On agreement feature processing
and representation*

SIMONA MANCINI
BCBL, Basque Center on Cognition, Brain and Language
s.mancini@bcbl.eu

Agreement is normally defined as an asymmetric dependency whose realization proceeds (i) in a subject-to-verb direction and (ii) independently from the thematic and discourse functions of the elements involved. In this work, I review some experimental data from Spanish and Italian showing that the directionality of agreement is not as rigid as assumed in standard models and that the comprehension of these dependencies critically touches on the discourse component.

I wish this could be as inspiring to Luigi’s work as my conversations with him have been to me.

1. Introduction

Agreement is a pervasive phenomenon that manifests itself when grammatical information appears on a word that is not the source of that information. Early derivational grammars defined agreement as a relation holding between two elements – a controller and a target – that share specific features, with the controller (also called trigger) being the element from which grammatical information originates, and the target the element that inherits the information. Subject-verb agreement (s-v agreement, henceforth) is a perfectly-fitting instantiation of the controller-target relation. What characterizes this dependency is the systematic covariance (Steele, 1978) existing between the feature sets of the former and latter member of the relation: the subject can vary between singular and plural number, and among 1st, 2nd and 3rd Person, with the form of the verb that changes accordingly, so that an identity of features is realized. Covariance is an essential notion: it is not sufficient that two elements happen to share properties, the sharing must be also systematic.

* Acknowledgments: This work summarizes the main points of my Ph.D Dissertation, together with some recently published work, which would not have been possible without the inspiring guidance of Luigi Rizzi. This work also benefits from my fruitful collaboration with other equally valuable scientific “guides”, (namely Alessandro Laudanna, Manuel Carreiras and Nicola Molinaro), and colleagues (Francesco Vespignani and Francesca Postiglione). All errors are, of course, mine.

2012 Simona Mancini
Enjoy Linguistics! Papers offered to Luigi Rizzi on the occasion of his 60th birthday
1.1 Agreement as displacement of information

An important aspect of agreement concerns the way this dependency is morphologically expressed on the verb. In Italian, as in many other languages, Person and Number values are expressed by an affix that attaches to the verb stem. Crucially, the same morpheme marks both Person and Number information. In (1) below, the agreement morpheme –*e* represents both the 3rd person and the singular value of the subject ‘il gatto’.

(1) Il gatto corre
    ‘The cat runs’

This leads to the first research question raised in this work: does the parser distinguish between Person and Number during agreement processing, or are these features undifferentiated and accessed as a bundle? This question reflects the theoretical divide existing between the single-cluster analyses of agreement elaborated within standard minimalist analyses (Chomsky, 1995) and the distinct-cluster analysis put forth within the cartographic framework (cf. Shlonsky, 1989, 2000, 2009; Sigurdsson, 2004; Sigurdsson & Holmberg, 2008, among the others). Similarly, within recent psycholinguistic research, an unequivocal answer has not been given yet (see Section 3 below). In light of this, this work represents an attempt to clarify whether a dissociation between Person and Number can be maintained, both in processing and in sentence structure terms.

1.2. Asymmetry

The idea of a controller-target dependency highlights a fundamental aspect of agreement, namely its asymmetrical character. Seeing agreement as an asymmetrical relation implies not only that this phenomenon is a matter of ‘displaced’ grammatical information (Corbett, 2006) copied from the controller to the target, but also that the two elements involved in the relation do not play the same role. Two are the interrelated ways in which the asymmetry between controller and target manifests itself. First, the controller (the subject) has no choice of feature value, while the target (the verb) does. The target can have different morphological forms available to match the Person and Number features of the noun: in (1), the verb *corre*, a 3rd person singular, is one of them, which is chosen on the basis of the Person and Number values of the subject-controller. The controller, on the other side, does not have the same availability of morphological forms: a lexical DP comes only as a 3rd person and the only variance allowed is between singular and plural. On this view, it is the verb that agrees with the subject, and not conversely. Second, the contribution to semantic interpretation is related to the controller rather than to the target: if we shift from a singular to a plural subject in (1), the verb varies accordingly, but it is not the plural Number marking on the verb that will affect the interpretation. Rather, interpretation will rely on the subject argument (cf. Chomsky 1995, 2000, 2001).

