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THE THEORY OF SYNTAX AND THE REPRESENTATION OF INDEXICALITY

1. Introduction

All languages have indexical expressions – i.e., expressions such as *here*, *I*, *tomorrow*, etc. The *meaning* of these items in a given language is always the same, but their *reference* depends on the peculiar context in which they appear. So, if Alessandra Giorgi is speaking on February 26th 2008 and she utters *I am happy today*, *I* refers to Alessandra Giorgi, and *today* to February 26th 2008, but it would not be so if the sentence were uttered at some other time by somebody else.
These considerations seem to be quite independent from a theory of syntax. The syntax of a sentence such as *I am happy today* is apparently computed with no interaction with the context, and only if one wants to know the actual reference of the various items, one has to check who the speaker is and what day it is.
In these pages I'm going to challenge this view, and I'll show that a different perspective is in order, as a natural consequence of recent developments in the theory of the structure of clauses.
I'll propose in particular that the left-most position in the C(omplementizer) layer is devoted to the representation of the speaker's temporal – and possibly spatial as well – coordinates, as can be seen in languages like Italian from the distribution of verbal forms in complement clauses. The hypothesis I propose is that this position in the C-layer defines it as a *phase*, in the sense of the Minimalist framework proposed in Chomsky (2005).

2. The structure of the left periphery

The very influential work by Cinque (1999, 2002) contributed to the theory of syntax an important result. He showed, with arguments coming from the analysis of a large corpus of languages, that the functional organization of a clause is much more complex than previously thought. It is constituted by many heads, projecting their constituents in an universally defined hierarchy. Therefore many functions, which up to that point were considered as arising exclusively at an interpretive level – such as for instance modality, evidentiality, epistemicity, etc – were attributed to heads located in a specific position in the syntactic tree. In this perspective, an adverb expressing for instance epistemicity, such as *probabilmente* (probably) derives its function not from a post-syntax interpretive process, but from the fact that it appears in a dedicated position in the syntactic tree.
Furthermore, in the same spirit, Rizzi (1997, 2001, 2002) showed that the left periphery of clauses is richly articulated and is constituted by more than one syntactic position. Rizzi's (2001) proposal concerning the structure of the left side of the clause is the following:[1]

(1) FORCE TOP* INT TOP* FOC TOP* FIN…

The high C – Rizzi's Force – in Italian is the position for the complementizer *che* (that), the lower INT is the position for the interrogative complementizer *se* (if, whether) and the lowest FIN is reserved to infinitival introducers. The intermediate positions are for topic – where the star, '*',

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[1] On the left periphery in Italian see also Poletto (1995, 2000, 2001), Beninca' (2001), Beninca' and Poletto (2004), Cardinaletti (2004). On the relation of T with C, see Pesetsky and Torrego (2004).

signals the possibility of recursion – and focus. Rizzi's work therefore showed that the left-periphery of the clause is a complex syntactic *layer*, projected by multiple heads.

The question emerging from this picture concerns the role of the high C. Giorgi (2008) proposed that this position constitutes the interface between the syntax of the clause and the context.[2]

This proposal sounds natural, once we consider that the information present in the C-layer according to Rizzi is already part of the interface with the context/ discourse. This is the case both of the Focus and of the Topic projections – devoted to new/ contrastive and old information respectively – and of the Interrogative complementizer position INT. Hence, it does not come as a surprise that the high C-position might be dedicated to a similar function as well.[3]

3. The left-most C-position and the Speaker's temporal coordinate

Among the indexical items present in the lexical inventory of (most) languages, we find verbal morphology. Consider for instance the following sentence:[4]

(2) Gianni ha mangiato/ mangiò un panino
    Gianni ate (present perfect /simple past) a sandwich

The sentence in (2) can be properly interpreted only if the eating event, due to its temporal morphology, is located in the past with respect to the speaker's temporal location. The same happens with the present *mangia* (he is eating) and the future *mangerà* (he will eat). Interestingly, the necessity of an indexical location of the event/state is true of (some) embedded contexts as well:

(3) Gianni ha detto che Maria è incinta
    Gianni said that Maria is(pres) pregnant

In sentence (3) the state of pregnancy of Mary must hold both at the time Gianni said it, and *now* – i.e., with respect to the speaker's temporal location. This phenomenon is known in the literature as *Double Access Reading* (henceforth, DAR).[5]

When the subordinate clause features a subjunctive, there is no DAR interpretation:

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[2] See also Giorgi and Pianesi (1997, 2004). Bianchi (2003, 2006) and Sigurdsson (2005) discuss hypotheses in the same vein, even if from a different point of view.

