

Two puzzles about appositives: Projection and perspective shift

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Abstract. This paper solves two puzzles about the interpretation of appositive constructions in English: (i) it explains why appositives robustly PROJECT even though they are interpreted in situ with respect to order-dependent phenomena such as discourse anaphora; (ii) it analyzes certain non-projective readings of appositives as instances of PERSPECTIVE SHIFT, a phenomenon that bears striking similarities with the phenomenon of shifted indexical pronouns. To solve the first puzzle, I assume that appositives are interpreted in surface position but adopt a less standard mechanism of operator scope according to which operators can bind lexical predicates or other operators. Since appositives form ForcePs and Force operators cannot be bound, it follows that appositives project even when placed in the syntactic scope of a higher operator. With respect to the second puzzle, I argue that shifted appositives are evaluated with respect to a secondary speech context introduced by a verb of saying or inferred from the larger discourse. Since the two mechanisms of projection and perspective shift are independent, they can be given a uniform analysis.

Keywords: appositives, projection, perspective shift, update semantics

1. First puzzle: Appositive projection despite in-situ interpretation

The consensus in the semantics literature is that appositive constructions cannot be interpreted in the scope of external operators, i.e. in the scope of operators that are placed elsewhere in the sentence (see e.g. Chierchia and McConnell-Ginet 2000, Potts 2005). The basic observation is illustrated below. In (1), despite the presence of an operator, each sentence implies the unaltered appositive content, i.e. that Edward is from Minnesota.¹

- (1) a. It is **not** true that Edward, who is from Minnesota, enjoys cold winters.
b. Lindsey **believes** that Edward, who is from Minnesota, enjoys cold winters.

Examples like these demonstrate a very robust pattern and have motivated the view that appositives PROJECT, i.e. do not interact with operators placed elsewhere in the sentence.

Such data could be taken as evidence that, at the relevant level of representation, appositives are not in the syntactic scope of main clause operators. However, appositives can participate in order-dependent phenomena like discourse anaphora (see Potts 2005, AnderBois et al. 2010), which suggests that they are interpreted in surface position. In (2), the anaphoric dependence between ‘Melanie’ and ‘who’ goes from the main clause into the appositive, and the anaphoric dependence between ‘an Italian’ and ‘him’ goes in the opposite direction, i.e. from the appositive into the main clause.

¹Appositives in linguistic examples and their contribution to logical representations are underlined.

- (2) Melanie^u, who_u adores an^v Italian, bought him_v a present.

Importantly, the anaphoric dependencies in (2) can be established only because in each case the antecedent *linearly precedes* the anaphor. This explains why the appositive cannot be interpreted as entirely preceding (3a) or entirely following (3b) the rest of the sentence.²

- (3) a. # She_u adores an^v Italian and Melanie^u bought him_v a present.
 b. # Melanie^u bought him_v a present and / because she_u adores an^v Italian.

The fact that appositives can participate in order-dependent phenomena strongly suggests that they are interpreted in surface position. Given that, it is initially striking that they are exempted from the scope of external operators (recall (1)), as it might appear that appositives are interpreted in situ and not in situ at the same time. This is the first puzzle about appositives.

2. First puzzle solved

In the previous section, we saw that appositives behave as integrated into the sentence with respect to one class of phenomena while they behave as non-integrated into the sentence with respect to another class of phenomena. This section offers an account that reconciles those two seemingly contradictory properties.

2.1. Basic ideas and assumptions

I propose that appositives are adjoined to their anchors, i.e. the constituents they modify (see Jackendoff 1977, Potts 2005, a.o.). This directly explains the in-situ interpretation of appositives with respect to order-dependent phenomena, discussed in the previous section. In order to derive their projection behavior, I assume that appositives—similarly to main clauses—form FORCE PHRASES (ForcePs; cf. Rizzi 1997, Krifka to appear). Force, the syntactic head of ForceP, is an operator that makes two semantic contributions: (i) it introduces a fresh propositional variable for the content expressed by the constituent in its scope, and (ii) it conveys that the speaker is publicly committed to that content. Finally, I assume that operators and predicates are adorned with propositional variables (see Stone 1999, Stone and Hardt 1999), and thus operators can bind predicates while higher operators can bind lower operators. Given that Force cannot be bound, it follows that appositives project even when syntactically embedded under an operator.

I make the following assumptions about the way propositional variables are distributed in syntactic structures.

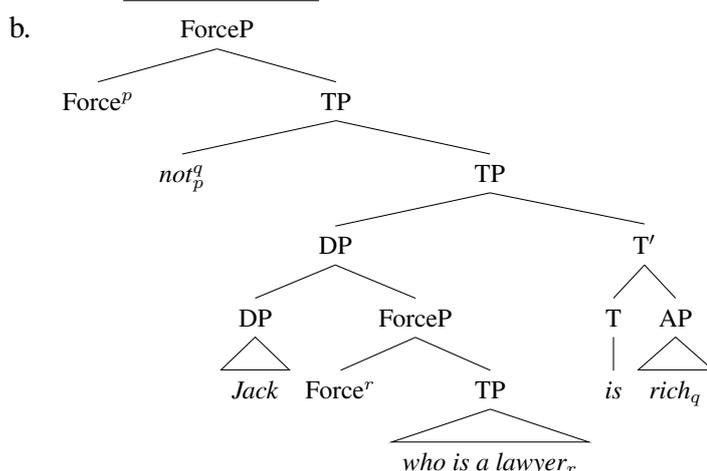
²Similar results are obtained with respect to other order-sensitive phenomena, e.g. presupposition or VP-ellipsis (see AnderBois et al. 2010).

