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Unaccusative Behaviors

1 Introduction

This paper[1] presents a monostratal, non-derivational analysis of a class of Italian verbal forms/stems which share a set of properties which we will label 'unaccusative behavior'. This class includes:

- Unaccusative verbs, i.e. verbal stems whose unaccusative behavior can be detected irrespective of their morphological realization.

- Passive constructions.

- Reflexive constructions.

- *Si* constructions.

The features that we consider decisive for determining inclusion in this class (whose members will be called either 'ergative constructions' or 'ergative forms' depending whether unaccusativity emerges at the phrasal or lexical level, respectively) are the following:

- *ne*-licensing;

- selection of the auxiliary *essere*;

- agreement of the past participle with the superficial subject in composed forms;

- possibility of entering as heads in adnominal past participle constructions;

- possibility of appearing with an expressed subject in absolute past participle constructions.

The basic idea of the present approach is that the features determining an unaccusative behavior are syntactic in nature, even though they can be semantically derived, as in the case of unaccusatives(Levin and Rappaport 1995). The justification for such a choice is that whereas a semantic generalization grouping together the verbs traditionally labeled 'unaccusatives' can be found, convincing semantic generalizations grouping together all verbs and verbal constructions which manifest an 'unaccusative behavior' are still missing[2].

Contrary to the previous GB literature, we reject the assumption that movement of constituents is at the base of an explanation for the unaccusative behavior. Indeed, we

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[1] Most of this paper has been developed as a joint research with Federica Busa and James Pustejovsky. The fact that this research has not evolved into a common paper is only due to 'geographical' circumstances. The section concerning Linking Theory and the Treatment of Aktionsart is almost literally derived from a research with Vittorio Di Tomaso concerning Dynamic Locative Expressions. Finally I am indebted to Pier Marco Bertinetto, Gennaro Chierchia, Paola Monachesi, Ivan Sag for various discussions concerning the proper treatment of unaccusativity in Italian.

[2] To see the reasons for this skepticism, take for instance two of the most popular characterizations of semantic ergativity, i.e.agentivity (Perlmutter 1978, Dowty 1991) and telicity (Centineo 1986, Dowty 1991, Van Valin 1990, Zaenen 1991, Zaenen 1993, Pustejovsky and Busa 1995). When these parameters are applied to the Italian verbal system, they provides satisfactory results in isolating the class of verbs traditionally labeled as unaccusatives (see below). However, as soon as we try to apply these semantic parameters to the whole class of ergative constructions, their individuating power immediately fades. For instance, it would be hardly tenable to argue that a verb like *osservare* ('to watch') at the passive form has either an agentive/causative semantics (it allows purpose clauses, thus the agent is not necessarily backgrounded: (1a)) or a telic aktionsart (it allows *for*-adverbial: (1b)):

(1) a. E' stato osservato per capirne il comportamento
         (He) has been observed to understand-of-him-CL the behavior

     b. E' stato osservato per un paio d'ore
         (He) has been observed for a couple of hours

Yet it clearly shows a syntactically unaccusative behavior, in that it selects *essere* as an auxiliary and it allows *ne*-cliticization:

(2) a. Giovanni e' stato osservato
         Giovanni has been observed

will show that an analysis which refuses movements and relies on the more 'economical'
hypothesis that unaccusative behaviors is always lexically determined, can fully account
for the data in question.

    The central claim of such an analysis, which is casted in the version of the HPSG
theory described in Chapter 9 of Pollard and Sag (1994), is that while unergative forms
are characterized by the presence of the subject within the SUBJ list, ergative forms have
an empty SUBJ list, their surface subject being the first member of the COMPS list:

$$(3) \quad \mathit{erg\text{-}val}\begin{bmatrix} \text{SUBJ} & \langle \rangle \\ \text{COMPS} & \langle \text{NP} \rangle \oplus \mathit{list} \end{bmatrix} \qquad \mathit{unerg\text{-}val}\begin{bmatrix} \text{SUBJ} & \langle \text{NP} \rangle \\ \text{COMPS} & \mathit{list} \end{bmatrix}$$

    In the rest of this paper, we will first verify the implementability of this approach with
respect to unaccusatives (2.1) and passives (2.2), showing in section 3 how it provides a
satisfactory explanation of the set of facts traditionally accounted for by the Unaccusative
Hypothesis. In section 4, finally, we will extend the whole treatment to *si*-constructions,
which pose by far more puzzling problems.

2 Deriving Unaccusatives and Generating Passives

2.1 Unaccusatives in Semantic and Syntax

In the following we will label 'unaccusatives' all those verbs which exhibits an 'unac-
cusative behavior' independently on their morphological realization. We will first provide
an informal characterization of their semantics (2.1.1), then we will show how this seman-
tics can be exploited in order to determine their mapping into syntax (2.1.2).

2.1.1 Unaccusatives in Semantics: Aktionsart and Causation

Many researchers (Centineo 1986, Dowty 1991, Sanfilippo 1991, Tenny 1992, Van Valin
(1990), Zaenen 1993, a.o.) have identified a clear relationship between *aktionsart* (or
actionality or *lexical aspect*) and unaccusativity. The basic claim is that whenever an
intransitive verb is a *process* (or an *activity*) from the point of view of the aktionsart it is
syntactically mapped as an unergative, whereas, when it is *telic* (or *bounded*), it is realized
as an unaccusative. This claim is substantiated by a long list of pairs of Italian verbs,
most strikingly by the behavior of verbs of movement, which behave as telic unaccusatives
if a goal phrase is realized, as unergative processes, otherwise:

(4) a. Giovanni è corso a casa in due ore
      Giovanni has-ESSERE run home in two hours

    b. Giovanni ha corso per tre ore
      Giovanni has-AVERE run for three hours

We think that in order for this generalization to be fully without exceptions a second
statement has to be added to the set of conditions which determine the unaccusativity
of a verb: assuming that a telic relation is formed of a causing act and a resulting state,
there has to be an index sharing between the agent of the causing act and the individual
of which the final state is predicated (cf. also Chierchia (1989)). For instance in (4a)
Giovanni play both the role of the *mover* and the one of the located participant (*being at
home*):

(5) MOVE(Giovanni) → BEING_AT(Giovanni,home)

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    b. Ne sono stati osservati molti
      Of-them-CL have been observed many

    In our 'mixed' approach there is no need to find a semantic generalization able to group together
unaccusatives, passives and *si*-constructions: unaccusativity is *semantically derived* but *syntactically
implemented* as a particular configuration of the valence structure (Levin and Rappaport 1995). Thus
the kind of valence structure which characterizes the unaccusative behavior can be derived by resorting
to different devices allowed by the grammar: Linking Theory in the case of unaccusatives, morphological-
lexical rules in the case of passives, rules of clitic affixation in the case of *si*-construction.

This further condition explains why verbs such as *vendemmiare* ('harvest-grapes) or *rimediare* ('remedy'), which are telic, never surface as unaccusatives: the resulting state they denote does not involve in any sense the actor of the causing event (the resulting state of 'harvesting grapes' involve plants, not farmers). More importantly, this explains why transitive verbs used absolutely (i.e. without a direct object) do not become unaccusatives (even though they can remain telic): the unexpressed direct object is still present in their semantic representation, thus blocking the coindexation between the first argument of the resulting state and the one of the causing event. For instance the semantic representation of (7) would be the one in (7b): clearly a coindexation between x and *Leo* would not be well formed. Hence the ungrammaticality of (7c)[3].

(7) a. Leo ha ucciso
     Leo has-AVERE killed

   b. $\exists x[\textbf{killing\_act}(leo, x) \wedge \textbf{dead}(x)]$

   c. * Leo è ucciso
      Leo has-ESSERE killed

The two parameters of telicity and coindexation between participants express a condition on unaccusative stems, but they are unable to explain the phenomenon of causative alternation, i.e. the fact that certain transitive verbs have a corresponding unaccusative form, where the direct object surfaces as the subject. Actually, we do not think that it is possible at all to identify a restricted set of features which guarantee that a transitive verb has an unaccusative counterpart in the lexicon. In Italian, both dyacronic evolution and influences from many dialectal variations have contributed to obscure the relationship between the class of transitive verbs and their unaccusative counterpart, in such a way that a safe rule for transitive→unaccusative derivation is extremely unlikely to be found.

However, renouncing to a precise criterion for determining the exact nature of such a derivation, does not mean abandoning any generalization. Consider three possible 'minimal' approaches to the causative alternation:

1. Unaccusative and transitive entries are simply listed in the lexicon: there is no relation between the two, thus no generalization can be captured.

2. Transitive verbs which have also an unaccusative realization are marked by a special feature (say, ERG) to which a lexical rule generating unaccusatives forms is sensible: there is a relationship between transitive and unaccusative stems, and this relationship is captured by the "format" of the lexical rule.

3. Verbs which can have either a transitive or an unaccusative realization are underspecified in the lexicon. Independently motivated principles states that these underspecified forms can have both the realizations.

The first approach is clearly inadequate. If it were true that unaccusatives and their causative alternant are simply listed in the lexicon their phonological and morphological identity should be simply considered a case of homonymy, which does not seem the case. The second approach provides a higher degree of generalization, but it still leaves the problem of the status of such a feature ERG unsolved. As far as we know, there is no cognitive motivation to assume that the lexical entries of transitive verbs which have an unaccusative alternant are "richer" than the ones of verbs which can have only a single syntactic realization. Moreover, the hypothesis of having in the lexicon features which can "guide" derivational operation is conceptually implausible. It would have as a consequence the fact that a speaker cannot have a complete lexical representation of a transitive verb such as *affondare* until the moment in which s/he learns that there is also an unaccusative variant of the same verb. The third approach overcomes this problem. First, there is no 'ad hoc' feature, thus the speaker can have a full fledged lexical representation of a transitive verbs without knowing anything about the existence of a corresponding

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[3]Whenever such a coindexation is possible, however, an unaccusative behavior is predicted, as in the case of the reflexives:

(6) a. Leo si è ucciso
     Leo has-ESSERE himself-CL killed

   b. $[\textbf{killing\_act}(\textbf{leo},\textbf{leo}) \wedge \textbf{dead}(\textbf{leo})]$

unaccusative. Second, there is no special device to handle the causative alternation: the same constraints which standardly rule the mapping into syntax of verbal semantic structures determine the kind of syntactic realization which a certain verb can have, depending whether it is specified as semantically unaccusative or semantically transitive. Third there is still a way to handle exceptions, as we will see more in detail in the following: verbs which "surprisingly" do not have an unaccusative variant are simply verbs which are fully specified as transitives in the lexicon.

In order to provide a satisfactory implementation of the causative alternation as lexical semantic underspecification, we are going to assume a neodavidsonian view of event semantics in HPSG, as proposed in Sanfilippo (1990, to appear), Balari (1991) and Dini (to appear). Every event which is part of a verbal relation is represented by a relation plus a *list* of θ-roles. Informally, a verb such as *spingere* ('push') would be represented as

$$(8) \quad \textbf{move}(e) \wedge \Theta\text{-}DOM(e) = <\textbf{agent}(x,e), \textbf{patient}(y,e)> \wedge$$
$$\textbf{at}(s) \wedge \Theta\text{-}DOM(s) = <\textbf{locatum}(y,s), \textbf{location}(z,s)> \wedge e \Rightarrow s$$

In prose: there is an event e of moving where x is an agent and y is a patient; and the state in which e results is a state of being spatially located, where y is the locatum and z the location. In the system we are assuming lists of θ-roles can be underspecified (partial), exactly as any other 'object' of the description language. This very underspecification is exploited to account for the phenomenon of causative alternation: transitive/unaccusative realizations of the same verbal stem are captured by assuming that the relevant causing event has an underspecified list of θ-roles. Depending on the possible completions we will have a semantic structure able to map either onto an ergative or a transitive valence structure. Take for instance the case of *affondare*, 'to sink'. Under the current approach, its lexical semantics representation is the following:

$$(9) \quad \textbf{sink\_act}(e) \wedge \Theta\text{-}DOM(e) = list \oplus <\textbf{patient}(y,e)>$$
$$\wedge \textbf{sunk}(s) \wedge \Theta\text{-}DOM(s) = <\textbf{theme}(y,s)> \wedge e \Rightarrow s$$

The Θ-DOM of the causing event is the concatenation of an underspecified list of θ-roles with a list containing just a patient. Independent principles over the well formedness of lists of θ-roles guarantee that the possible completions of such an underspecified list are only two: $<\textbf{agent}(x,e), \textbf{patient}(y,e)>$ and $<\textbf{patient}(y,e)>$. In the former case we have a standard causative semantics (10a), which is mapped onto a transitive valence (10b). In the latter both the constraints on aktionsart and the one on indexing of participants are satisfied: thus we correctly predict that the realization of *affondare* described by the logical form in (10c) will surface as an unaccusative verb (10d):

(10) a. $\exists x \exists y \exists e \exists s[\textbf{sink\_act}(e) \wedge \Theta\text{-}DOM(e) = <\textbf{agent}(x,e), \textbf{patient}(y,e)> \wedge$
$\textbf{sunk}(s) \wedge \Theta\text{-}DOM(s) = <\textbf{theme}(y,s)> \wedge e \Rightarrow s]$

b. I pirati hanno affondato una nave
The pirates have-AVERE sunk a ship

c. $\exists y \exists e \exists s[\textbf{sink\_act}(e) \wedge \Theta\text{-}DOM(e) = <\textbf{patient}(y,e)> \wedge$
$\textbf{sunk}(s) \wedge \Theta\text{-}DOM(s) = <\textbf{theme}(y,s)> \wedge e \Rightarrow s]$

d. Una nave è affondata
A ship has-ESSERE sunk

Conceptually, this treatment amounts to claiming that the causative alternation is a form of optionality handled through a θ-role discharging mechanism, along the lines of Parsons (1990). The semantic nature of this optionality plays a crucial role here. As Dini (to appear) shows, there are many ways in which verbal arguments can be omitted in Italian, for instance *pro*-drop, arbitrary complement deletion, indefinite complement deletion, pragmatically controlled anaphora. However in none of these cases the semantic nature of the predicate is changed, i.e. the list of θ-roles remains unaffected. Semantic optionality, on the contrary, affects exactly the lexical list of θ-roles, a change which in turn causes a change in the valence structure of the relevant verb (cf. Pinker (1989)).

