

Anaphoric priority modals in attitude contexts

Jerra Lui Busch

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1 Zimmermann's Puzzle

Context: The legal department of the European Central Bank has a job opening.

- (1) Die EZB sucht einen Juristen, der EU-Bürger sein soll.
the ECB seeks a lawyer who EU-citizen be should
'The ECB is looking for a lawyer who should be an EU-citizen.'
- (2) Die EZB sucht einen Juristen, der EU-Bürger ist.
the ECB seeks a lawyer who EU-citizen is
'The ECB is looking for a lawyer who is an EU-citizen.'
- (3) Die EZB sucht einen Juristen. Er soll EU-Bürger sein.
the ECB seeks a lawyer he should EU-citizen be
'The ECB is looking for a lawyer. He should be an EU-citizen.'

In an unspecific reading, all three examples seem to share the same reading. This means that the sentence in (1) can be paraphrased by a modal-free sentence (2) and a paratactic discourse (3). A parallel canonical example behaves differently, as shown below:¹

Context: Several members of a teen gang were recently sentenced to 90 hours of community service. The FAZ is now looking to interview one of them.

¹The symbol ® is used to indicate that the intended reading is not available.

- (4) Die FAZ sucht eine jugendliche Straftäterin, die gemeinnützige Arbeit leisten muss.
 the FAZ seeks a juvenile offender who community service perform must
'The FAZ is looking for a juvenile offender who must perform community service.'
- (5) [Ⓢ]Die FAZ sucht eine jugendliche Straftäterin, die gemeinnützige Arbeit leistet.
 the FAZ seeks a juvenile offender who community service performs
'The FAZ is looking for a juvenile offender who performs community service.'
- (6) [Ⓢ]Die FAZ sucht eine jugendliche Straftäterin. Sie muss gemeinnützige Arbeit leisten.
 the FAZ seeks a juvenile offender. she must community service perform
'The FAZ is looking for a juvenile offender. She must perform community service.'

(5) does not paraphrase the unspecific reading of (4): The modal cannot be omitted without changing the meaning of the sentence. (6) paraphrases only the specific reading of (4).

Going back to Zimmermann's puzzle, there are two questions that arise in connection with example (1), one concerning the role of the modal, the other one concerning the status of the relative clause.

Q1: The sentence (1) can be paraphrased with the modal-free version in (2).
 - Is the modal in (1) semantically empty?

Q2: In our preferred reading, the sentence (1) can be paraphrased by a sentence with a restrictive relative clause and by a paratactic discourse (hinting at appositive structure).
 - What type of relative clause is involved in the reading we are interested in in (1)?

2 Data discussion

2.1 Q1: Is the modal semantically empty?

Counterexample 1: Hypothetical, attitude-dependent content

Context: Otto organizes the accomodation of the guest speakers at a conference.

- (7) Otto sucht ein Hotel, in dem die Gastsprecher unterkommen sollen.
Otto seeks a hotel in which the guest speakers be accommodated should
‘Otto is looking for a hotel in which the guest speakers should be accommodated.’
- (8) [⊗]Otto sucht ein Hotel, in dem die Gastsprecher unterkommen.
Otto seeks a hotel in which the guest speakers are accommodated
‘Otto is looking for a hotel in which the guest speakers are accommodated.’
- (9) Otto sucht ein Hotel. Dort sollen die Gastsprecher unterkommen.
Otto seeks a hotel there should the guest speakers be accommodated
‘Otto is looking for a hotel. There, the guest speakers should be accommodated.’

(7) can only be paraphrased by the discourse but not by the modal-free sentence in (8). The modal is responsible for a hypothetical, attitude-dependent interpretation of the relative clause. This interpretation is not featured in (1), hence the omission of the modal seems to have no consequences.

Counterexample 2: Possibility modals

Context: The legal department of the European Central Bank has a job opening.

- (10) Die EZB sucht einen Juristen, der EU-Bürger sein darf.
the ECB seeks a lawyer who EU-citizen be may
‘The ECB is looking for a lawyer who may be an EU-citizen.’
- (2) [⊗]Die EZB sucht einen Juristen, der EU-Bürger ist.
the ECB seeks a lawyer who EU-citizen is
‘The ECB is looking for a lawyer who is an EU-citizen.’
- (11) Die EZB sucht einen Juristen. Er darf EU-Bürger sein.
the ECB seeks a lawyer he may EU-citizen be
‘The ECB is looking for a lawyer. He may be an EU-citizen.’