In sum, two assumptions seem rather straightforward and unequivocal about agreement: i) it is based on a systematic covariance of features, which surfaces as feature identity between controller and target; ii) the unidirectionality of the feature
valuing process, which is supposed to operate from subject to verb and not vice versa. Straightforward as they may seem, these assumptions are nevertheless controversial. Let us see why.

Across languages, agreement patterns are found in which a featural mismatch between subject and verb is allowed. Unagreement in Spanish is one such phenomenon, in which the presence of a Person mismatch between a plural subject and a verb produces nonetheless a well-formed sentence, as in (2):

(2) Los periodistas escribimos un artículo muy interesante.
    The journalists wrote an article very interesting
    ‘We journalists wrote a very interesting article’

It should be noticed that in Spanish, feature mismatches of the kind illustrated in (2) are possible only with plural subjects, while singular subjects (e.g. el periodista/the journalist) require a fully matching verbal form (e.g. escribiste you write).

The relevance of Unagreement resides in the presence of an allegedly reversed checking procedure that permits the copying of the relevant Person information from verb to subject, and the interpretation of the nominal as ‘We journalists’, ensuring the grammaticality of the sentence. Person on the verb should not be regarded as a copy of nominal Person, but it may have an autonomous status, thus challenging the traditional views that identify the locus of interpretation in the nominal argument.

1.3 The Person Asymmetry Hypothesis

The third issue addressed in this work is related to a more fine-grained aspect of s-v agreement. Namely, it concerns the distinction between 1st/2nd and 3rd person pronouns. Morphological and configurational splits among pronouns have been highlighted in a variety of languages and have been attributed to different featural specifications of pronouns. A long-standing tradition (Benveniste, 1966; Forcheimer, 1953; Jakobson, 1971) distinguishes 1st and 2nd person pronouns from 3rd ones on the basis of the capacity that the former, but not the latter pronouns, have to pick up and identify a specific speech participant (Speaker and Addressee). This intrinsic difference in terms of discourse-(un)relatedness is thought to affect the featural makeup of pronouns. As real participants in the speech act, 1st and 2nd person are taken to be specified for the Person feature, while 3rd person pronouns, which represent entities being talked about without any active role in the speech act, are taken to be specified for the Number feature only (Anagnostopoulou, 2003; Benveniste, 1966; Harley & Ritter, 2002; Kayne, 2000, *inter alia*). Identity with (or inclusion of) a speech participant is thus the criterion used to discern the two classes of pronouns, and the discourse-relatedness of a pronoun is therefore determined solely on this basis. Alternative and less radical feature representations have been developed (cf. Bianchi, 2006; Sigurdsson, 2004) that do not analyse the discourse-relatedness of a pronominal form solely on the basis of the reference to an underlying speech participant. It is true that 1st and 2nd person differ from 3rd person in their reference to a speech role, but there are also similarities between the three forms that have not been captured by former analyses, namely the fact that 3rd person refers to a
contextually salient entity that determines a certain degree of discourse-relatedness (Bianchi, 2006).

1.4 The present work

The aim of this work is to cast a new light onto the computation of agreement, by offering insights from both a theoretical and a psycholinguistic perspective. In line with previous mainstream theoretical and psycholinguistic models, agreement is described as a dependency that hinges on the performance of a formal operation like Agree. The key property of this operation concerns the involvement of fine-grained interpretive properties of Person and Number –which will be called interpretive anchors – that are capable of guiding interpretation, integration but also repair stages of processing in case of anomaly.

This paper is organized as follows: in Section 2, I will present the core tenets of an alternative approach to agreement feature representation and processing based on feature anchors, while in Section 3, an introduction to psycholinguistic findings on agreement processing will be provided. In Section 4 and 5, experimental data on Spanish and Italian agreement comprehension will be provided to support the approach outlined here. Finally, in Section 6, conclusions will be drawn to highlight the relevance of feature anchors for both the realization and the comprehension of agreement dependencies.

