Formalizing linguistic perspective:
insights from spatial anaphora

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Abstract

Perspectival predicates along the mental dimension (psych/attitude/"taste" predicates) and along the spatial one (locational and path predicates) systematically resemble one another syntactically, semantically, and morphologically. The ways they differ from one another (categorially and crosslinguistically) are also suggestive and set them apart from non-perspectival predicates. But for all their telling similarities/differences, spatial and mental predicates are not seldom in the same breath, and the syntactico-semantic conditions regulating the representation of different types of perspective remain poorly understood. Here, we take a first step toward filling this gap. Our empirical starting point, which we exploit to derive the parallels between mental and spatial predication, is the observation that the antecedents of *all* perspectival anaphors, including spatial-perspective-driven anaphors must denote sentient individuals. On the strength of such data, we propose that all perspective is ultimately mental in nature. In particular, we propose that all perspectival predicates quantify over elements of a set that are designated by a sentient entity as candidates for the actual time/location/world of that entity. The difference between spatial, temporal, and attitudinal/psych predicates, lies merely in the choice of this coordinate – a choice that may in turn be parametrized with respect to the nature and category of predication involved.

1   Introduction

The influence of perspective, instantiated along the mental, spatial, and/or temporal dimensions, has been observed in linguistic phenomena ranging from certain types of anaphora (Clements, 1975; Sells, 1987; Speas, 2004; Sundaresan, 2012; Pearson, 2013), psych predications (Adger and Ramchand, 2005), so-called "taste"-predicates (Stephenson, 2010), and more generally, in regulating clausal finiteness and selection (Sigurðsson, 2004; Speas and Tenny, 2003; Bianchi, 2003; Landau, To appear, among others).

Predicate-types along different perspectival dimensions such as psych-, attitude-, and taste predicates (mental dimension), spatial prepostions and temporal adverbials and nouns (spatial and temporal dimensions, respectively), seem to share core properties that set them

apart from other classes of predicate. For instance, anaphors are (often anomalously) licensed in psych/attitude- as well as spatio-temporal predications crosslinguistically (Sells, 1987, among others). Attitude/psych verbs have been argued to be more structurally complex than other verbs (Speas, 2004; Adger and Ramchand, 2005); spatio-temporal PPs have similarly been argued to be functionally more articulated than other PPs (Cinque and Rizzi, 2010). Spatio-temporal and attitudinal predicates are often marked with special morphology and there is a well-noted crosslinguistic syncretism between spatial and mental predicates (Lakoff and Johnson, 1980). Even psycholinguistic evidence seems to indicate the existence of a significant correlation between our sensitivity to spatial-perspective-inducing and (certain)-mental-perspective-inducing linguistic cues (Cohen and Kaiser, 2012).

The differences between perspectival predicates along different modalities are also telling. At least two types of systematic distinctions, categorial and crosslinguistic, may be discerned. With respect to the former (and obviously simplifying greatly) we might generalize that attitude/psych-predicates tend to be verbal and spatio-temporal ones prepositional/adverbial. With respect to the latter, languages differ in the types of perspective that are linguistically relevant for a particular phenomenon. For instance, a language like Tamil of the Dravidian family, is particularly promiscuous and allows anaphora in the scope spatial, temporal and mental (psych/attitude-) predicates. Norwegian, on the other hand, seems only to have perspectival anaphora along the spatial dimension (Hellan, 1988). Icelandic, Italian, and Ewe, on the other hand, have perspectival anaphora under attitude/psych verbs but not under spatio-temporal ones.

But for all their systematic similarities and differences, spatial, temporal and mental predicates are seldom discussed in the same breath, and the syntactico-semantic conditions regulating the different types of perspective, as well as the factors that distinguish perspectival predicates from non-perspectival ones, remain poorly understood. We have yet to fully answer the question of how linguistic perspective is formally represented, how the differences and similarities between the different types of perspective are grammatically encoded, and how the instantiation of perspective might differ relative to anaphora and other phenomena. Here, we take an initial step toward helping fill this gap.

Our empirical starting point is an observation concerning antecedence restrictions on spatial-perspective-driven anaphora, in particular, the restriction that the spatial perspective-holder must be sentient – not, incidentally, a new observation (see, for instance Cantrall, 1974). On the strength of this and additional data, we propose that perspective along all dimensions is, at its core, a mental notion, and take a first step toward a formal account of linguistic perspective that explains both the sentience restriction in perspectival anaphora as well as the apparent lack of such a restriction in non-anaphoric structures in-

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volving spatial perspective. In particular, we propose that all perspectival predicates quantify over elements of a set that are designated by a sentient entity as candidates for the actual time/location/world of that entity. The difference between spatial, temporal, and attitudinal/psych predicates, lies merely in the choice of this coordinate. We might further imagine that this choice is in turn parametrized and also varies according to the nature and category of predication involved.