The modal in (10) clearly contributes to the sentence meaning in terms of modal force. Therefore, the modal-free sentence, which paraphrased (1), cannot function

as a paraphrase here. The discourse paraphrase, however, is available.

Counterexample 3: Third reading

Context: Otto wants to augment his wardrobe with a new jacket.

- (12) Otto sucht eine neue Jacke, die aus Kunstleder sein soll.
Otto seeks a new jacket which of imitation leather be should
'Otto is looking for a new jacket which should be made of imitation leather.'
- (13) Otto sucht eine neue Jacke, die aus Kunstleder ist.
Otto seeks a new jacket which of imitation leather is
'Otto is looking for a new jacket which is made of imitation leather.'
- (14) Otto sucht eine neue Jacke. Sie soll aus Kunstleder sein.
Otto seeks a new jacket it should of imitation leather be
'Otto is looking for a new jacket. It should be made of imitation leather.'

Context: Otto wants a jacket made out of imitation leather because it is not as expensive as real leather. Imitation leather is also vegan. Otto does not care about veganism. Still:

- (15) ?#Otto sucht eine neue Jacke, die vegan sein soll.
Otto seeks a new jacket which vegan be should
'Otto is looking for a new jacket which should be vegan.'
- (16) Otto sucht eine neue Jacke, die vegan ist.
Otto seeks a new jacket which vegan is
'Otto is looking for a new jacket which is vegan.'
- (17) ?#Otto sucht eine neue Jacke. Sie soll vegan sein.
Otto seeks a new jacket it should vegan be
'Otto is looking for a new jacket. It should be vegan.'

In this context, (16) seems to be the most suitable example because it can receive a third reading. (15) and (17), both containing the modal, are considerably worse in this context. The difference here is that the modal marks *being vegan* as part of Otto's search intentions when he is looking for a new jacket. This contradicts the suggested context. The use of the modal in these examples makes it very difficult to have a third reading because the modal identifies its complement as part of the attitude-holders intentions.

Conclusion: The embedded modal in our examples cannot be seen as semantically empty because it is an intention-marker, an intensional shifter and can influence the interpretation with its modal force. The modal may appear redundant in (1) because these aspects have been neutralized in this particular example:

- The modal's complement inside the relative clause in this example is not attitude-dependent. Hence, there is no hypothetical content that needs to be shifted by an intensional operator
- The necessity modal *soll* matches the attitude in modal force, strength and flavor. Because of the lack of mismatch in this area, the modal appears to be redundant in this regard
- The third reading, where the content of the relative clause is not seen as part of the attitude holder's intentions, can only come out with an adequate motivation through context and world knowledge. This is, however, not given in Zimmermann's Puzzle, which is why the third reading is not very prominent in the modal-free example (2)

A specific type of modal anaphoricity is responsible for the reading in (1) and parallel examples. The embedded modal is able to anaphorically refer to the matrix attitude. This is only possible when attitude and modal share the same type of modality, which can be either teleologic, buletic or deontic (*Priority Modals*, cf. Portner (2009)). Crucially, they do not have to match in quantificational force.

- (18) Die EZB sucht/wünscht sich/verlangt einen Juristen, der EU-Bürger
the ECB seeks/wishes for/demands a lawyer who EU-citizen
sein kann/darf/sollte/soll/muss.
be can/may/ought to/should/must

2.2 Q2: What type of relative clause is involved?

The attachment of relative clauses with indefinites is always a tricky subject, and the involvement of intensionality in our data does not make it easier (cf. Busch & Schumann 2016).

In our examples, there is evidence for both the restrictive and the appositive relative clause. In this talk, I will only present the results that are relevant for an analysis of the phenomenon. A thorough investigation on this topic can be found in my thesis.

The relative clause seems to be ambiguous.

- (1) Die EZB sucht einen Juristen, der EU-Bürger sein soll.
the ECB seeks a lawyer who EU-citizen be should
'The ECB is looking for a lawyer who should be an EU-citizen.'
- (10) Die EZB sucht einen Juristen, der EU-Bürger sein darf.
the ECB seeks a lawyer who EU-citizen be may
'The ECB is looking for a lawyer who may be an EU-citizen.'