2. On features, anchors and interpretation

It is known that the information conveyed by Number and Person is intrinsically different. While the former feature expresses the mere numerosity of a nominal argument, the latter refers to the argument’s role with respect to the participants in the speech act, i.e. Speaker and Addressee. As Jakobson (1971) observes, ‘Person characterizes the participants of the narrated event with reference to the participants of the speech event’. A deictic component is therefore present in Person information that may crucially shape the way this feature is licensed and interpreted. Recent theoretical analyses have indeed emphasized on the fact that this feature can be interpreted only in relation to speech act participants (Bianchi, 2003, 2006; Sigurdsson, 2004). For instance, a 1st person value expresses identity with (or inclusion of) the Speaker, while a 2nd person value identity with (or inclusion of) the Addressee. Third person instead indicates non-identity of the referent with either the Speaker or the Addressee. On this view, Speaker and Addressee are individuals participating in the speech act, which recalls the Kaplanian representation of the context as an index made of several coordinates that directly refer to the actual circumstance of utterance, namely its time, location and participants (Kaplan, 1989).

The link existing between Person specifications and the speech act has been explicitly implemented in recent cartographic analyses of agreement and agreement features that posit a syntactic encoding of speech act and participants in the left periphery of the sentence. Bianchi (2003, 2006) draws a parallel between Person agreement and Tense marking and identifies the anchoring point for both features in the so-called Logophoric Centre (LC), which constitutes the centre of deixis and hence corresponds to the speech event, with its spatial, temporal and participant coordinates. In structural terms, Bianchi’s LC resides in Fin (following Rizzi’s 1997
approach), the head encoding information concerning the finite or non-finite nature of a clause. It is the LC that licenses full-fledged Person agreement and absolute Tense, by establishing a link – or anchoring – between the IP layer of the sentence (where ‘morphosyntactic’ Person is expressed) and the left periphery of the sentence.

In a similar fashion, Sigurdsson (2004) has captured this link in terms of matching relation among features. What characterizes Person, with respect to Number, is a matching established between clause-internal positions – the IP system – and the participants in the speech act, arguably expressed in the left periphery of the clause (the CP system, cf. Rizzi, 1997), as in (2):

\[(3) \{CP \text{ Force..} \lambda_A \lambda_P.. \text{ Top..} S_T.. S_L[[IP.. \text{ Pers}_S.. \text{ Num}_S.. \text{ M..} T..[vP...]]]\]

More precisely, Sigurdsson (2004) subdivides clause structure into three layers, each of them encoding specific features: the lexical layer in the vP shell, encoding event features; the inflectional layer in the IP area, encoding grammatical features; and the speech event layer within the CP area, encoding speech act features (speech participant, speech time and speech location features). A matching relation ties lexical to grammatical features, and grammatical features to speech act ones. This way, an Agent can be linked to a 1st person pronoun or 1st person verbal morphology, and consequently to a Speaker role (a Logophoric Agent, in Sigurdsson’s terms), as shown in (4). This would lead to proper interpretation of Person.

\[(4) \quad \Theta = +\text{Person} = +\lambda_A - \lambda_P \quad \text{1st person by computation}\]
\[\Theta = +\text{Person} = -\lambda_A + \lambda_P \quad \text{2nd person by computation}\]
\[\Theta = +\text{Person} = -\lambda_A - \lambda_P \quad \text{3rd person by computation}\]

(from Sigurdsson, 2004:27)

To sum up, for Person to be interpreted, matching must necessarily involve speech participants features in the left periphery of the sentence. No such IP-left periphery connection is necessary for Number, whose interpretation does not necessitate any link outside of the local subject-verb configuration.

A fundamental difference therefore lies at the heart of the distinction between Person and Number, namely the requirements that their interpretation imposes. To clarify this point, I will introduce the notion of ‘interpretive anchor’, which I will use throughout to refer to the two features’ interpretive properties. Let us better define this concept.

A tight connection (a mapping) exists between structure and interpretation: to receive a proper interpretation, each morphosyntactic feature entering a derivation activates its ‘anchor’, a specific feature in the semantic representation of the sentence. This link to the anchor will be activated every time the morphosyntactic feature is involved in operations entailing its licensing and interpretation, as is the case when Agree is performed. In the case of Number, its interpretive anchor will be represented by the Number specification on the subject argument, involving thus no link outside of the specifier-head configuration within which subject-verb agreement occurs. In essence, this amounts to saying that Number is interpretable on the subject, in accordance with standard minimalist assumptions. A different interpretive anchor is
instead identified for Person. In this case, interpretation is made possible by the link activated between clause-internal positions (the specifier and head positions of IP) and the speech act layer, where speech participants features are encoded. In other words, the interpretive anchor of Person resides in the speech act participants representation.