2 Background: perspectival anaphora

The role of perspective has been widely discussed in the context of anaphora.[1] In languages with perspectival anaphora, the anaphor is a kind of "perspective-seeker". Perspective-holding is a necessary condition on anaphoric antecedence in such cases: i.e. the antecedent of the anaphor must denote an individual who holds a perspective, mental or spatial or temporal, toward some predication containing the anaphor.

2.1 Mental vs. spatial perspectival anaphora

Crosslinguistically, anaphoric dependencies seem to be regulated by mental perspective (involved in so-called "logophoric" relationships) as well as by spatial perspective (invoked in the context of "snake" sentences).

The role of mental perspective is typically invoked in connection with logophoric phenomena. In the examples below, the antecedent, which may be in a different sentence altogether, denotes an individual that holds a mental perspective toward the minimal proposition containing the anaphor.

(1) "With Tuesday came the agreeable prospect of seeing him again, and for a longer time than hitherto; of judging of his general manners, and by inference, of the meaning of his manners towards **herself**; of guessing how soon it might be necessary for her to throw coldness into her air . . . " (Austen, 1816, Chapter XVIII, 321)

(2) Formaðurinn$_1$ varð óskaplega reiður. Tillagan væri avívirðileg.
the chairman became furiously angry. the proposal was.SBJV outrageous.
Væri henni beint gegn sér$_1$ persónulega?
was.SBJV it aimed against ANAPH personally?

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[1]It is important to be clear at the outset that we are limiting our current discussion to nominal anaphors – anaphors which lack a reference for person. Specifically, we are not talking about entities that are anaphoric for tense and location – which are often also treated as pro-forms in the literature (Partee, 1973, 1984; Abusch, 1997, among others) – though these are undoubtedly relevant to the issue at hand.

"The chairman became furiously angry. The proposal was outrageous. Was it aimed at him personally?" (Icelandic, Sells, 1987)

(3) Kofi$_i$ be yè$_{\{i,*j\}}$ dzo.
     Kofi say ANAPH/LOG left

'Kofi$_i$ said [$_{CP}$ that he$_{\{i,*j\}}$ left].' (Ewe, Clements, 1975)

But as has been noted elsewhere (Kuno, 1987; Sells, 1987, among others), anaphora may also involve spatial perspective, as in the Dutch example from Rooryck and Wyngaerd (2011) below:

(4) De volwassenen$_i$ op het schilderij kijken van ons weg, met de kinderen [$_{PP}$
     The adults   on the painting look   from us   away with the children
     achter zich$_{\{i,*j\}}$].
     behind ANAPH/them

     "[The adults]$_i$ in the picture are facing away from us, with the children placed behind themselves$_{\{i,*j\}}$".

(5) De volwassenen$_i$ op het schilderij kijken van ons weg, met de kinderen [$_{PP}$
     The adults   on the painting look   from us   away with the children
     achter hen$_{\{i,j\}}$.
     behind ANAPH/them

     "[The adults]$_i$ in the picture are facing away from us, with the children placed behind them$_{\{i,j\}}$.

The minimal pairs in (4)-(5) suggest that the anaphor *zich* occurs in free variation with the pronoun *hen*. However, the two sentences actually yield systematically distinct readings. When the anaphor is used, the spatial perspective must be that of the antecedent ("the adults"), such that the "behind-ness" of the children is evaluated from the spatial perspective of the adults. When the pronoun is used, however, it is reported that the behindness of the children may be evaluated either from the spatial perspective of the adults in the picture, or from that of the speaker.

The distribution of the simplex anaphor *seg* in Norwegian also seems to be regulated by spatial perspective: "the simple reflexive is used when the physical aspect of the referent of the binder is in focus" (Lødrup, 2007, 183). This is particularly nicely illustrated in minimal pairs like the ones below, involving prepositions that are homophonous between a spatial vs. a more abstract, non-spatial meaning:

(6) *mot* (TOWARD, AGAINST):

     a. Han$_i$ drar   den mot   seg$_{\{i,*j\}}$.
        He[NOM] pull.PRS it   towards ANAPH

        "He$_i$ pulls it towards himself$_{\{i,*j\}}$."

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b. Forbrukerråd-et   argumenterer mot   [seg   selv]$_{\{i,*j\}}$
consumer.council-DEF argue.PRS   against ANAPH self.

"[The consumer council]$_i$ argues against itself$_{\{i,*j\}}$."

(7) *om* (AROUND, ABOUT):

a. De$_i$ spredte   en karakteristisk odør om   seg$_{\{i,*j\}}$.
they[NOM] spread.PST a characteristic odor around ANAPH

"They$_i$ spread a characteristic odor around themselves$_{\{i,*j\}}$."

b. De$_i$ vil fortelle om   [seg   selv]$_{\{i,*j\}}$.
they[NOM] will tell   about ANAPH self

"They$_i$ will tell about themselves$_{\{i,*j\}}$."

The simplex *seg* form is used only when the preposition is interpreted as spatial, and its antecedent is obligatorily interpreted as the spatial perspective-holder with respect to the spatial PP containing the anaphor. In all other cases, *seg selv* is used, making this form the elsewhere case.

