

The Shiftability of German Appositive Relatives across Intensional Contexts: Two Experimental Studies

Todor Koev

1. Introduction

Supplemental expressions typically entail commitments for the utterer of the sentence (see e.g. Chierchia & McConnell-Ginet, 2000; Potts, 2005). In (1), the speaker is committed to what the appositive relative clause (the bracketed part) says, i.e., that Lance won seven titles. The speaker orientation of the appositive is retained when the sentence is placed in the syntactic scope of entailment-canceling operators such as negation, a possibility modal, an *if*-operator, or a question operator, as witness (2).

- (1) Lance, [who won seven titles]_{speaker}, cheated his way to the top.
- (2)
 - a. It's not true that Lance, [who won seven titles]_{speaker}, cheated his way to the top.
 - b. It's possible that Lance, [who won seven titles]_{speaker}, cheated his way to the top.
 - c. If Lance, [who won seven titles]_{speaker}, cheated his way to the top, then he has no integrity.
 - d. Did Lance, [who won seven titles]_{speaker}, cheat his way to the top?

However, appositives are not invariably speaker oriented. They can occasionally be shifted to the perspective of an attitude holder. Two examples of shifted appositives are given in (3)-(4).

- (3) Joan is crazy. She's hallucinating that some geniuses in Silicon Valley have invented a new brain chip that's been installed in her left temporal lobe and permits her to speak any of a number of languages she's never studied. She believes that, thoughtfully, they installed a USB port behind her left ear, so the chip can be updated as new languages are available. Joan believes that her chip, [which she had installed last month]_{Joan}, has a twelve year guarantee. (Amaral *et al.*, 2007)
- (4) Poor Joan seems to have grown crazier than ever. She now claims that her apartment was bugged by the Feds, [who are listening to her every word]_{Joan}. (Harris & Potts, 2009)

Data as these are surprising because they posit a challenge to most theories of appositive projection, which predict that appositive content, along with other not-at-issue content, is obligatorily anchored to the speaker (see e.g. Potts, 2005; Simons *et al.*, 2010; but see also Schlenker, 2009). The research question that this paper is trying to answer is the following: What factors enable a perspective shift of appositives? I report two experimental studies from German that directly address this question. The experiments show (i) that verbs of saying are more likely to lead to shifted interpretations than other attitude predicates, and also (ii) that the German second subjunctive (*Konjunktiv II*), which has reportative uses, facilitates perspective shift. The major theoretical implication of this work is that secondary speech contexts are the prototypical appositive shifters.

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The paper is structured as follows. In Section 2, I briefly review previous work on shifted appositives. In Sections 3 and 4, I present Experiments 1 and 2, respectively. Section 5 introduces the formal proposal and Section 6 looks at possible extensions to other phenomena involving perspective shift. I conclude the paper in Section 7.

2. Previous work on shifted appositives

Amaral *et al.* (2007) were among the first to notice that appositives are not invariably speaker oriented. They suggest that non-speaker orientation of appositives is a reflex of another, more basic pragmatic phenomenon, i.e., indexical shift. Harris & Potts (2009) demonstrate experimentally that appositive shift is a robust phenomenon. They had two conditions (syntactic embedding under verbs of saying vs. no embedding), which allowed them to conclude that even though shifted interpretations are more likely for syntactically embedded appositives, they arise with unembedded appositives as well. Based on that, Harris & Potts argue that shifted appositives are not interpreted in the scope of an operator but rather arise through some pragmatic mechanism. Building on this previous work, Koev (2013) proposes that the perspective of appositives depends on the speech context with respect to which they are interpreted. In the default case, appositives latch on to the utterance context and thus receive speaker oriented interpretations. If, however, a secondary speech context is made available (e.g., because it is overtly introduced by a verb of saying or can be somehow inferred), appositives can also be anchored to the agent of that secondary context and undergo perspective shift.