[3] The left-most C position in Rizzi's framework is FORCE. According to Rizzi, in Italian it is projected by the Complementizer *che* (that). In some sense therefore, the position I am arguing for here should coincide with it. The identity however is only superficial, because, as I will remark below, the complementizer *che* (that) introducing an indicative clause cannot be omitted, whereas the same lexical item introducing a subjunctive clause can. Giorgi and Pianesi (1997, 2004). argue that *che* (that) does not project the same phrase in the two cases, in particular, they argue that the subjunctive head is lower in the syntactic hierarchy. If one wants to assign a label to the projection I am talking about, one could label it *C-Speaker*. The important point is to make explicit that at this syntactic level the phase is closed, hence the projection ceases to be operative in the syntax. On C deletion see also Poletto 1995, 2000, Cardinaletti, 2004.

[4] In all the following examples I will only use the present perfect and translate it in English as a simple past. In this work in fact I will consider the two forms as equivalent. In Italian, the distribution of the two past forms is mostly determined by the regional background – the simple past being used predominantly in Southern Italy. Note however that this is certainly an oversimplification of the facts, see Giorgi and Pianesi (1997, ch. 4) for a brief discussion.

[5] The DAR is not a universal phenomenon. In Italian and English the meaning of the sentence in (1) is as discussed in the text. In Russian, Romanian, Japanese and Chinese, to mention only some, the equivalent of sentence (1) would have more or less the meaning of the following sentence in Italian:
i.   Gianni ha detto che Maria era incinta
         Gianni said that Maria was pregnant.
Note also that the temporal location of the embedded event/state in (3) cannot be purely indexical – i.e., Maria's pregnancy cannot hold only *now*, but *not* at the Gianni was speaking. This shows that temporal anchoring to the superordinate event is obligatory. See also Enç (1987), Higginbotham (1995, 2001).

(4) Gianni credeva che Maria fosse incinta
    Gianni believed that Mary was (subjunctive) pregnant

The only time Maria is required to be pregnant in this case, coincides with the temporal location of the superordinate subject – Gianni – and does not require to be simultaneous with the temporal location of the speaker as well.
Giorgi and Pianesi (1997, 2004) observed the existence of a strong correlation in Italian between the possibility of omitting the Complementizer *che* (that) and the existence of the DAR. They stated the following generalization:

(5) It is never the case for the DAR to arise, when the complementizer is omitted

In other words, Complementizer Deletion (henceforth, CD) and DAR never coexist.[6]
The account, developed in Giorgi (2008), is that the impossibility of deleting C in DAR contexts is due to the presence of the speaker's temporal coordinate in the left-most position of the C-layer. When the temporal location of the speaker is required, in order to temporally locate the embedded event, the complementizer cannot be omitted. On the contrary, when it does not, it can be omitted. Consider the following examples:

(6) Gianni ha detto *(che) è incinta
    Gianni said (that) she is(indicative) pregnant
(7) Gianni credeva (che) fosse incinta
    Gianni believed (that) she was(subjunctive) pregnant

CD/ non-CD correlates, roughly, with the indicative/ subjunctive distinction. The subjunctive tense morpheme can be argued to be just an instance of tense-agreement with the superordinate verbal form.[7]
In other words, in subjunctive complement clauses no *real* temporal interpretation is required, and in particular no location with respect to the speaker's temporal coordinate. Hence, CD is possible, because the speaker's temporal coordinates are not involved in the interpretation of the clause. To put it in simple terms: When the DAR is required, the complementizer has some *content* – the speaker's temporal (and spatial) coordinates – and therefore cannot be omitted. I conclude this section therefore, by proposing the following hypothesis:[8]

(8) A Complementizer introducing an indicative clause is the projection in the syntax of the speaker's temporal and spatial location.