In light of this, the interpretability status of nominal and verbal Person needs to be re-examined: if neither the former nor the latter represent the interpretive anchor, they become two autonomous values, whose interpretation requires a separate anchoring to the speech act participant layer. This obviously marks a fundamental point of departure from standard minimalist analyses of agreement and agreement features, which indicate the subject argument as the locus of Person interpretation. The mechanism driving Person and Number interpretation can be stated as follows:

(5) **FEATURE INTERPRETATION PROCEDURE (FIP):**

A feature is interpreted in relation to its anchor:

a) The anchor for Person resides in the speech act participants layer;

b) The anchor for Number resides in the subject argument.

By introducing the notion of ‘interpretive anchor’, I have sketched an approach to Person and Number agreement that seems to accurately account for the intrinsic differences underlying the two features. In the following, I will try to show that the presence of distinct interpretive anchors for Person and Number can explain the Person-Number dissociation that emerged from on-line studies of s-v agreement processing.

### 3. The psycholinguistics of agreement

The on-line processing of agreement has been fruitfully studied by measuring comprehenders’ reading and response times (Carminati, 2005), as well as by tracking their eye movements during the reading of grammatical and ungrammatical sentences (Braze et al. 2002; Deutsch & Bentin, 2001; Ni et al. 1998; Pearlmutter et al. 1999). Another source of influential and reliable evidence on agreement processing comes from methodologies such as the event-related potential technique (ERPs). ERPs are averages of brain electrical activity time-locked to some external or internal event, such as the reading of a word or sentence. They are classified according to their polarity (i.e. positive or negative deflections in the waveform), the time of their onset or peak occurrence in milliseconds, and their topographical distribution across the scalp. Thanks to its exquisite temporal resolution, this technique can help us identify specific processing stages and provide information concerning the nature of the mechanisms involved in the analysis of an agreement dependency.

Processing mechanisms can be best understood when the system is forced to deal with mistakes (Wagers et al., 2009). Cross-linguistically, agreement anomalies have been found to elicit a positive deflection starting about 600 ms post-stimulus onset (P600), often preceded by an increased anterior negativity lateralized to the left hemisphere (LAN) and arising between 300-500 ms post-stimulus (English: Osterhout & Mobley, 1995; Italian: De Vincenzi et al. 2003; Dutch: Hagoort et al. 1993; Hagoort & Brown, 2000; Spanish: Silva-Pereyra & Carreiras, 2007; German:
Rossi et al. 2005). In general, LAN effects have been functionally interpreted as indexing the detection of a syntactic violation (Hagoort et al., 1999), while the presence of anomalies affecting the interpretation of the sentence has been found to produce a centro-posterior negativity with a slightly right scalp distribution that peaks about 400 ms post-stimulus onset. This effect, referred to as N400, is commonly regarded as a marker of increased effort in lexical-semantic processing (Kutas & Hillyard, 1980). P600 effects, in contrast, have been linked to reanalysis/repair (Friederici, 2002; Hagoort et al., 1993) but also syntactic integration processes (Carreiras et al. 2004; Kaan et al. 2000).

According to some authors (Barber & Carreiras, 2005; Carreiras et al. 2004; Kaan & Swaab, 2003; Molinaro et al. 2008), the reanalysis processes underlying the P600 effect would be pursued in two subsequent stages. In the first stage (between about 500 and 800 ms), integration of all the information concerning the critical word with the information concerning the previous sentence fragment is performed, in order to detect the source of the incongruence. In this stage, not only syntactic and semantic information would be handled by the parser, but also discourse-related information, as shown by Kaan & Swaab (2003), who reported frontally distributed P600 effects due to a greater number of referents to be integrated in the same discourse representation. Once the anomaly has been correctly diagnosed, in the late phase of the P600 effect (after 800 ms), repair of anomalous features is assumed to be performed (Barber & Carreiras, 2005; Molinaro et al. 2008; Kaan and Swaab, 2003).

