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(Non-)veridicality and PPI-hood: The case of the Russian attitude verb *polagat*¹

1. Introduction

PPIs are standardly defined as elements that cannot occur under the direct scope of negation (Szabolcsi 2004).

PPIs come in various shapes and forms (e.g.):

- existential in a nominal domain (English *some/somewhat*)
- disjunctions (French *soit soit* ‘either or’ in French (Spector 2014), French *ou* ‘or’ (Nicolae 2017) etc),
- universal modal verbs (*must* and *should* in English (Israel 1996, Iatridou and Zeijlstra 2009, Homer 2010a,b), *supposed_{deont}* (Homer 2010a))

Given this variation, we should not assume that there is a single uniform analysis that covers all cases.

While PPIs are defined as items that cannot occur under negation, it is also well established that in some cases this restriction is lifted (‘rescuing’) (Jespersen 1909–1949; Jackendoff 1969).

- (1) You didn't see something. * \neg something ✓ something \neg
- (2) I don't believe that you didn't see something. ✓ $\neg\neg$ something

Szabolcsi’s (2004) generalization: the PPI *some* can take scope under negation in the same types of environments in which the NPI *any* is licensed (e.g. under *surprise* and *regret*, in *if*-clauses, in the restrictor of *every*, under *only*, and in the restrictor and scope of *few*).

It is also well established that licensing conditions for NPIs differ cross-linguistically.

- In English, NPIs are licensed in downward-entailing environments (Fauconnier 1975, 1978; Ladusaw 1979).
- In other languages (such as Mandarin Chinese and Russian), NPIs are licensed in a wider set of environments that can be broadly characterized as non-veridical (Haspelmath 1997; Giannakidou 1998, 2011, 2018).

Non-veridical environments include all downward-entailing environments and, in addition, environments such as the scope of modal verbs, intensional verbs, generics, and disjunction.

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This is illustrated by the example of the Russian NPI *wh-libo*, which cannot occur in episodic contexts but is licensed in disjunction:

(3) **Episodic**

**Kto-libo iz Kolinix družej ostavil na podokonnike časy.*
 Who-libo from Kolja's friends left on windowsill watch.
 Intended: 'Some of Kolja's friends left the watch on the windowsill'.

(4) **Disjunction**

Kolja ili kto-libo iz ego družej ostavil na podokonnike časy.
 Kolja or who-libo from his friends left on windowsill watch.
 'Kolja or some of his friends left the watch on the windowsill'. Paducheva 2015

The natural **question** arises: are there any PPIs that are sensitive to non-veridicality in the same way as some NPIs are?

- One expected way such sensitivity would manifest itself is if non-veridicality served as a rescuing environment for a PPI—i.e. a set of environments in which a NEG–PPI configuration becomes acceptable.
- To our knowledge, no such PPI has been described so far.
- In this work, we aim to fill this gap.
- The empirical contribution of this work is a description of a PPI in the domain of attitude verbs that is sensitive to the veridicality of its environment.
- The theoretical contribution of this work is a proposal for a concrete grammatical mechanism that derives the properties of this PPI.

We do not claim that other PPIs in Russian or other languages have the same underlying mechanism.

After all, PPIs differ in many respects, apart from the property that unifies them: their inability to occur under negation.

2. The empirical description of the phenomenon

2.1 *Polagat'* is a PPI

The Russian attitude verb *polagat'* ('believe'/'think'/'suppose') cannot co-occur with negation. This restriction is well-documented and explicitly noted in dictionaries.

(5) *Ja polagaju, čto ty budeš eto delat'.*
 I believe that you will this do
 'I believe that he will do this'.

- (6) **Ja ne polagaju, čto ty budeš eto delat’.*
 I NEG believe that you will this do
 Indented: ‘I don’t believe that he will do this’.

By the most basic definition of PPI-hood—namely, that PPIs are items that cannot occur under negation—*polagat’* qualifies as a PPI.

2.2. Rescuing

We make a novel observation that *polagat’* shares with other PPIs the property of being rescuable: there are contexts in which NEG *polagat’* becomes acceptable.

Specifically, the co-occurrence of negation and *polagat’* is permitted in certain **non-veridical contexts**.

We will rely on the following (simplified) definition of veridicality:

an operator O is non-veridical iff Op does not entail p .