The claim that appositive shift is a pragmatic rather than a semantic phenomenon is supported by the fact that shifted appositives need not be interpreted in the scope of attitude predicates. This is harder to see in (3) or (4), where the embedding verb (*believe* or *claim*, respectively) picks up on Joan's troubled mental state, already introduced in the previous discourse. But let us consider cases in which the embedding verb has a negative meaning and thus excludes beliefs from the attitude holder, as in (5). If the shifted interpretation was indeed obtained through semantic embedding, we would expect that the sentence receives the interpretation in (5a), where *doubt* takes scope over the appositive. Instead, the reading obtained is as in (5b), where the attitude holder does not doubt but rather believes the appositive content. If so, appositive shift must arise through some pragmatic mechanism.

- (5) *Joan is crazy. She's hallucinating that some geniuses in Silicon Valley have invented a new brain chip that's been installed in her left temporal lobe and permits her to speak any of a number of languages she's never studied. She's now worried about the battery life of her chip.*

Joan doubts that her chip, [which she had installed ten years ago]_{Joan}, will last for another year.

- a. #Joan doubts that she had her chip installed ten years ago and that it will last for another year.
- b. Joan thinks that she had her chip installed ten years ago and doubts that it will last for another year.

All previous authors only discussed appositive shift in English. It is therefore important to ask whether the phenomenon generalizes to other languages as well, e.g. to languages which can create modal environments by grammatical tools like reportative mood that are unavailable in English. The following two experiments focus on German and put to test the claim of Koev (2013) that speech contexts are the prototypical appositive shifters. At the same time, this work aims to uncover the extent to which appositives can shift in non-speech attitudinal contexts, such as belief or dream contexts. In particular, while one might observe shifting across a variety of modal environments, there are likely to be various degrees to which different environments support shifting. In order to tap into these questions, I manipulated two variables (attitude verb type and mood) and investigated their effect on appositive shift in German.

3. Experiment 1

In this experiment, I looked at intensional contexts created by four types of attitude verbs: verbs of saying, believing, dreaming, and imagining. The choice of these verb types was motivated by the need for

some diversity of intentional contexts. I thus picked two attitudes of acceptance (introduced by verbs of saying and believing), which commit the attitude holder to the embedded proposition, and two fiction attitudes (introduced by verbs of imagining and dreaming), which do not.¹ In addition, speech contexts differ from believe/imagine/dream contexts in that they involve two parties, i.e. a speaker and a hearer. By selecting attitude verbs with different features, I hoped to be able to draw generalizations about the shifting properties of a wider range of modal environments.

In addition to verb type, Experiment 1 included mood as a factor. Modern German makes a grammatical distinction between the indicative and the so-called second subjunctive (or *Konjunktiv II*). The second subjunctive has two major uses: a counterfactual use and a reportative use, and, given the discussion in Section 2, it is especially the latter use that is expected to have an impact on appositive shift.² Controlling for mood is then crucial if one wants to ensure that the possibility of appositive shift is not blocked by inappropriate mood marking. Including the second subjunctive also gives us the opportunity to evaluate the impact of grammatical mood on appositive shift.

I now present the experiment itself. 32 undergraduate students at the University of Stuttgart participated. They received a nominal amount of compensation.

The experiment employed a 4×2 design and test items varied across two factors: verb type and mood. The verb type variable had four levels for verbs of saying, *glauben* ‘believe’, *träumen* ‘dream’, and *sich vorstellen* ‘imagine’.³ The mood variable had two levels: indicative vs. subjunctive. Test items were drawn from six sets. Each test item set consisted of two tokens with a say verb (which only differed in mood marking) and two tokens with a non-say verb (which too only differed in mood marking). There were six test item sets (two sets for each of the three non-say verbs) and four tokens per set, thus amounting to a total of 24 test items. There were only six fillers. Four lists were created with 12 stimuli in them, of which six were test items and six were fillers.

Questionnaires were distributed among participants and each participant saw one test item per set and all fillers, all presented in a pseudorandomized order. Test items consisted of two-sentence discourses. The second sentence contained an appositive relative clause in the syntactic scope of an attitude verb and the initial sentence aimed to reinforce the speech context associated with this attitude verb. Participants were asked to read the sentences and attribute a belief or opinion towards the content expressed by the appositive to the person delivering the utterance, the subject of the sentence, or neither. This last option provided a fallback strategy for cases in which a shifted reading is unavailable yet a default speaker oriented reading feels pragmatically implausible.⁴ Below is a sample test item (together with an English translation) in which the appositive is embedded under *sagen* ‘say’ and marked by the subjunctive mood.