Arguments for a restrictive relative clause:

- Intuitively, (1) appears to express restriction
 - The option of having a modal-free paraphrase with an unambiguously restrictive relative clause suggests that at least in the original example, the relative clause is restrictive too
 - The relative clause is interpreted below the scope of sentence negation
- (19) Es ist nicht der Fall, dass die EZB einen Juristen sucht, der EU-Bürger sein darf/soll.
it is not the case that the ECB a lawyer seeks who EU-citizen be may/should
'It is not the case that the ECB is looking for a lawyer who may/should be an EU-citizen.'

Arguments for an appositive relative clause:

- Intuitively, (10) appears to express apposition
- The option of having a discourse paraphrase suggests that these examples contain an appositive relative clause

Conclusion: The intended reading seems to be available both with a restrictive and an appositive relative clause.

3 Towards an analysis

These are the results of our data discussion:

- Zimmermann's Puzzle represents a special case of the phenomenon that is not representative
 - The reading we are interested in is compatible with both a restrictive and an appositive relative clause, hence we have to account for both types of relative clauses
 - Instead of a semantically empty modal, an anaphoric relation between the matrix attitude and the embedded modal is the crucial feature of the reading
- (1) Die EZB sucht einen Juristen, der EU-Bürger sein soll.
the ECB seeks a lawyer who EU-citizen be should
'The ECB is looking for a lawyer who should be an EU-citizen.'
- (20) *Quine-Hintikka-Zimmermann-approach:*
seek'(P)(x)(w) = try'(λw'.∃y[P(y)(w') & find'(y)(x)(w')])(x)(w)
- (21) $\forall w' \in ATT(w_0) : [\exists y[P(y)(w') \dots \forall w'' \in MAX_{<g(w')}(\cap f_{circ}(w')) : [Q(y)(w'')]]]$
- (22) $\forall w' \in GOAL_{ECB}(w_0) : \exists y[lawyer(y)(w') \& find(y)(ECB)(w') \& \forall w'' \in MAX_{<g_{tel}(w')}(\cap f_{circ}(w')) : [be\ an\ EU-citizen(y)(w'')]]]$
- (23) $\forall w' \in GOAL_{ECB}(w_0) : \exists y[lawyer(y)(w') \& find(y)(ECB)(w') \& \forall w'' \in MAX_{<g_{GOAL_{ECB}(w_0)}}(\cap f_{circ}(w_0)) : [be\ an\ EU-citizen(y)(w'')]]]$

Final construal with anaphoric ordering source and historical modal base:

- (24) $\forall w' \in GOAL_{ECB}(w_0) : \exists y[lawyer(y)(w') \& find(y)(ECB)(w') \& \forall w'' \in MAX_{<g_{GOAL_{ECB}(w_0)}}(\cap f_{hist}^t(w')) : [be\ an\ EU-citizen(y)(w'')]]]$
In all worlds w' in which the ECB's goals in w₀ are reached, there is a lawyer that the ECB finds, and in all of the future continuations w'' that best comply with the ECB's goals in w₀, the lawyer (found in w') is an EU-citizen.

The appositive reading is analyzed as a case of modal subordination, similar to examples like (25):

- (25) A thief might break into the house. He would take the silver. (Roberts (1989), attributed to Fred Landman p.c.)

4 Conclusion

Q1: Is the modal semantically empty?

No, but it can be considered redundant in some special cases, like in (1). Generally, the modal in our data is not semantically empty but its ordering source is anaphoric to the matrix attitude.

$$(26) \quad \forall w' \in \mathbf{ATT}(\mathbf{w}_0) : [\dots \underbrace{\forall w''}_{lexical} \in \underbrace{MAX}_{anaphoric} < \underbrace{g_{\mathbf{ATT}(\mathbf{w}_0)}}_{anaphoric} (\cap \underbrace{f_{hist}^t}_{structural}(w')) : [\dots]]$$

The modal functions as an intensional shifter, an intention-marker, and can influence the modal force of the matrix attitude concerning the embedded property.

Q2: What type of relative clause is involved in our data?

The phenomenon is compatible with both the restrictive and the appositive relative clause.

5 References

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