- (4) ASSUMPTIONS ABOUT THE DISTRIBUTION OF PROPOSITIONAL VARIABLES
- i. Operators (e.g. Force, negation) introduce fresh propositional variables.
 - ii. Lexical operators (e.g. negation, modals, attitude verbs, but not Force!) and lexical predicates (e.g. ‘man’, ‘rich’) are marked by the propositional variable introduced by the closest higher operator.

Assumption (4i) requires operators to be assigned fresh propositional variables. This assumption allows operators to introduce variables which store the semantic content of the constituent in their scope (see below for details). Assumption (4ii) ensures that semantic content is interpreted relative to the closest operator that is higher up in the syntactic tree: a lexical operator, if such is present, or else a Force head. Unlike lexical operators, which are bound by higher operators, Force heads do not depend on propositional variables introduced by higher operators and thus cannot be bound. This is what makes appositives “invisible” to external operators.

Here is an illustration of how those two assumptions derive appositive projection. In (5a), the main clause is interpreted in the scope of the negation while the appositive content is not. The reason for this can be read off from (5b), the syntactic structure associated with (5a). There are three operators in (5b): the higher Force head, the negation, and the lower Force head. According to assumption (4i), each of these operators introduces a propositional variable. Given assumption (4ii), the main clause predicate ‘rich’ is bound by the negation via the variable q , the negation is bound by the higher Force operator via the variable p , and the appositive predicate ‘lawyer’ is bound by the lower Force operator via the variable r . Crucially, Force operators are not lexical and cannot be bound. Thus, the appositive, even though in the syntactic scope of the negation, is not bound by it and its content projects.

- (5) a. Jack, who is a lawyer, is **not** rich.



According to my proposal, operators can target constituents in their syntactic scope *selectively*.

That is, constituents are interpreted in the scope of an operator only if they are relativized to the propositional variable introduced by that operator. The rest of the structure is interpreted as if it were outside the syntactic scope of the operator. This way of looking at things requires a modification of the traditional notion of OPERATOR SCOPE. The new notion requires operator scope to take into consideration not only syntactic scope but also the presence of propositional variables, thus equating operator scope with operator binding. Propositional content operators (such as negation or attitude predicates) can now be regarded as a particular kind of binding operators.

2.2. An overview of the logic

In this section, I spell out the analysis of appositive projection sketched above in a typed update logic called UPDATE WITH SPEECH CONTEXTS (USC). Below, I present its main characteristics.

USC is an update logic with basic types e (for individuals), ω (for possible worlds), s (for assignment functions), and t (for truth values). Among the more important complex types are the type of propositions ωt (sets of worlds), the type of speech contexts $e \times (\omega t)$ (ordered pairs consisting of an individual and a proposition), the type of information states st (sets of assignments), and the type of dynamic terms $(st)st$ (functions from information states to information states). SPEECH CONTEXTS are ordered pairs consisting of the speaker and her discourse commitments.³ I reserve the speech context variable k for the UTTERANCE CONTEXT. Models for USC consist of non-empty and pairwise disjoint sets of individuals, possible worlds, assignment functions and truth values, and the basic interpretation function I_M , for a model M . Assignment functions and the basic interpretation function respect typing, i.e. they assign to an expression of some type a model-theoretic object of the same type. Information states are sets of WELL-BEHAVED assignment functions. Assignments are well-behaved if they assign to speech context variables values whose coordinates are linked in the right way. More specifically, we need to ensure that for any speech context value, the first coordinate (the speaker) is publicly committed to the second coordinate (her discourse commitments).

Next, I list the interpretation rules of USC and briefly discuss the ideas behind those rules.⁴

(6) Def (SEMANTICS)

a. PRIMITIVE TERMS

- $\llbracket t \rrbracket^{g,\sigma} = \begin{cases} g(t) & \text{if } t \text{ is a variable} \\ I(t) & \text{if } t \text{ is a constant} \end{cases}$

b. FUNCTIONAL TERMS

- $\llbracket \mathbf{sp}(c) \rrbracket^{g,\sigma} = \mathbf{proj}_1(\llbracket c \rrbracket^{g,\sigma})$
- $\llbracket \mathbf{dc}_{\mathbf{sp}}(c) \rrbracket^{g,\sigma} = \mathbf{proj}_2(\llbracket c \rrbracket^{g,\sigma})$
- $\llbracket \mathbf{max}(p) \rrbracket^{g,\sigma} = \{ \mathbf{w} \mid \exists \mathbf{h} \in \sigma : \mathbf{w} \in \llbracket p \rrbracket^{\mathbf{h},\sigma} \}$

³Speech contexts can easily be extended to include further coordinates, if needed.

⁴Reference to models is dropped.

c. DYNAMIC TERMS

- $\sigma \llbracket R_p \{t_1, \dots, t_n\} \rrbracket = \{ \mathbf{g} \in \sigma \mid \forall \mathbf{w} \in \llbracket p \rrbracket^{\mathbf{g}, \sigma} : \langle \mathbf{w}, \llbracket t_1 \rrbracket^{\mathbf{g}, \sigma}, \dots, \llbracket t_n \rrbracket^{\mathbf{g}, \sigma} \rangle \in \llbracket R \rrbracket^{\mathbf{g}, \sigma} \}$
- $\sigma \llbracket t_1 R t_2 \rrbracket = \{ \mathbf{g} \in \sigma \mid \llbracket t_1 \rrbracket^{\mathbf{g}, \sigma} R \llbracket t_2 \rrbracket^{\mathbf{g}, \sigma} \}$, where $R \in \{=, \subseteq, \emptyset\}$
- $\sigma \llbracket \phi \wedge \psi \rrbracket = \sigma \llbracket \phi \rrbracket \llbracket \psi \rrbracket$
- $\sigma \llbracket \exists u \rrbracket = \{ \mathbf{h} \mid \exists \mathbf{g} \in \sigma : \mathbf{g}[u]\mathbf{h} \}$