2.1.2 Unaccusatives in Syntax: Linking Theory

Once we have achieved some understanding of the constraints which governs the semantics of unaccusatives, we have to introduce a mechanism, linking theory, able to relate them to certain syntactic features.

Technically, the formal language of our fragment of linking theory is a totally *well-typed, sort resolved* system, augmented with multi-dimensional inheritance, as described in Erbach 1994(). Multi-dimensional inheritance allows a single feature structure to be assigned different types, as long as they are chosen from different dimensions. For instance to state that an attribute A has a value which has to be at the same time of type b and of type c, we will write:

(11) $A > [b] * [c]$

In this way we capture the fact that any feature structure appearing as value of the attribute A has to receive both a subtype of b and a (compatible) subtype of c, without the need of introducing a subtype which inherits from both dimensions.

The kind of semantic representation we are going to map into syntax *via* linking theory is the one described in Dini and Di Tomaso (1995), which is in turn derived from the *event structure* of Pustejovsky (1995), and is given a formal interpretation in Dini and Bertinetto (1995). We assume that the NUCLEUS attribute of the CONTENT of a sign has as its value an *event structure*. An event structure is defined as a matrix of type *aktionsart* with at most two attributes, EVENT and TELOS. The value of the attribute EVENT is a relation which is of type *dynamism* (for instance, a *motion* relation); the value of the attribute TELOS is a relation which is of type *state* (for instance, a stative relation). In turn, every relation has an attribute INDEX, whose value is either a plural index or a singular index. If both the attributes EVENT and TELOS are well typed for a certain semantic representation, the feature structure has to be interpreted as: *the event denoted by the relation in EVENT will prototypically result into a state, which is in the denotation of the relation in TELOS.*

The traditional vendlerian classes (plus the class of punctual events, which has been identified by Moens and Steedmann (1988)) are defined as subtypes of *aktionsart* with the following constraints:

- **process (or activity)**: a subtype of *aktionsart* for which only the attribute EVENT is appropriate and the index of the relation in EVENT is plural;

- **punctual**: a subtype of *aktionsart* for which only the attribute EVENT is appropriate and the index of the relation in EVENT is singular;

- **accomplishment**: a subtype of *aktionsart* for which both EVENT and TELOS are appropriate and the index of the relation in EVENT is plural;

- **achievement**: a subtype of *aktionsart* for which both EVENT and TELOS are appropriate and the index of the relation in EVENT is singular;

- **state**: a subtype of *aktionsart* for which only TELOS is appropriate.

The subtypes of *aktionsart* are hierarchically represented as in fig. 1.

Once we have determined the exact nature of the NUCLEUS attribute we are ready to implement our constraints on the mapping of unaccusatives into syntax. These constraints[4] are conceived as a declarative monotonic mechanism ruling the interface between semantics and syntax (cf. Davis (1995)). In particular, we postulate three parallel type hierarchies which determine the mapping of the event structure onto syntax: *ev-link* (which maps participants to the causing event), *telos-dir-link* (which maps participants to the resulting state into the direct object position) and *telos-ind-link* (which maps participants to the resulting state into the direct object position). Thus, in terms of multi-dimensional inheritance[5]:

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[4]Here we are not going to provide a whole linking theory of Italian. We simply isolate a fragment of a much more complex hierarchical construction, which is described in Dini (forthcoming).

[5]Since we are dealing with types linking syntax and semantics we prefer to perform subtyping operation over the type *local*, the innest type having visibility both on CONTENT and CAT. Different choices are however possible, as in Davis (1995).
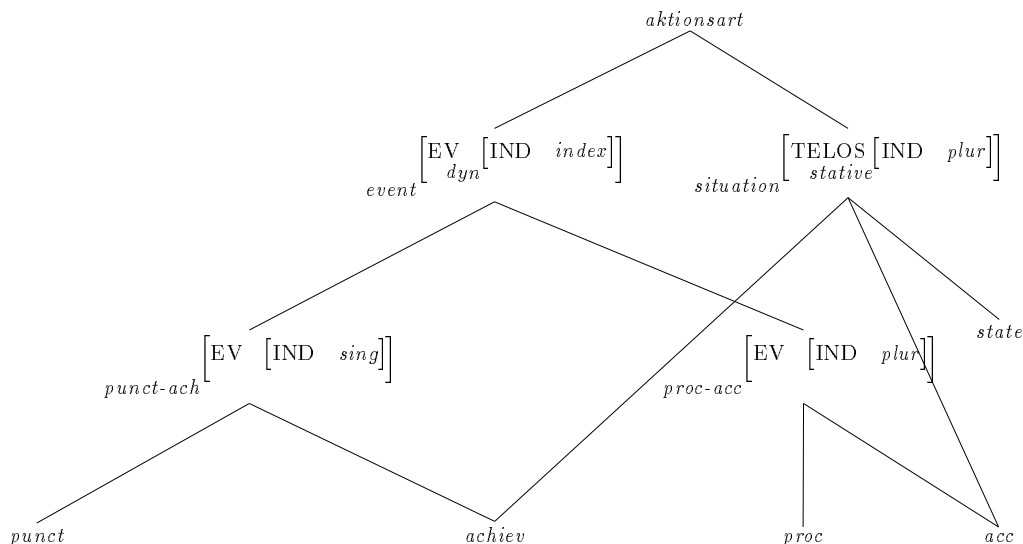
Figure 1 is a tree diagram "The hierarchy of Aktionsart" with the following nodes:

$aktionsart$

$event$ $\begin{bmatrix} \text{EV} & [\text{IND} & index] \\ dyn & & \end{bmatrix}$

$situation$ $\begin{bmatrix} \text{TELOS} & [\text{IND} & plur] \\ stative & & \end{bmatrix}$

$punct\text{-}ach$ $\begin{bmatrix} \text{EV} & [\text{IND} & sing] \end{bmatrix}$

$state$

$proc\text{-}acc$ $\begin{bmatrix} \text{EV} & [\text{IND} & plur] \end{bmatrix}$

$punct$ $achiev$ $proc$ acc

Figure 1: The hierarchy of Aktionsart

(12) $local > [ev\text{-}link] * [telos\text{-}dir\text{-}link] * [telos\text{-}ind\text{-}link] * \ldots$

Let's start with the eventive-linking hierarchy, which is described in fig. 2 (where @EV is an abbreviation for CONTENT|NUCLEUS|EVENT). We admit the presence of both an unexpressed EVENT (in the case of stative verbs) and an expressed EVENT, which is always filled by a relation denoting a change, either a plural or a singular one. If an attribute EVENT is appropriate, its first role is either mapped into the SUBJ list, or the SUBJ list is empty.

Figure 2 is a tree diagram "Eventive linking Theory" with nodes:

$ev\text{-}link$ $\begin{bmatrix} \text{@EV} & top \end{bmatrix}$

$expr\text{-}ev$ $\begin{bmatrix} \text{@EV} & change \end{bmatrix}$

$unexp\text{-}ev$ $\begin{bmatrix} \text{CAT} \mid \text{SUBJ} & \langle\rangle \\ \text{@EV} & *undef* \end{bmatrix}$

$unerg\text{-}ev$ $\begin{bmatrix} \text{CAT} \mid \text{SUBJ} & \langle \text{NP}_{\boxed{1}} \rangle \\ \text{@EV} & \begin{bmatrix} \Theta\text{-DOM} & \langle \theta(\boxed{1}) \mid \ldots \rangle \\ rel & \end{bmatrix} \end{bmatrix}$

$unacc\text{-}ev$ $\begin{bmatrix} \text{CAT} \mid \text{SUBJ} & \langle\rangle \end{bmatrix}$
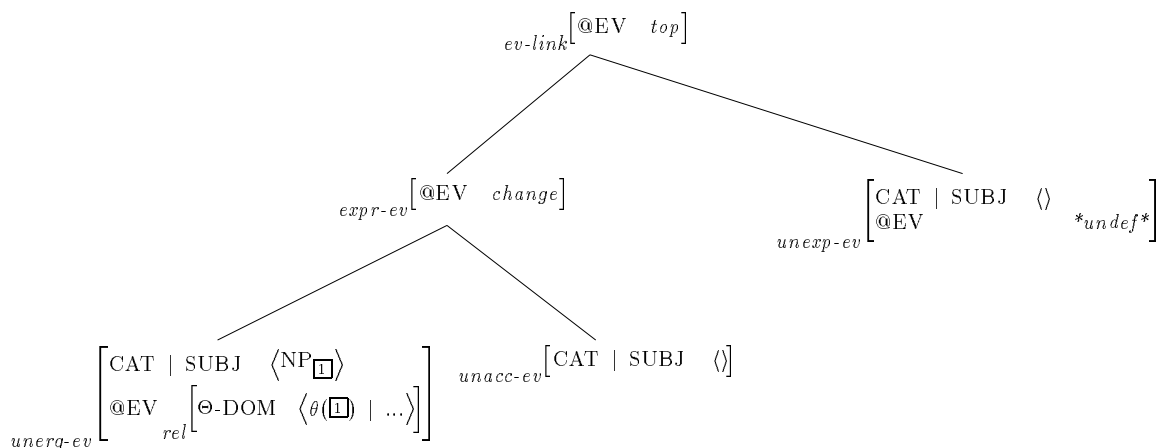
Figure 2: Eventive linking Theory

The linking theory for the TELOS attribute is a bit more complex, as it has to account for direct objects, unaccusative subjects and indirect complements. Here, again we adopt multidimensional inheritance and we assume two different hierarchies, one taking care of the mapping of constituents into the first position of the COMPS list (direct internal arguments) and the other taking care of the mapping of PPs into the remaining positions (indirect internal arguments).

Concerning the former we have simply to state that whenever a TELOS is present, the index of the first θ role associated with it is always mapped as the index of a NP appearing in the first position of the COMPS list (fig. 3)

As for indirect internal arguments, we limit our attention to those complements which are *delimiting* in the sense of Tenny (1994): in other words we are only interested in linking those arguments whose presence marks the achievement of a final resulting state, this achievement being able to trigger the interpretation of the predicate as a telic event. The basic idea is that the semantic nature of the predicate within the TELOS is able to fully determine the syntactic realization of the indirect object. In particular we assume that
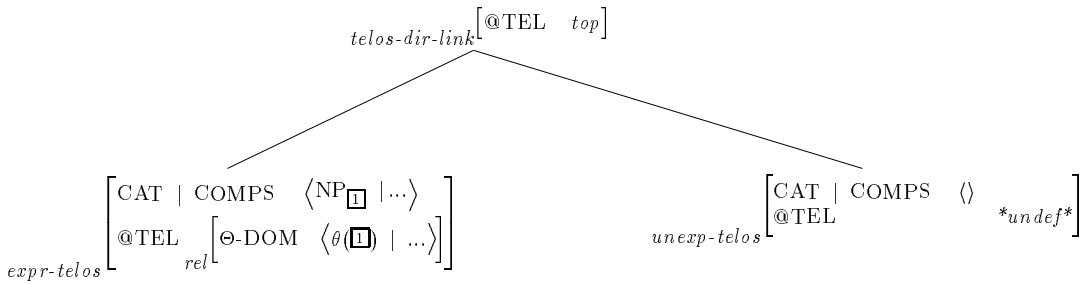
$$\textit{telos-dir-link}\begin{bmatrix}\text{@TEL} & top\end{bmatrix}$$

$$\textit{expr-telos}\begin{bmatrix}\text{CAT} \mid \text{COMPS} & \langle \text{NP}_{\boxed{1}} \mid ... \rangle \\ \text{@TEL} & \textit{rel}\begin{bmatrix}\Theta\text{-DOM} & \langle \theta(\boxed{1}) \mid ... \rangle\end{bmatrix}\end{bmatrix} \qquad \textit{unexp-telos}\begin{bmatrix}\text{CAT} \mid \text{COMPS} & \langle \rangle \\ \text{@TEL} & *undef*\end{bmatrix}$$

Figure 3: TELOS linking Theory for direct internal arguments

whenever the TELOS contains at least two θ roles the relation it denotes is mapped as the content of the last PP in COMPS. Whenever it denotes a monoargumental relation no PP appears in COMPS and the list is simply "closed". A sketchy fragment of a type hierarchy performing such a task is provided in fig. 4. See Dini and Di Tomaso (to appear) for more details[6].