To sum up, the use of a spatial-perspectival anaphor targets a reading where the spatial perspective-holder is strictly that of the entity denoted by the antecedent of that anaphor.

2.2 Perspective-holding as necessary antecedence condition

Long-distance anaphors such as those described here are standardly characterized as being "subject-oriented": this is supposed to indicate that these anaphors choose (syntactic) subjects over objects as antecedents. But while this is undeniably a tendential property of such anaphors crosslinguistically, it is by no means an obligatory one In fact, as discussed in Bianchi (2003); Giorgi (2010) and Sundaresan (2012), syntactic subjecthood is neither a necessary nor sufficient condition on anaphoric antecedence. Object experiencers may antecede anaphors in psych-predications for instance. This is illustrated by the Italian sentence (reformatted from Giorgi, 2006) below:

(8) la-propria moglie preoccupa molto Gianni
self's   wife   worries   a-lot Gianni
"Gianna is worried by self's wife."

In (8) – a psych-predicate construction – a non-(syntactic/surface)-subject serves as the antecedent to the SE-anaphor *la propria*. Thus, the condition for antecedence seems to be one of attitude-holding, rather than of (syntactic) subjecthood. We get very similar effects in Malayalam (9) (Jayaseelan, 1997):

(9) taan   waliya aaḷ aana enna raaman.a toonni
self.NOM great man is   that raman.DAT occurred/seemed

"It seemed to Raman$_i$ [$_{CP}$ that self$_i$ was a great man]."

Conversely, non-thematic subjects and other non-perspectival subjects are disbarred from anteceding such anaphors. Consider the Italian example from Giorgi (2006) below.

(10) il   primo ministro sperava che il   dittatore partisse prima   che i
      the prime minister hoped   [$_{CP}$ that the   dictator left.SUBJ [$_{CP}$ before
      rivoluzionare sequestrassero il   proprio patrimonio
      the   revolutionaries sequestered self's   patrimony]]
      "The prime-minister$_i$ hoped that the dictator$_j$ left before the revolutionaries$_k$ sequestered self's$_{i,*j,k}$ patrimony."

Here, the medial DP *il dittatore* may not be an antecedent, even though it is a syntactic subject, because it doesn't denote an attitude (or mental perspective) holder.[2]

To sum up, the subject-orientation of an anaphor does tend to be true as a descriptive generalization which captures the idea that entities that satisfy the conceptual requirements tend to be syntactic subjects – but this is a misleading label for this effect because it suggests a direct correlation between syntactic subjecthood and anaphoric antecedence which is actually not empirically attested. Rather, the antecedents (potential and actual) of these anaphors invariably denote perspective-holders: individuals who hold a certain perspective toward some minimal proposition containing the anaphor. Perspective-holding is thus a necessary condition on the antecedence of such anaphors.

3   An observation about spatial perspective

Against this background, we now present a puzzling restriction on spatial perspective-holding: a restriction, incidentally, already noted elsewhere (Cantrall, 1974; Rooryck and van Wyngaerd, 2007). Consider the following sentence in Tamil:

(11)   Tan-akkŭ$_{\{i,*j\}}$ pinnaalæ iru-nd-æ   maratt-æ koɹendæ$_i$ iḍi-tt-adŭ.
       ANAPH-DAT   behind   be-PST-REL snake-ACC the child.NOM hit-PST-3NSG
       "The child$_i$ hit [$_{DP}$ the tree [$_{CP}$ that was [$_{PP}$ behind itself$_{\{i,*j\}}$]]]."

In (11), the anaphor *tanakkŭ* is the complement of the spatial preposition *pinnaalæ* ('behind'). The antecedent *koɹendæ* ('child') denotes an individual from whose spatial perspective the behindness of the tree must, in the unmarked discourse scenario, be interpreted. (11) thus illustrates the role of spatial perspective in long-distance anaphora.

Now consider the sentence in (12):

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[2]Incidentally, Italian *proprio* does not seem to show anti-locality effects. Thus, the local subject DP may also bind it.

(12) * Tan-akkŭ$_{\{i,*j\}}$ pinnaalæ iru-nd-æ   maratt-æ vaɳɖi   iɖi-tt-adŭ.
      ANAPH-DAT   behind   be-PST-REL tree-ACC car.NOM hit-PST-3NSG
      "The car$_i$ hit [$_{DP}$ the tree [$_{CP}$ that was [$_{PP}$ behind itself$_{\{i,*j\}}$]]]." (Intended)

Given the interpretation of (11), we would expect (12) to mean that the car hit a tree that was behind the car from the spatial perspective of the car: i.e. behind the car relative to the physical location and orientation of the car. But what we get instead is an ungrammatical structure. (12) is a minimal variant of (11); the only difference is the choice of (intended) antecedent: *koɻendæ* ('child') in the former, and *vaɳɖi* ('car') in the latter. We assume, therefore, that the ungrammaticality of (12) is a direct result of the choice of antecedent.