Starting with primitive terms, variables are interpreted by the given assignment function and constants are interpreted by the basic interpretation function. Moving on to functional terms, the interpretation of the first two is straightforward: those terms extract (by means of projection functions) the first or the second coordinate of a speech context, here represented by the variable c . The term $\mathbf{max}(p)$ denotes the maximal value of the propositional variable p in a given information state, i.e. the set of all worlds that are contained in some value assigned to p by assignments in that information state. Dynamic terms introduce a few peculiarities. First, arguments and predicates have access not only to individual assignments but also to entire information states. Assignments are used for the dynamic interpretation of variables, while access to entire information states is needed for the interpretation of $\mathbf{max}(p)$. Second, dynamic terms describing lexical (but not logical) relations are relativized to sets of worlds and require that the relation hold throughout that set.⁵ The remaining part of the interpretation rules is straightforward: conjunction is interpreted as sequential update, and random assignment to a variable amounts to introducing into the information state any assignment that differs from some old assignment at most with respect to the value it assigns to that variable.

2.3. First puzzle: Formal account

Let us first consider sentences without operators. The simple sentence in (7a) is represented in USC as in (7b).

- (7) a. $[\text{ForceP Jack is rich}]$
 b. $\exists p \wedge \exists u \wedge u = \text{jack} \wedge \text{rich}_p\{u\} \wedge \mathbf{dc}_{\text{sp}}(k) \subseteq p$

An utterance of this sentence introduces a propositional variable p with the semantic content that Jack is rich. This is because p is restricted by the conjunct $\text{rich}_p\{u\}$, which requires that u , i.e. Jack, be rich in all of the worlds represented by p . The fact that the proposition expressed by p is asserted is represented by the conjunct $\mathbf{dc}_{\text{sp}}(k) \subseteq p$, which ensures that the discourse commitments of the speaker contained in the value of k are included in the value of p . Since, in general, different assignments will assign to k values with different discourse commitments, the DISCOURSE COMMITMENTS of the speaker in an information state σ , $\mathbf{DC}_{\text{sp}}(\sigma)$, is the set of all worlds found in the value of some $\mathbf{dc}_{\text{sp}}(k)$ in σ , i.e. $\mathbf{DC}_{\text{sp}}(\sigma) := \{ \mathbf{w} \mid \exists \mathbf{g} \in \sigma : \mathbf{w} \in \llbracket \mathbf{dc}_{\text{sp}}(k) \rrbracket^{\mathbf{g}, \sigma} \}$.

⁵The symbol \emptyset stands for set-theoretic non-overlap. Note that I use the same relational symbols in the object and the metalanguage.

If the content expressed by (7a) is accepted by the addressee, the context set will be updated with that content. In order to model this, we could enlarge speech contexts with a third coordinate for the context set. If we did that, accepting semantic content could be represented as $\text{cs}(k) \subseteq p$, where $\text{cs}(k)$ denotes the third coordinate of the utterance context represented as k , i.e. $\llbracket \text{cs}(k) \rrbracket^{g,\sigma} = \text{proj}_3(\llbracket k \rrbracket^{g,\sigma})$. The CONTEXT SET in σ could be defined as $\text{CS}(\sigma) := \{w \mid \exists g \in \sigma : w \in \llbracket \text{cs}(k) \rrbracket^{g,\sigma}\}$. In what follows, I will disregard acceptance of semantic content.⁶

Sentences with appositives contain multiple ForcePs and thus make multiple assertions. In (8), the main clause receives the same interpretation as in (7) above: it asserts the proposition that Jack is rich, represented as p . The appositive asserts another proposition, that Jack is from Brooklyn, represented as q . By uttering (8a), the speaker commits herself to both propositions.

- (8) a. $[\text{ForceP Jack } [\text{ForceP } \underline{\text{who is from Brooklyn}}] \text{ is rich}]$
 b. $\exists p \wedge \exists u \wedge u = \underline{\text{jack} \wedge \exists q \wedge \text{from.brkln}_q\{u\} \wedge \text{dc}_{\text{sp}}(k) \subseteq q \wedge \text{rich}_p\{u\} \wedge \text{dc}_{\text{sp}}(k) \subseteq p}$

Let us now turn to sentences with operators. In update semantics, negation is usually modeled as a sentential operator that has the semantic effect of removing all assignments from the information state that survive after the information state is updated with the non-negated sentence (see e.g. Heim 1982, Veltman 1996). The interpretation rule for negated sentences is usually stated as $\sigma \llbracket \neg \phi \rrbracket = \sigma - \sigma \llbracket \phi \rrbracket$, for an information state σ and a dynamic term ϕ . However, this rule is hard to reconcile with the observation that certain parts of the non-negated sentence, i.e. the ones contributed by appositives, escape the scope of negation. This is why I will follow Stone and Hardt (1999) in assuming that operators like negation state a relationship between two propositions. I introduce the abbreviation in (9) for what is intuitively *not* ϕ .

$$(9) \quad \text{not}_p^q(\phi) := \exists q \wedge \phi \wedge p \emptyset \text{max}(q)$$

Negation has the following three semantic effects: (i) it introduces a propositional variable (here represented as q) for the content of the term in its scope (here represented as ϕ), (ii) it processes its scope term (assume that q occurs free in ϕ), and (iii) it states that the proposition expressed by the negated sentence (here represented as p) is disjoint from the maximal value of the proposition expressed by the scope term. Let us call the proposition introduced by an operator the SCOPE PROPOSITION and the proposition that operators are anaphoric to the REFERENCE PROPOSITION. In (9), the scope proposition is represented as q and the reference proposition is represented as p .⁷ In

⁶In Koev (2013), I argue that the order in which semantic content is accepted explains the typically NOT-AT-ISSUE status of appositives.

