LINGUISTICS AND PSYCHOLINGUISTICS OF UNACCUSATIVITY IN SPANISH

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Two lines of research converge as motivation for a raising analysis for unaccusatives in Spanish. From the point of view of linguistic theory, it is possible to propose a S-structure for unaccusative predicates involving an NP-trace in object position. Our psycholinguistics studies show that the psychological reality of NP- traces in Spanish unaccusatives can be demonstrated through experiments using priming techniques.

1. Starting Points.

Within linguistic theory, Perlmutter (1978) put forward the influential proposal that not all intransitive predicates are syntactically equivalent. In the Unaccusative Hypothesis (bold), Perlmutter stated that the initial stratum of monadic predicates can involve either an initial 1 or an initial 2.

Burzio (1986) introduces the Unaccusative Hypotesis to GB theory: there is an asymmetry regarding Theta Role and Case assignment in Chomsky's (1981) framework. All NP arguments must receive Theta role and Case. Theta roles may be assigned in non-Case positions, and Case can be assigned to non-thematic positions. Passive and Raising illustrate this:

(1) a. e was arrested Mary
    b. e seems Mary to have been arrested

The internal argument Mary in (1a) and the subject of the clausal complement of seem in (1b) sit in positions where no Case is assigned. In the mapping onto S- Structure, they must undergo NP-movement to a Case-assigning position, the Specifier of a [+Tns] Infl.

Burzio (1986) argues that unaccusative predicates have a D-structure similar to the ones in (1): their NP argument is a D-Sructure complement of the verb. Burzio's Generalization (bold) states that if a verb assigns no Theta role to its subject, it assigns no Case to its object. As a consequence, the complement NP must seek alternative ways to receive Case. According to Burzio (1986), there are two options: a) movement to [Spec,IP] yields a syntactic representation equivalent to that of Passives and Raising in that all contain an NP-trace :

    (2) a. [IP Mary i was [arrested ti]]
       b. [IP Mary i [VP seems [IP ti to have been
         arrested]]]
       c. [IP Mary i [VP fell ti]]

b) When the NP remains in original position, it forms a chain with an expletive, either overt or silent, thus receiving Case from it.

In Null Subject languages such as Italian or Spanish, the two choices (a) and (b) entail that the syntactic representation of a sentence with a preverbal subject of an unacusative verb contains an NP-trace, whereas the syntactic representation of a sentence with postverbal subject and an unaccusative predicate does not (Burzio (1986)), as illustrated in (3) for Spanish[2]:

    (3) a. las flores i crecen ti en el jardÉn
       the flowers grow in the garden

      b. proi crecen las floresi en el jardÉn
       grow the flowers in the garden

Parallel investigations in Psycholinguistics (Bever & McElree (1988), Bever et al. (1989)), provided evidence as to the relevance of NP-traces in processing, by proving that NP-traces, like overt pronouns, prime the NPs they are chained with.

Our paper intends to be a continuation of these two lines of research. If both are on the right track, the prediction is made that, all other things being equal, whenever the linguistic analysis posits a trace, priming should obtain. Throughout the paper, we assume the implementation of the Unaccusative Hypothesis sketched in (1), due to Burzio (1986).

In section 2, we provide syntactic evidence that unaccusative predicates involve a D-Structure complement of V. This evidence determined our choice and selection of unaccusative pedicates for the experiment. Some of the uaccusativity tests presented here have been proposed in the literature as being significant for Italian; some others are novel. In section 3, after discussing the effect of inflectional morphology in processing Spanish, we turn to the analysis of the data in our experiment.

2. Morpho-Syntactic Evidence for Unaccusativity in Spanish.-

In this section, we provide some evidence for the syntactic analysis of Spanish unaccusatives in which their only argument is generated in D-Structure object position.

2.1. Distribution of Bare Noun Phrases.

Bare NPs are plural Noun Phrases that lack a determiner of some kind. In Spanish, their appearance is restricted to complement positions of [-N] categories (Torrego (1989), Lois (1987), Rodriguez (forthcoming)). (3a) and (3b) show that the NP without the determiner is ruled out as the subject of the sentence, whereas it can appear as complement of V:

    (3) a. Los monos comen cacahuetes
       the monkeys eat peanuts
      b. * monos comencacahuetes
       monkeys eat peanuts

Unergative verbs like (4a) and (4b) do not allow bare NPs, whereas unaccusative verbs, like in (4d) do. (4c) shows that grammaticality only holds when the single argument is in post-verbal position (presumably, the complement of V position in which it is generated)[3]:

    (4) a. * monos duermen   c. * aviones llegan
       monkeys sleep   planes arrive
      b. * duermen monos   d. Llegan aviones
       sleep monkeys   arrive planes

2.2. Past Participial Clauses.

As discussed by Burzio (1986)and Perlmutter (1989) for Italian, past participial clauses require an NP-argument in their complement structure. Unaccusative predicates are grammatical in past participial clauses, while unergative predicates are ungrammatical, confirming the hypothesis that the former contain a complement NP at D-Structure. This evidence is found in Spanish too (Footnote 2: The different behavior of unaccusatives and unergatives regarding past participial clause formation is not universal. Thus, for instance, the results in (5) do not obtain in English (Burzio (1986), Laka & Mauner (1991))), both in the absolute construction and in the participial relative version. Consider (5):

    (5) a. [LeÉda la carta] , el poeta procediù a suicidarse
       read the letter, the poet proceeded to commit suicide
       once the poet read the letter, he proceeded to commit
       suicide

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[2]Verb movement places the verb in the head of Infl. We ignore verbal traces in the representation in (3).

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[3]As Torrego (1989) discusses, locative phrases, when accompanying these monadic predicates, have a strong effect related to the test involving bare NPs when a locative phrase is attached at the beginning of the sentence:
    En esa cueva duermen monos
    in that cavern sleep monkeys
Being aware of this phenomenon, we did not use locative phrases in our stimuli. Rather, we attached a manner adverbial phrase at the end of the sentences, which we do not believe has the same effects.

b. * [leΣdo el poeta] , (el) procediù a suicidarse
   read the poet, (he) proceeded to commit suicide

c. El mono [atacado por el tigre] pereciù
   the monkey attacked by the tiger perished

d. *el tigre [atacado el mono] pereciù
   the tiger attacked the monkey perished

(5a) and (5b) illustrate the facts with regard to the
absolute construction. (5c) and (5d) do the same for Participial
Relative clauses. Only the sentences containing a complement
((5a)), or whose antecedent is a complement ((5c)) are allowed.
On the contrary, both constructions involving subjects ((5b, d))
are ruled out.

When we consider intransitive predicates, as in (6), only
unaccusative verbs allow participial clauses:

(6) a. Una vez llegado el ministro, comenzù la reuniùn
       once arrived the minister, started the meeting
       once the minister arrived, the meeting
       started

    b. Un estudiante llegado de Francia inaugurù el Congreso
       a student arrived from France opened the Conference

    c. * Una vez llorado el niûo, vino su madre
         once cried the child, came his mother
         once the child cried, his mother came.

    d. * Un niûo llorado pintù los dibujos
         a child cried drew the pictures
         a cried child drew the pictures

(6a, b) contain a verb of the unaccusative type, hence the
grammaticality of the examples, whereas the unergative predicates
of (6c, d) yield ungrammatical results.

2.3. Nominalization.

Facts regarding nominalization are also revealing when
comparing unergative and unaccusative verbs. As Burzio notes for
Italian, and related to the previous point about past participles,
only unaccusative verbs can nominalize by adding a determiner to
the past participle. This also holds for Spanish:

(5) a. los desaparecidos   c. * los llorados
       the disappeared   the cried
    b. los llegados   d. * los paseados
       the arrived   the walked

Another interesting fact about nominalization in Spanish is
the pattern that suffixation yields when applied to monadic
predicates in Spanish (Sanz (1991)). Certain suffixes like
-ada/-ida, -ion, -aje, etc, lend abstract nominals from verbs in
Spanish. However, once again, only transitives or unaccusatives

will take these suffixes and yield correct nominals, as shown in
(7):[4]

(7)   a. unergatives   b. unaccusatives
          verb--> * Noun   verb--> Noun

       hablar * hablada   aparecer apariciùn
       talk   (talk)   appear   appearance

       caminar * caminada   aterrizar aterrizaje
       walk   (walk)   land   landing

       dormir * dormida   caer   caΣda
       sleep   (sleep)   fall   fall

       cantar * cantada   desaparecer desapariciùn
       sing   (singing)   disappear   disappearance

2.4. 'Por parte de'- (by) and 'de'-Phrases with nominals.-

The argument structure of the nominals in 2.3 influences the
kind of complements they can take. By-Phrases ('por parte
de'-phrases in Spanish) are licensed only by external arguments
(Grimshaw (1990)). On the other hand, 'de'- phrases (of-phrases)
in nominalizations are licensed only by an internal argument. The
examples in (8) show this for the corresponding nominal of a
transitive predicate, 'destruccion' (destruction):