For instance:

- *Hope* is non-veridical because “I hope that p ” does not entail that p is true.
- A disjunction is non-veridical because “ p or q ” does not entail p , and it does not entail q .
- under *hope*:
 (7) *Ja nadejus’, ty ne polagaješ čto ja budu eto delat’.*
 I hope you NEG believe that I will this do
 ‘I hope you don’t believe I will do this’.
- in bias questions:
 (8) *Ne polagaješ li ty, čto ja budu eto delat’?*
 NEG believe li you that ja will this do?
 ‘You don’t believe that I will do this, do you?’. A positively biased question
- in conditional antecedents (both counterfactual and indicative):
 (9) *Esli trener ne polagaet, čto ty možeš eto sdelat’, on ne postavit tebja v komandu.*
 If coach NEG believe that you can this do he NEG will-put you in team
 ‘If the coach does not believe that you can do it, he will not put you on the team’.
- (10) *Esli by trener ne polagal, čto ty možeš eto sdelat’, on ne postavil by tebja v komandu.*
 If CONTR coach NEG believe that you can this do he NEG will-put CONTR you in team
 ‘If the coach did not believe that you can do it, he would not put you on the team’.

- In complex *libo-libo* disjunctions:

(11) *Trener libo ne polagaet, čto ty možeš eto sdelat', libo*
 coach either NEG believe that you can this do or
xočet postavit' svoju doč v komandu.
 want put self daughter in team
 'Either the coach does not believe that you can do it or he wants to put his daughter on the team'.

Clarification:

- We carefully said that NEG *polagat'* is acceptable in a subset of non-veridical environments.

For example, it is not acceptable under *think* that is standardly considered to be a non-veridical environment and has been reported to license NPIs in some languages (Giannakidou 1998, Paduceva 2015)

However, although it is globally non-veridical, it is veridical for the subject (i.e., “holder-veridical”), and this distinction will play a role in our account of this phenomenon.

(12) **Ja dumaju, ty ne polagaješ čto ja budu eto delat'.*
 I think you NEG believe that I will this do
 Intended: ‘I think you don’t believe I will do this’.

It is also not acceptable under some classical licensers of NPIs, such as *few* and *only*.

(13) **Malo kto ne polagajet, čto on budet eto delat'.*
 Few who NEG believe that he will this do
 Intended: ‘Few people don’t believe that he will do this’.

(14) **Tol'ko trener ne polagaet, čto ty možeš eto sdelat'.*
 Only coach NEG believe that you can this do
 Intended: ‘Only the coach does not believe that you can do it’.

The account we develop aims to explain the described rescuing pattern and its restrictions.

3. The analysis

3.1 The ban on NEG *polagat'*

We propose an account in the spirit of Zeijlstra (2022), according to which PPIs introduce a Non-Entailment-of-Non-Existence Condition – the mirror image of Lin’s Entailment-of-Non-Existence Condition (NENEC) for NPIs (Lin 1996, 1998).

We implement NENEC as a presupposition introduced by *polagat'*.

- *Polagat'* gets a standard semantics for *believe* in terms of universal quantification over doxastic alternatives.
- Its difference from English *believe* lies in this presupposition

Polagat' presupposes that p is compatible with the attitude holder's doxastic state.

$$(15) \llbracket \textit{polagat}' \rrbracket^{w_0} = \lambda p_{\langle s, t \rangle}. \lambda x_e: \exists w' [w' \in \text{Dox}(x, w_0) \ \& \ p(w')]. \forall w [w \in \text{Dox}(x, w_0) \rightarrow p(w)]$$

Under this analysis, a positive sentence containing *polagat'* can be either true or false.

- In addition, we propose that *polagat'* is an (obligatory) Neg-raiser.

We adopt an Exh-based account of neg-raising following Jeretič (2022) and Mirrazi & Zeijlstra (2023a, 2023b).

- *polagat'* introduces subdomain alternatives that **must** be applied to by Exh.
- *polagat'* differs from canonical Neg-raisers in that the insertion of Exh is obligatory.
- By adopting this assumption, we follow much of the literature on NPIs and PPIs (see Chierchia 2013, Spector 2014, Nicolae 2017 among others)

$$(16) \text{ LF: [Exh Sbj ne polagat}' \varphi]$$

- We assume the IE+II version of Exh.
- This version of Exh first negates all innocently excludable alternatives and then includes the rest of the alternatives (Bar-Lev & Fox 2020)

The prejacent:

$$(17) \llbracket \text{Sbj ne polagat}' \varphi \rrbracket^{w_0} = \text{T iff } \neg \forall w [w \in \text{Dox}(A, w_0) \rightarrow \lambda w'. \llbracket \varphi \rrbracket^{w'}(w)]$$

Assuming that the set of A's doxastic alternatives is $\{w_1, w_2\}$, we have two subdomain alternatives.

$$(18) \text{ ALT: } \{ \neg \forall w'' [w'' \in \{w_1\} \rightarrow \lambda w'. \llbracket \varphi \rrbracket^{w'}(w'')], \neg \forall w''' [w''' \in \{w_2\} \rightarrow \lambda w'. \llbracket \varphi \rrbracket^{w'}(w''')] \}$$

- These alternatives cannot be both negated consistently with the assertion of the prejacent and therefore are asserted.
- The resulting interpretation is equivalent to that of negation taking scope below the universal quantifier.

