

NPIs, inferences, and double licensing: exper. evidence

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RELEVANCE OF NPIs

- The most prominent theory of NPIs (Ladusaw, 1979 and subsequent work) explains their licensing as inference markers (downward entailment (DE) environments, downward inferences (DI)).
- Our experimental research (double licensing (DL) of NPIs in Czech and the inferences triggered in the DL environments (env)) supports experimentally the hypothesis of Szabolcsi et al. (2008) (also Barker, 2018) that NPIs are unreliable indicators of downward inferences.

(RQ) Do NPIs in double licensing environments correlate with facilitating downward inferences?

DESCRIPTIVE STATISTICS

- Fig. 1 and Fig. 2;
- aggregated data from both versions of the experiment since (the interaction between the versions and the independent variables non-credible).

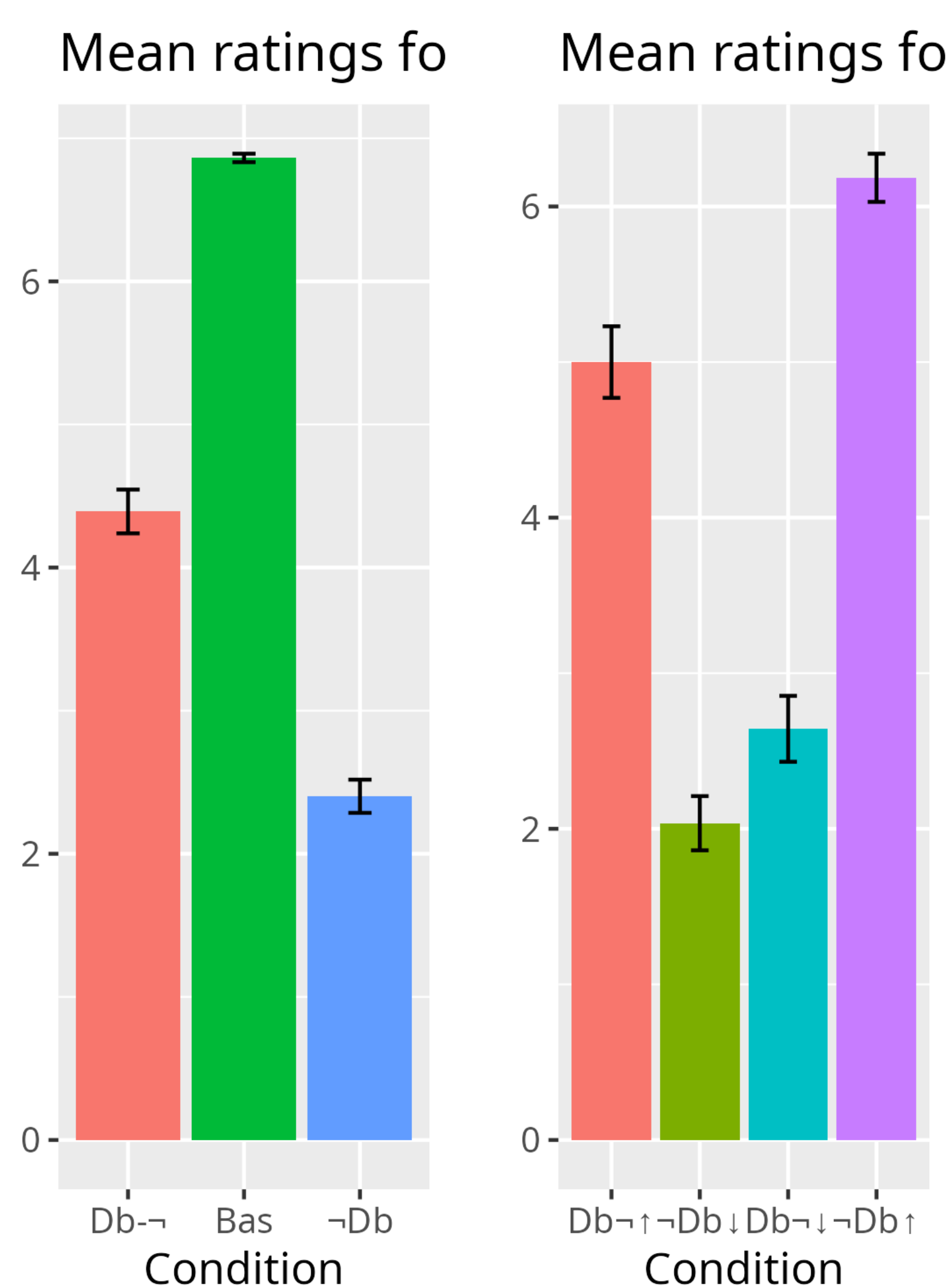


Figure 1 & 2: Ratings of NPIs licensing in DL envs & inferences in DL envs, exp 2