<p>Mein Onkel teilt oft seine verrückten Ideen mit mir. Er sagt, dass meine Tante, die eine Außerirdische wäre, ihn entführen will.</p>

<p><i>Von wem stammt die Information, dass meine Tante eine Außerirdische wäre?</i></p>

<p>A. von mir B. von meinem Onkel C. weiß nicht</p>

<p>My uncle often shares his crazy ideas with me. He says that my aunt, who is.SUBJ an alien, wants to hijack him.</p>
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<p><i>Whose opinion is it that my aunt is.SUBJ an alien?</i></p>
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<p>A. mine B. my uncle’s C. can’t tell</p>
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¹ In other words, “*A* said/believes that *p*”, if uttered truthfully, commits *A* to *p* while “*A* imagined/dreamed that *p*” does not.

² The German first subjunctive (or *Konjunktiv I*) only has reportative uses (see Schlenker, 2003; Fabricius-Hansen & Sæbø, 2004; Potts, 2005). However, this mood form is barely found in colloquial German and thus was excluded from the experiment.

³ There were as many test items with say verbs as there were items with all non-say verbs (see below). I used different lexical forms for the former but stuck with the same forms for the latter.

⁴ In a similar experiment involving English appositives, Harris & Potts (2009) included as a third option the perspective of both the speaker and the attitude holder. However, judging double perspectives seems challenging.

1. Our professor says that Justin Bieber, who can.IND not sing, became famous only because of his looks.
2. Our professor believes that Justin Bieber, who can.IND not sing, became famous only because of his looks.
- In which sentence is it more likely to attribute the thought that Justin Bieber can.IND not sing to the professor?*
- A. first sentence B. second sentence C. no difference

Given the findings in Experiment 1, we expect that sentences with verbs of saying are a more likely selection than sentences with other attitude verbs for attributing beliefs to the attitude holder. We also know that German mood is a factor in appositive shift. However, since each pair of sentences to be compared shared the same mood marking (either the indicative or the subjunctive), we expect a weaker effect of mood, if any. Table 2 summarizes the core findings for each comparison.

say verbs vs. ‘imagine’	say verbs vs. ‘dream’	say verbs vs. ‘believe’	say verbs vs. non-say verbs
56.25% vs. 18.75%	56.25% vs. 15.63%	50% vs. 12.5%	54.17% vs. 15.63%

Table 2: Rates for association with shifted interpretations for different competitor verbs.

We note that verbs of saying are most easily associated with a shifted interpretation of the appositive. The mean of the response variable of $\mu = 0.69$ (where response = 1 if a say sentence was chosen, response = 0 if a non-say sentence was chosen, and response = 0.5 if answer C was chosen) also suggests that verbs of saying have a privileged status.⁵

A logistic regression model was fitted to the data. Answer C (“no difference”) was chosen about 30% of the time and thus could not be excluded. To ensure a binary response, this answer was taken to contribute to the weight of the choice between answers A and B but was not considered a separate response. There was no significant effect of mood marking ($p = 0.24$), which is less surprising: even though mood was one of the manipulated variables, the direct comparison between the two sentences did not involve a contrast in mood. However, there was a highly significant contrast between verbs of saying vs. non-say verbs in general and for each of the individual comparisons ($p < 0.001$). Importantly, in this experiment there was no indication that ‘dream’ is special: this verb was not found to be a stronger competitor to verbs of saying than e.g. ‘imagine’.