Rooryck and van Wyngaerd (2007), discuss English minimal pairs like that in (13)-(14) (note: these sentences are grammatical with a coreferent pronoun):

(13)   Mary has dirt on herself$_{\{i,*j\}}$.

(14)   * The gun$_i$ has dirt on itself$_{\{i,*j\}}$.

Similar contrasts can also be observed for Dutch (Johan Rooryck (p.c.)):

(15)   Jan$_i$ botste tegen de boom achter zichzelf$_{\{i,*j\}}$.
         Jan bumped against the tree behind himself
         "Jan$_i$ bumped against the tree (that was) behind himself$_{\{i,*j\}}$."

(16)   * [De Auto]$_i$ botste tegen de boom achter zichzelf$_{\{i,*j\}}$.
         The car bumped against the tree behind itself
         "[The car]$_i$ bumped against the tree (that was) behind itself$_{\{i,*j\}}$." (Intended)

In all the minimal pairs above, the antecedent in the grammatical cases denotes a sentient individual, whereas the intended one in the ungrammatical cases doesn't. That is, the spatial perspective-holder denoted by the antecedent of a(n) (perspectival) anaphor must be sentient. Of course, as noted earlier, mental perspective-holding also requires sentience.

We might thus formulate this as a a stronger and more general restriction on linguistic perspective-holding, as in (17) below:

(17) **Sentience restriction on perspective-holding:**
     The grammatically expressed or discourse-salient perspective-holder relative to a linguistic proposition must be sentient.

4   A first solution: perspective and self-location

How do we formally derive the sentience restriction in (17)? Our first attempt at a solution is inspired by prior analyses having to do with the semantics of self-ascription. Lewis (1979)

and Abusch (1997) propose that an individual's mental state locates her in a world and at a time, and that these are reflected in the encoding of de se perspective and temporal (de nunc) perspective. Building on this idea, we propose that an individual x's mental state (and in particular x's perceptual experience) may also designate the spatial coordinates s' (modelled as an ordered pair consisting of location and axial orientation) that x might be located at. These are modelled as a set of spatial coordinates, yielding a set of $Khorastic_{x,w,t}$ alternatives (in analogy with $Doxastic_{x,w,t}$ alternatives), namely the set of spatial coordinates that an individual considers candidates for the spatial coordinate that she occupies.

(18) $Khorastic_{x,w,t} = \{s' :$ it is compatible with x's perceptual experience in w at t at $s_{x,w,t}$ for $s_{x,w,t}$ to be $s'\}$, where $s_{x,w,t} =$ the spatial coordinate of x in w at t.

We assume that the semantics of spatial predicates such as 'behind' and 'left' appeals to such sets; 'behind' may this have a lexical entry like the following.

(19) $[\![behind]\!]^{c,w,t,g} = \lambda x \lambda y \lambda z. \forall s'[s' \in Khorastic_{z,w,t} \rightarrow y$ is behind x in w relative to $s']$.

The perspective holder is the individual with respect to whose $Khorasticc_{x,w,t}$ alternatives the meaning of 'behind' is calculated, supplied as the value of a covert pronominal argument:

(20)   The tree is behind the child.
(21)   LF: $[pro_1$ The tree is behind the child$]$
(22) $[\![(20)]\!]^{c,w,t,g} = 1$ iff $\forall s'[s' \in Khorastic_{g(1),w,t} \rightarrow$ *the tree is behind the child relative to s'*]

Against this model, the sentience restriction described in (17), finds a natural explanation. The appeal to self-location in worlds, times and spaces entails that attitudinal, temporal and spatial perspective are all mental notions, with the type of perspective simply being a reflex of the dimension of self-location that is picked up by the semantics. Since only sentient individuals can engage in self-location, spatial, temporal and mental perspective-holders must be sentient. The antecedent of a spatial anaphor denotes the spatial perspective-holder; thus, the antecedent must denote a sentient individual.

5   A new puzzle

The solution we have just proposed explains the sentience restriction on perspective-holding, observed with respect to certain kinds of anaphora. But it raises a new puzzle having to do with the apparent absence of such a restriction in non-anaphoric structures involving spatial perspective. Consider the sentence below:
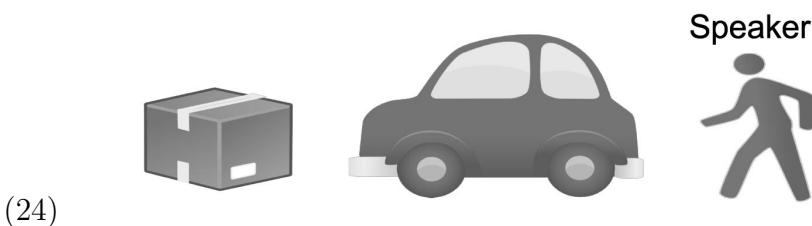
(23)   The box is behind the car.