$$(19) \llbracket \text{Exh Sbj ne polagat}' \varphi \rrbracket^{w_0} = \text{T iff } \neg \forall w [w \in \{w_1, w_2\} \rightarrow \lambda w'. \llbracket \varphi \rrbracket^{w'}(w)] \ \& \ \neg \forall w'' [w'' \in \{w_1\} \rightarrow \lambda w'. \llbracket \varphi \rrbracket^{w'}(w'')] \ \& \ \neg \forall w''' [w''' \in \{w_2\} \rightarrow \lambda w'. \llbracket \varphi \rrbracket^{w'}(w''')] \\ = \text{T iff } \forall w [w \in \{w_1, w_1\} \rightarrow \lambda w'. \neg \llbracket \varphi \rrbracket^{w'}(w)]$$

This, however, contradicts the presupposition introduced by *polagat'*.

(20) $[[\text{Exh Sbj ne polagaet}' \varphi]]^{w_0}$ is defined only if $\exists w[w \in \{w_1, w_2\} \ \& \ \lambda w'. [[\varphi]]^{w'}(w)]$

This contradiction accounts for the ungrammaticality of *polagat'* under negation in unembedded contexts.

Accordingly, we predict that *ne polagat'* is acceptable in two cases:

- (i) when the presupposition projects in a way that does not contradict the asserted content;
- (ii) when no strengthening occurs despite the presence of Exh

Before we discuss each of the rescuing cases in detail, we first consider what happens in a positive context.

- By our assumption, in such a context *polagat'* also introduces subdomain alternatives and requires the insertion of Exh.
- However, the subdomain alternatives are weaker than the prejacent.
- Their inclusion does not change the meaning of the sentence.
- The application of Exh is vacuous.

(21) LF: $[\text{Exh Sbj polagaet}' \varphi]$

Domain alternatives (entailed by the assertion):

(22) $\{\forall w''[w'' \in \{w_1\} \rightarrow \lambda w'. [[\varphi]]^{w'}(w'')], \forall w''[w'' \in \{w_2\} \rightarrow \lambda w'. [[\varphi]]^{w'}(w'')]\}$

Exhasutification:

(23) $[[\text{Exh}(\text{Sbj polagaet}' \varphi)]]^{w_0} = \text{T}$ iff $\forall w[w \in \text{Dox}(A, w_0) \rightarrow \lambda w'. [[\varphi]]^{w'}(w)]$

4. Rescuing

4.1 The difference between *hope* and *believe*

We propose that this difference in the ability to host NEG *polagat'* lies in the interaction between the presupposition and the assertion in the two cases.

We assume the same LF for both cases:

(24) $[\text{I hope/believe} [\text{you Exh NEG polagaješ I will do this}]]$

This means that Neg-raising applies within the embedded clause in both cases.

We follow Karttunen (1973, 1974) and Heim (1992) and assume that if the embedded clause contributes the presupposition *p*, the resulting presupposition in both cases is 'x believes *p*'.

(25) **Presupposition in both cases:** I believe you allow for the possibility that I will do this.

In the case of *hope*, the presupposition is consistent with the assertion whereas in the case of *believe*, it is not.

- (26) \checkmark Hope: Assertion: In all of my preferred worlds you believe I will **not** do this.
Presupposition: I believe you allow for the possibility that I will do this.
- (27) *Believe: Assertion: I believe that you believe that I will **not** do this.
Presupposition: I believe you allow for the possibility that I will do this.

- The assertive content of *hope* concerns preference, while its presupposition concerns belief.
- In the case of *believe*, both the assertive content and the presupposition concern belief, and a contradiction arises, just as in the non-embedded cases.

4.2 Biased questions

Here the question is bias because of the presupposition introduced by *polagaet*: the speaker presupposes that the holder allows for the possibility that p.

4.3 Antecedents of conditionals

We propose that in the case of conditionals there is an LF where Exh is inserted, but no strengthening occurs.

- We assume that a conditional restricts the domain of a silent universal epistemic modal.
- This means that NEG *polagaet* is in a DE environment, since the restrictor of a universal is DE.
- Placing Exh outside the conditional does not lead to strengthening.
- The application of Exh in this position is predicted to be vacuous (see Jeretič 2021 for this reasoning).

- (28) [Exh[[\forall the coach does not believe that you can do it] [he not put you on the team]]]

- The included alternatives are weaker than the original existential in the domain of \forall
- The presupposition projects: $\exists w' [w' \in \text{Dox}(\text{coach}, w_0) \ \& \ \text{you can do it}(w')]$ (the coach allows for the possibility that you can do it)
- This presupposition is consistent with the speaker's ignorance about whether the coach believes p.