Let us look back at the results for both experiments. Participants in Experiment 1 were asked to attribute a belief to the speaker or the attitude holder, and manipulated the verb type of the embedding predicate and the mood of the appositive relative clause. Appositive shift turned out to be most likely to occur in the presence of a verb of saying or the subjunctive mood. Experiment 2 asked participants to select the better sentence form for attributing an opinion to the attitude holder when attribution to the speaker was not an option, pitting verb types against each other and varying the mood shared among the two competing sentences. The results demonstrated that participants have a preference for a sentence with a say verb over a sentence with a non-say verb. The combined findings of the two experiments show that while German appositive relative clauses can shift in the presence of different intensional contexts, such readings are most likely to occur in the presence of secondary speech contexts.

5. Formal proposal

I have presented experimental evidence that appositive relative clauses in German are shiftable to various degrees depending on the type of the modal environment present. In order to explain the observed patterns, we need (at least) two things: (i) a mechanism that explains the dependency of shifted appositives on intensional contexts, one that is not based on semantic binding (recall example (5)); (ii) a constraint that derives the preferences for particular intensional contexts.

Regarding (i), I propose that shifted appositives are linked to intensional contexts by the mechanism of *discourse anaphora* (see Karttunen, 1976 and much subsequent work). Discourse anaphora is a

⁵ Notice that the sum of the percentages in each comparison is less than 100% because of the possibility of answer C (“no difference”).

referential dependency that is not based on syntactic scope and can cross sentential boundaries. If there is no intensional context introduced in the discourse, an appositive is linked to the context of utterance, which is always implicitly present. If, however, another intensional context is saliently present, appositives can latch on to it and undergo perspective shift.

As for (ii), the preferences for appositive shift seem sensitive to the *structure* of intensional contexts. Speech contexts have the richest structure and include a speaker, a hearer, their discourse commitments, as well as various locational parameters such as the world/time/place of the utterance (see Kaplan, 1989; Farkas & Bruce, 2010; a.o.). Other attitudinal contexts, such as belief contexts, have a more impoverished structure and lack the equivalents of a hearer and her commitments yet contain an agent, her belief worlds, and the locational coordinates to which the belief worlds are anchored. Other intensional contexts could be even simpler and lack further coordinates.⁶ I assume that appositives are by default linked to the utterance context (cf. AnderBois *et al.*, 2013; Koev, 2013), which explains why these constructions are typically speaker oriented, as seen from (1)-(2). The preferences for shifted appositives follow from differences in context structure. Secondary speech contexts, typically introduced by verbs of saying, have a structure identical to utterance contexts: both are just speech contexts. This is why appositives can shift to such contexts most easily. Non-speech contexts (e.g., those introduced by *believe*, *imagine*, etc.) have a similar structure but lack a theme coordinate and an associated proposition (the equivalent of a hearer and her commitments). While appositives can in principle shift to such contexts, this option is dispreferred. The basic idea then is that the farther we move away from the utterance context, the more difficult shifting becomes. This reasoning derives the following preference constraint on appositive perspective.

- (6) *Context preferences for appositive perspective*
utterance contexts > secondary speech contexts > attitudinal non-speech contexts

To make these ideas explicit, I sketch a dynamic semantic account which represents intensional contexts and facilitates anaphora to such contexts. I introduce an update semantics in which sentential terms are functions from information states to information states, where information states are modeled as sets of assignment functions (cf. Heim, 1982; Beaver, 2001; a.o.).⁷ The semantics has two complex non-sentential terms, interpreted as shown.

- (7) *Non-sentential terms*
a. $\llbracket \mathbf{ag}(c) \rrbracket^g = \text{the agent of } \llbracket c \rrbracket^g$
b. $\llbracket \mathbf{con}(c) \rrbracket^g = \text{the propositional content of } \llbracket c \rrbracket^g$

The first term, $\mathbf{ag}(c)$, refers to the agent of the context represented as c . Depending on the particular context, this could be the speaker, the believer, etc. The second term, $\mathbf{con}(c)$, refers to the propositional content of a context, i.e., the set of worlds compatible with what is said, believed, etc.

The interpretation rules for sentential terms are as stated below.