(23) is ambiguous between (at least) two readings:

Reading 1: The box is behind the car relative to my (the speaker's) spatial coordinates, not relative to the car's: i.e. the box is on the other side of the car from me.

This is the "deictic/observer centered frame" of perspective, discussed in Levinson (1996); Rooryck and van Wyngaerd (2007), and illustrated below:

(24)

Reading 2: The box is behind the car relative to the car's spatial coordinates rather than my (speaker's) own; i.e. it is at by the trunk of the car, not by the hood.

This is the object-centered frame in Levinson's terms, corresponding to the scenario below:

(25)
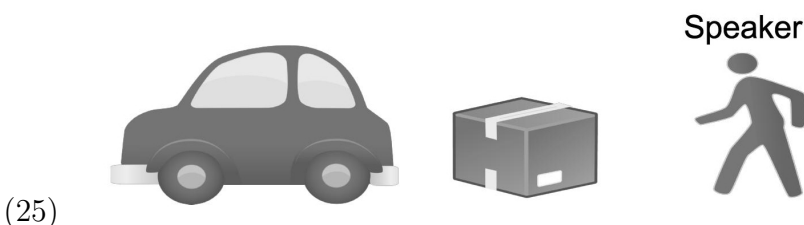
But now we run into a problem. Under Reading 2, the car seems to be functioning as the spatial perspective holder. But precisely this is predicted to be impossible, given the sentience restriction in (17), which we have just proposed to explain by invoking the notion of sentient self-location.

It is clear that our account above is too simple and needs to be revised.

6 The role of the utterance-context Speaker

There are two possible strategies toward a solution. We could argue that the sentience restriction delineated in (17) is too general, and that it applies only to perspective-holding in the context of anaphoric dependencies. Alternatively, we could try to show that the sentience restriction is a universal condition on linguistic perspective-holding: i.e. show that sentences like (23) actually do obey the sentience restriction.

We pursue the second strategy here. The root of our solution lies in the observation that linguistic perspective along all dimensions, including along the spatial one, is ultimately projected from the mind of the (utterance-context) Speaker.

This is not an original observation by any means and has been modelled in different ways in the literature: e.g. the performative hypothesis due to Ross (1970), the conceived role of "empathy" in anaphora (Kuno and Kaburaki, 1977; Kuno, 1987), the idea of a Speech-Act phrase in the left clausal periphery (Cinque, 1999, and subsequent), the syntactic representation of the speaker in CPs (Baker, 2008; Giorgi, 2010) and spatial PPs (Rooryck and Wyngaerd, 2011), and the representation of the Kaplanian utterance context, posited within certain analyses of indexical shift (Schlenker, 2003; Anand, 2006). Regardless of how the speaker's role in the grammar is formalized, it seems clear that the grammatical involvement of the speaker plays a role in perspectival relations. This intuition is also implicit in Kuno (1987)'s idea of empathy, defined as follows (emphasis in the original):

> "Empathy is the speaker's identification, *with varying degrees* (ranging from 0 to 1), with a person who participates in the event that he describes in a sentence."
> (Kuno and Kaburaki, 1977, 628)

In other words, all perspective-holding is filtered through the mind of the (utterance context) speaker.

6.1 Imagination, Speaker, and spatial perspective

Koopman and Sportiche (1989, among others) and more recently Sundaresan (2012) have proposed that there is a silent perspectival pronominal operator (a *pro*) in the left periphery of certain maximal projections (CPs, PPs, vPs). This pronoun encodes the syntax and semantics of perspective and is controlled/bound by a contextually salient individual denoting the perspective-holder. Combining this insight with the idea of Speaker involved, discussed above, we now propose the following:

(26)   If *pro* is the perspectival argument of a spatial predicate in c, and *pro* is not non-obligatorily controlled by some other expression, then $[\![pro]\!]^c = Speaker(c)$.

Khorastic alternatives are now bifurcated into two distinct classes, which we call $Khorastic_{perceptual}$ and $Khorastic_{imagined}$. These are defined as follows:

(27) $Khorastic_{perceptual_{x,w,t}} = \{s'$: it is compatible with x's perceptual experience in w at t for $s_{x,w,t}$ to be $s'\}$
       Where $s_{x,w,t} =$ the spatial coordinate of x in w at t.

(28) $Khorastic_{imagined_{x,w,t}} = \{s' :$ it is compatible with what x imagines in w at t for x to be located at $s'\}$

Intuitively, $Khorastic_{imagined}$ is applicable whenever the speaker imagines herself to be located at some spatial coordinate that is occupied by some (other) salient entity. This can be stated as follows:

(29) Constraint on $Khorastic_{imagined}$:
There is some contextually salient entity u such that for every element s' of $Khorastic_{imagined_{x,w,t}}$, it is compatible with what x believes in w at t for u to be located at s'.