⁷Strictly speaking, the scope proposition in (9) is expressed by $\text{max}(q)$, not by q , which is potentially non-maximal. Nevertheless, it would be easier if we gloss over this technicality and informally think of the scope proposition as the proposition expressed by the variable introduced by the operator.

the absence of higher lexical operators, the reference proposition would simply be the proposition introduced by the Force operator sitting on top of the structure.

Let us consider the sentence with negation in (10) below. The representation of that sentence is given in (10a), which, by the abbreviation in (9), can be more succinctly represented as in (10b).

(10) Jack is **not** rich.

- a. $\exists p \wedge \exists q \wedge \exists u \wedge u = jack \wedge rich_q\{u\} \wedge p \emptyset \mathbf{max}(q) \wedge \mathbf{dc}_{sp}(k) \subseteq p$
 b. $\exists p \wedge \mathbf{not}_p^q(\exists u \wedge u = jack \wedge rich_q\{u\}) \wedge \mathbf{dc}_{sp}(k) \subseteq p$

In (10b), there are two propositions present: the reference proposition, represented as p and introduced by the Force operator, and the scope proposition, represented as q and introduced by the negation operator. The negation operator states that the reference proposition is disjoint from the scope proposition that Jack is rich. That is, the entire sentence expresses the proposition that Jack is *not* rich, as required.⁸

We are now ready to offer an explanation for why appositives project past negation. Consider the example in (11a) and its logical representation in (11b).

(11) a. Jack, who is from Brooklyn, is **not** rich.

- b. $\exists p \wedge \mathbf{not}_p^q(\exists u \wedge u = jack \wedge \exists r \wedge \underline{from.brooklyn_r}\{u\} \wedge \mathbf{dc}_{sp}(k) \subseteq r \wedge rich_q\{u\}) \wedge \mathbf{dc}_{sp}(k) \subseteq p$

The negation operator requires that the content of the variable p introduced by the Force operator in the main clause be disjoint from the scope proposition, represented as q . However, the variable introduced by the Force operator in the appositive is r , and thus the appositive is not bound by the negation. In other words, the appositive content scopes out of the negation, making (11a) synonymous in propositional content to ‘Jack is from Brooklyn and he is not rich’.

Let me also demonstrate why appositives project when found in the syntactic scope of attitude predicates such as ‘believe’. Where p, q are propositional variables, v is an individual variable, and ϕ is a dynamic term, I will make use of the following abbreviation.

(12) $\mathbf{believe}_p^q(v, \phi) := \exists q \wedge \phi \wedge believe_p\{v, q\}$

⁸Since assigning values to variables is exhaustive, at least one value of p will be the entire complement of the scope proposition. This guarantees that the speaker of (10) is not committed to more than necessary.

According to (12), $\text{believe}_p^q(v, \phi)$ stands for a dynamic term which requires that in all of the worlds in the reference proposition the attitude holder believes the content of the scope proposition.⁹ To illustrate, in (13) the verb ‘believe’ introduces the scope proposition that Jack is rich and states that Mary believes that proposition in all of the worlds in the reference proposition. In short, this sentence expresses the proposition that Mary believes that Jack is rich, which is the intuitively correct result.

- (13) a. Mary **believes** that Jack is rich.
 b. $\exists p \wedge \exists v \wedge v = \text{mary} \wedge \text{believe}_p^q(v, \exists u \wedge u = \text{jack} \wedge \text{rich}_q\{u\}) \wedge \text{dc}_{\text{sp}}(k) \subseteq p$

Finally, let us look at examples in which an appositive occurs in the syntactic scope of ‘believe’.

- (14) a. Mary **believes** that Jack, who is from Brooklyn, is rich.
 b. $\exists p \wedge \exists u \wedge u = \text{mary} \wedge \text{believe}_p^q(u, \exists v \wedge v = \text{jack} \wedge \exists r \wedge \text{from.brooklyn}_r\{v\} \wedge \text{dc}_{\text{sp}}(k) \subseteq r \wedge \text{rich}_q\{v\}) \wedge \text{dc}_{\text{sp}}(k) \subseteq p$

In (14a), the proposition that Jack is from Brooklyn is attributed to the utterer of the sentence and not to the attitude holder, i.e. Mary. This intuition is captured in the logical representation in (14b). The propositional variable introduced by the ‘believe’-operator is q , and only the embedded clause predicate ‘rich’ is relativized to this variable. The appositive predicate ‘from Brooklyn’ is relativized to the propositional variable r , introduced by the Force operator in the appositive. Thus, (14a) is correctly predicted to mean the same as ‘Jack is from Brooklyn and Mary believes that he is rich’. The appositive is syntactically part of the embedded clause, yet it is not interpreted in the scope of the attitude operator and projects.

This way of viewing operators as stating a relationship between propositions is general enough and can be applied to other operators, e.g. epistemic modals (see Stone 1999, Stone and Hardt 1999).

3. Previous approaches to appositive projection

In this section, I briefly review four existing approaches to appositive projection.