- (8) *Sentential terms*
a. $\sigma \llbracket R_p(t_1, \dots, t_n) \rrbracket = \{g \in \sigma \mid \text{for all } w \in \llbracket p \rrbracket^g : \langle w, \llbracket t_1 \rrbracket^g, \dots, \llbracket t_n \rrbracket^g \rangle \in \llbracket R \rrbracket^g\}$
b. $\sigma \llbracket t_1 = t_2 \rrbracket = \{g \in \sigma \mid \llbracket t_1 \rrbracket^g = \llbracket t_2 \rrbracket^g\}$
c. $\sigma \llbracket t_1 \neq t_2 \rrbracket = \{g \in \sigma \mid \llbracket t_1 \rrbracket^g \neq \llbracket t_2 \rrbracket^g\}$
d. $\sigma \llbracket \varphi \wedge \psi \rrbracket = \sigma \llbracket \varphi \rrbracket \llbracket \psi \rrbracket$
e. $\sigma \llbracket \exists v \rrbracket = \{h \mid \exists g \in \sigma : g \text{ and } h \text{ differ at most w.r.t. the value they assign to } v\}$
f. $\sigma \llbracket \mathbf{say}_p(x, q) \rrbracket = \{g \in \sigma \mid \text{for all } w \in \llbracket p \rrbracket^g : \text{SAY}(w, \llbracket x \rrbracket^g) \subseteq \llbracket q \rrbracket^g\}$

Starting with (8a), non-logical relations are required to hold throughout a set of possible worlds (see Stone, 1997). Roughly, $\mathbf{smart}_p(x)$ says that the referent of x is smart in all the worlds of the proposition expressed by p . In embedded environments, this is the proposition expressed by $\mathbf{con}(c)$, where c refers

⁶ For example, modal auxiliaries introduce contexts which may have certain locational parameters but seem to lack agents.

⁷ The semantics presented here is spelled out in full in Koev (2013).

to the context introduced by the closest modal operator. In unembedded environments, this is simply the speaker's commitment worlds, represented as $\mathbf{con}(u)$, where u refers to the utterance context. Sentential terms that state a logical relation are not relativized to sets of worlds, see (8b)-(8c). Dynamic conjunction proceeds left to right (8d), and existential quantification over v introduces into the information state minimally different assignment functions that can map v to any value (8e). The term $\mathbf{say}_p(x, q)$ means the referent of x is publicly committed to the proposition expressed by q in all the worlds in p (8f).

Finally, I introduce the following abbreviations for verbs of saying and the German second subjunctive. (Here, φ stands for an arbitrary sentential term.)

(9) *Abbreviations for modal operators*

- a. Verbs of saying: $\mathbf{SAY}_p^c(x, \varphi) := \exists c \wedge x = \mathbf{ag}(c) \wedge \varphi_{\mathbf{con}(c)} \wedge \mathbf{say}_p(x, \mathbf{con}(c))$
- b. The German second subjunctive: $\mathbf{SUBJ}_c(\varphi) := \varphi_{\mathbf{con}(c)} \wedge c \neq u$

According to (9a), verbs of saying introduce a speech context (represented as c) whose agent is the speaker and require that the complement holds throughout the speaker's commitment worlds, represented as $\mathbf{con}(c)$.⁸ The German second subjunctive requires that its complement holds in the worlds of some previously introduced context that is not the utterance context (represented as u), see (9b). Put simply, the German subjunctive conventionally encodes perspective shift.

This semantics and the preference constraint in (6) derive the core experimental findings. Let us assume that the sentence in (10a) is uttered in a discourse in which no intensional context has been introduced. If so, the appositive (as well as the main clause) can only be anaphoric to the utterance context and will commit its speaker to the proposition that Gina is an alien and that she was born on Mars. (The appositive contribution to the logical representation is underlined.)

- (10) a. Gina, die eine Außerirdische ist, ist am Mars geboren.
 ‘Gina, [who is.IND an alien]_{speaker}, was born on Mars.’
 b. $\exists x \wedge x = gina \wedge \underline{alien_{\mathbf{con}(u)}(x)} \wedge born.on.mars_{\mathbf{con}(u)}(x)$

(11) differs from (10) in that a secondary speech context, represented as c , is introduced by a verb of saying. In principle, the appositive could be anaphoric to either the utterance context or that secondary speech context. However, the presence of the subjunctive mood forces the latter option and the appositive obligatorily shifts.