We then amend the lexical entry for a spatial predicate like 'behind' as follows:

(30) $[\![behind]\!]^{c,x,t,w,g} = \lambda x \lambda y \lambda z. \forall s'[s' \in Khorastic_{x,w,t} \rightarrow y$ is behind x in w at t relative to $s']$
Where
  i. $Khorastic_{x,w,t} = Khorastic_{perceptual_{x,w,t}}$ or $Khorastic_{imagined_{x,w,t}}$; and
  ii. $Khorastic_{x,w,t} = Khorastic_{imagined_{x,w,t}}$ only if
    a. $x = Speaker(c)$ and
    b. there is some contextually salient entity u such that for every element s' of $Khorastic_{imagined_{x,w,t}}$, it is compatible with what x believes in w at t for u to be located at s'.

We can now apply these notions to the puzzle in (23), repeated below:

(31) The box is behind the car.

As we saw, Reading 2 (illustrated in (25)) – where the behindness of the box is interpreted relative to the spatial coordinates of the car – is predicted to be impossible, contrary to fact.

We now claim that mental perspective is involved even in this case. Put informally, Reading 2 for (23)/(31) is possible because the perspective holder is the utterance-context speaker, who in this context *imagines* (defined as above) herself to be in the location of the car.

7 Re-evaluating the sentience restriction on antecedence

But now we have a new puzzle on our hands. Given what we've just said, the interpretive ambiguity of sentences like (23) is no longer strange. But it is clear that the ungrammaticality of the non-sentient Figure (in the sense of Talmy, 1975) in the Tamil, Dutch, and English sentences below – requires a different solution.

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(32) Tan-akkŭ$_{\{i,*j\}}$ pinnaalæ iru-nd-æ   maratt-æ *vaɳɖi/koɭendæ iɖi-tt-adŭ.
ANAPH-DAT   behind   be-PST-REL tree-ACC car.NOM/child   hit-PST-3NSG

"The car$_i$ hit [$_{DP}$ the tree [$_{CP}$ that was [$_{PP}$ behind itself$_{\{i,*j\}}$]]]." (Intended)

(33) *[De Auto]$_i$/Jan$_i$ botste tegen de boom achter zichzelf$_{\{i,*j\}}$.

The car bumped against the tree behind itself

"*[The car]$_i$/Jan bumped against the tree (that was) behind itself$_{\{i,*j\}}$/himself." (Intended)

(34) *The gun$_i$/The child has dirt on itself$_{\{i,*j\}}$.

In light of the discussion above, we can recast this question as follows: why can the Speaker not serve as a perspective-holder in structures involving perspectival anaphora? I.e. why is it ungrammatical to say that the gun has dirt on itself (34), if the utterance-context Speaker can just imagine herself to be in the spatial coordinates of the gun (or some other salient individual)?

The answer, we propose, has to do with independent restrictions on perspective-holding in the context of anaphoric relations. In particular, while perspective-holding is a necessary condition on the antecedence of perspectival anaphors, it is not a sufficient one.

7.1 Perspective-holding: insufficient condition for antecedence

We saw above that perspective-holding is a necessary condition on antecedence of (perspectival) anaphora. Here we will see that perspective-holding is not a sufficient condition on anaphoric antecedence. There is an additional negative restriction associated with the antecedent of a perspectival anaphor, namely that it may *not* denote a participant (Speaker, Addressee, or indexical 3rd-person entity) of the utterance context.

This restriction makes itself known in different ways. A well known reflex is that perspectival anaphors of the kind discussed here may not take 1st and 2nd person pronouns as antecedents.[3] Thus, the sentences in (35)-(36) are ungrammatical in Tamil (similar patterns can be shown for Icelandic, Dutch, Italian, and Norwegian – some of the other languages with perspectival anaphora). Notably, a shifted 1st or 2nd person pronoun may antecede such an anaphor (see the discussion of Tamil monstrous agreement patterns in Sundaresan, 2012), showing that the restriction is not against indexicals per se, but indexicals that are evaluated against the utterance context.

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[3]Of course, there are languages with anaphors that take 1st and 2nd person antecedents, such as Chinese and Thai. Under the current system, we would have to say that such languages either don't have perspectival anaphors, or weaken the negative restriction made here.

(35) * Naan [$_{CP}$ Seetha   tann-æ$_i$ paar-tt-aaɭ-ŭnnŭ]   nene-tt-een.
I.NOM   Seetha.NOM ANAPH-ACC see-PST-3FSG-COMP think-PST-1SG

"I$_i$ thought [$_{CP}$ Seetha saw me$_i$]" (Intended)

(36) * Nii   [$_{CP}$ Seetha   tann-æ$_i$ paar-tt-aaɭ-ŭnnŭ]   nene-tt-aaj.
You.NOM   Seetha.NOM ANAPH-ACC see-PST-3FSG-COMP think-PST-2SG

"You$_i$ thought [$_{CP}$ Seetha saw you$_i$]" (Intended)