EXPERIMENT

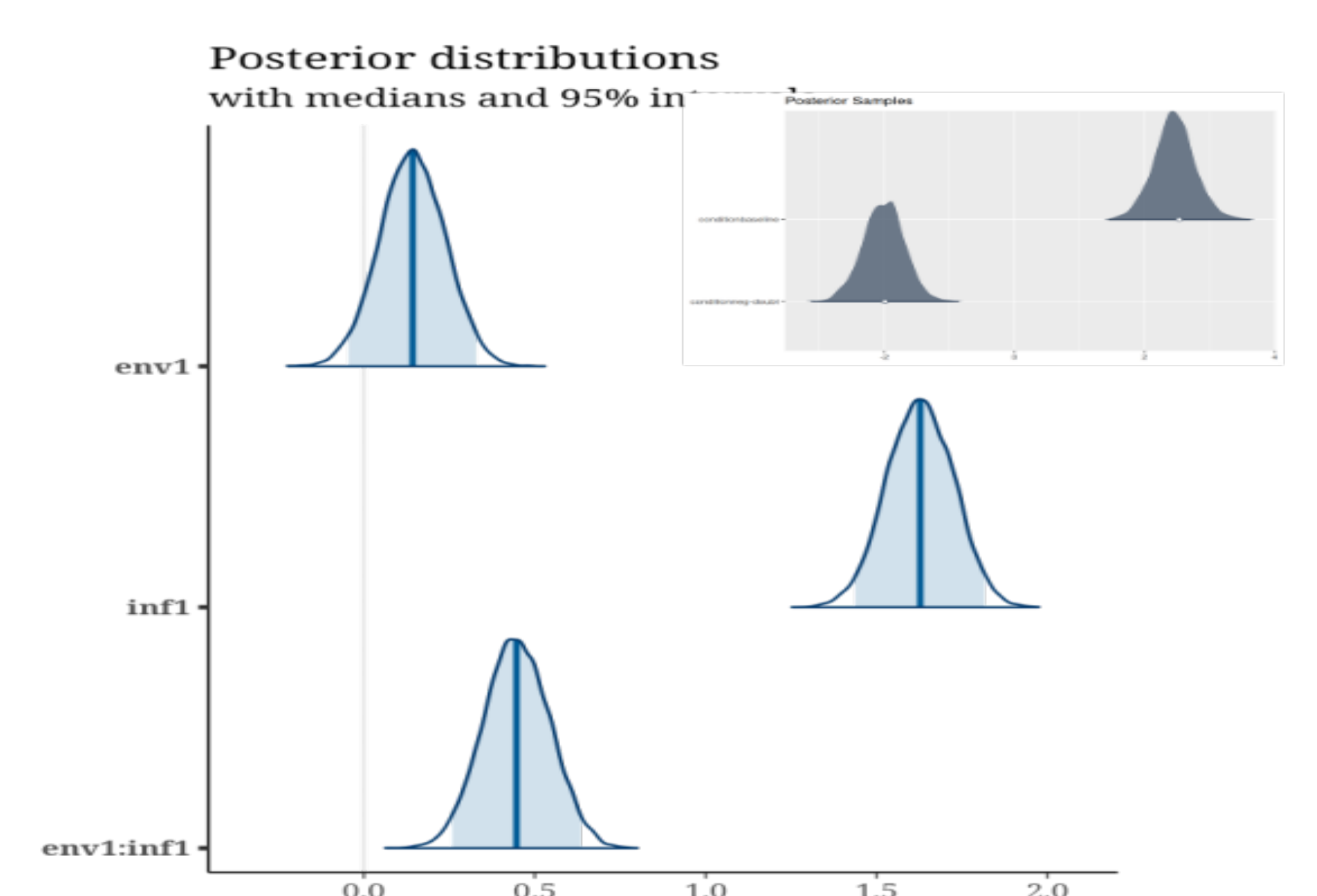
- double licensing environments \leftrightarrow NPI licensing varies in such contexts (Schmerling, 1971; Barker, 2018; Homer, 2021), despite being intuitively upward entailing;
- DL often fails when licensors are syntactically close (Homer, 2021; Mayer et al., 2019);
- 2 experiments (both acceptability judgment tasks) on a 7-point Likert scale, online on *L-Rex* with 57 (out of 70) native Czech speakers; two versions of the experiments with reversed order of Exp1 and Exp2 to control for the order effect:

1. on NPI licensing in DL environments (1x3 design with the conditions: BASELINE, DOUBT-NEG, NEG-DOUBT; see (1) for an example item, the NPIs in italics);
2. on inference reasoning in these environments (2x2 design: the inferences reasoning in the DL environments: (i) in sentences with both polarity reversing operators in different domains (DE-DOWN, DE-UP); (ii) in sentences with both operators in the same domain (UE-DOWN, UE-UP), see (2)); in model sum-coding was used (ENV for the location of negation (ref.: local (DE)); INF for inferences (ref.: DI)).

- (1) a. Policie *ne*-má *seběmenší důvod* tu
Police neg-have.3sg slightest reason that.acc
stopu zahladit.
trail.acc cover.
'The police have no reason to cover the trail.'
BASELINE
- b. Petr *pochybuje*, [že policie *ne*-má
Petr doubts that police neg-have.3sg
seběmenší důvod tu stopu zahladit].
slightest reason that.acc trail.acc cover.
'Petr doubts that the Police have no reason to
cover the trail.' DOUBT-NEG
- c. Petr *ne-pochybuje*, [že policie má
Petr neg-doubts that police have.3sg
seběmenší důvod tu stopu zahladit].
slightest reason that.acc trail.acc cover.
'Petr does not doubt that the Police have the
slightest reason to cover the trail.' NEG-DOUBT
- (2) a. Petr *pochybuje*, [že si
Petr doubts that SE
Marie *ne*-pořádila
Marie neg-buy.3sg
kočku].
cat.acc.
'Peter doubts that Marie
didn't get a cat.'
(i) → siamese cat DE-DOWN
(ii) → animal DE-UP
- b. Petr *ne-pochybuje*, [že
Petr neg-doubts that
si Marie pořádila *kočku*].
SE Marie buy.3sg cat.acc.
'Petr does not doubt that
Marie has got a cat.'
(i) → siamese cat UE-DOWN
(ii) → animal UE-UP

Models

Data analyzed in Bayesian linear regression models in *rstanarm*: 1st model shows BASELINE was more natural than DOUBT-NEG – ref. level – ($\hat{\beta} = 2.46$, BF 1.01e+18), while NEG-DOUBT was less natural ($\hat{\beta} = -1.98$, BF 2.25e+15). 2nd model revealed upward inferences were strongly preferred (INF: $\hat{\beta} = 1.63$, BF 1.38e+16), but negation position showed no effect (ENV: $\hat{\beta} = 0.14$, BF 0.044). But intriguing interaction INF x ENV!



RESULTS

- support for Homer's (2021) environment-based approach: DL is acceptable when NPIs occur with their licensor (DOUBT-NEG);
- upward inferences were always preferred regardless of negation position across domains;
- this answers our **research question**: NPIs licensing in DL environments doesn't correlate with downward inference facilitation.
 - normalized correlations between Exp1 and Exp2 conditions show no credible link between NPI licensing and inferences, unlike Denić et al. (2021) – the only hint: the interaction INF x ENV, but the effect is weak ($\hat{\beta} = 0.45$, BF 171).
- experimental support of Szabolcsi et al. (2008) and the results agree with the view that NPI licensing signals narrow scope w.r.t. its licensor (see Barker, 2018);
- In DL environments, NPIs remain indicators of narrow scope within

their local polarity domain;

- Barker's (2018) NPI scope licensing: in DL cases, the NPI is licensed in the embedded clause, as wide scope does not entail narrow scope ($\exists[\text{REASON}(x) \wedge \neg \text{POLICECOVERS}(x)] \not\models \neg \exists[\text{REASON}(x) \wedge \text{POLICECOVERS}(x)]$);
- NPIs thus mark a narrow scope but are not necessarily good signals of inferences;

- Overall, our results align more with Szabolcsi et al. (2008) and Barker (2018) than with claims of a DI-NPI link (Chemla et al., 2011; Denić et al., 2021; Ladusaw, 1979);
- the Bayesian analysis shows strong main effects but a weaker interaction effect (weaker UE inf in non-local neg env \approx DOUBT-NEG NPI), supporting the view that NPIs are grammaticalized in DI environments, but DI is not synchron. necessary for them (Herburger, 2023).

SELECTED REFERENCES

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