4.4 Disjunction

The problem:

- Regardless of the position of Exh – inside or outside of the disjunct where NEG *polagaet* appears, we predict strengthening of $\neg\forall$ to $\forall\neg$, which would violate *polagaet*'s projected presupposition
- The presupposition is predicted to project: $\exists w' [w' \in \text{Dox}(\text{coach}, w_0) \ \& \ \text{you can do it}(w')]$ (the coach allows for the possibility that you can do it)

- This is an unwelcome result, as it makes the presupposition incompatible with the first disjunct.
- The prediction is that the disjunction is used to express that the second disjunct is true.
- This violates Non-opinionatedness (NO): (Gazdar 1979, Schlenker 2008) the speaker must be ignorant of the truth of each disjunct.

(29) [(Exh) [Either (Exh) he does not believe you can do it or he wants to do it himself]]

A possible solution:

- Intuition: no strengthening occurs in this case.
- There exists a parse with no strengthening in disjunctions, even though Exh is inserted.
- Hirsch & Hackl (2014): last-resort local accommodation (operator **A**) to avoid violation of a specific pragmatic constraint (NO) (Heim 1983).

(30) [[Either Exh (**A** he does not believe you can do it) or he wants to do it himself]]

- The operator **A** makes the presupposition a part of the assertion.
- The resulting prejacent of Exh (in the first disjunct) is as shown in (31):

(31) $\exists w'[w' \in \text{Dox}(c, w_0) \ \& \ \text{you can do it } (w')] \ \& \ \exists w'[w' \in \text{Dox}(c, w_0) \ \& \ \neg \text{you can do it } (w')]$

- Here, Exh will apply, but no strengthening is possible.
- The predicted interpretation of the whole disjunction:

(32) **Either** [he allows the possibility that you can do it **and** also allows for the possibility that you cannot do it] **or** he wants to do it himself

In other words:

(33) Either he not fully sure about your ability to do it or he wants to it himself.

4.4 No rescuing in other DE environment

- *Ne polagat'* is **not acceptable** in other DE environments.
- We build on existing accounts of the anti-licensing of strict NPIs by presuppositions and implicatures (Gajewski 2011; Chierchia 2013).
- We conjecture that such cases are excluded by positive presuppositions or implicatures contributed by the sentence.

(34) **Malo kto ne polagajet, čto on budet eto delat'*.
 Few who NEG believe that he will this do
 Intended: 'Few people don't believe that he will do this'.

Here, the problem is *few*'s implicature: '*few, but some*' (derived by negating the alternative of *few - no one, zero*) (Gajewski 2011).

(35) [Exh few not polagajet that he will do it]

The alternative introduced by *few*:

(36) The negative alternative: [zero people not polagajut that he will do it]

- We also assume that subdomain alternatives are generated for (36).
- We propose that a single Exh operator evaluates all of these alternatives.
- This strengthening from *not believe p* to *believe not p* for these individuals leads to a conflict with the presupposition that the same individuals allow for the possibility that *p*.

Since each individual has their own set of dox alternatives, we represent the negative alternative as a disjunction of not *polagat'* claims.

Assume: $\text{Dox}(w_0, \text{individual A}) = \{w_1, w_2\}$, $\text{Dox}(w_0, \text{individual B}) = \{w_3, w_4\}$

(37) Negative alternative: $\neg(\exists w[w \in \{w_1, w_2\} \ \& \ \neg p(w)] \vee \exists w[w \in \{w_3, w_4\} \ \& \ \neg p(w)] \vee \dots)$

(38) $\text{Alt}_{\text{subdomain}} = \{\neg(\exists w[w \in \{w_1\} \ \& \ \neg p(w)] \vee \exists w[w \in \{w_3\} \ \& \ \neg p(w)] \dots);$
 $\neg(\exists w[w \in \{w_2\} \ \& \ \neg p(w)] \vee \exists w[w \in \{w_4\} \ \& \ \neg p(w)] \dots)\}$

- The negation of subdomain alternatives holds only if, for at least one individual, $\neg p$ is true in all of their doxastic worlds.
- Combined with the presupposition that this individual allows for the possibility of *p*, this results in a contradiction, leading to ungrammaticality.

6. The conclusion

In this talk, we made a novel empirical observation: there are PPIs that are sensitive to the veridicality of their environments.

This supports Szabolcsi's (2004) generalization about the close relationship between PPIs and NPIs: PPI rescuing environments are NPI-licensing environments.

Given that in some languages NPIs are licensed in non-veridical contexts, we expect to find PPIs that are rescued in such contexts.

We demonstrated that Russian *polagat'* meets the criteria for PPI-hood and is rescued in non-veridical contexts such as disjunction.

We proposed a concrete grammatical mechanism deriving the properties of *polagat'*: it is obligatorily a Neg-raiser, but also introduces a presupposition that is incompatible with Neg-raising in non-embedded cases.

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