Another well-known reflex of this restriction has to do with mood restrictions on anaphora. In languages like Icelandic (Sigurðsson, 1990) and Italian (Giorgi, 2006), for instance, perspectival anaphors are licit only in subjunctive clauses, not in indicative ones – as illustrated by the minimal pair in (37)-(38) from Icelandic (Sigurðsson, 1990). Crucially, it has been noted for Icelandic that the role of the subjunctive-marker is "mainly to signal that the perspective-holder of a given construction is distinct from the [utterance-context] speaker" (Hellan, 1988, 89) – the same may be said of Italian as well:

(37)   [$_{DP}$ Skoðun Jóns$_i$]   er [$_{CP}$ að   sig$_{\{i,*j\}}$ vanti   hæfileika].
opinion Jon.GEN is   that ANAPH.ACC lacks.SBJV talents

"[$_{DP}$ Jon's$_i$ opinion] is [$_{CP}$ that he$_{\{i,*j\}}$ lacks talents]."

(38)   * [$_{DP}$ Skoðun Jóns$_i$]   fær   mig til að   halda [$_{CP}$ að   sig$_{\{i,*j\}}$
opinion Jon.GEN leads me to to.INF believe   that ANAPH.ACC
vanti   hæfileika].
lacks.SBJV talents

"[$_{DP}$ Jon's$_i$ opinion] leads me to believe [$_{CP}$ that he$_{\{i,*j\}}$ lacks talents]."

In other words, the anaphor is licensed in precisely those environments where the utterance context speaker is prevented, for independent reasons, from serving as a perspective-holder.

To sum up then, perspective-holding (relative to a minimal proposition containing the anaphor) is a necessary condition on the antecedence of a perspectival anaphor. However, such perspective-holding is not a sufficient condition on antecedence: the perspective-holder may additionally not denote a participant (Speaker, Addressee, indexical 3rd-person entity) of the utterance context.

8   Final proposal: self-location, imagination, anaphora

We now have all pieces of the puzzle in place and can explain the restriction against inanimate antecedents in perspectival anaphora (as well as the lack of such a restriction in non-anaphoric structures encoding perspective). The sentience restriction on antecedence of anaphors is a direct result of the restriction that precludes utterance-context participants from being

perspective-holders. Specifically, in a sentence like (12), the Speaker is explicitly prevented from serving as a perspective-holder: the behindness of the tree may not be evaluted from the spatial position of the Speaker (or any other utterance-context participant whose space the Speaker imagines herself to be and against which her *Khorastic* alternatives are evaluated). Thus, the choice of perspective-holder in (39) is restricted to the car. But of course, since the car is inanimate, it cannot serve as a perspective-holder and the sentence crashes:

(39)   * Tan-akkŭ$_{\{i,*j\}}$ pinnaalæ iru-nd-æ   maratt-æ vaṇḍi   iḍi-tt-adŭ.
       ANAPH-DAT   behind   be-PST-REL tree-ACC car.NOM hit-PST-3NSG
       "The car$_i$ hit [$_{DP}$ the tree [$_{CP}$ that was [$_{PP}$ behind itself$_{\{i,*j\}}$]]]." (Intended)

In non-anaphoric perspectival sentences the utterance context Speaker is not prevented from being a perspective-holder in this manner: thus readings where the relevant spatial coordinates are those occupied by a non-sentient entit, as in (23)/(31), are available.

     This restriction against utterance-context Speaker involvement has been modelled in different ways. For instance, Schlenker (2003) models it by proposing that logophors (perspectival anaphors) are all obligatorily shifted indexicals. I.e. they are indexicals that are explicitly prevented from being evaluated against the utterance context:

(40)   **Schlenker's version (simplified):**
       $[\![log]\!]^{c,g} = Participant(\neg UtteranceContext)$

Sundaresan (2012), however, argues – on the grounds that logophors like Tamil *ta(a)n* are not indexicals (shifted or otherwise) – that they have rather have the lexical entry in (41):

(41)   **Sundaresan (2012)'s version:**
       $[\![taan]\!]^{c,g} = \neg Participant(UtteranceContext)$

Regardless of how this is precisely formalized, however, the end effect is that the Speaker of the utterance context is prevented from serving as a perspective holder, by a restriction that is built into the meaning of the perspectival anaphor/logophor.

8.1   Formally deriving the sentience restriction

With this in place, we can now walk through formal derivations of the Tamil minimal pair showing the sentience restriction again:

(42)   Tan-akkŭ$_{\{i,*j\}}$ pinnaalæ iru-nd-æ   maratt-æ koɹendæ$_i$
       ANAPH-DAT   behind   be-PST-REL snake-ACC the child.NOM/*the car.NOM
       iḍi-tt-adŭ.
       hit-PST-3NSG
       "The child$_i$ hit [$_{DP}$ the tree [$_{CP}$ that was [$_{PP}$ behind itself$_{\{i,*j\}}$]]]."