$$\textit{telos-ind-link}\begin{bmatrix}\text{@TEL} & *top*\end{bmatrix}$$

$$\textit{no-telos}\begin{bmatrix}\text{CAT} \mid \text{COMPS} & \langle \rangle \\ \text{@TEL} & *undef*\end{bmatrix} \qquad \textit{expr-telos}\begin{bmatrix}\text{@TEL} & \textit{rel}\end{bmatrix}$$

$$\textit{expr-ind}\begin{bmatrix}\text{CAT} \mid \text{COMPS} & \langle [\,], \text{PP}_{\boxed{1}} \rangle \\ \text{@TEL} & \boxed{1}\,\textit{rel}\begin{bmatrix}\Theta\text{-DOM} & \langle [\,],[\,] \mid ... \rangle\end{bmatrix}\end{bmatrix} \qquad \textit{unexp-ind}\begin{bmatrix}\text{CAT} \mid \text{COMPS} & \langle [\,] \rangle \\ \text{@TEL} & \textit{rel}\begin{bmatrix}\Theta\text{-DOM} & \langle [\,] \rangle\end{bmatrix}\end{bmatrix}$$
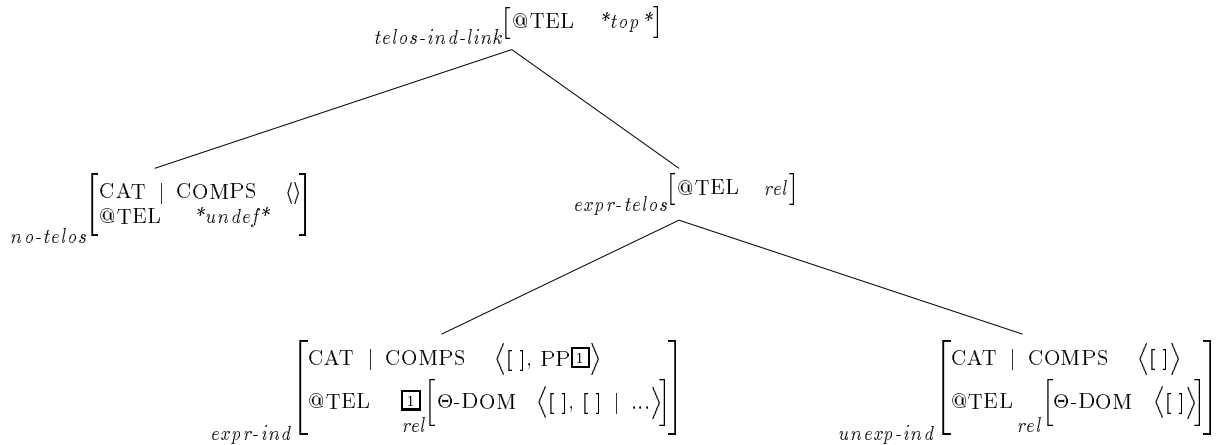
Figure 4: TELOS linking Theory for indirect internal arguments

Furthermore we assume a principle very similar to Pustejovsky (1995)'s *Qualia Saturation*, which we dub as *Participant Saturation*[7]:

(13) No index in a Θ-DOM list can be left unbound.

that is, every index has to be either associated to a constituent in VALENCE or quantificationally closed in the lexicon, or coreferential to some other index.

By exploiting the conjoined application of this principle and of the hierarchies in fig. 2, 3 and 4, we are able to predict, on a lexical basis: (i) the unaccusative/causative alternation; (ii) cases of split intransitivity; (iii) the fact that most statives in Italian are unaccusative.

The Unaccusative/Causative alternation. As we already stated in a number of passages, the alternation between the causative and the unaccusative sense of certain verbs has to be captured as a matter of underspecification. Thus a verb like *affondare* , 'sink', will be declared in the lexicon in the following way:

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[6]The choice of having two split hierarchies for direct and indirect objects is not mandatory. The type *expr-telos* of (4) could indeed be substituted by the type *expr-telos* of (3), thus collapsing the two hierarchies.

[7]We will not provide any formal implementation of this principle here. However Dini (to appear) provides an implementation of the principle of *Semantic Completeness* which could work equally well for our purposes.

(14)

$$\left[\begin{array}{l} \text{CONTENT} \ \left[\text{NUCLEUS} \ \left[\begin{array}{l} \text{EVENT}_{act} \left[\Theta\text{-DOM}_{\theta\text{-}list} \left\langle ..., \text{patient}(\boxed{1},e)\right\rangle\right] \\ \text{TELOS}_{sunk} \left[\Theta\text{-DOM}_{\theta\text{-}list} \left\langle \text{theme}(\boxed{1},e)\right\rangle\right] \end{array}\right]\right] \end{array}\right]_{\textit{affondare}}$$

where θ-*list* is a particular type of list of θ roles, which can be constrained in the usual way by adopting a type inheritance hierarchy. In particular, for our purpose, we need to state only the constraints in fig 5.
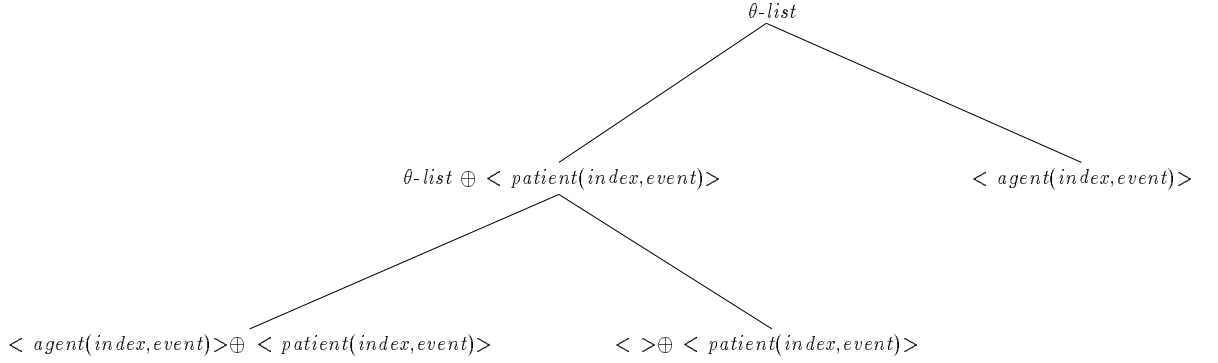
Figure 5: Hierarchical constraints on θ-list

Since the hierarchies *ev-link*, *telos-dir-link* and *telos-ind-link* are on parallel dimensions of the attribute LOCAL, the feature structure in (14) has to receive a maximally specific type belonging to all of them. As for EVENT linking, two options are available:

(15) a.

$$\left[\begin{array}{ll} \text{CAT} & \left[\text{SUBJ} \ \langle\rangle\right] \\ \text{CONTENT} & \left[\text{NUCLEUS} \ \left[\text{EVENT}_{act} \left[\Theta\text{-DOM}_{\theta\text{-}list} \left\langle ..., \text{patient}(\boxed{1},e)\right\rangle\right]\right]\right] \end{array}\right]_{\substack{\textit{affondare} \wedge \\ \textit{unacc-ev}}}$$

b.

$$\left[\begin{array}{ll} \text{CAT} & \left[\text{SUBJ} \ \left\langle \text{NP}_{\boxed{1}}\right\rangle\right] \\ \text{CONTENT} & \left[\text{NUCLEUS} \ \left[\text{EVENT}_{act} \left[\Theta\text{-DOM}_{\theta\text{-}list} \left\langle \text{agent}(\boxed{1},e), \text{patient}(\boxed{2},e)\right\rangle\right]\right]\right] \end{array}\right]_{\substack{\textit{affondare} \wedge \\ \textit{unerg-ev}}}$$

As for the TELOS, since the *sunk* relation is of a monoargumental type, the only types belonging to *tel-dir-link* and *tel-ind-link* which can apply are *expr-telos* and *unexp-ind*, thus generating the following two possibilities:

(16) a.

$$\left[\begin{array}{ll} \text{CAT} & \left[\begin{array}{ll} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle\text{NP} \ \boxed{1}\rangle \end{array}\right] \\ \text{CONTENT} & \left[\text{NUCLEUS} \ \left[\begin{array}{l} \text{EVENT}_{act} \left[\Theta\text{-DOM}_{\theta\text{-}list} \left\langle \text{patient}(\boxed{1},e)\right\rangle\right] \\ \text{TELOS}_{sunk} \left[\Theta\text{-DOM}_{\theta\text{-}list} \left\langle \text{theme}(\boxed{1},e)\right\rangle\right] \end{array}\right]\right] \end{array}\right]_{\substack{\textit{affondare} \wedge \\ \textit{unacc-ev} \wedge \\ \textit{expr-telos} \wedge \\ \textit{unexp-ind}}}$$

b.

$$
\begin{bmatrix}
\text{CAT} & \begin{bmatrix} \text{SUBJ} & \left\langle \text{NP}_{\boxed{1}} \right\rangle \\ \text{COMPS} & \left\langle \text{NP}_{\boxed{2}} \right\rangle \end{bmatrix} \\
\\
\text{CONTENT} & \begin{bmatrix} \text{NUCLEUS} & \begin{bmatrix} \text{EVENT}_{act} & \begin{bmatrix} \Theta\text{-DOM}_{\theta\text{-}list} & \left\langle \text{agent}(\boxed{1},e),\ \text{patient}(\boxed{2},e) \right\rangle \end{bmatrix} \\ \text{TELOS}_{sunk} & \begin{bmatrix} \Theta\text{-DOM}_{\theta\text{-}list} & \left\langle \text{theme}(\boxed{2},e) \right\rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}
\end{bmatrix}
$$

affondare ∧
unerg-ev ∧
expr-telos ∧
unexp-ind

Note that the eventive Θ-DOM in (16a) has been specified as containing only a patient, i.e. the agent has been backgrounded, as standardly required by the unaccusative semantics (cf Pustejovsky and Busa (1995)). Should it have been otherwise, we would have ended up with a violation of two constraints, i.e. the *Participant Principle* and the coindexation of the two first arguments of the θ-list in EVENT and TELOS. As for (16b), a constraint on causation is active in ruling out the possibility of having a coindexation between the patient and the subject: if this were the case, we would end up with no participant relating the causing act and the resulting state. This constraint, however, seems to be a mandatory restriction on the semantics of lexical causatives (i.e. we do not admit verbs expressing a meaning such as *x acts on y, and as a consequence a certain state of z holds*).

The crucial point, here, is that we did not resort to any 'destructive' operation, but we deduced the multiple possibilities of syntactic realization of a predicate such as *affondare* as a type inference mechanism over the hierarchies connecting semantics to syntax. This use of a monotonic device enables us to get rid of the problem of exceptions. Consider a transitive verb such as *distruggere* ('to destroy'). Unless we appeal to distinctions which concern more world knowledge than language use, we are rather unlikely to find a clear-cut semantic distinction between *affondare* and *distruggere*. Yet, the former has an unaccusative counterpart, while the latter does not. This fact is trivially captured in our system by stating that a verb such as *distruggere* has always a fully specified Θ-domain for its EVENT attribute:

(17)

$$
\begin{bmatrix}
\text{CONTENT} & \begin{bmatrix} \text{NUCLEUS} & \begin{bmatrix} \text{EVENT}_{act} & \begin{bmatrix} \Theta\text{-DOM}_{\theta\text{-}list} & \left\langle \text{agent}(\boxed{1},e),\ \text{patient}(\boxed{2},e) \right\rangle \end{bmatrix} \\ \text{TELOS}_{destroyed} & \begin{bmatrix} \Theta\text{-DOM}_{\theta\text{-}list} & \left\langle \text{theme}(\boxed{2},s) \right\rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}
\end{bmatrix}
$$

distruggere

As the reader can verify, there is no way in which the above hierarchies can force the type *unacc-ev* on this lexical entry, as the kind of type discipline we are assuming does not allow removal of information, only specialization: thus we predict that *distruggere* will never have an unaccusative semantics. Crucially, this fact would be much harder to capture if we were working with lexical rules, where destructive operations are allowed. For instance, if we were to allow a lexical rule deriving the unaccusative *affondare* from the corresponding causative entry, we would have no way of excluding the presence of an unaccusative *distruggere*, without resorting to additional stipulations[8].

The same consideration holds for unaccusative verbs which do not have a causative variant, such as *andare*, 'go'. These verbs do not create any problem in our approach as they are simply lexically specified as having a singleton Θ-DOM list for EVENT. They would not either create problems for an approach which derives unaccusatives from causatives. They are problematic, however, for non monotonic approaches (such as Van Valin (1990) and Williams (1981)) which try to derive causative forms from unaccusative ones, as they would incorrectly derive the presence of a causative *andare*, in the same way as they derive the causative *spostare*, 'move', from the unaccusative *spostarsi*, 'move-self'.

---

[8]Actually our system predicts a possible ergative realization in the case in which $\boxed{1}=\boxed{2}$. In this case the HPSG binding theory would force the realization of the direct object as a reflexive. With some additional assumption we could then provide an semantic explanation of the reasons why reflexive constructions exhibit an unaccusative behavior in Italian. Reasons of space prevent us from spelling out this analysis more in details.

In sum, our approach is able to handle exceptions, which are hardly tractable in approaches which relies on (destructive) lexical rules, deriving either unaccusatives from causatives or causatives from unaccusatives.