(8) a.   la destrucciùn [theme de la ciudad] [agent por
          parte del enemigo]
          the destruction of the city by the enemy
    b. * la destrucciùn [agent del enemigo]
          the destruction of the enemy (agent)
    c.   la destrucciùn [theme de la ciudad]
          the destruction of the city

Going back to (7), nominals derived from unaccusative verbs
allow 'de-phrases' to be attached to them, while they disallow
'por parte de'-phrases:

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[4]There are nouns like 'caminata' that derive from intransitive verbs.
However, the suffix involved in this derivation does not belong to the group
of suffixes that yield abstract nouns. The corresponding abstract noun from a
verb like 'cantar' would be something like *cantada, which is ruled out. In
Catalan, though this constitutes a perfectly grammatical formation (Merce
Gonzalez, verbal communication). There is also an apparent counterexample,
'corrida'. In some variants of colloquial Spanish it can be used as derived
from the verb 'correr':
       Se dio una corrida tal, que llegò a casa sin aliento
       he gave himself such a running, that he got home breathless
       (he ran so much, that he got home breathless)
However, note that there is a transitive version of the verb 'correr' from
which the usual meaning of the word 'corrida' (bullfighting) derives. It is
also used in expressions such as 'correr las cortinas' (pull the curtains),
'correr la pantalla' (scroll the screen), etc. Analogy with this use of
'corrida' may be playing a role onthe appearance of this noun with the
intransitive meaning of 'run'.

(8) a. * la apariciùn por parte del enemigo
        (the appearance by the enemy)
    b.   la apariciùn del enemigo
          the appearance of the enemy

This is expected only if they involve an internal argument,
unlike unergatives.

2.5. Predication with 'floating' entero

The distribution of floating entero is restricted to
complements of verbs. (9), in which both 'poeta' and 'libro' are
masculine singular NPs, exemplifies this:

(9) El poeta i leyù el libro j entero j/*i
    the poet read the book whole
    the poet read the whole book

Introducing a relative clause after the complement shows
that entero(italica) and the complement do not belong in the same
constituent: entero(italica) in (9) is not an adjective modifying
the complement:

(10) El poeta leyù el libro i [que habÆa escrito su madre]
     entero i
     the poet read the book [that his mother had written] on
     the whole

Although apparently entero can also be coindexed with the
subject of unergative predicates, as (11a) shows, (11b) proves
that its behavior differs from that in (9b), in that the insertion
of a relative clause separating entero(italica) from the subject
yields an ungrammatical sentence:

(11) a. jugù el equipo i entero i
        played the team on the whole
        the whole team played

     b. * jugù el equipo i [que animçbamos] entero i
          played the team [that we cheered] on the whole
          the whole team that we cheered played

In light of these examples, our initial assumption as to the
constraint on floating entero to complements of verbs is
confirmed.[5]

We predict, therefore, that unergative verbs, lacking a
D-Structure object, will be ruled out in this construction,
whereas entero will be able to be predicated of the only argument
of unaccusative verbs, this being a D- Structure complement of V.
The examples in (12) confirm this:

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[5] entero in sentence (9c) is a plain adjective, and not a small clause,
like the ones we consider here as tests to distinguish complements of verbs.
It is important to note that entero agrees in gender andnumber with the NP it
refers to, like any other adjective in Spanish.

(12) a. DespuÄs del accidente, la niûa i llegù entera i
        after the accident, the girl arrived whole
        after the accident, the girl arrived in one piece

     b. * despuÄs del accidente, la niûa i llorù entera i
          (after the accident, the girl cried whole/in one
          piece)

The syntactic tests we have been using throughout these
pages constitute evidence for an analysis of unaccusative verbs in
which their only argument is generated as a complement of V.

3. Experiment on Processing of Monadic Predicates in Spanish.

As we mentioned in the introduction to this paper, previous
research on NP-traces shows that trace behaves like an anaphor in
accessing its antecedent directly. The studies on anaphor resolution
(Cloitre & Bever (1988)), which proved that pronouns access the
conceptual aspects of their antecedents directly, led to the
realization of a series of experiments involving implicit anaphors
(Bever & McElree (1988), Bever et al. (1989)). These experiments
used a priming technique in which a speaker reads a sentence on a
screen, presented one phrase at a time. At the end of the
sentence, one probe (which is an adjective included in the
antecedent Noun Phrase) appears on the screen, and the task of the
speaker is to decide whether the word was or not in the sentence.
Comparing constructions with adjectival as opposed to syntactic
passives, Bever & McElree found that the RTs were faster following
syntactic passives (that have a trace) than following adjectival
passives (that do not). The conclusion was that NP- trace in
passive accesses its antecedent during comprehension.