- (11) a. Hans sagt, dass Gina, [die eine Außerirdische wäre]_{Hans}, am Mars geboren ist.
 ‘Hans says that Gina, who is.SUBJ an alien, was born on Mars.’
 b. $\exists x \wedge x = hans \wedge \mathbf{SAY}_{\mathbf{con}(u)}^c(x, \exists y \wedge y = gina \wedge \underline{\mathbf{SUBJ}_c(alien_{\mathbf{con}(c)}(y))} \wedge$
 $born.on.mars_{\mathbf{con}(c)}(y))$

A similar example with a non-say attitude verb and without the subjunctive mood marking on the appositive should still be compatible with a shifted reading. However, given the preference hierarchy in (6), such a reading is expected to be more difficult to get.

6. Extensions

This paper was devoted to the shifting properties of German appositive relatives across intensional contexts. Nothing about what I have proposed depends on this particular construction, though. We have uncovered patterns about the interaction between intensional contexts and perspective sensitivity that are expected to generalize across empirical domains. A first hint that this expectation is met is the fact that main clauses can undergo perspective shift as well. This is shown in (12) for German, where the last sentence has the subjunctive mood and is necessarily attributed to Martin's say-worlds. If pronounced with the right intonation, English main clauses can shift too, even without the help of mood marking (13).

⁸ Other attitude predicates can be represented similarly. For example, $\mathbf{BEL}_p^c(x, \varphi)$ could abbreviate $\exists c \wedge x = \mathbf{ag}(c) \wedge \varphi_{\mathbf{con}(c)} \wedge \mathbf{bel}_p(x, \mathbf{con}(c))$, where $\sigma[\mathbf{bel}_p(x, q)] = \{g \in \sigma \mid \text{for all } w \in \llbracket p \rrbracket^g : \mathbf{DOX}(w, \llbracket x \rrbracket^g) \subseteq \llbracket q \rrbracket^g\}$.

- (12) Der arme Martin hat nicht mehr alle Tassen im Schrank. Er sagt, die Polizei hätte seine Wohnung verwanzt. [Sie hätten ihn auf Schritt und Tritt überwacht]_{Martin}.
'Poor Martin has gone crazy. He says the police has.SUBJ bugged his apartment. They have.SUBJ put him under surveillance.'
- (13) Poor Joan seems to have grown crazier than ever. She now claims that her apartment was bugged by the Feds. [They are listening to her every word]_{Joan}.

These data are barely surprising. Like appositives, main clauses are usually anchored to the speaker. It is then expected that in the right environment their perspective is able to shift. This shift can be captured by the same mechanism as the one proposed above for appositives.

Another phenomenon that points in the same direction involves shifted indexical pronouns. In English, first and second pronouns are necessarily tied to the utterance context (barring occurrences in direct quotations). For example, *I* invariably refers to the speaker and *you* always picks out the hearer. However, indexical pronouns can undergo perspective shift in some languages (see e.g. Schlenker, 2003; Anand, 2006; Sudo, 2012). Here is an example from Kurmanji (Iranian).

- (14) Ehmet go k1 ez_{speaker/Ehmet} e nexoş-im.
Ehmet.ERG say.PART that I.NOM COP ill-1SG
'Ehmet said that I am / he (=Ehmet) is ill.' (Koev, 2013)

Pronominal shift is similar to appositive shift in at least one crucial respect. Depending on the language and/or the indexical element, pronominal shift is either only possible or most easy in the presence of verbs of saying (see the references above). In other words, pronominal shift seems to obey similar preferences as the ones we observed in appositives.

7. Conclusion

I have presented experimental evidence that appositive relatives in German can undergo perspective shift under different attitude verbs and moods. Such shifted readings were found to occur most often in the presence of verbs of saying or when the appositive is marked by the subjunctive mood. I proposed to account for this pattern by making appositives anaphoric to the intensional context at hand and sensitive to its structure. The formal account allowed us to look beyond appositives and start to see the phenomenon of appositive shift as pertaining to the broader class of perspective sensitivity.

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