Split Intransitivity. We have seen that a verb like *correre*, 'run', can originate either an unergative or an unaccusative structure, depending on the realization of the the *goal argument*. In Dini and Di Tomaso (to appear) the following lexical entry is provided for a verb like *correre* (we just add θ roles lists, which were not considered in that approach):

(18)

$$
proc\text{-}acc\left[\text{EVENT}_{\ manner\text{-}motion}\Big[\Theta\text{-DOM}\ \ \langle\text{agent}(\boxed{1},e)\rangle\Big]\right]
$$

This lexical entry is underspecified w.r.t to the hierarchy in 1. Since we assume sort resolvedness (every type has to be maximally specific) (18) can have the following realizations (the coindexation of $\boxed{1}$ in (19a) is obtained by exploiting the HPSG Control Theory, cf. Dini and Di Tomaso (to appear)):

(19) a.

$$
acc\left[\begin{array}{l}\text{EVENT}_{\ manner\text{-}motion}\Big[\Theta\text{-DOM}\ \ \langle\text{agent}(\boxed{1},e)\rangle\Big]\\[2mm]\text{STATE}_{\ at}\Big[\Theta\text{-DOM}\ \ \langle\text{locatum}(\boxed{1},s),\ \text{location}(\boxed{2},s)\rangle\Big]\end{array}\right]
$$

b.

$$
proc\left[\begin{array}{l}\text{EVENT}_{\ manner\text{-}motion}\Big[\Theta\text{-DOM}\ \ \langle\text{agent}(\boxed{1},e)\rangle\Big]\\[2mm]\text{STATE}\quad *undef*\end{array}\right]
$$

Our three linking hierarchies will apply on these two representations, inferring the following syntactic realizations:

(20) a.

$$
\begin{array}{l}correre\ \wedge\\unacc\text{-}ev\ \wedge\\expr\text{-}ind\ \wedge\\expr\text{-}tel\end{array}\left[\begin{array}{ll}\text{CAT}&\left[\begin{array}{ll}\text{SUBJ}&\langle\rangle\\\text{COMPS}&\langle\text{NP}_{\boxed{1}},\ \text{PP}\ \boxed{3}\rangle\end{array}\right]\\[4mm]\text{CONTENT}&\left[\text{NUCLEUS}\left[\begin{array}{l}\text{EVENT}_{\ manner\text{-}motion}\Big[\Theta\text{-DOM}\ \langle\text{agent}(\boxed{1},e)\rangle\Big]\\\text{STATE}\ \boxed{3}_{\ at}\Big[\Theta\text{-DOM}\ \langle\text{locatum}(\boxed{1},s),\ \text{location}(\boxed{2},s)\rangle\Big]\end{array}\right]\right]\end{array}\right]
$$

b.

$$
\begin{array}{l}correre\ \wedge\\unerg\text{-}ev\ \wedge\\unexp\text{-}ind\ \wedge\\unexp\text{-}tel\end{array}\left[\begin{array}{ll}\text{CAT}&\left[\begin{array}{ll}\text{SUBJ}&\langle\text{NP}_{\boxed{1}}\rangle\\\text{COMPS}&\langle\rangle\end{array}\right]\\[4mm]\text{CONTENT}&\left[\text{NUCLEUS}\left[\begin{array}{l}\text{EVENT}_{\ manner\text{-}motion}\Big[\Theta\text{-DOM}\ \langle\text{agent}(\boxed{1},e)\rangle\Big]\\\text{TELOS}\quad *undef*\end{array}\right]\right]\end{array}\right]
$$

We have now a reason for the following contrasts:

(21) a. * E' corso
    (He) has-ESSERE run

b. E' corso a casa
    (He) has-ESSERE run home

    c. * Ha corso a casa
        (He) has-AVERE run home

    d. Ha corso
        (He) has-AVERE run

Consider first sentence (21a): since the auxiliary *essere* is present, we should expect, as we will see, an empty subject list on the governed past participle. However, since there is no locative PP, such a configuration could only arise from the application of the type *unexp-ind*, on a pair with the case of *affondare*, a possibility which is ruled out by the fact that the relation *at* always involves two arguments, a location and a locatum. Thus the only possible type along the hierarchy *telos-ind-link* is *expr-ind*, which imposes an obligatory PP argument, as in (21b). As for (21c), it could be generated only as a result of the conjunctive specification *unerg-ev* ∧ *unexpr-tel* ∧ *expr-ind*, a configuration rejected by virtue of the fact that the two type *unexpr-tel* and *expr-ind* cannot unify ($*undef* \sqcup rel = \perp$)[9]. Sentence (21d), on the contrary, is perfect: in this case, since the verb does not subcategorize for any complement, no resulting state is inferred and TELOS is necessarily set to an *undef* value: this provides a parallel explanation of the well known fact that unergative motion verbs behave as activities from the point of view of aktionsart.

    Admittedly, the fragment of linking theory we have presented here would allow the generation of sentences such as

(23) a. * Giovanni è camminato a casa
        Giovanni has-ESSERE walked home

     b. * Il pesce è nuotato via
        The fish has-ESSERE swimmed away

These sentences are not grammatical because the predicates which are involved (*camminare*, 'walk' and *nuotare*, 'swim') are not compatible with a *goal* phrase. Such a constraint does not emerge from our system, but Dini and Di Tomaso (to appear) provide a clear explanation of this fact by adopting the same premises assumed in this paper . It should be said, anyway, that if an Italian speaker is forced to utter sentences with verbs like *camminare* and *nuotare* with goal phrases s/he will always chose the form with the auxiliary *essere*, never the one with *avere*. This fact constitutes a further proof of the validity of the system we sketched: it captures the productivity of the unergative/unaccusative alternation also in contexts where there is no possibility of appeal to frequency of use: no speaker of Italian is likely to have ever heard sentence such as the one in (23), yet s/he is perfectly able to mark the contrast with:

(24) a. ** Giovanni ha camminato a casa
        Giovanni has-AVERE walked home

     b. ** Il pesce ha nuotato via
        The fish has-AVERE swimmed away

More formally such a contrast is explained by the fact that in (23) only very particular restrictions over the use of Italian spatial prepositions are violated (for instance they would not be violated in the corresponding English sentences), while in (24) there is both this violation and a much more serious violation of the constraints ruling linking theory in Italian.

---

[9]Our system as, it stands, can generate a causative version of (21c), i.e:

(22) * Ha corso Leo a casa
      (He) has-AVERE run Leo at home

Such a sentence is ruled out by independent principles which state that lexically expressed causation is always *direct causation*, in the sense that at least one of the participants to the causing act has to be involved in the resulting state. This constraints is clearly violated in (22), where, according to our linking theory, the only index appearing in EVENT plays no role in TELOS.

Stative Unaccusatives. Since stative verbs are classified from the point of view of aktionsart as those verbs for which the EVENT is undefined, we predict that the only way in which an argument structure can be inferred is through the conjunctive application of the types *unexpr-ev*, *expr-dir* and *unexpr-ind*. Thus we predict their membership to the unaccusative class, a prediction which is borne out by the data, as the test of auxiliary selection confirms:

(25) a. Leo è vissuto a Parigi
    Leo has-ESSERE lived in Paris

   b. Quella villa è appartenuta a mia zia
    That villa has-ESSERE belonged to my ant

   c. Leo è sembrato a tutti un idiota
    Leo has-ESSERE seemed to everybody an idiot

Such a generalization, apparently, is not immune from exceptions. For instance a verb such as *vivere* has the possibility of appearing either as unaccusative or as unergative (cf. Rosen (1984)):

(26) Leo ha/è vissuto male
    Leo has-AVERE/has-ESSERE lived badly

In order to explain this possibility, we must consider that the stative behavior of a verb such as *vivere* can be challenged at the light of the fact that it can be used with the progressive aspect:

(27) Stiamo vivendo proprio male
    (We) are living really badly

The grammaticality of (27) suggests that there are in fact two different realizations of the verb *vivere*, one semantically behaving as a process and one semantically behaving as a state. The former is unergative, the latter is unaccusative. The possibility of having the double auxiliary in (26) is thus due to the fact that no factor intervenes in disambiguating between the two reading.

   A clear confirmation of this hypothesis comes when taking into account the test of *ne*-cliticization. Consider that the clitic *ne* is grammatical with the unaccusative realization of *vivere* and ungrammatical with the unergative one:

(28) a. A Parigi di poeti ne sono vissuti molti
    In Parish, of poets, of-them-CL have-ESSERE lived many

   b. * A Parigi di poeti ne hanno vissuto molti
    In Parish, of poets, of-them-CL have-AVERE lived many

Consider also that the progressive form and *ne*-cliticization are not incompatible, provided the verb is an unaccusative one:

(29) Ne stanno arrivando molti
    Of-them-CL are arriving many

If we are on the right track in assuming that *vivere* is ambiguous between an unergative process and an unaccusative state interpretation, the presence of the progressive morphology should select only the process-unergative reading. Thus *ne*-cliticization should be impossible. Indeed, this is the case:

(30) * A Parigi, di poeti ne stanno vivendo molti
    In Parish, of poets, of-them-CL are living many

   Thus we conclude that apparent exceptions to the prediction that all intransitive statives are unaccusative are in fact cases of semantic ambiguity between a process and a state reading.

2.2 Passives

While unaccusatives are derived by means of devices relating the semantic part of the sign with the syntactic one, passives are generated in the grammar as the output of a morphological operation which takes as input a base form and returns a past participle. This morphological operation is achieved by a lexical rule which is just a parametrization of the one proposed in Pollard and Sag (1987)[10]:

(31)

$$
\begin{bmatrix} \text{PHON} & \boxed{1} \\ \text{SYNSEM} \,|\, ... & \begin{bmatrix} \text{SUBJ} & \langle \text{NP} \rangle \\ \text{COMPS} & \langle \text{NP}_{\boxed{2}} \rangle \oplus \boxed{3} \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \text{PHON} & \text{f}_{psp}(\boxed{1}) \\ \text{SYNSEM} \,|\, ... & \begin{bmatrix} \text{SUBJ} & \langle \rangle \\ \text{COMPS} & \langle \text{NP}_{\boxed{2}} \rangle \oplus \boxed{3} \end{bmatrix} \end{bmatrix}
$$

Here, we assume that Italian *by*-phrases are *thematically bound adjuncts*, in the sense of Sanfilippo (to appear). This is not an obligatory choice, but it simplifies the formulation of the above lexical rule. Moreover, we assume that SUBCAT is the append of the SUBJ and COMPS list, both on the left hand side of this rule and on the right hand side. Since case assignment is performed with respect to SUBCAT (nominative to the first NP, accusative to the second one) we derive that the subject of passive sentence, being the first NP in SUBCAT, has to be nominative[11]. Note that this rearrangement of the SUBCAT list is independently motivated by binding theory. Consider that a sentence such as

(32) Giovanni è ammirato solamente da se stesso
     Giovanni is admired only by himself

is perfectly acceptable in Italian, with the surface subject binding the reflexive *by*-phrase. Without the exclusion of the original subject from SUBCAT, a configuration would be obtained ($< \text{NP}_{refl_{[1]}}\ \text{NP}_{[1]} >$) where a non-pronoun is not o-free, thus causing the violation of principle C of the HPSG binding theory.

3 Explaining the Unaccusative Behavior

In the following we will spell out how the present theory of ergative valence explains the set of syntactic facts that we labeled 'unaccusative behavior'. We will show, in particular, that the analysis of these phenomena can be worked out on a strictly lexical ground. No particular language specific rule will be added to the grammar and the whole treatment will rely on the exploitation of devices such as lexical rules or underspecification in the lexicon.

3.1 *Ne* Licensing

Burzio (1986) claims that the possibility of having free inverted subjects in Italian is not a unitary phenomenon. In particular, he claims that subject inversion with unergative verbs is derived from rightward movement, while subject inversion with ergative verbs is an effect of the fact that the their subject is base-generated in an object position:

(33) a. Molti esperti [$_{VP}$ arriveranno]
        Many experts will-arrive

     b. [$_{VP}$ Arriveranno molti esperti]

---

[10]It should be noted that the use of lexical rules either for inflectional or derivational purposes, is intended just as a shorthand for more complex mechanisms of type inference (such as the ones exploited in Kathol (1992) and Riehemann (1993)) by which the behavior of lexical items is derived without resorting to any "derivational" device (cf. Dini (forthcoming) for an application to the Italian verbal system).

[11]In fact a theory of case assignment such as the one proposed in Heinz and Matiasek (1994) could work as well and, may be, could dispense us at all from consideration about case assignment. For the time being, however, since in this paper we are loosely interested in the problem of case assignment in Italian, we prefer to maintain more conservative positions.

c. Molti esperti [$_{VP}$ telefoneranno]
Many experts will-phone

d. [[$_{VP}$ Telefoneranno] molti esperti]

The fact that a simple variation in the order of constituents cannot account uniformly for the above examples can be spelled out by considering the behavior of the clitic pronoun *ne* ('of them'), which is usually able to license a quantificational element in an object position:

(34) Maria ne leggerá molti
Maria of-them-CL will-read many

Now, surprisingly, it happens that *ne* is able to license quantificational elements in the inverted subject position of ergative verbs, but not in the inverted subject position of unergative ones:

(35) a. Ne arriveranno molti
Of-them-CL will-arrive many

b. Ne sono stati comprati molti
Of-them-CL have been bought many

c. * Ne telefoneranno molti
Of-them-CL will-phone many

Burzio's traditional explanation for this phenomenon relies on the assumption that unaccusative verbs generate their subject in an object position, which is exactly the one to which *ne* refers. This intuition, which we still consider a correct one, can be imported in the framework we are assuming by introducing the following rule for the generation of clitic *ne*, which is considered a lexical affix, along the lines of Monachesi (to appear)[12]:

(36) *ne*-CL-LR

$$
\begin{bmatrix} \text{HEAD} & verb \\ \text{COMPS} & \langle \text{NP}_{\boxed{1}} \rangle \oplus \boxed{3} \end{bmatrix} \rightarrow \begin{bmatrix} \text{HEAD} & verb \\ \text{COMPS} & \langle \text{QP}_{\boxed{1}} \rangle \oplus \boxed{3} \\ \text{CLTS} \left\{ ne \right\} \end{bmatrix}
$$

Crucially,this rule correctly captures the generalization that only objects of transitives and subjects of ergatives can license *ne*. Moreover the lexical entry able to generate *ne* as an affix has to satisfy a further requirement, i.e. it must obligatorily subcategorize for a QP rather than an NP. This explains the ill formedness of the following examples:

(37) a. * Ho letto molti
(I) have read many

b. * Ne ho letto molti libri
(I) Of-them-CL have read many books

However, this is not the whole story. We have, indeed, to face the problem that *ne* licensing depends *also* on the linear ordering of the constituents. Thus ergative subjects occurring in a non topicalized pre verbal position are not able to license *ne*:

(38) a. * Molti ne arriveranno
Many of-them-CL will-arrive

b. * Molti ne sono stati comprati
Many of-them-CL have been bought

This behavior is accounted for by assuming that in a language like Italian the distribution of constituents within the valence lists determines (at least partially) their linear order. In particular:

---

[12]We are neglecting any detail concerning the semantic import of *ne* as well as the one of the quantified element.