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[6] See Giorgi and Pianesi (1997, 2004) and Giorgi (2008, ch. 1 and 2). Note that the generalization is one-way. I.e., when there is no DAR, the complementizer may or may not be deleted, according to further conditions. Note also that the analysis of CD is neither in terms of "truncation", nor of "omission". Giorgi and Pianesi propose that in the case of subjunctive *deletion*, the complementizer is analyzed as part of the subjunctive morphology itself, hence syncretically realized on the verbal head itself. The authors provide extensive discussion to this extent, which for reasons of space I will not reproduce here.

[7] Note however the following case, discussed in Giorgi and Pianesi (2004) and Giorgi (2008):
i.   Gianni ha ipotizzato (che) fosse incinta
        Gianni hypothesized (that) she was(past subj) pregnant
ii.   Gianni ha ipotizzato *(che) sia incinta
        Gianni hypothesized (that) she is (pres subj) pregnant
Interestingly, in this case the embedded verbal form is a subjunctive, but in the present under past configuration – samewhat an anomalous one – the DAR arises and, coherently with the analysis proposed, CD is not available.

[8] I'm not analyzing here the role of the speaker's *spatial* location. See Ritter and Wiltschko (2008) for an interesting analysis of Salish languages in this respect.

The Complementizer, therefore, is an important component of the syntactic device bridging the gap between syntax and indexicality.

In the following section I will deal with a phenomenon traditionally constituting a challenge for any theory of Sequence of Tense (henceforth, SoT), i.e., the dependencies from a future verbal from. I'll show how the proposal I just sketched can provide a better insight into it, constituting therefore an argument in favor of the proposal itself.

This is obviously true not only in the contexts where a present tense is realized, but also in the other cases. Consider for instance the following examples:

(9) Gianni ha detto *(che) Maria ha telefonato
    Gianni said that Maria called
(10)   Gianni ha detto *(che) Maria telefonerà
        Gianni said that Maria will call

In sentence (9) the embedded past is interpreted as past with respect to the saying by Gianni – namely Gianni talked of a *past* calling event – and past with respect to the speaker's coordinate as well. In sentence (10), the event is future with respect to Gianni's temporal location – i.e., Gianni talked about a future calling event – and with respect to the speaker's temporal location as well, as in the English *will* future. In both cases, CD is impossible. Hence, the existence of the DAR in complement clauses can be generalized in Italian to all the indicative tenses.[9]

4.   Dependencies from a future

I illustrated above that a present tense under a past gives rise in Italian – and English – to the DAR, typically requiring (also) an indexical interpretation of the embedded tenses.[10]

No DAR however arises if the main verbal form is a future. Compare for instance the following sentences:

(11)   Gianni ha detto che c'è poco zucchero nel caffè
        Gianni said(PAST) that there is(PRES IND) too little sugar in the coffee

(12)   Domani, quando gli porterai il caffè, Gianni dirà che c'è poco zucchero
        Tomorrow, when you will take him the coffee, Gianni will say(FUT) that there is(PRES IND) too little sugar

The interpretation of sentence (11) is the expected DAR one. For instance, it would be felicitous in a situation in which Gianni just told me, a few minutes ago, that in the coffee he is drinking *now* there isn't enough sugar. The DAR interpretation is however by no means the most natural one for the sentence in (12). For this sentence to be felicitous there is no need for the sugar to be *already* in the coffee when the speaker utters the sentence, i.e., *now*. According to the most natural interpretation, on the contrary, the embedded state does not hold at utterance time, but only at the time of the saying, hence in the *future from now*.

Note furthermore, that CD is impossible in this case as well, as in all the other cases with an embedded indicative:

(13)   Domani, quando gli porterai il caffè, Gianni dirà *(che) c'è poco zucchero

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[9] This amounts to Giorgi and Pianesi's (2000, 2001) *Generalised Double Access Theory*.