The main idea behind the SCOPAL APPROACH to appositive projection is a *syntactic* one: appositives escape the scope of external operators because, at the relevant level of representation, they are attached to a high syntactic node, typically the root node of the sentence (see Demirdache 1991, Del Gobbo 2003, Nouwen to appear, Schlenker ms). Since appositives appear string-adjacent to their anchors, this approach has to rely on some less standard syntactic assumptions in order to

⁹Again, assume that q occurs free in ϕ and thus records its propositional content.

derive high attachment. Yet, it correctly derives the fact that appositives are not interpreted in the scope of main clause operators.

One major issue for scopal accounts is that it is not obvious how they would explain the in-situ interpretation of appositives, witnessed by data as in (2) above (=‘Melanie^u, who_u adores an^v Italian, bought him_v a present’). However scopal accounts might want to interpret such examples, the interpretation procedure should be made sensitive to the *linear order* between the appositive and the remaining parts of the sentence. But this requirement goes against the assumption of such accounts that appositives are interpreted outside the clause in which they occur.

According to the TWO-DIMENSIONAL APPROACH, appositive content is separated from the main clause content not in the syntax but rather in a secondary meaning dimension (see Potts 2005; see also Karttunen and Peters 1979, Bach 1999). This explains why main clause operators have no effect on the way appositives are interpreted and derives the projection behavior of appositives. Under this approach, the sentence ‘Lance, a cyclist, didn’t win’ receives the rough interpretation $\langle \llbracket \neg \text{win}(\text{lance}) \rrbracket, \llbracket \text{cyclist}(\text{lance}) \rrbracket \rangle$, in which the negation operator only takes scope over the main clause, as required.

The two-dimensional approach inherits the same major problem as that of scopal accounts: it does not leave room for the in-situ interpretation of appositives. This approach neatly separates the two meaning dimensions, thus excluding unwarranted scopal interaction between them. But in doing so, it destroys the linear order between the appositive and the rest of the sentence. Yet, it is exactly this order that the interpretation procedure should be made sensitive to, if the participation of appositives in order-sensitive phenomena is to be captured.

In addition, the two-dimensional approach seems to make wrong predictions with respect to truth-value intuitions about sentences with appositives. Since appositive content projects a secondary meaning dimension, the lack of a single truth value per sentence predicts that when speakers are forced into a binary judgment, they either disregard the appositive content or exhibit reluctance to render a judgment. However, none of those predictions is borne out: informants judge sentences with false appositives and true main clauses simply as false (see Syrett et al. ms). More generally, there seems to be an inherent tension between two-dimensionality and the fact that the secondary dimension is part of the regular truth conditions of the sentence.

The basic idea behind the PRESUPPOSITIONAL APPROACH is that appositives express presupposed content (see Sæbø 2011; see also Schlenker ms). Thus, whatever mechanism is evoked to explain presupposition projection, it would also explain appositive projection.

There are two general points which cast serious doubt on the idea that appositives are presuppositional. First, unlike classical presuppositions, appositives seem to make a purely truth-conditional contribution to the sentence in which they appear. As mentioned above, false appositives make the whole sentence false, not infelicitous (see again Syrett et al. ms). The second major difference

between presuppositions and appositive content is that the former are usually discourse-old while the latter typically expresses new (see Chierchia and McConnell-Ginet 2000, Potts 2005) albeit unsurprising information (see Schlenker ms).

In addition, the projection pattern of appositives significantly differs from that of classical presuppositions (but see Schlenker ms for potential parallels). While presuppositions can be canceled, this is harder for appositive content. To illustrate, in (15a) the presupposition triggered by ‘regret’ is blocked and the sentence as a whole does not imply that Betty slapped Fred. In contrast, in (15b) the implication triggered by the appositive, i.e. the proposition that Obama is a socialist, is not canceled. Since this proposition is also hypothetically assumed in the first part of the sentence, the result is a piece of infelicitous discourse.

- (15) a. If Betty slapped Fred, then she regrets that she slapped him.
 b. # If Obama is a socialist, then the President, who is a socialist, will raise taxes on the rich.

Finally, the DISCOURSE TOPIC APPROACH seeks to derive the projective nature of appositives and other constructions from their not-at-issue discourse status (see Amaral et al. 2007, Roberts et al. 2009, Simons et al. 2010). According to this approach, semantic content is not at-issue if and only if it is not relevant to the current topic of the conversation.

The discourse topic approach rides on the strong correlation between projective meanings and not-at-issue meanings across empirical domains. However, this correlation cannot be seen as a mere equivalence: meanings may not project but be not at-issue, and meanings may project but be at-issue. In the sentence ‘Jessica **imagined** she became the next Miss USA’ the embedded proposition need not address the discourse topic, i.e. it need not be at-issue, yet it does not project, i.e. the sentence does not imply it. Also, sentence-final appositive relative clauses as in ‘Liz **might** be with her husband, who has prostate cancer’ project but can be at-issue, e.g. can be directly rejected (see AnderBois et al. 2010, Koev 2013, Syrett et al. ms). Such data suggest that the relationship between not-at-issueness and projection is more flexible and needs further investigation.

4. Second puzzle: Some non-projective readings of appositives

In the first part of this paper, I offered an explanation for the fact that appositives project out of external operators. Yet, scholars have uncovered several exceptions to the claimed projection behavior of appositives (see Thompson 1971, Amaral et al. 2007, Harris and Potts 2009, Sæbø 2011, Wang et al. 2006, Nouwen to appear, Schlenker ms). Here, I focus on the cases cited below. In (16), the information that Harold’s girlfriend is a little bit crazy need not be attributed to the speaker and can instead be attributed to Harold. In (17), the information that Joan’s chip was installed last month is attributed to Joan and not to the speaker.