(39) a. H[LEX +] $\prec$ XP

    b. XP $\prec$ H[-LEX]

Note that this is a basic assumption in Pollard and Sag (1987) and, may be, the default assumption of the universal grammar[13]. An expensive assumption, however, if we were not anymore able to account for the preverbal occurrence of Italian ergative subjects without resorting to movement rules of some kind. In our approach, the possibility of ergative subjects in a preverbal position is captured as a matter of lexical underspecification. This is achieved by admitting relational constraints in our formal language and assuming that the basic realization of finite ergative verbal forms is the one proposed in (40):

$$(40) \quad \textit{fin-erg-valence} \begin{bmatrix} \text{SUBJ} & \boxed{1} \\ \text{COMPS} & \boxed{2} \oplus \text{list} \end{bmatrix}$$

$$\text{Constraint:} \boxed{1} \oplus \boxed{2} = < \text{NP} >$$

Note that this is not in conflict with the conclusion in 2.1 concerning the valence structure of unaccusative verbs. Indeed, we assume that the indeterminacy of the syntactic realization of the verbal arguments in (40) is a side effect of finite inflection. Sentences such as (33a) will thus be generated by the option $\boxed{1}=<>$, and $\boxed{2}=<$NP$>$, while ergative sentences with a pre verbal subject (cf. (33b)) are generated by the option $\boxed{1}=< $ NP $ >$, and $\boxed{2}=<>$, thus resulting identical, in every respect, to unergative sentences. It goes without saying that only under the former option the input conditions of *ne*-CL-LR are satisfied, thus accounting for the contrast between (38a-b) and (35a-b).

    This analysis of preverbal ergative subjects constitutes a significant departure from the classical GB hypothesis according to which preverbal subjects of ergative stems are derived via movement, and, we think, a positive one. Indeed, there is no area of the grammar where pre verbal subjects of ergative and unergative verbs show different properties either from a semantic or a syntactic point of view. Having preverbal subjects derived by movement from a deep object position (in contrast with the ergative subjects which are base generated *in situ* or, anyway, not in an object position) is just a theory internal assumption, completely unsupported on the ground of data[14].

---

[13]Sanfilippo (to appear) makes an analogous assumption, even if he does not distinguish between ergative and unergative inverted subjects.

[14]Saccon (1992) presents a different approach to *ne* licensing, where it is argued that ne-*cliticization is allowed if and only if a VP-internal subject is allowed*. In turn, the possibility of having VP-internal subjects is ruled by a set of constraints on predication, according to which subjects should move outside the VP in order to be predicated of. In this way she justifies the fact that the clitic *ne* is sometimes allowed with unergative intransitive, provided a subject of predication different from the grammatical subject is found (the following data are from Lonzi (1986)):

(41) a. Ne telefonano molti, di tifosi, la domenica
    Of-them-CL phone many, of fans, on Sunday
    'Lots of fans call on Sunday'

    b. Ne cammina tanta, di gente su quei marciapiedi
    Of-them-CL walk many, of people, on those sidewalks
    'Lots of people walk on those sidewalks'

Here, according to her approach, the subjects of predication are represented by the phrases *la domenica* and *su quei marciapiedi*, thus allowing the grammatical subject to remain VP-internal.

    The weak point of this approach is represented by the fact that *ne* cliticization should be allowed every time some complement is able to work as subject of predication. Thus, is an appropriate context, the following should be acceptable:

(42) * Anche oggi ne hanno parlato tre al convegno
    Also today of-them-CL have spoken three at the congress

In fact, she marks this sentence as acceptable, but such a judgment contrasts both with our intuitions and with the judgment of all the Italian speakers we consulted.

    Moreover, under this approach, it is not clear how a sentence such as

(43) Se ne sono mossi molti
    Of-them moved many

can be accounted for, unless a rather dubious non overt subject of predication is hypothesized.

    We think that the reason for the (partial) acceptability of (41) should be looked for in the semantics of habitual expression rather than in the syntax/semantics of predication. Indeed, it seems that what license the presence of *ne* in (41) is the verbal inflection, the simple present, which is usually associated

In some sense, it is also a significant departure from the treatment of ergativity proposed in Heinz and Matiasek (1994), which contrasts standard GB assumptions by claiming that the phenomenon of ergativity can be handled in a purely lexical fashion. The authors assume a feature DA (*designated argument*), which contains an NP structure shared with the first member of the SUBCAT list in the case of unergative forms, while it is empty on ergative verbal stems. In such a system SUBCAT is assumed to play the same role as our SUBJ and COMPS, i.e. it is able to determine the projectional properties of lexical items. Conversely, DA is different from our SUBJ feature in that it does not determine in any way either the phrasal structure or the linear ordering. As a consequence it would be useless in determining the conditions of *ne* licensing, which, we have seen, depend both on the valence structure *and* on the word order, the latter being, in our treatment, a consequence of the former. This is a crucial difference and, we think, one which should deserve more investigation in the future: indeed it could be argued that the differences in ergative behavior between Italian and German are derivable as a matter of parametric variation: whereas German is able to exploit ergative behaviors only at a lexical level, in Italian we are forced to assume that certain properties of ergative constructions influence the phrasal realization of ergative stems.

3.1.1 Auxiliary Selection

In Italian there are two different auxiliaries, i.e. *essere* ('to be') and *avere* ('to have'). *Essere* is always associated with ergative past participles, while *avere* is associated with unergative ones[15]:

(45) a. Leo è arrivato
  Leo has-ESSERE arrived

b. Leo è osservato da Lia
  Leo is-ESSERE observed by Lia

(46) a. Leo ha osservato Lia
  Leo has-AVERE observed Lia

b. Lia ha parlato a lungo
  Lia has-AVERE spoken long

This fact is captured in our approach by assuming that past participle forms do not show any underspecification of the kind exploited in the preceding section: ergative past participle have always an empty subject list, while unergative ones have a non empty subject list. Thus, the valence structure of the finite forms of the two Italian auxiliaries *essere* and *avere* can be formulated as follows (we assume a treatment of auxiliaries as raising verbs triggering argument composition, as proposed in Miller and Sag (1993), Aranovich et al. (1994), Abeillé et al. (to appear), Monachesi (1993a, to appear), Miller and Sag (1995)):

---

with habitual interpretations. If this is the case, we are able to account for this exceptional licensing of *ne* in a principled way. It has been shown by Lenci (1994) that Italian non quantificational habitual should be considered statives in every respect, in contrast with quantificational habituals (such as the one in (44)) where a quantifier is assumed to bind an eventive variable:

(44) * Spesso ne hanno telefonato molti, di tifosi, la domenica
  Often of-them-CL have phoned many, of fans, on Sunday

Now, if non quantificational habituals are stative, we predict their possible realization as unaccusative finite forms, on a pair with other stative verbs. Such a realization would be, obviously, limited to simple tenses (the only ones able to carry habitual semantics) thus explaining the invariance of all the remaining tests for unaccusativity (since non quantificational habituals are impossible in composed tenses the tests involving auxiliary selection and past participle agreement simply do not apply). Moreover, Lenci (1994) argues that non quantificational habituals are possible only in an appropriate predicational context, namely when some kind of modifier is present: this explains the restrictions noted by Saccon (1992) concerning the obligatory presence of a locative to be predicated of.

[15]We are omitting details concerning the temporal and aspectual contribution of Italian auxiliaries: this topic is explored in Dini (1993).

(47) a. *avere*:

$$
\begin{bmatrix}
\text{SUBJ} & \left\langle \boxed{1}\,\text{NP} \right\rangle \\[2ex]
\text{COMPS} & \boxed{2} \oplus \left\langle \begin{bmatrix} \text{HEAD} & pastp \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \left\langle \boxed{1}\,\text{NP} \right\rangle \\ \text{COMPS} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle
\end{bmatrix}_{valence}
$$

b. *essere*:

$$
\begin{bmatrix}
\text{SUBJ} & \boxed{1} \\[2ex]
\text{COMPS} & \boxed{2} \oplus \left\langle \begin{bmatrix} \text{HEAD} & pastp \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \langle\,\rangle \\ \text{COMPS} & \boxed{3} \end{bmatrix} \end{bmatrix} \right\rangle
\end{bmatrix}_{valence}
$$

Constraints: $\boxed{1} \oplus \boxed{2} = \boxed{3}$

The crucial difference between *essere* and *avere* lies in their different subcategorization properties: while *essere* subcategorizes for verbs with an empty SUBJ, *avere* requires an NP to be present in the SUBJ list. Note that the finite form of *essere* is underspecified in the same fashion as finite ergative verbs. This allows us to account for the licensing of *ne* directly on the auxiliary, which can work as a proper left hand side of *ne*-LR only in its realization with the subject in COMPS, thus explaining the contrast between (48a) and (48b):

(48) a. Ne sono arrivati molti
     Of-them-CL have-ESSERE arrived many

   b. * Molti ne sono arrivati
     Many of-them-CL have-ESSERE arrived

The difference between *essere* and *avere* also enables us to explain the behavior of copular sentences in Italian, where the only possible auxiliary is *essere*. This would follow as a consequence of the assumption (defended both in Haider (1985) and Heinz and Matiasek (1994)) that adjectives are ergative and as such they have a valence structure with an empty SUBJ list. In our system, this is not at all an assumption, but a consequence of our semantic treatment of unaccusativity. Indeed, we predict, on a semantic basis (cf. 2.1), that states show the typical semantics of unaccusatives. Now, adjectives are prototypical states, thus their unaccusative semantics is mapped, by the linking rules provided in fig. 2-4 into an ergative valence structure: as a consequence, their syntactic behavior (in this case *essere* selection) is derived without any additional stipulation[16]. In the following sections, when relevant, we will keep on stressing this similarity between adjectives and ergative verbs.

3.1.2 Past Participle Agreement

In Pollard and Sag (1988) and Pollard and Sag (1994) syntactic agreement is seen as an instance of semantic-pragmatic agreement: agreement features of nominals (PERS, NUM and GENDER) are grouped together under a single attribute INDEX whose value serves as a variable which can be predicated in various way. In turn, verbal agreement is seen as a constraint imposed on the semantic INDEX of the subcategorized constituents. To put it in Pollard and Sag's terms:

> ...to be a third singular verb is nothing more than to assign third-singular agreement to the index associated with one's subject. That English finite verbs 'inflect for agreement' is just to say that within the inflectional paradigm

---

[16]Cinque (1990) mention the fact that different kinds of adjectives show different behavior with respect to *ne* licensing in copular sentences. However, the fuzziness of the data he mentions (there are great variation in judgment among different Italian speakers), opposed to clear cut judgments concerning verbal licensing of *ne*, seems to suggest an independent semantic restriction would better account for his data.

we find a correspondence between the inflectional morphology of the verb and the assignment of agreement features to the subject.
(Pollard and Sag 1994, p. 82)

In the case of Italian past participles, this tight correspondence between syntax and semantics needs to be loosened: indeed, while ergative past participles agree with their subject, past participles of unergative composed forms have always a masculine singular inflection, irrespective of the index of the subject:

(49) a. Le pizz*e* sono arrivat*e*
       The pizzas-FEM.PLU have-ESSERE arrived-FEM.PLU

     b. La propost*a* fu apprezzat*a*
        The proposall-FEM.SING was-ESSERE appreciated-FEM.SING

(50) a. I bambin*i* hanno mangiat*o*
       The children-MASC.PLU have-AVERE-PLU eaten-MASC.SING

     b. * I bambin*i* hanno mangiat*i*
        The children-MASC.PLU have-AVERE-PLU eaten-MASC.PLU

At first glance, one could suppose that the -*o* morpheme of transitive and unergative past participles in (50) has no inflectional relevance: it is just a kind of default ending. This would mean that two past participle endings -*o* exist in Italian, one setting an agreement value (masculine singular), the other simply providing an unmarked ending for certain past participles. However, as far as we know, the existence of such a *vacuous* ending is not independently motivated, i.e. there is no area in the morphology-syntax interface where this morpheme is active. For this reason we will assume no vacuous *default* morpheme, and we will account for the facts in (49) and (50) stating that while ergative past participles trigger the semantic INDEX sharing usually found in finite forms, unergative past participles do not. Moreover the only possible inflection for the latter class of past participles (at least in standard Italian, in absence of clitics[17]) is masculine singular.

Technically, we will assume a framework such as the one described in Kathol (1994): the phonological form of a word is a function of its phonological base form (contained in STEM|PHON) and its INFL attribute:

(51)
$$
\begin{bmatrix}
\text{PHON} & \text{infl}(\boxed{1},\boxed{2}) \\
\text{STEM} & \begin{bmatrix} \text{PHON} & \boxed{1} \end{bmatrix} \\
...\,|\,\text{HEAD}\,|\,\text{INFL} & \boxed{2}
\end{bmatrix}
$$

Within past participles, INFL will have a feature AGR, in turn containing NUM and GEND. The four past participle endings (*o*, *a*, *i* and *e*) will always instantiate AGR, irrespective of the verb type. However while ergatives trigger semantic agreement (i.e. a structure sharing between AGR and the semantic index of the first NP in COMPS) unergatives do not, thus explaining the well formedness of (50a) in spite of the lack of agreement. These two different strategies are encoded as global constraints (fig. 6) on the well formedness of items which can undergo gender and number inflection (basically adjectives and past participles): they are described in the lexicon as being of type *num-gend-agr*: since this is not a maximally specific type, type inference will apply, trying to deduce, for every stem, either *sem-agr* or *no-agr*. Note that these subtypes are associated with constraints on the valence lists, which cannot be overridden by type inference: therefore the hierarchy in fig. 6 will guarantee that ergatives ([SUBJ <>]) are always of type *sem-agr*, while transitive or unergative ([SUBJ<NP>]) are always of type *no-agr*[18].