Before getting further into the particulars of the design of
the experiment and the hypotheses tested, it is important to point
out several peculiarities concerning Spanish Grammar. Spanish has
an Inflectional system in which the inflected verb is
morphologically marked for number and person, thus agreeing with
the subject of the sentence. Furthermore, as noted by Contreras
(1991) among others, Spanish allows relative free word order of
the elements of the sentence. Gergely(1991) shows that, in a
language of similar characteristics, like Hungarian, morphological
cues allow for the direct identification of grammatical functions
(as opposed to English, in which underlying structural relations
are identified with regard to surface order of the elements).
Consistent with this, studies about Spanish processing (Elias &
Kurtzman (1991)), reveal the preeminent effect of morphology in
sentence parsing.

The expectation is, therefore, that agreement morphology
will carry the structural analysis of a sentence, obviating the
importance of other structural features. That is, in a paradigm
like (13):

(13) a. NP1 [Rel.Cl. ....NP2 ....] V+Agr
     b. NP1 [Rel.Cl. ....NP2 ....] V+Agr

the times for accessing the subject of the main verb will be
longer if both NPs are compatible with the agreement features of
the main verb (and therefore are possible candidates to be its

subject), than in case only NP1 shows compatibility with the agreement features of INFL.

We tested this prior to studying the behavioral differences between unergatives and unaccusatives, in the following way: in the experiment reported in this paper, subjects were presented with 16 sentences of the type in (14) (which correspond to the patterns in (13)). After reading each sentence, phrase by phrase, the subject was presented with a probe adjective from the subject, and required to say if it was in the just-read sentence. (There were other sentences in the study, to which the correct answer was 'no').

(14)a. El insigne/delgado artista que asistia a la
        conferencia
        the famous/thin artist that attended the conference

        hablo/llego   con animo/con desgana
        talked/arrived   cheerfully/unwillingly

Two sentence frameworks are provided (whose subject nouns are paired in frequency and length), so that every participant confronts the two verbs of the pair (i.e.talk and arrive). The counterpart of (14a) is (14b):

(14)b. El insigne/delgado escritor que apoyaba a sus
        compatriotas
        the famous/thin writer who supported his
        fellow-citizens

        hablo/llego   con animo/con desgana
        talked/arrived   cheerfully/unwillingly

In four out of the eight pairs of sentences, one member had a third person singular NP in the relative clause, whereas the NP in the relative clause of the other member was a third person plural (see (12) a and b). The matrix verb is always marked for third person singular. (Recall the pattern in (11)). What this means is that, in cases like (12a), the NP2 (contained in the relative clause) agrees with the matrix verb. We therefore expect longer latencies in the RTs following the appearance of the probe in these sentences. The results were in the right direction for the fulfillment of our expectation: (15) inflectional agreement acts as a powerful cue for the processing of structural relations in Spanish:

(15) a. NP1 [Rel.Cl ....NP2 ....] V+Agr........ 1.100
     b. NP1 [Rel.Cl ....NP2 ....] V+Agr........ .901

Given these results, the focus of the paper turns now to the cases in which agreement is not sufficient to determine which of the NPs is the subject of the matrix verb. Thus, we will search for differences in behavior between the two types of monadic predicates under study, considering sentences where inflectional morphology does not suffice for determining subjecthood.

We noted that previous studies show that the syntactic passive construction primes its antecedent. To rule out as an explanation the possibility that some property of passives speeds

all lexical recognition processes, another factor was introduced in the previous experiments (based on Cloitre & Bever (1988)): using both abstract and concrete adjectives, the experiments in Bever et al. (1989) showed that recognition times for abstract probes were longer that those for concrete probes. The underlying assumption was that the processing of certain words is accelerated by their being recently primed, while the processing of others will be relatively impeded for the same reason. The validated prediction was that the abstract/concrete difference in recognition time appears only when the adjective has been recently primed by a trace. The numbers in (16) are the results of this previous research:

(16) a. NP-trace Constructions   Abs/Con Difference

        Syntactic Passive................... 103
        Psych-ergative active.............. 166

     b. Non-trace Constructions

        Transitive active.................. -15
        Adjectival passive................. 10
        Psych-ergative passive............. -41

We adopt the same priming technique used in all these experiments. The probe recognition task is identical, and the probes are abstract and concrete adjectives that have been paired in frequency and length. A given participant was be presented with a sentence containing the abstract member of the pair and another one containing the concrete. Also, one of the frameworks was the main verb an unaccusative, and the other an unergative predicate. The experiment consists of a total of 16 sentence trials and 80 fillers. The other possibilities of combination are spread throughout 8 different lists, so that we could analyse a given verb with both types of adjectives.

Given the relative freedom of word order in Spanish, our design included sentences in which the subject Noun Phrase appears in preverbal position, and others that present the subject in postverbal position. In addition to the probe, the sentences were followed by a yes/no question about their contents, to avoid coincidences or mechanical responses. Wrong answers with respect to either probe recognition or question were dismissed. Our data are based on the performance of 32 native speakers of Castilian Spanish with more than 88% of right responses throughout the experiment.

Our first expectation concerns the contrast between abstract and concrete adjectives. We predict that, if the NP-movement analysis for unaccusative predicates is correct, the contrast between abstract/concrete recognition times will be larger for unaccusatives than for unergatives, the subject being recoded conceptually when accessed through trace. In light of the results we have, this prediction is confirmed:

(17) a. Abstract/Concrete difference with unaccusatives .111

     b. Abstract/Concrete difference with unergatives   .036

We also find a contrast between the RTs when the subject NP appears in preverbal position, as opposed to postverbally. Latencies are longer when the subject is preverbal, which is expected if one considers that in these cases the distractor noun appears closer to the main verb. Given our conclusions as to the preeminence of morphology, if the distractor in a configuration like (11) a is compatible with the agreement features of the verb and it is adjacent to it, it causes a garden path in the processing of the sentence.

Further comments can be made about the data from our experiment. This difference abstract/concrete in RTs is related to the position of the subject NP in the sentence, as shown in (16): it is considerably larger when the subject NP sits in preverbal position than when it appears post- verbally in the case of unaccusatives, whereas the contrast for unergatives is minimal, as shown in (16):

(18)	Unaccusatives		Unergatives	
	Preverbal	Postverbal	Preverbal	Postverbal
Abs/Con	.145	.077	.04	.033

The contrast found when the subject of the unaccusative appears in preverbal position corroborates the previous findings that trace results in greater priming. Furthermore, assuming Burzio's view that the argument in postverbal position is linked to a pro, the question arises as to the difference in priming caused by this pro as opposed to an NP-trace (PRO in English proved to cause weaker priming than Np- trace, as reported by Bever & McElree (1988) and others). The question to be pursued refers to the similarities in behavior between this pro of NS languages and PRO.

As to the data for unergatives, the small difference in the abstract/concrete adjective recognition times raises several possibilities: assuming Burzio's analysis, there is an empty category left behind when the only argument of an unergative verb moves to postverbal position. This empty category doubling the representation of the subject of the sentence, we would expect the RTs to show more priming when the subject appears postverbally. However, notice that the traces that have been analysed in the literature in relation to priming are always the result of A-movement whereas the movement of the subject of an unergative predicate is an Abar-movement. The status of this trace, if existent at all, is still an open question.

C-Summary and Conclusions.

We have reviewed in the first part of this paper some of the criteria that show the syntactic difference between unaccusative and unergative predicates in Spanish. In light of this evidence, we adopted the GB account for these verbs, in which unaccusatives present a trace when movement of their only argument occurs. Taking as a starting point previous research concerning the role of NP-traces in processing, we undertook an experiment that would be sensitive to the presence of trace in complement position in

constructions with unaccusatives in Spanish. The results suggest that morphological cues are used initially when parsing the structure of a sentence. However, when morphology does not provide a unique argument for the subject position, other structural differences come into play. The contrast found in our data between abstract and concrete adjetives RTs following the probe in unaccusative constructions, suggests the existence of a trace. Also, a subsidiary effect of the position of the subject Noun Phrase in the sentence arose in our results. The interaction between that effect and the difference abstract/concrete for unaccusatives supports further our analysis with a trace. Research controlling for the facts concerning agreement morphology requires further study; our research also raises questions about the difference between traces that have been originated as the result of an obligatory movement, and empty categories like pro.

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