- (16) Harold says that his girlfriend, who is a little bit crazy^{Harold}, wants to go to Hanoi, but I think she's too rational to try it. (Thompson 1971)
- (17) *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.*
Joan believes that her chip, which she had installed last month^{Joan}, has a twelve year guarantee. (Amaral et al. 2007)

Thus, despite the otherwise robust projection behavior of appositives, we find cases in which appositive projection seems blocked and the appositive content is not implied by the sentence as a whole. This is the second puzzle about appositives.

5. Second puzzle solved

This section argues that certain embedded-like readings of appositives arise through perspective shift to the speaker of a secondary speech context.

5.1. The nature of the phenomenon

In the previous section, we saw examples in which appositives fail to project (recall (16)-(17)). Such data might create the impression that the appositive is semantically embedded, i.e. interpreted in the scope of an attitude predicate. There are two pieces of evidence that this not so. First, the examples we saw above involved positive attitude predicates. In similar sentences with *negative* attitude predicates, the appositive is clearly not semantically embedded but can nevertheless give rise to non-speaker-oriented interpretations. In (18), the appositive content (that the brain chip was installed ten years ago) is not doubted / disbelieved by Joan but is actually part of what she believes.

- (18) *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 is now worried about the battery life of her chip.*
Joan **doubts** / **doesn't believe** that her chip, which she had installed ten years ago^{Joan}, will last for another year.

In addition, Harris and Potts (2009) provide experimental evidence showing that non-speaker-oriented readings of appositives are possible in the absence of an embedding predicate.

- (19) My aunt is extremely skeptical of doctors in general. Dentists, who are only in it for the money anyway^{my aunt}, are not to be trusted at all. (Harris and Potts 2009)

I propose that such non-speaker-oriented readings of appositives result from PERSPECTIVE SHIFT to another agent. Shifted appositives are attributed to another agent not directly but through the intermediary of a secondary speech context. Such secondary speech contexts are canonically introduced by verbs of saying (see (16)), but their existence can be inferred in the presence of other attitude predicates (see (17)-(18)) or even in the absence of an intensional predicate (see (19)).

Put simply, my claim is that (i) shifted appositives are understood as *uttered* (not as believed, conjectured, doubted, etc.) and (ii) this utterance is performed by the *speaker* (not the addressee) of a secondary speech context. This claim makes two testable predictions. The first prediction is that appositive shift is blocked when the existence of a secondary speech context cannot be inferred. This prediction is confirmed in (20)-(21). In these examples, the appositive content is not inferred from verbal communication and appositive shift seems hard or impossible. Since a speaker-oriented reading of the appositive is excluded by the broader context, the discourses sound odd.

- (20) My old horse is such a picky eater, it's unbelievable. He only likes his food fresh. # He **thinks** the lush grass he got today, which looks so dry, is not worth eating at all.
- (21) *Sarah Palin, a right-wing politician with strong religious beliefs, has criticized liberal politicians on literally every social issue. Even though she never explicitly said it, it is clear that her political opinions stem from her belief that liberals have no moral values and should not be allowed to lead the country. You are liberally minded and don't share Palin's beliefs. You say:*
 ?? Palin **believes** that liberals, who have no moral values, should not be allowed to lead the country.

The second prediction of the current proposal is that appositives cannot shift to a party other than the speaker of a speech context. This prediction too seems to be borne out. In (22), the appositive can only be attributed to the speaker of the reported speech context, i.e. the aunt. This is independent of the grammatical role of the speaker (subject in (22a) vs. oblique object in (22b)) and the fact that another person, i.e. the uncle, is mentioned in the sentence.

- (22) *Crazy aunt, crazy uncle.*
- a. **My aunt** said to my uncle that the Feds, who are following her_{my aunt}, have bugged her apartment.
 - b. My uncle heard from **my aunt** that the Feds, who are following her_{my aunt}, have bugged her apartment.

In the following section, I demonstrate how the formal account of appositive projection developed above can accommodate shifted appositives.

5.2. Second puzzle: The formal account

I have argued that sentences with verbs of saying exhibit a canonical environment in which appositives can undergo perspective shift (cf. Harris and Potts 2009 for further support). It is then reasonable to assume that verbs of saying, due to their lexical meaning, introduce reported speech contexts. I will use the dynamic term $\text{say}_p^{c,q}(v, \phi)$ in order to express that v says ϕ in the speech context c .

$$(23) \quad \text{say}_p^{c,q}(v, \phi) := \exists c \wedge v = \text{sp}(c) \wedge \exists q \wedge \phi \wedge \text{say}_p\{c, v, q\}$$

According to (23), $\text{say}_p^{c,q}(v, \phi)$ abbreviates a series of conjuncts and has the following semantic effects: (i) it introduces a secondary speech context (expressed by c) and requires that the thematic agent of ‘say’ (expressed by v) be the speaker of that context, (ii) it introduces a scope proposition (expressed by q) as recording the content of ϕ , and (iii) it states that the speaker of the secondary speech context uttered the scope proposition in all of the worlds in the reference proposition (expressed by p). The sentence with ‘say’ in (24a) can now be logically represented as in (24b).

$$(24) \quad \begin{array}{l} \text{a. Harold says that his girlfriend is a little bit crazy.} \\ \text{b. } \exists p \wedge \exists v \wedge v = \text{harold} \wedge \text{say}_p^{c,q}(v, \exists u \wedge \text{gf.of}_q\{u, v\} \wedge \text{crazy}_q\{u\}) \wedge \text{dc}_{\text{sp}}(k) \subseteq p \end{array}$$