---

[17]See Monachesi (1993a) and Monachesi (1993b) for a treatment of the relation between clitics and agreement in an Italian HPSG grammar.

[18]It must be said that a *default* principle such as 'whatever is not of a *sem-agr* type is *no-agr*' would do better for our purposes, as it would capture also the generalization concerning the *o-* ending of past participles of atmospheric and impersonal verbs, which usually gets *essere* as an auxiliary. However, since an analysis of this verbs is outside of the scope of this paper, we will rely on the simpler formulation in fig. 6.
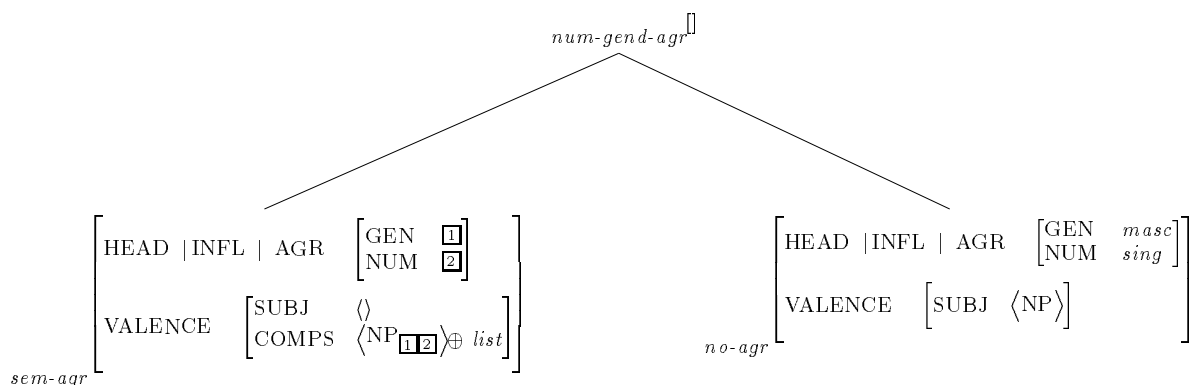
$$
num\text{-}gend\text{-}agr
$$

$$
sem\text{-}agr\begin{bmatrix} \text{HEAD} \mid \text{INFL} \mid \text{AGR} & \begin{bmatrix} \text{GEN} & \boxed{1} \\ \text{NUM} & \boxed{2} \end{bmatrix} \\[2ex] \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle \text{NP}_{\boxed{1}\boxed{2}} \rangle \oplus list \end{bmatrix} \end{bmatrix}
\qquad
no\text{-}agr\begin{bmatrix} \text{HEAD} \mid \text{INFL} \mid \text{AGR} & \begin{bmatrix} \text{GEN} & masc \\ \text{NUM} & sing \end{bmatrix} \\[2ex] \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \langle \text{NP} \rangle \end{bmatrix} \end{bmatrix}
$$

Figure 6: Number and gender agreement in Italian

3.1.3 Adnominal Past Participle

It is possible, in Italian, to use past participle VPs as nominal modifiers in constructions where the variable associated to the modified noun fills the semantic role of either the subject (in (52a)) or the object (in (52b)) of the corresponding inflected form:

(52) a. I soldati partiti per la guerra non sono mai tornati
       The soldiers left to the war never came back

    b. I soldati mandati al fronte non sono mai tornati
       The soldiers sent to the war never came back

There are reasons to believe that when transitive verbs are used, as in (52), it is in fact their passive form which is used. This is clearly manifested by the possibility of using *by*-phrases and by the appearence of temporal modifiers which are incompatible with the perfective meaning of active past participles:

(53) a. I soldati mandati al fronte dal colonnello non sono mai tornati
       The soldiers sent to the war by the coroner never came back

    b. Gli stipendi riscossi entro la fine del mese in corso non subiranno variazioni
       The salaries received within the end of the month will not change

More interestingly, not every intransitive past participle can appear in a nominal construction. Past participles of unergative verbs are always ungrammatical

(54) * I soldati camminati furono fucilati
    The soldiers walked were shot

In our system, this fact is accounted for by introducing the lexical rule in (55):

$$
(55) \quad \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{MOD} & nil \\ \text{INFL} & num\text{-}gend \end{bmatrix} \\[2ex] \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle \text{NP}_{\boxed{1}} \rangle \oplus \boxed{2} \end{bmatrix} \end{bmatrix}
\rightarrow
\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{MOD} & \text{NP}_{\boxed{1}} \\ \text{INFL} & num\text{-}gend \end{bmatrix} \\[2ex] \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \boxed{2} \end{bmatrix} \end{bmatrix}
$$

Note that we do not impose any categorial condition on the left hand side of this lexical rule, just a morphological one: the input item has to be of the kind which allows number and gender inflection and only number and gender inflection. In this way, besides excluding verbal forms other than past participles from appearing in nominal modification contexts, we capture the fact that also adjectives undergo an analogous derivation, thus being able to appear either as complements of copular verbs or as nominal modifiers. Moreover, the constraint SUBJ[<>] correctly prevents unergative and active transitive past participles from appearing as nominal modifiers (cf. also Heinz and Matiasek (1994)).

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3.1.4 Absolute Past Participle

Italian absolute past participles (APs) usually occur in sentence initial position, playing the role of temporal modifiers[19]. They are possible with transitive and unaccusative past participles, as shown in (56) and (57), respectively

(56) Maltrattata Maria, Carla partí
  Mistreated-FEM.SING Maria-FEM.SING, Carla left
  After having mistreated Maria, Carla left

(57) Partita Maria, la mia vita cambió
  Left-FEM.SING Maria.FEM.SING, my life changed
  After Maria's departure, my life changed

An NP is usually present, as in (56) and (57), even though unaccusatives can lack of their subject, thus being involved in a control configuration:

(58) PRO_i scesa dal taxi, $Maria_i$ scoppió a piangere
  Descended- FEM.SING from the taxi, Maria burst into tears

The same control relation holds for the subject of transitive APs, which cannot be expressed:

(59) a. PRO_i bevuto un bicchiere di vino, $Maria_i$ partí
  Drunk a glass of wine, Maria left

  b. * Bevuto un bicchiere di vino Mario, Maria partí
  Drunk a glass of wine Mario, Maria left

Unergative verbs can form, under certain semantic conditions (which are widely explored in Dini (1994)), APs, but they are always ungrammatical when the subject NP is present:

(60) Vendemmiato in fretta e furia, i contadini lasciarono la campagna
  Harvested in a great hurry, the farmers left the country

(61) * Vendemmiato in fretta e furia i contadini, lasciarono la campagna
  Harvested in a great hurry the farmers, left the country

Passive forms are always grammatical in APs:

(62) Abbandonata da tutti, Maria viveva in solitudine
  Abandoned-FEM.SING by everybody, Maria.FEM.SING was-living in loneliness

The past participle agrees with the NP contained within the AP, irrespective of its grammatical function. So in (56) the past participle of the verb *maltrattare* 'mistreat' agrees in gender and number with the object NP *Maria*. The same holds for (57), where the NP is the subject of *partire* 'leave'. As for case, unaccusative verbs select nominative, transitive ones select accusative:

(63) Partito io, nessuno ha più nutrito Fido
  Left I.NOM, nobody has fed Fido
  After my departure, nobody has fed Fido

(64) Vistala, se ne innamoró
  Seen her.ACC.cl, he fell in love with her
  After having seen her, he fell in love with her

The behavior of APs in Italian provides a strong evidence for our theory of ergative valence. Indeed, in order to account for the above data, we just need to assume the following lexical rule:

---

[19]Other readings are in fact available, but they are always additional w.r.t. the temporal meaning, which is considered the basic one.

(65)

$$
\begin{bmatrix}
\text{HEAD} & \begin{bmatrix} \text{MOD} & nil \\ \text{INFL} & \text{num-gend} \end{bmatrix} \\
\text{VALENCE} & \begin{bmatrix} \text{SUBJ} & list \\ \text{COMPS} & \boxed{4} \end{bmatrix}
\end{bmatrix}
\rightarrow
\begin{bmatrix}
\text{HEAD} & \begin{bmatrix} \text{MOD} & \mathbf{S} \end{bmatrix} \\
\text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \boxed{4} \end{bmatrix}
\end{bmatrix}
$$

Verbs with both unergative and ergative valence can undergo such a rule, which discharges the subject of transitive and intransitive forms, while retaining the valence structure of unaccusatives and passives unchanged: this explains the presence of an NP in the examples in (56) and (57), as well as the ungrammaticality of (59b) and (61) ((58) is explained as a case of adjunct control (Sells 1987, Williams 1992)). Since the SUBCAT list remains unchanged, we expect no change in Case, which explains why transitive objects remain accusative and ergative subjects remain nominative[20]. Moreover the new configuration of the valence structure is one which is predicted to be able to trigger semantic agreement (cf. fig. 6), provided an NP is present in COMPS: we explain in this way the otherwise surprising fact that transitive absolute past participles agree with their object (cf. (57)) while unergative ones, having no NP in the COMPS list, remain uninflected, thus explaining the ill-formedness of:

(67) * Vendemmiati, i contadini lasciarono il paese
   Harvested-grapes, the farmers left the country

Admittedly, this sketchy treatment is not meant to fully explain the complex phenomenon of absolute past participle formation in Italian: it just provides the taste of a more full fledged analysis, which is developed in Dini (1994), adopting exactly the same assumptions concerning ergativity which are exploited in this paper.

4 *Si* constructions

Italian *si*-constructions are characterized by the fact that the subject of the 'original' verbal form is not overtly realized (it is understood as either a generic or a first plural person participant) and the clitic *si* surfaces. Basically these constructions can be divided in three different types:

1. the base form is a monoargumental verb (i.e. a verb subcategorizing just for one NP): it always receive a third singular inflection (*impersonal si*):

   (68) Si parlava a bassa voce
      SI spoke-THIRD-SING with soft voice
      One used to spoke softly

2. The base stem is transitive and the direct object agrees with the verb (*passive si*):

   (69) Si mangiavano gli spaghetti
      SI ate-THIRD-PLUR the spaghetti-THIRD-PLUR
      One used to eat spaghetti / spaghetti used to be eaten

3. The base stem is transitive and the verb gets a third singular inflection (*non agreeing si*):

   (70) In quel ristorante si mangia spaghetti
      In that restaurant SI eat-THIRD-SING spaghetti-THIRD-PLUR
      In that restaurant one used to eat spaghetti

---

[20]The fact that SUBCAT remains unaffected by the application of (65) is not an arbitrary assumption. Remember that in 2.2 we had independent evidence from the binding theory for assuming that the passive lexical rule affects the SUBCAT list. Here, again, the behavior of reflexives urges us towards the assumption that SUBCAT is unaffected by (65). Indeed, if the subject were not present in the SUBCAT list of an AP such as the one in (66), the binding of the reflexive anaphor would come as unexpected:

(66) Picchiatosi$_i$, Gianni$_i$ si allontanó
   Beaten himself, Gianni went away

Here we will not take into consideration the third case, as its use is in fact very restricted and apparently limited to bare plural objects, as confirmed by the unacceptability (at least for speakers of certain regions) of a sentence such as

(71) * Si ascolta i deputati che parlano
      SI listen at the deputes which are speaking

The analysis of cases 1. and 2. we are going to provide is built both on Monachesi (1993b) (for the syntactic behavior) and Dini (to appear) (for the semantic identification of the index of the unexpressed subject). We will first show that the use of two distinct lexical rules for generating impersonal and passive *si*, proposed in Monachesi (1993b), is in some sense redundant, then we will go more through the details of these constructions showing how their syntactic behavior can be accounted for by adopting our proposal concerning the presence of ergative syntactic structures in Italian.