[10] In the literature on the topic the DAR has usually been considered as an exclusive property of the present tense. In particular, see the analysis given in Abush (1997) and Schlenker (2003). See also Ogihara (1995).

Tomorrow, when you will take him the coffee, Gianni will say(FUT) (that) there is(PRES IND) too little sugar

This constitutes a *prima facie* problem: the speaker's temporal coordinate in C should give rise to a DAR reading, namely, to a reading under which the sugar is supposed to be in the coffee both *now* and *then*.[11]

As non-DAR contexts however, these are anomalous ones. In particular, the interpretation of embedded indexical and anaphoric temporal locutions is not as one would expect it to be in standard non-DAR contexts. In what follows I will briefly outline their distribution. Following Giorgi and Pianesi (2003) and Giorgi (2008) I distinguish three types of temporal locutions: the *referential* ones – i.e., the 24th of May, June 2006, etc. – the *indexical* ones – yesterday, last week, tomorrow morning, etc. – and the *anaphoric* ones – the day before, the day after, etc.

I briefly pointed out above that subjunctive, in general, does not give rise to DAR sentences. Both indexical and anaphoric temporal locutions can appear in a subjunctive, non-DAR, clause:

(14)   Gianni credeva che Maria partisse ieri/ domani
        Gianni thought that Maria leave(PAST SUBJ) yesterday/ tomorrow
(15)   Gianni credeva che Maria fosse partita il giorno prima
        Gianni thought that Maria had(PAST SUBJ) the day before
(16)   Gianni credeva che Maria partisse il giorno dopo
        Gianni thought that Maria leave(PAST SUBJ) the day after

I will show that, contrary to expectations, both indexical and anaphoric temporal locutions in clauses embedded under a main future do not have the distribution exhibited in typical non-DAR contexts as (14)-(16) above.

5.   Temporal locutions

5.1 Indexical temporal locutions

Consider now the distribution of referential and indexical temporal locutions in indicative clauses embedded under a past. These clauses are introduced by the high C projection and are therefore DAR contexts:

(17)   Gianni ha detto che Maria partirà il 28 agosto
        Gianni said that Maria will leave(FUT IND) on the 28th of August
(18)   Gianni ha detto che Maria partirà domani
        Gianni said that Maria will tomorrow

Under the hypothesis that the speaker is speaking on the 27th of August, in principle, both sentences are possible. The referential locution locates the event directly on a certain date, whereas the indexical one locates it with respect to the speaker, in this case in her future. In these contexts therefore, it is always possible to pair a referential locution with its corresponding indexical one, and they are mutually interchangeable.[12]

Consider now the following sentence with a main future:

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[11] See also the discussion in Giorgi (2008).
[12] This is true independently of the exact words used by Gianni. In particular whatever expression *he* used, an indexical such as *tomorrow*, by definition, will always locate the event with respect to the *speaker's* temporal coordinate.

(19)   Gianni dirà che Maria è partita
        Gianni will say that Maria left

As I briefly discussed above, the embedded event must be located only with respect to the superordinate one, and not with respect to *now*. Therefore, the following reading is possible:

(20)   *now*_____leaving_____saying

Under this reading, the *leaving* event is past only with respect to the saying, but not (necessarily) with respect to the speaker's temporal location (*now*).
Let's suppose that *now* is the 27th of August, the leaving is on the 28th and that Gianni talks on the 29th. The following example expresses this meaning, as shown in (20) above, by using referential locutions:

(21)   (Oggi è il 27 agosto) il 29 Gianni dirà che Maria è partita il 28
        (Today is the 27th of August) on the 29th Gianni will say that Maria left on the 28th

With respect to a speaker speaking on the 27th of August, the 28th is indeed *tomorrow*. In this case, however, it is not possible to substitute the referential expression in the embedded clause by the corresponding indexical – namely *tomorrow*:[13]

(22)   *Il 29 agosto Gianni dirà che Maria è partita domani
        On the 29th of August Gianni will say that Maria left tomorrow