We can offer the following straightforward explanation of why appositives can undergo perspective shift after verbs of saying. In the presence of two speech contexts (the utterance context and a secondary speech context introduced by ‘say’), appositive content can restrict the discourse commitments of the speaker of either context. When the appositive is anaphoric to the utterance context, it is interpreted as non-shifted; when, however, the appositive is anaphoric to the reported speech context, it gives rise to a shifted reading. This is illustrated in (25) below. In (25a), the appositive contribution is evaluated with respect to the utterance context and does not shift, while in (25b), it is evaluated with respect to the reported speech context and does shift. This contrast is captured by the difference between the conjuncts $\text{dc}_{\text{sp}}(k) \subseteq r$ vs. $\text{dc}_{\text{sp}}(c) \subseteq r$ in the underlined portion of the translations, where k stands for the utterance context and c stands for the reported speech context.

$$(25) \quad \begin{array}{l} \text{Harold says that his girlfriend, who is a little bit crazy, wants to go to Hanoi.} \\ \text{a. } \exists p \wedge \exists v \wedge v = \text{harold} \wedge \text{say}_p^{c,q}(v, \exists u \wedge \text{gf.of}_q\{u, v\} \wedge \exists r \wedge \text{crazy}_r\{u\} \wedge \text{dc}_{\text{sp}}(k) \subseteq r \wedge \\ \quad \text{want.go.to.hanoi}_q\{u\}) \wedge \text{dc}_{\text{sp}}(k) \subseteq p \quad \text{(non-shifted reading)} \\ \text{b. } \exists p \wedge \exists v \wedge v = \text{harold} \wedge \text{say}_p^{c,q}(v, \exists u \wedge \text{gf.of}_q\{u, v\} \wedge \exists r \wedge \text{crazy}_r\{u\} \wedge \text{dc}_{\text{sp}}(c) \subseteq r \wedge \\ \quad \text{want.go.to.hanoi}_q\{u\}) \wedge \text{dc}_{\text{sp}}(k) \subseteq p \quad \text{(shifted reading)} \end{array}$$

Notice that the appositive in (25) is linked to the relevant speech context variable through discourse anaphora. This implies that no *structural* configuration is required to hold between the intensional

predicate and the shifted appositive. This analysis is empirically supported by the possibility that a verb of saying licenses appositive shift across a sentence boundary, as demonstrated in the following example.

- (26) Harold **told** me a bunch of interesting things the other night. His new girlfriend, who is a little bit crazy_{Harold}, wants to go to Hanoi.

Although in most of the examples discussed so far the shifted appositive was in the syntactic scope of an intensional predicate, (26) demonstrates that appositive shift is primarily a discourse-level phenomenon that calls for a dynamic analysis.

I now turn to the shifting possibilities of appositives in the absence of verbs of saying. Recall from the previous section that perspective shift after non-‘say’ attitudes is generally possible, *except* when it is clear from the larger discourse that no speech act communicating the content of the appositive has occurred. This necessitates two representations for verbs like ‘believe’: one that does and another that does not introduce a secondary speech context ((27a) is repeated from (12) above).

- (27) a. $\text{believe}_p^q(v, \phi) := \exists q \wedge \phi \wedge \text{believe}_p\{v, q\}$
 b. $\text{believe}_p^{c,q}(v, \phi) := \text{believe}_p^q(v, \phi) \wedge \text{say}_p^{c,r}(v, \phi) \wedge q = r$

The representation in (27b) could be thought as the pragmatically enriched representation of (27a). Since one typically gains knowledge of other people’s mental states through verbal communication, from “A believes that *p*” the hearer will typically conclude “A said that *p*”. Alternatively, one could claim that non-‘say’ attitudes in English are lexically ambiguous between a regular form as in (27a) and a form as in (27b) which introduces a speech context. Here, I will not choose between those two options.

Finally, what about the possibility of appositive shift in the absence of intensional verbs? I will assume that in such cases a default inference can be drawn to the effect that a secondary speech act had occurred and thus an additional speech context is present. I leave the details of this analysis to further research.

In this section, I offered a formal analysis of the phenomenon of perspective shift in appositives. Importantly, doing so did not require any modifications to the account of appositive projection past external operators developed in the first part of the paper.

6. The parallels between shifted appositives and shifted indexical pronouns

Kaplan (1989) alleged that indexical expressions in English are directly referential and denote parameters of the utterance context. Kaplan conjectures that operators that shift the context—which

he famously called MONSTERS—do not exist in English. For example, the English indexicals ‘I’ and ‘you’ can only refer to the current speaker and hearer.

Yet, it has been known for some time that indexical pronouns, i.e. first and second person pronouns, in some languages can shift their reference in the presence of an intensional predicate (see Rice 1986, Speas 1999, Schlenker 2003, Anand 2006, a.o.). When shifting occurs, first person pronouns refer to the speaker of a secondary speech context and second person pronouns refer to the actual speaker. I illustrate the phenomenon on the following data from Kurmanji (Iranian), where the first person pronoun shifts its reference in the presence of a ‘say’-verb.¹⁰

(28) *Ehmet is visibly not feeling well and says to you that he is ill. Later you say:*

Ehmet go ki ez e nexoş-im.
Ehmet.ERG **say**.PART that I.NOM COP ill-1SG

‘Ehmet said that he (=Ehmet) is ill.’