Let us consider the rules proposed in Monachesi (1993b) to account for these constructions, here reported under the modified version of Dini (to appear):

(72) Impersonal *si* Lexical Rule (IS-LR)

$$
\begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle \text{NP}_{optional} \rangle \\ \text{CLTS} & \{\} \end{bmatrix} \rightarrow
\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{INFL} & \boxed{1} \begin{bmatrix} \text{NUM} & sing \\ \text{PERS} & 3rd \end{bmatrix} \end{bmatrix}_{verb} \\ \text{SUBJ} & \langle \rangle \\ \text{CLTS} & \{ si\, \boxed{1} \} \end{bmatrix}
$$

(73) Passive *si* Lexical Rule (PS-LR)

$$
\begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle \text{NP}_{optional} \rangle \\ \text{COMPS} & \langle \text{NP}_{\boxed{2}} \mid \boxed{3} \rangle \end{bmatrix} \rightarrow
\begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle \text{NP}_{[nom]\boxed{2}} \rangle \\ \text{COMPS} & \boxed{3} \\ \text{CLTS} & \{ si \} \end{bmatrix}
$$

It should be noted that the only features differentiating these two rules are (i) the presence of a third singular inflection on the output form of IS-LR; (ii) different operations on the SUBJ list. Inflectional restrictions on the output of IS-LR can be omitted by considering that in Italian all forms which do not subcategorize for at least one NP always receive third singular inflection. See for instance impersonal verbs and atmospheric verbs:

(74) a. Piove / *Piovono
          (it) rains-THIRD-SING / rain-THIRD-PLUR

      b. Accade/*accadono che sia malato
          (it) happensTHIRD-SING / happen-THIRD-PLUR that he is sick

      c. Sembra/*sembrano che sia malato
          (it) seems-THIRD-SING / seem-THIRD-PLUR that he is sick

If the third singular inflection of impersonal *si* needs not to be stated explicitly but it follows as a general constraint governing inflection in Italian, we are now able to unify the rules for non reflexive *si* generation, simply by incorporating our theory of ergative valence structure:

(75)
$$
\begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle \text{NP}_{optional} \rangle \\ \text{COMPS} & \boxed{1} \end{bmatrix} \rightarrow
\begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle \rangle \\ \text{COMPS} & \boxed{1} \\ \text{CLTS} & \{ si \} \end{bmatrix}
$$

Let us first consider intransitive verbs. Tensed forms of unergative intransitives are correctly generated by (75), and, since they happen to be completely without NPs to be inflected, they will get a third singular inflection. The same rule also applies to unaccusative verbs , as we have shown that they always have a finite counterpart where the subject is contained in the SUBJ list. Thus the sentences in (76) are correctly generated:

(76) a. Si parlava troppo
       SI spoke too much

   b. Si viveva bene
       SI lived well

As for transitive verbs, the discharging of the NP in the subject list, creates a valence structure non distinct from the one of unaccusative verbs. In this way we justify the fact that nominative case assignment and inflection are with respect to the first NP in COMPS (which also coincides with the first NP in SUBCAT). The otherwise surprising 'agreement with the object' behavior is thus explained:

(77) A Viareggio si affittano poche case
      In Viareggio SI rent-THIRD-PLUR few houses-THIRD-PLUR

Unfortunately, it seems that Italian *si* formation as stated in (75) is not able to account properly for auxiliary selection facts. To see how the problem arises, consider the standard treatment of clitic climbing as proposed in Monachesi (1993a): verbs able to trigger clitic climbing can inherit the arguments of the subcategorized verb (either an infinitival form with restructuring verbs or a past participle with auxiliaries) *via* argument composition, and then generate the relevant clitics as affixes. Consider, now, a composed verb phrase such as:

(78) Si è parlato
      SI has-ESSERE spoken

Here, since the clitic appears on the auxiliary, we must admit that the rule for impersonal *si* generation has applied on the auxiliary. However, if the past participle is unaffected by the application of such a rule, its compatibility with *essere* is unexplained[21]: indeed, in Italian the verb *parlare* ('speak') is a prototypical unergative.

We have basically to ways to get out from this impasse: either we assume a new kind of auxiliary (impersonal *essere*) able to subcategorize for both ergative and unergative past participles or we change our mechanisms of clitic generation. The first option is scarcely recommendable in as much as (i) it postulates the presence of a lexical item (the auxiliary) with a clitic directly plugged in; (ii) it weaken the generalization in (75), as simple and composed impersonal forms would be generated by two completely different mechanisms. Let us, then, pursue the second option, and assume that the presence of *si* is ruled by two different mechanisms: licensing and morphological spell out. Under this hypothesis a head is able to introduce the information that a clitic has to be present without effectively spelling it out phonetically. This information is passed up to verbs which subcategorize for such a head and, at a certain point, it is spelled out morphologically through a process of affixation. In designing such a treatment, we have to take care that (i) this information is transmitted locally, in order to avoid the problems mentioned in Monachesi (1993a); (ii) no additional feature is used, as this would weaken the explanatory adequacy of the treatment. In fact, in a certain sense, we already have all the ingredients to achieve this task. Assume that the clitic *si* is not phonologically spelled out by (75), which is thus reduced to:

---

[21]A possible escape hatch would be to relax the constraints on auxiliary selection, making *essere* able to subcategorize also for unergative past participles. In this case, however, we would run into the problem that clitic generation is always optional, in the sense that no principle of the grammar forces an argument to appear as a clitic rather than a full constituent. Thus, if we allow (78) we would also admit the occurrence of a completely ungrammatical sentence such as (79), where the subject of the auxiliary is realized as a full NP rather than undergoing the rule of clitic generation.

(79) * Giovanni è parlato
      Giovanni has-ESSERE spoken

Notice that the problem is quite independent on our position about ergativity or auxiliary selection facts: it would arise also in a grammar which deals with auxiliary selection by postulating 'ad hoc' features marking unaccusativity, such as the ERG feature of Kathol (1991) and Pollard (1994).

(80) *Si* licensing Lexical Rule (SL-LR)

$$\begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle \text{NP}_{optional} \rangle \end{bmatrix} \rightarrow \begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle \rangle \end{bmatrix}$$

Here the device marking the application of the *si*-licensing rule is constituted by the type *optional* which, for independently motivated reasons (Dini to appear), characterizes the content of the discharged subject. Such a type is maintained in the output form, as the SUBCAT list is structure shared between the input and the output form. By simple unification the result of the application of SL-LR on both transitive and intransitive verbs will be something like:

(81)
$$\begin{bmatrix} \text{HEAD} & verb \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \langle \rangle \\ \text{COMPS} & \boxed{1} \end{bmatrix} \\ \text{SUBCAT} & \langle \text{NP}_{optional} \rangle \oplus \boxed{1} \end{bmatrix}$$

We are now in a situation where a mismatch is found between the append of SUBJ and COMPS lists and SUBCAT, as there is an NP semantically marked as *optional* which is not structure shared with any constituent in the valence structure. We assume that the types responsible for the inflection of finite forms excludes such a configuration[22]:

(82)
$$\begin{bmatrix} \text{HEAD} \mid \text{INFL} & \begin{bmatrix} \text{FORM} & fin \\ \text{AGR} & \boxed{1} \end{bmatrix} \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \boxed{2} \\ \text{COMPS} & \boxed{3} \end{bmatrix} \\ \text{SUBCAT} & \boxed{4} \end{bmatrix}_{fin\text{-}infl}$$

Constraints: $\boxed{2} \oplus \boxed{3} = \boxed{4} = <\text{NP}_{\boxed{1}}> \oplus list$

The mismatch in (81), which crucially prevents a finite verbal form which has undergone SL-LR from having a proper agreement inflection, is rescued by a morphological rule which simply discharges an optional NP from the first position of the SUBCAT list:

(83) *Si* spell out Lexical Rule (SSO-LR)

$$\begin{bmatrix} \dots \mid \text{SUBCAT} & < NP_{[optional]} > \oplus \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \dots \mid \text{SUBCAT} & \boxed{1} \\ \text{CLTS} & \{si\} \end{bmatrix}$$

Now, the constraint in (82) is not anymore violated, and the verbal form can undergo standard inflectional rules.

   With simple verbal forms this revised treatment accounts for exactly the same set of data accounted for by the previously described treatment. Indeed, tensed forms which undergo SL-LR have necessarily to undergo SSO-LR as well, otherwise they cannot receive a proper inflection. At the same time this new formulation solves the problems which arose in connection with clitic climbing in composed forms. Consider first the analysis of a sentence such as

(84) Si è parlato
SI has-ESSERE spoken

The past participle undergoes rule SL-LR without discharging the optional NP. Since, after the application of that rule, there is no NP to be inflected (remember that past participle inflection is always w.r.t. to elements in VALENCE, not in SUBCAT), the past participle will receive the non semantically linked ending *-o* (see section 3.1.2). Moreover,

---

[22]This restriction is limited to finite forms as controlled non finite forms should be allowed to retain unrealized complements in their SUBCAT as proven by binding facts concerning both adnominal and absolute past participles. Moreover such a constraint is likely to have unwanted interactions with certain treatments of *pro*-drop, a problem which we are not going to discuss in this paper.

since it has an empty SUBJ list it can only be selected by *essere*, which inherits both its complements (if any) and its SUBCAT list. In particular, the only possibility for *essere* to select such a past participle is to first undergo rule SSO-LR, thus discharging the optional argument in the SUBCAT list. If this were not the case the inflectional template in (82) could not apply, because of the mismatch between SUBCAT and the append of SUBJ and COMPS. The digram in fig. 7 describes how the analysis of a phrase such as *si è parlato* would proceed.
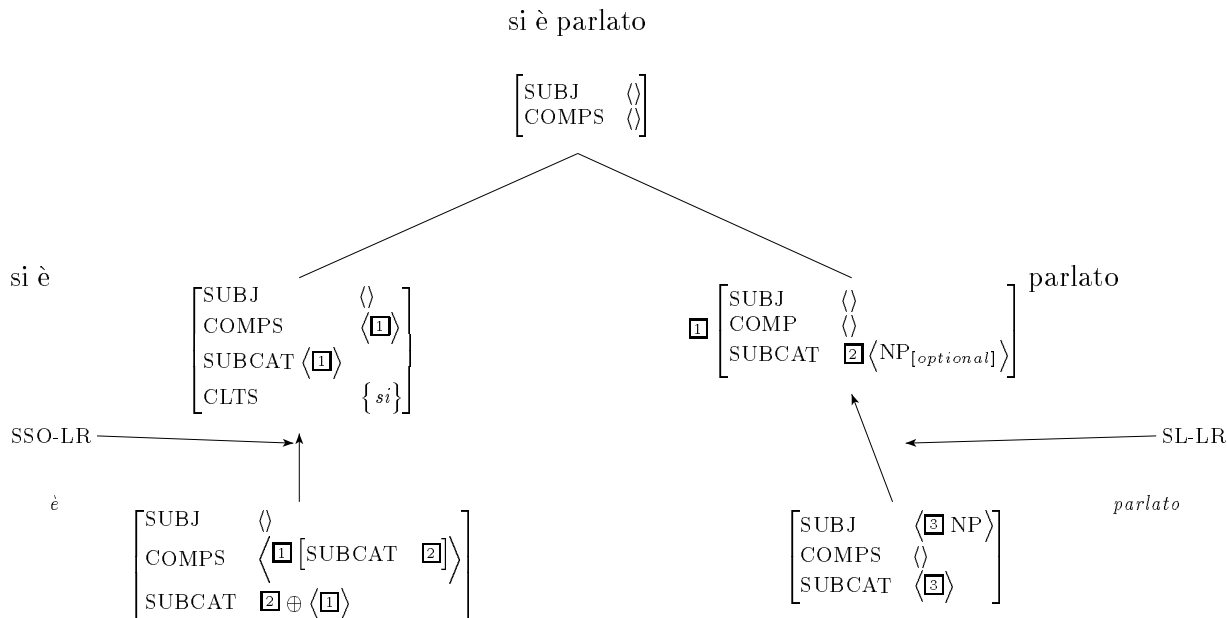

Figure 7: The analysis of *si è parlato*

Composed impersonal forms of unaccusative verbs, on the other hand, undergoes a slightly different derivation. Since the past participle has an empty SUBJ list, it cannot serve as a proper left hand side of rule SL-LR. Thus, in impersonal unaccusative composed sentences, the 'impersonalization' of the composed forms is always due to the presence of the auxiliary, which has to undergo both SL-LR and SSO-LR, along the lines described in fig. 8 (note that the lexical entry for the tensed form of *essere* is the one described in (47b), under the option with [<NP>=1])[23].

At this point some considerations concerning agreement are worth. In Dini (to appear) it has been argued on a independent ground that NPs marked as semantically *optional* have a semantic index of type *arb*, bearing masculine plural features. Now, since the NP$_{[optional]}$ marked with 3 in fig. 8 is structure shared with the first NP in the COMPS list of the unaccusative, and since the index of such an NP is in turn structure shared with the INLF attribute (cf. section 3.1.2), we have an explanation for the masculine plural inflection of unaccusative past participle in *si* constructions:

(86) si è andati/*o a casa
     SI has-ESSERE gone-MASC-PLUR / *MASC-SING home

Conversely, unergative past participles never trigger semantic agreement (not even after the application of SI-LR in fig. 7 they can be inflected, as they happen to subcategorize for no NP at all), thus explaining the mismatch between auxiliary selection and past participle agreement observed in:

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[23]The same applies with respect to impersonal passive forms and impersonal copular forms, which are always possible in Italian, as proved by:

(85) a. Si era ammirati da tutti
        SI was admired by everibody

     b. Si era contenti solo la domenica
        SI was happy only on Sunday

si è venuti

$$
\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle\rangle \end{bmatrix}
$$

si è

$$
\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle[1]\rangle \\ \text{SUBCAT} & \langle[1]\rangle \\ \text{CLTS} & \{si\} \end{bmatrix}
$$

venuti

$$
[1]\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle[3]\,\text{NP}\rangle \\ \text{SUBCAT} & [2]\langle[3]\,\text{NP}\rangle \end{bmatrix}
$$

SSO-LR

è

$$
\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle[1]\rangle \\ \text{SUBCAT} & [2]\langle[3]\,\text{NP}_{[optional]}\rangle\oplus\langle[1]\rangle \end{bmatrix}
$$