The day of the leaving, as pointed out above, is *tomorrow* with respect to the utterance time, and indexicals, by definition, should not be sensitive to the specific syntactic context in which they appear. Therefore, the ungrammaticality of example (22) poses a problem to whatever theory of SoT and indexicality.
Consider also that, were the embedded clause in (22) a main one, we would also get ungrammaticality:

(23)   *Maria è partita domani
        Maria left tomorrow

Tomorrow places the leaving event in the future of the speaker and, simultaneously, the past tense places it in her past. Hence, the two locations are contradictory and the sentence is ungrammatical.
My proposal is that *tomorrow* cannot be used in example (22) exactly for the same reason. This shows that, contrary to appearances, the embedded clause in (22) actually undergoes a double evaluation as in ordinary DAR cases.
The reasoning goes as follows. In clauses appearing under a future the embedded event is located with respect to the main event. Hence, the leaving is past with respect to the saying. Furthermore, the indexical adverb *tomorrow* places the event in the future of the speaker.
Let's suppose now that the context in question is indeed a DAR one, contrary to appearances, as one would expect given that these are well-behaved indicative contexts. Therefore, the embedded event should undergo a second evaluation with respect to the speaker's coordinate.

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[13] It is indeed possible to use indexical temporal locutions corresponding to the following interpretation:
   i.   Leaving_____*now*_____saying
   ii.   Gianni ha detto che Maria è partita ieri
         Gianni said that Maria left yesterday

Now, and this is the crucial part of the hypothesis, let's suppose that the speaker's temporal location in the clause embedded under a future is not provided by the utterance time, *now*, anymore, but is made to *coincide with the subject's temporal location.*

Summarizing, the proposal is the following:

(24)   a. The contexts embedded under a future are DAR contexts
        b. The function of the main future is to make the speaker's temporal location to coincide with the subject's.

By applying the hypothesis in (24) to the example in (22), we obtain a situation analogous to that described above for the sentence in (23). The past tense on the verb *partire* (leave) locates the event in the past with respect to the subject's, *Gianni*'s, temporal location. The indexical *tomorrow* places the leaving in the speaker's future. By (24), however, the subject's temporal location coincides with the speaker's temporal location. Therefore, the presence of *tomorrow* gives rise to ungrammaticality in example (22), exactly as in (23).

5.2 Anaphoric temporal locutions

In this section I show that the speaker's temporal coordinate is present in C, even if it is not distinguishable from the subject's. The argument is provided by the distribution of anaphoric temporal locutions, such as *the day after/ the day before*. Giorgi and Pianesi's (2003) observe that these kind of expressions cannot occur in DAR contexts. The following generalization can be taken to hold:[14]

(25)   Anaphoric temporal locutions cannot be used for locating events that are in a direct relation with the utterance event.

This generalization captures the following contrast between an indexical temporal expression and an anaphoric one:[15]

(26)   Questa mattina Gianni ha detto che Maria è partita ieri / ?* il giorno prima
        This morning Gianni said that Maria left(PAST) yesterday / the day before

In sentence (26) an indicative verbal form – *è partita* (left) – is embedded under a past. This is a typical DAR configuration and, as discussed in Giorgi and Pianesi (2003), the anaphoric temporal locution contrasts with the indexical expression, *ieri* (yesterday) in the example. This is not the case in subjunctive contexts, typically non-DAR ones:

(27)   Gianni credeva che Maria fosse partita ieri/ il giorno prima
        Gianni believed that Maria had(PAST SUBJ) left yesterday/ the day before

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[14] See Giorgi and Pianesi (2003) for a discussion of the reasons behind this generalization.

[15] As discussed in Giorgi (2008), in the following sentence the embedded imperfect does not give rise to a DAR contexts and, consequently, the anaphoric temporal locution is much better than in (26), giving rise to a minimal pair:

i.   Questa mattina Gianni ha detto che Maria era partita il giorno prima
        This morning Gianni said that Maria had(IMPF) left the day before

A reviewer also suggests that the locution *il giorno prima del nostro arrivo* (the day before our arrival) yields a grammatical result, being indexical. Let me remark that the indexical nature of this locution is presumably due to the presence of the indexical pronoun *nostro* (our) in the noun phrase. How exactly this might by worked out from the interpretive point of view is a complex issue, which deserves further study.