4. On the Person-Number distinction: evidence from Spanish and Italian
Several ERP findings suggest the presence of a functional dissociation among agreement features. While a considerable number of studies on agreement have dealt with number and gender (Barber & Carreiras, 2005; Deutsch & Bentin, 2001; Hagoort et al. 1999; Hagoort, 2003; Molinaro et al. 2008; Osterhout & Mobley, 1995, among others), person has been given less attention and fewer studies can be found in the ERP literature on person agreement. Nevins et al. (2007) found that in Hindi, the P600 effect generated by a gender+person mismatch had a greater amplitude than the one elicited by single gender, single number and gender+number mismatches. According to the authors, this modulation in the P600 amplitude should be attributed to the special status of person violations, rather than to an enhanced response to multiple violations of agreement features. Such an interpretation is convergent with evidence from language processing (Carminati, 2005) and language typology (Greenberg, 1963), which points to the presence of an implicational hierarchy among features, namely Person>Number>Gender.

Mancini et al. (2011a) found clear differences at the verb position in sentences containing person and number anomalies like those in (7) and (8) (PM and NM respectively), compared to (6), in early as well as in later processing stages.

(6) Los cocineron cocinaron un pescado muy rico
The cooks3.pl cooked3.pl very tasty fish

(7) *El cocinero cocinaste un pescado muy rico
The cook3.sg cooked2.sg very tasty fish
(8) *El cocinero *cocinaron un pescado muy rico
   The cook3.sg cook3.pl very tasty fish

Specifically, while number violations relative to Control produced a LAN followed by a P600 with posterior distribution, person anomalies (relative to Control) generated an N400 component followed by a positivity that was frontally distributed in the early phase, but posteriorly distributed in the late one (Figure 1). In processing terms, one can thus argue that the different anchoring positions of the two features determine different anomaly detection and repair strategies.

Figure 1. ERP effects to Person (relative to Control) and Number (relative to Control) anomalies. From Mancini et al. (2011a)

The different early negative effects elicited by Person and Number violations may be the result of the activation/inspection of different interpretive anchors for the two features and for the different levels of analysis affected by the two violations. On the one side, the interpretation of Person relies on a cross-dimensional mapping between the inflectional layer (the IP level), where morphosyntactic information is encoded (e.g. 1st, 2nd or 3rd person), and the left periphery of the sentence (in the CP
layer, cf. Rizzi, 1997), where discourse information concerning speech act participants (Speaker, Addressee and non-participants) is encoded. At a later stage of processing, the breaking of a multi-dimensional mapping may determine harder diagnosis and repair processes. The presence of a broadly/anteriorly distributed P600 in the early phase of this effect suggests that a mismatch has been detected at the discourse level, in line with Kaan & Swaab (2003), while the subsequent posterior positivity is indicative of repair processes at work. Crucially, the fact that this positive effect has been found to be larger than the one elicited for Number anomalies may be interpreted as evidence for the greater effort the parser is making to fix the anomaly, similarly to what Barber & Carreiras (2005) and Molinaro and colleagues (2008) suggest.

On the other side, the interpretation of Number requires an anchoring that does not expand beyond the inflectional area, as its anchor is identified on the subject argument that occupies the SpecIP position. The breaking of this local “morphosyntactic” anchoring results in a LAN effect and in later positive effects whose topography and size are significantly different from those that arise in the case of a Person anomaly, suggesting less severe consequences for the overall interpretation of the sentence.

There is yet another aspect of subject-verb agreement processing which points to a functional dissociation between person and number, namely the distinction between 1st/2nd and 3rd person pronouns. As already stated, pronominal forms each entail different underlying representations in terms of the type of participants and their roles in the speech act. Results from a study in Italian (Mancini et al. 2009) showed that Number anomalies involving 1st and 2nd person subjects elicited qualitatively different ERP patterns compared to number anomalies with 3rd person subjects. Specifically, while (9b) elicited a LAN followed by a P600 effect that was broad/frontally distributed in its early phase, (10b) gave rise to a LAN followed by positivity that presented a posterior distribution in both its early and late phase.