SL-LR

è

$$
\begin{bmatrix} \text{SUBJ} & \langle[3]\text{NP}\rangle \\ \text{COMPS} & \left\langle[1]\begin{bmatrix}\text{COMPS} & \langle[3]\,\text{NP}\rangle \\ \text{SUBCAT} & [2]\end{bmatrix}\right\rangle \\ \text{SUBCAT} & [2]\oplus\langle[1]\rangle \end{bmatrix}
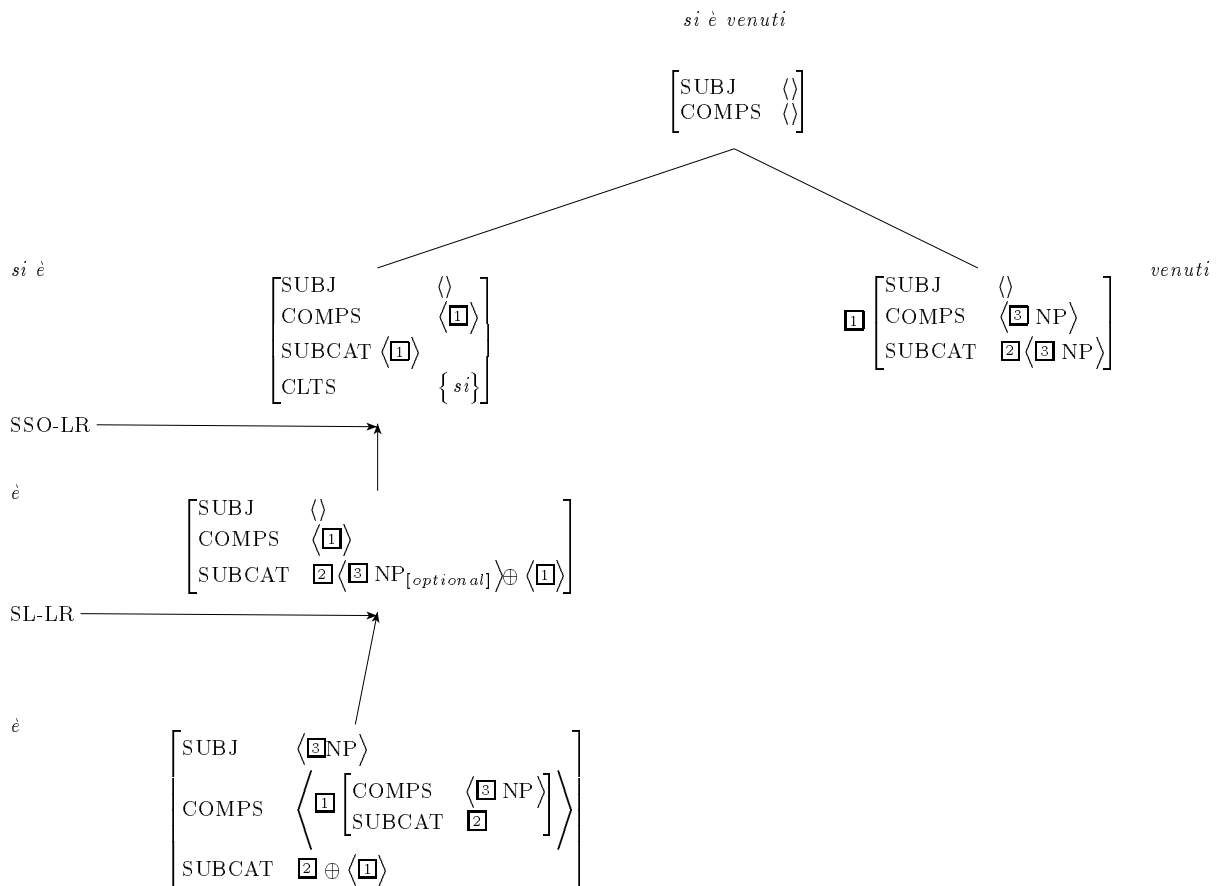$$

Figure 8: Analysis of the sentence *si è venuti*

(87) Si è parlato/*i
    SI has-ESSERE spoken-MASC-SING / *MASC-PLUR

Note that, irrespective of the verbal inflection, the semantic *arb* index associated to the suppressed subject still fills a semantic slot in the CONTENT attribute. Thus we should expect its masculine plural features to emerge whenever the generic subject of an impersonal sentence is modified by a secondary predicate: this is indeed the case, as pointed out by Cinque (1988), among others:

(88) Si è cenato contenti
    SI has-ESSERE dined-MASC-SING happy-MASC-PLUR

In (88) the predicate *contenti*, 'happy', modifies the agent of the *dining* action. Since it is reasonable to assume that the behavior of these kinds of adjuncts is governed by semantic principles, we expect the secondary predicate to be able to 'pick up' the index it predicates of in the semantic part of the sign it modifies. If this is the case, since adjectives are agreeing category in Italian (in 3.1.2 we explained why), the masculine plural inflection of the adjective in (88) is accounted for as a reflex of the fact that the *arb* index, while being unable to trigger past participle agreement, is still active in the semantics of the verbal sign.

    If we are on the right track, we should expect a further mismatch between unaccusative and unergative composed forms, besides inflectional facts: the former should be able to 'select' only the auxiliary *essere* (this is the only possibility with unaccusative past participles, which have always an empty SUBJ list), while the latter should be compatible with either *essere* or *avere* depending whether the 'impersonalization' takes place in the split way described in fig. 7 ('licensing' on the past participle and 'spell out' on the auxiliary) or it applies completely on the auxiliary (in a way very similar to the one sketched in fig. 8), which, in this case, should be *avere*. The data confirm this prediction:

(89) a. Quando si è/*ha andati a fondo, non ci si solleva piú.
        When SI has-ESSERE / *has-AVERE gone down, not SI raise anymore

b. Quando si è/ha amato troppo, non ci sono piú certezze.

   When SI SI has-ESSERE / has-AVERE loved too much, nothing is certain anymore

This fact comes completely unpredicted under Burzio's approach where *essere* assignment is triggered whenever a particular type of binding relation (*binding relation*₁) exists between the subject and a nominal contiguous to the verb. Under his generalization we should admit that in (89b) the prenominal clitic *si* (which is assumed, in the traditional GB approach, to be coindexed with a subject position) is contiguous to the verb when *essere* is realized but it is either non contiguous to the verb or non coindexed with the subject position when *avere* is realized. Moreover such a non contiguous (or non coindexed) position should be licensed only by unergative verbs. Since there is no independent evidence, at least in Italian, for such a behavior, the data in (89) can be accounted for, in Burzio's analysis, only as a mere stipulation. In the present approach, on the contrary, they are captured as an available option of Italian, which arises in connection to the fact that this language allows clitic climbing and, consequently, argument composition.

Passive *si* (or 'agreement with the object *si*') is accounted by exactly the same set of rules. In particular the derivation of a sentence such as

(90) Le case si sono affittate bene

   The houses-FEM-PLUR SI have-ESSERE rent-FEM-PLUR well

would proceed as in fig. 9, where the past participle is inflected with respect to the subject NP (④) by virtue of the ergative valence that it acquires after the application of of SL-LR. The auxiliary *essere* is able to select such a past participle only after having undergone SSO-LR, which triggers passive clitic morphology[24].
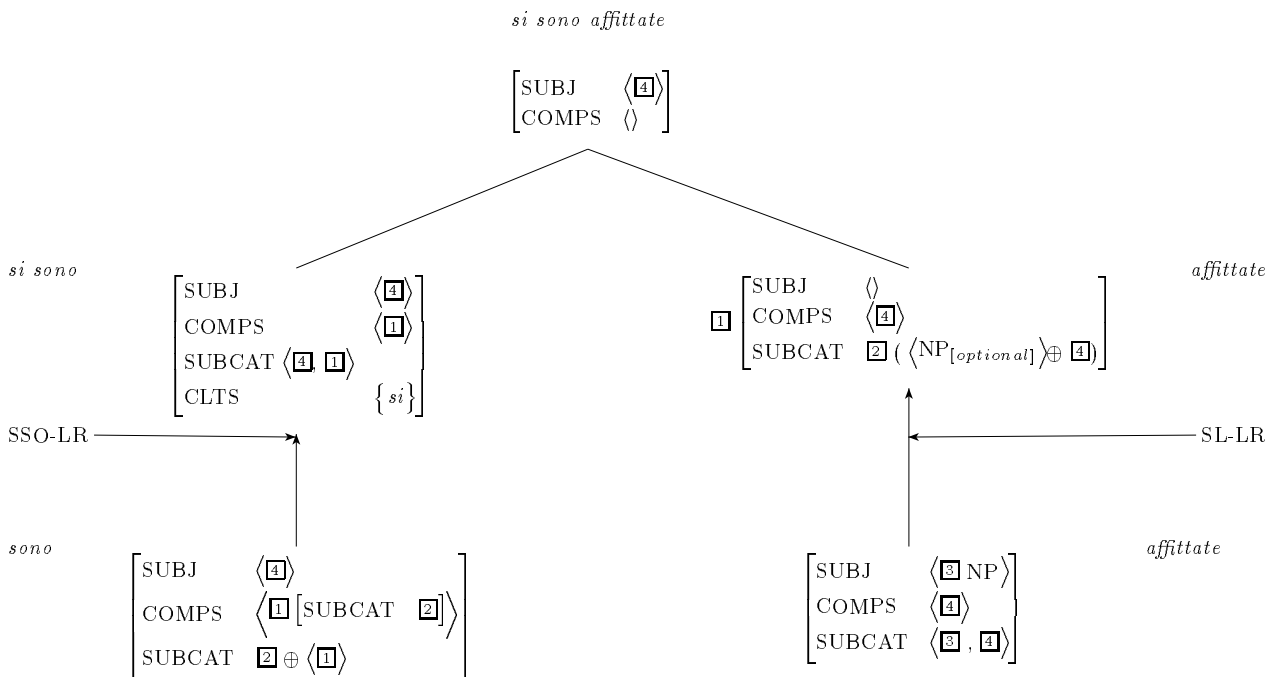

Figure 9: Analysis of the VP *si sono affittate*

It can be shown that the present analysis of *si*-constructions is empirically adequate to handle also cases of *ne*-cliticization. In these cases our rules SI-LR, SSO-LR and NE-CL will apply in sequence, as shown in fig. 10. In this way we capture the fact that the post

---

[24]The system also generates sentences in which the auxiliary *avere* is selected. In this case case the auxiliary agrees with the subject and the past participle occurs in an uninflected form. We could get rid of such configurations in a number of ways, simply by adding more constraints to the proposed rules. The reason why we do not take such a move is that sentence such as (91) are acceptable for many speakers:

(91) Quando si ha mangiato troppa polenta, da vecchi si ingrassa

   When SI has-AVERE eaten-MASC-SING too much polenta-FEM-SING, when old SI become fat

It must be said that these sentences seem to be acceptable only in particular semantic contexts, but they are nonetheless acceptable, and they should not be rejected on a purely syntactic ground.

verbal subject of *si* passive constructions can surface as a *ne*-licensing quantificational phrase, as shown by (93)[25]:

(93) Se ne mangiano molti

$$
\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle\rangle \end{bmatrix}
$$

QP

$$
\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle \text{QP}_{\boxed{5}} \rangle \\ \text{CLTS} & \{\text{si ne}\} \end{bmatrix}
$$

NE-CL

$$
\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle \boxed{1}\, \text{NP}_{\boxed{5}} \rangle \\ \text{SUBCAT} & \langle \boxed{1} \rangle \\ \text{CLTS} & \{si\} \end{bmatrix}
$$

SSO-LR

$$
\begin{bmatrix} \text{SUBJ} & \langle\rangle \\ \text{COMPS} & \langle \boxed{1} \rangle \\ \text{SUBCAT} & \langle \text{NP}_{[optional]}, \boxed{1} \rangle \end{bmatrix}
$$

SI-LR

$$
\begin{bmatrix} \text{SUBJ} & \langle \boxed{2}\, \text{NP} \rangle \\ \text{COMPS} & \langle \boxed{1}\, \text{NP} \rangle \\ \text{SUBCAT} & \langle \boxed{2}, \boxed{1} \rangle \end{bmatrix}
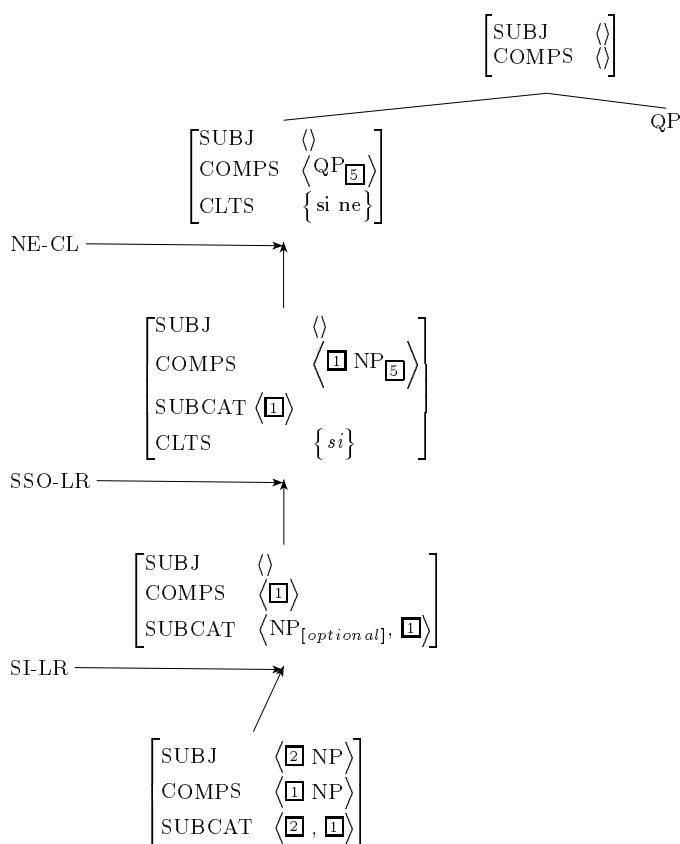$$

Figure 10: Analysis of *Se ne mangiano molti*

5   Conclusions

We have shown how a certain configuration of the VALENCE feature can account uniformly for all the phenomenon which are standardly associated to unaccusativity in Italian.We have also shown that different strategies are available to Italian verbs in order to realize this configuration: Linking Theory, inflectional rules, rules of clitic affixation. In all cases, a lexical treatment has proved to be enough to account for the relevant behaviors, without any need either to exploit empty categories, or to introduce new principles in the linguistic organization of HPSG.

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[25]The possibility of having both adnominal and absolute past participles derived from passive *si* stems is also correctly accounted for: passive *si* past participles are indeed allowed both in absolute and adnominal contexts:

(92) a. Costruitesi quelle case, il sindaco sará licenziato
          Built-FEM-PLUR-SI those hose-FEM-PLUR, the major will be fired

      b. E' bene che le case affittatesi abusivamente vengano liberate It would be better if the houses-FEM-PLUR rent-FEM-PLUR illegally are made available

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