Let's go back to the contexts embedded under a future. The distribution of anaphoric temporal locutions provides us with a test: If the context is a DAR one, it should pattern like (26), if it is a non-DAR one, it should go with (27).
Interestingly, the anaphoric locution is not available, as shown by the following example:[16]

(28)   Gianni dirà che Maria è partita ieri/ ?*il giorno prima
        Gianni will say that Maria left(PAST IND) yesterday/ the day before

The distribution of anaphoric temporal locution can be explained by the hypothesis in (24). The contexts depending from a future are DAR ones, even if the speaker's temporal location coincides with the subject's. Hence, an anaphoric temporal locution is not available.
This is a welcome result, because it fits with the observation above, concerning the distribution of the indexical adverb *domani* (tomorrow).
Summarizing: the distribution of an embedded present tense – and in general of indicative verbal forms – is anomalous, in that it does not show the DAR. In particular, it seems not to be located with respect to the speaker's temporal location. The distribution of indexical and anaphoric temporal locutions, on the other hand, shows that this is only apparent. Under the hypothesis that the speaker's temporal coordinate is indeed represented in C even in these contexts, these cases fall out. The peculiar behavior of clauses embedded under a future is due to the temporal re-location of the speaker at the subject location.
The last issue, about which I only offer some speculation, concerns the cause of such a state of affairs. Why is the speaker (obligatorily) re-located? My proposal is that the temporal re-location of the speaker is part of the meaning of the future, which works in this respect as an operator.
This explicit resetting operation is not rare in natural language, as shown for instance in counterfactuals:

(29)   If I were you, I would marry me/ *myself

The compatibility between *I* and *me* – and conversely, the incompatibility between *I* and *myself* – shows that the counterfactual *if*-clause has precisely this *resetting* role. In the second part of the sentence, the pronoun *I* has a different reference with respect to the one it has in the first part. There is in fact in this case an explicit instruction to reset *I* as *you*. Only because of this the pronoun and the anaphor can have the distribution they have.

6. Conclusion

Concluding these brief remarks, it is possible to say that the left-periphery of the clause – the Complementizer *layer* – constitutes the syntactic interface with the context. All the projections appearing in this layer in fact, contribute something in terms of *informational* structure. This observation, as remarked above in section 2, is self-evident for topic and focus phrases, which express new or old information. It might seem less evident when applied to words such as *che* (that), and to complementizers in general. However, I have shown that, at the appropriate level of abstraction, this hypothesis turns out to be quite a natural one: The left-most position in the C-layer, lexicalized by the indicative non-deletable *che* (that), encodes the information concerning the utterance event itself – i.e., the speaker's coordinate. Hence, for the sake of labeling, it could be labeled *C-speaker*. This hypothesis captures the correlation in Italian between the DAR and the impossibility of deleting the complementizer. The analysis of the 'anomalous' behavior of the

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[16] Again, there is a contrast between the sentence in (28) and one containing an embedded imperfect, a non-DAR form:
i.   Gianni dirà che Maria era partita il giorno prima
         Gianni will say that Maria left(IMPF) the day before
This contrast is indeed expected under the hypothesis.

contexts embedded under a future provides an additional argument in favor of this view, i.e., since the speaker's coordinate has a syntactic realization, it is expected that it can be manipulated in the syntax.

Note also that this hypothesis opens the way to speculations about the phase nature of C, in Chomsky's (2005) terms. A possible line of further inquiry in fact, might concern the observation that, once located in a temporal (and spatial) context, the event is not accessible anymore to further manipulations, hence the projection dominating it is a phase. Further studies to this end are indeed necessary, in particular about the nature of the C-layer in non-DAR languages. [17]

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[17] On the relation with the position hypothesized here and Rizzi's (1997, 2001, 2002) position FORCE, see the brief discussion in fn.3. On the analysis of C-*speaker* in non-DAR languages see Giorgi (2008).

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