(9) a. Io scrivo una lettera a casa ogni sera
   I1.sg write a letter home every night
   "I write a letter home every night"

   b. *Io scriviamo una lettera a casa ogni sera
   I1.sg write1.pl a letter home every night
   "I write a letter home every night"

(10) a. Lui scrive una lettera a casa ogni sera
    He3.sg writes3.sg a letter home every night
    "He writes a letter home every night"

   b. *Lui scrivono una lettera a casa ogni sera
    He3.sg write3.pl a letter home every night
    "He writes a letter home every night"

These results can be taken to indicate that extra resources are needed in order to process number anomalies with 1st and 2nd person subjects, due to the deictic component and the positive matching between morphosyntactic and discourse information that characterizes these pronominal forms but not 3rd person ones. As discussed in Mancini et al (2011a), the presence of a broadly distributed P600 effects
is suggestive of diagnosis operations that expand beyond the purely morphosyntactic level of analysis and touch on the discourse component. On the one side, in (9b), shifting from a subject referring to the Speaker (1st person singular, io) to a verb implying an heterogeneous group that includes the Speaker and other (non)-participants (1st person plural, scriviamo) involves a shift not only in the numerosity, but also in the type of participants, whereby the different diagnosis-related ERP effects elicited as compared to (10b). In this latter case, shifting from a non-participant subject (3rd person singular, lui) to a verb invoking a group of non-participants (3rd person plural, scrivono) simply implies a shift in the numerosity that does not affect the speech-participant makeup of the referent.

In sum, the studies just reviewed speak against a syncretic representation of features and a unique and strictly formal operation through which their content would be accessed. Instead, they provide evidence for a functional dissociation among Person (and its values) and Number that may well be ascribed to their different interpretive anchors.

5. Asymmetry, agreement and Unagreement

The role of interpretive anchors is expected to be crucial in cases of agreement mismatch that lead either to ungrammaticality or to patterns like Unagreement (see (2) above), in which the mismatch is only apparent. In Section 4, I showed how the difference in terms of interpretive anchors can account for the qualitatively different effects produced by Number and Person agreement anomalies. Here, a comparison between true and apparent Person anomalies will be carried out to show that the same interpretive anchor is able to flexibly activate different checking operations that are meant to deal with agreement patterns such as Unagreement. Let us dwell on the strategy arguably adopted in this case.

In presence of a Person anomaly, the parser should find itself faced with an agreement inconsistency: inspection of the interpretive anchor would probably not provide any cue on how to resolve the conflict, and an error would be thus sanctioned, blocking Person interpretation and triggering repair analyses.

One may expect Unagreement to be dealt with differently. Similarly to Person (and Number) anomalies, in Unagreement an agreement inconsistency is likely to be detected quickly, and recourse to the anchor will be activated. However, instead of sanctioning an agreement mismatch and activate repair strategies (as would happen for true Person anomalies), the inspection of the interpretive anchor may give the parser a cue on how to solve the conflict, i.e. by superimposing verbal person onto the subject and shifting the interpretation from “the journalists” to “we journalists”. No repair strategy would be therefore activated and the apparent conflict should be soon resolved.

Mancini et al. (2011b) have investigated the processing of Unagreement by contrasting it to both true person anomalies and full agreement (Control) sentences in an ERP study, as in (11)-(13) below:

(11) Los periodistas escribimos un articulo muy interesante \text{ \_UNAGR}\n\text{‘We journalists wrote a very interesting article’}
The data showed that the reading of *escribimos* (11) elicited qualitatively different effects when compared to both *escribieron* (12) and *escribiste* (13), cf. Figure 2. Crucially, on encountering the “unagreeing” verb relative to a 3rd person verb in the standard agreement condition, an N400-like effect was generated that was followed by a central negative effect in the 500-800 ms interval. After 800 ms, no difference emerged between Unagreement and full agreement sentences, suggesting that by that time the grammaticality of the pattern had already been acknowledged. On the other hand, person agreement violations relative to the control condition elicited an N400 effect in the 300-500 ms interval that was followed by a P600, thus replicating the findings from Mancini et al. (2011a). Let us consider these results in relation to the feature-anchoring approach developed here.

**Figure 2.** 1ERP effects to Unagreement (relative to Control) and Person Mismatch (relative to Control)
Recourse to the speech participant layer is assumed to always occur for a proper interpretation of Person (cf. Bianchi, 2006; Sigurdsson, 2004), regardless of whether a full agreement pattern (Control condition), an apparent mismatch (Unagreement condition) or an outright violation of this feature (Person mismatch condition) is present. However, the activation of the interpretive anchor may surface differently in the three cases.