(43) * Tan-akkŭ$_{\{i,*j\}}$ pinnaalæ iru-nd-æ   maratt-æ vaɳɖi   iɖi-tt-adŭ.
      ANAPH-DAT   behind   be-PST-REL tree-ACC car.NOM hit-PST-3NSG

"The car$_i$ hit [$_{DP}$ the tree [$_{CP}$ that was [$_{PP}$ behind itself$_{\{i,*j\}}$]]]." (Intended)

The derivation of the grammatical sentence in (42) proceeds in the following manner. Adapting Sundaresan (2012), we propose that the perspective-holder argument of 'behind' is a *pro* in the Spec of "PerspP" (perspectival phrase) in the left periphery of the spatial PP. This *pro* mediates the anaphor-antecedent relationship. In (42), the anaphor *ta(a)n* obligatorily Agrees with and is subsequently bound by this perspectival *pro*. Crucially, *pro* cannot denote the utterance-context Speaker because of the lexical restriction on *ta(a)n* that prevents an utterance context participant from serving as a perspective-holder. *pro* is thus non-obligatory controlled by the antecedent *koɻendæ* ('child') (as per the rule in (26)), which then serves as the antecedent of *ta(a)n* by transitivity. The spatial preposition *pinnaalæ* ('behind') has the lexical entry given in (30), repeated below:

(44) $[\![behind]\!]^{c,x,t,w,g} = \lambda x \lambda y \lambda z . \forall s'[s' \in Khorastic_{x,w,t} \rightarrow y$ is behind x in w at t relative to $s']$

Where

   i. $Khorastic_{x,w,t} = Khorastic_{perceptual_{x,w,t}}$ or $Khorastic_{imagined_{x,w,t}}$; and

   ii. $Khorastic_{x,w,t} = Khorastic_{imagined_{x,w,t}}$ only if

      a. $x = Speaker(c)$ and

      b. there is some contextually salient entity u such that for every element s' of $Khorastic_{imagined_{x,w,t}}$, it is compatible with what x believes in w at t for u to be located at s'.

These together yields the LFs and truth-conditions for (42):

(45) LF: [Child$_2$ hit the tree [$_{CP}$ which$_1$ [$_{PerspP}$ pro$_2$ t$_1$ was behind ta(a)n$_2$]]]]

(46) $[\![(42)]\!]^{c,w,t,g} = $ In w at t, the child hit the tree such that for all s' [s' is an element of $Khorastic_{the\ child,w,t} \rightarrow$ the tr is behind the child in w at t relative to s'].

The derivation of the ungrammatical minimal variant in (43) proceeds unproblematically in the syntax, in the manner described above. But it fails to converge at LF. Just as before, the utterance context Speaker cannot serve as the spatial perspective-older, given the lexical entry for *ta(a)n*; thus *pro* may not denote the Speaker. As per (26), *pro* is thus non-obligatorily controlled by a contextually salient DP – here, *vaɳɖi* ('car'), as this is the only (obvious) candidate. However, this DP denotes a non-sentient entity which, as discussed earlier, cannot self-locate, thus cannot serve as the referent of the third argument for 'behind' in (44). The interpretation of 'behind' thus doesn't go through and the sentence crashes at LF.

9 Outro: conclusion and extensions

Based on the data and discussion so far, we have reached the following conclusions. Linguistic perspective-holding along all dimensions – mental, spatial, and potentially also temporal – requires sentience. Thus all linguistic perspective is ultimately mental in nature. It is evaluated either relative to the Speaker's actual coordinates (her time, space, world) or relative to the coordinates of some other contextually salient entity (sentient or otherwise) that the Speaker *imagines* herself to be located at. In perspectival anaphoric structures, the perspectival involvement of the Speaker (and other utterance-context participants – all trivially sentient)[4] is explicitly prohibited by a restriction built into the lexical entry of the anaphor. This in turn yields a sentience restriction in perspectival anaphoric structures where all potential antecedents are non-sentient.

The idea that all linguistic perspective is ultimately mental in nature, might be exploited to explain empirical parallels between different types of perspectival predications. As noted at the beginning, spatial, temporal, and "mental" (i.e. psych- and attitude) predicates crosslinguistically resemble and differ from one another in systematic and interesting ways. Under the proposal we have started to develop here, these differences and similarities receive a potentially principled explanation. All perspectival predicates share the property that they quantify over members of a set that are judged by a sentient entity (denoting the perspective-holder) to represent the candidates for the actual temporal, spatial and world coordinates of that entity. The difference between spatial, temporal, and attitudinal/psych predicates, lies merely in the choice of this coordinate – a choice that, we might propose, is in turn parametrized and also varies according to the nature and category of the predication. That is, a spatial predicate involves quantification over location/axial-orientation pairs, an attitudinal one, involves quantification over worlds, and a temporal one involves quantification over times. Yet other predicates (e.g. 'before', 'while') may be underspecified for this information yielding well-known crosslinguistic syncretism patterns. The idea that linguistic perspective along all dimensions is ultimately mental may thus give us a way to understand both the similarities and differences between different dimensions of linguistic perspective.

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[4]Or anthropomorphized: there are people who talk to their plants, for instance.

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