda G_{\langle d, \langle e, t \rangle \rangle} \lambda x_e [G(x) (50\% (S_G))],$$

where $50\% (S_G)$ is an abbreviation for $\frac{50}{100} \times \text{MAX}(S_G)$

Transitives (G&W)

Composition

Bochnak (2010)

- ▶ Proportional quantifier cannot combine with incorporation expression directly
- ▶ μ operation relates the part-whole structure of a plurality denoted by the subject with a cardinality scale
- ▶ μ_R existentially binds the direct object variable and introduces an open degree argument associated with the cardinality of the relevant (plural) individual via the $\#$ measure function
- ▶ Motivation: degree/quantity ambiguity

(130) The meat is half cooked.

(131) $\llbracket \mu_R \rrbracket = \lambda R_{\langle e, \langle e, t \rangle \rangle} \lambda d_d \lambda y_e \exists x_e [R(x)(y) \wedge \#(x) = d]$

(132) $\llbracket \mu_R \rrbracket (\llbracket \text{women-employ} \rrbracket) =$
 $\lambda d_d \lambda y_e \exists x_e [\text{EMPLOY}(x)(y) \wedge \text{WOMEN}(x) \wedge \#(x) = d]$

Transitives (G&W)

Composition

- ▶ Scalar expression encodes a cardinality scale based on the part-whole structure of the λ -bound nominal argument
- ▶ Argument represents a bounded individual \Rightarrow the corresponding scale is also bounded \Rightarrow fully closed
- ▶ $S_{\text{women-employ}} \Rightarrow$ cardinality-based fully closed scale

$$\begin{aligned} (133) \quad \llbracket \text{fifty percent} \rrbracket (\llbracket \mu_R \text{ women-employ} \rrbracket) = & \\ \lambda G_{\langle d, \langle e, t \rangle \rangle} \lambda x_e [G(x)(50\%(S_G))] (\lambda d_d \lambda z_e \exists y_e [\text{EMPLOY}(y)(z) \wedge & \\ \text{WOMEN}(y) \wedge \#(y) = d]) = & \\ \lambda x_e [(\lambda d_d \lambda z_e \exists y_e [\text{EMPLOY}(y)(z) \wedge \text{WOMEN}(y) \wedge \#(y) = & \\ d](x)(50\%(S_{\text{women-employ}}))] = & \\ \lambda x_e \exists y_e [\text{EMPLOY}(y)(x) \wedge \text{WOMEN}(y) \wedge \#(y) = 50\%(S_{\text{women-employ}})] & \end{aligned}$$

Transitives (G&W)

Composition

- ▶ The complex predicate combines with the subject DP
- ▶ Saturation of the individual variable

(134) $\llbracket \text{fifty percent } \mu_R \text{ women-employ} \rrbracket (\llbracket \text{the company} \rrbracket) =$
 $\exists y_e [\text{EMPLOY}(y)(tc) \wedge \text{WOMEN}(y) \wedge \#(y) = 50\% (S_{\text{women-employ}})]$
 \sim 'The extent to which the company employs women is 50% of
the maximal value on a cardinality scale based on the part-whole
structure of the (plural) individual *tc*.'

Intransitives (G&W)

Intransitive non-conservative construals

- ▶ Underlyingly existential-like construction
- ▶ Support: intra-linguistic and cross-linguistic parallels

(135) In dieser Firma arbeiten fünfzig Prozent Frauen.
in this company work.3PL 50%.NOM women.NOM
'50% of the workers at this company are women.' GERMAN

(136) There are fifty percent women working at this company.

(137) Im Garten sind Blumen.
in-the garden are.3PL flowers
'There are flowers in the garden.' GERMAN

(138) Ve městě je lékař.
in town.LOC is doctor.NOM
'There is a doctor in town.' CZECH

Intransitives (G&W)

Assumptions

cf. McNally (2011); Bassaganyas-Bars (2015)

- ▶ Subject \Rightarrow (a plural individual at) the location
- ▶ Pragmatic restriction \Rightarrow only individuals relevant from the perspective of the verb
- ▶ IOTA-shift to the maximal plurality

(139) $\text{IOTA}(\llbracket \text{at this company} \rrbracket) = \sigma_{x_e}[\text{AT-THIS-COMPANY}(x)] = \text{atc}$

Intransitives (G&W)

Assumptions

cf. Barker (1995); McNally (2011); Bassaganyas-Bars (2015)

- ▶ Existentials \Rightarrow the verb introduces a general pragmatically determined relation π
- ▶ $\pi_{\text{work}} \Rightarrow$ resolved as a working relation between two individuals
- ▶ The bare plural in the pivot is incorporated into the verbal predicate via RESTRICT and then the result in (140) feeds μ_R in order to yield the gradable property

$$(140) \quad \llbracket \text{women-work} \rrbracket = \\ \text{RESTRICT}(\lambda x_e \lambda y_e [\pi_{\text{work}}(x)(y)], \lambda z_e [\text{WOMEN}(z)]) = \\ \lambda x_e \lambda y_e [\pi_{\text{work}}(x)(y) \wedge \text{WOMEN}(x)]$$

$$(141) \quad \llbracket \mu_R \rrbracket (\llbracket \text{women-work} \rrbracket) = \\ \lambda d_d \lambda y_e \exists x_e [\pi_{\text{work}}(x)(y) \wedge \text{WOMEN}(x) \wedge \#(x) = d]$$

Intransitives (G&W)

Composition

- ▶ The complex predicate combines with the locative PP
- ▶ Saturation by the maximal plurality of individuals associated with the location

(142) $\llbracket \text{fifty percent } \mu_R \text{ women-work} \rrbracket (\llbracket \text{at the company} \rrbracket) =$
 $\exists y_e [\pi_{\text{work}}(y)(atc) \wedge \text{WOMEN}(y) \wedge \#(y) = 50\%(\mathcal{S}_{\text{women-work}})]$
 \sim 'The extent to which there is a working relationship between women and the individuals working at this company is 50% of the maximal degree on the relevant cardinality scale.'