In the presence of explicit manipulations of Person, as in the Unagreement and in the Person mismatch conditions, the speech act participants representation is explicitly called upon and plays an important role. More precisely, after the detection of a Person inconsistency between subject and verb, the anchor in the speech participants representation may either provide the cue on how to resolve the conflict (i.e. application of a Reverse Agree for Unagreement), or it may sanction the presence of a “syntactic error” (for true Person anomalies). In the absence of a mismatch, when full agreement occurs between subject and verb as in the Control sentences, the anchor remains ‘silent’. Hence, the difference between Unagreement and Control in the LAN/N400 window.

In the 800-1000 ms window, no difference is found with respect to the Control condition, suggesting that no repair mechanism is triggered and that the two sentences undergo the same processes in this phase.

Finally, let us consider the relevance of these findings for current theoretical and psycholinguistic analyses of agreement. Overall, these results represent a fundamental headway towards a novel and more comprehensive account of agreement. The relevance of the Unagreement data presented above resides first and foremost in the novel finding that the mechanisms operating in the comprehension of an agreement dependency may not be as rigid as is claimed in Chomsky (1995 and subsequent work) in terms of directionality of checking operations and interpretability of features. Alternative “more marked” options may be applied, reversing the directionality of feature checking and interpretation from the verbal morphology to the subject. Crucially, this cannot be accomplished if the asymmetry that characterizes agreement dependencies is assumed to be strictly unidirectional and Agree is conceived of as an operation treating Person and Number uniformly. An interpretive dissociation between Person and Number must be postulated and a greater flexibility in the directionality of Agree must be allowed.

6. Conclusions

6.1. Comprehending agreement

The data presented in this paper have showed that feature anchors and the different interpretive requirements that these presuppose for Person and Number features can account for experimental data on the comprehension of agreement dependencies, from which a functional dissociation between the two features has emerged. In both cases, the parser checks feature consistency between subject and verb using a formal operation (Agree), but while Number interpretation requires the parser to inspect the specification of this feature on the subject argument, Person interpretation forces the parser to inspect the speech act participant representation.
Similarly, the dissociation in diagnosis/integration processes identified may not be a consequence of the different mechanisms employed for the processing of the two features: it may rather derive from the different impact that the two violations have on the overall interpretation of the sentence and the different levels of analysis affected. Subsequently, when repairing the anomaly, the parser would follow the same procedure for both features, i.e. going back to the relevant interpretive anchor to find the appropriate information to be overwritten onto the miscopied value. The difference here resides in the structural level at which the anchor is located: the inflectional area for Number and the hierarchically higher discourse representation area for Person.

Let us now sketch the dynamics of subject-verb agreement checking and interpretation. After the extraction of the relevant categorial information, feature checking and interpretation is carried out. Importantly, Person and Number are processed and interpreted separately, after congruence between the overt specifications and their respective interpretive anchors has been verified. If no mismatch is detected, the material is passed on for further elaboration. On the contrary, if an inconsistency is found, a syntactic error signal is sanctioned. Alternatively, when allowed, a marked checking operation is carried out that rescues the sentence, as in Unagreement patterns. A diagnosis/integration step follows and, if necessary, repair operations are triggered that may take different shapes depending on the type of anomaly and the type of subject encountered.

6.2. Relation to Minimalist and Cartographic analyses

The approach proposed above fruitfully draws from both the minimalist and the cartographic analyses of sentence structure. Specifically, the core tenets of both lines of research have been exploited to derive a unified account of agreement feature representation and interpretation. The Feature Interpretation Procedure (FIP) serves exactly this purpose and epitomizes the fruitful combination of minimalist devices (Agree, in this case) and the cartographic fine-grained mapping of syntactic structures. On the one side, in keeping with standard minimalist assumptions, the FIP presupposes the same Agree operation at work for the licensing and interpretation of Person and Number. On the other side, following the cartographic approach, the FIP predicts a distinction between Person and Number based on the different interpretive properties associated with the two features – their anchors – which can arguably correlate with positional differences.

In conclusion, feature anchoring provides a more composite analysis of agreement that does not encapsulate this structural dependency within narrowly syntactic boundaries, but identifies the importance of an interplay between the purely formal character of feature checking on one side, and the semantic-pragmatic information associated with the arguments’ roles on the other side.
References


Agreement feature processing and representation