The important question is: What are the conditions under which indexical pronouns can shift? Two universal constraints proposed in the literature on perspective shift are SHIFT TOGETHER and STRICT LOCALITY. According to Shift Together, a given perspective holds throughout the entire complement, i.e. all perspective-sensitive elements in a clause are interpreted with respect to the same context. Strict Locality states that the perspective of a complement clause is solely determined by the immediately dominating predicate, not by predicates that are higher up in the structure. There seem to be severe empirical challenges to both of those constraints (see Rice 1986, Speas 1999, Anand 2006 for discussion).

However, there appears to be another, more robust universal constraint on pronominal shift that is only cursorily mentioned in the literature. Authors often observe that pronominal shift is limited to or most natural under verbs of saying (see Speas 1999, Schlenker 2003, Anand 2006; but see Rice 1986 for potential challenges). The same is true for Kurmanji: while indexical pronouns in this language can shift in the presence of verbs of saying (recall (28)), pronominal shift in ‘belief’-reports is not possible, even when those are based on an existing speech act.

(29) *Ehmet often says that he is a rich man. You meet Adan and say to her:*

Ehmet ino di-k-e ki ez e zengin-im.
Ehmet.NOM **belief** HAB-do-COP that I.NOM COP rich-1SG

‘Ehmet believes that he (=Ehmet) is rich.’ (intended)

¹⁰In the glosses, the following abbreviations are used: 1SG = first person singular, COP = copula, ERG = ergative, HAB = habitual, NOM = nominative, PART = participle, PL = plural.

Thus, Kurmanji adds more crosslinguistic evidence for the generalization that verbs of saying are the canonical environment for pronominal shift. I will then tentatively propose the following candidate for an implicational language universal.

(30) SAY SHIFT (a potential language universal)

If a language allows a perspective-sensitive element to shift in the presence of any intensional operator, the element can shift in the presence of a verb of saying.

We are now ready to compare shifted appositives in English to shifted indexical pronouns in Kurmanji. My claim is that the two phenomena agree in at least two respects: (i) they both obey Say Shift, and (ii) they both can be licensed pragmatically. First, we already know that English appositives and Kurmanji indexical pronouns can shift after verbs of saying (see (16) and (28)) and thus obey Say Shift. Second, in most of the literature it is assumed that pronominal shift is licensed only if the pronoun is in the *syntactic scope* of a monstrous operator (see e.g. Schlenker 2003, Anand 2006). I already demonstrated that there is no such requirement on shifted appositives, which can be licensed pragmatically (recall (19) and (26) from above). Somewhat strikingly, the same holds for shifted indexical pronouns in Kurmanji: in (31), pronominal shift is licensed across a sentence boundary.

(31) *You talked to Ehmet last night and he complained that he is ill. Later, you say:*

Min dhuni Ehmet ra şor kur-in. Ez e nexoş-ım.
I.ERG yesterday Ehmet with **word did**-PL I.NOM COP ill-1 SG

‘Yesterday I talked to Ehmet. He (=Ehmet) is ill.’

Data as in (31) suggest that analyses of pronominal shift in terms of c-commanding monstrous operators might be mistaken, at least for Kurmanji. In this language, pronominal shift can be licensed from preceding discourse without the need for a particular structural configuration.

The fact that shifted appositives in English and shifted indexical pronouns share certain distributional restrictions suggests that the two phenomena should be given a uniform analysis. Below, I sketch an analysis of the Kurmanji data within the current account. Let us assume that Kurmanji ‘say’-predicates but no other intensional predicates introduce secondary speech contexts. Unlike in English, where indexical pronouns are lexically specified to refer to the participants of the utterance context, indexical pronouns in Kurmanji are lexically underspecified. If they are anaphoric to the utterance context, they refer to participants of the actual context and do not shift. If, however, they are anaphoric to a secondary speech context, they refer to participants of this latter context and shift. This simple analysis is illustrated on the example in (32) below. In it, *ez* ‘I’ is translated as $sp(k)$ for the non-shifted reading and as $sp(c)$ for the shifted reading.

- (32) *Ehmet go ki ez e nexoş-ım.*
 Ehmet.ERG say.PART that I.NOM COP ill-1 SG
 ‘Ehmet said I am / he (=Ehmet) is ill.’
- a. $\exists p \wedge \exists v \wedge v = ehmet \wedge \mathbf{say}_p^{c,q}(v, ill_q\{\mathbf{sp}(k)\}) \wedge \mathbf{dc}_{\mathbf{sp}}(k) \subseteq p$ (non-shifted reading)
 b. $\exists p \wedge \exists v \wedge v = ehmet \wedge \mathbf{say}_p^{c,q}(v, ill_q\{\mathbf{sp}(c)\}) \wedge \mathbf{dc}_{\mathbf{sp}}(k) \subseteq p$ (shifted reading)

Despite the similarities, it is important to keep in mind that English appositives differ from Kurmanji indexical pronouns in that the former can shift in the absence of a verb of saying (recall (17)–(19)). Under the assumption that drawing of pragmatic inferences is not subject to crosslinguistic variation, we seem forced to conclude that—for reasons to be further investigated—indexical pronouns can only refer to speech contexts that have been lexically introduced.

7. Conclusion

This paper was devoted to two puzzles about appositives: (i) the fact that appositives are interpreted in situ with respect to order-dependent phenomena such as discourse anaphora but nevertheless project past external operators, and (ii) the fact that appositive projection can be blocked in certain environments. I solved the first puzzle by claiming that appositives are interpreted in surface position but cannot be bound by external operators. The second puzzle was attributed to an independent perspective-shifting mechanism that does not involve interpreting appositives in the scope of an operator. More generally, both puzzles have been explained in a uniform formal account that preserves the robust projection behavior of appositives.

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