

Towards an HPSG Analysis of Constituent Order in Maltese

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This paper deals with the constituent order in Maltese. The next section describes the orders that are possible, including cases in which objects are realized both by clitics and by full NPs. Section 2 provides an analysis and Section 3 gives a summary and an outlook.

1 The Phenomenon

In Maltese, the subject can be placed to the left or to the right of the verb:

- (1) a. Pawlu ġie.
Pawlu came
b. Ġie Pawlu.
came Pawlu

Fabri (1993, p. 138) showed that SV order is marked if the subject is indefinite and mentions various other factors that influence markedness of certain orders, but in principle both the SV and the VS order is attested in Maltese.

The position of the subject in transitive clauses is rather free too, if the subject is a topic. Without the object clitic there are the ordering variants in (2b, d–f) for the sentence in (2a) in reply to the utterance *U Ingrid?* ('and Ingrid'):

- (2) a. Ingrid kiel-et il-mazzit-a. SVO
Ingrid eat-3fsg df-blood.sausage-fsg
'Ingrid ate blood sausage.'
b. Kielet il-mazzita Ingrid. VOS
c. * Kielet Ingrid il-mazzita. VSO
d. Ingrid il-mazzita kielet. SOV
e. Il-mazzita Ingrid kielet. OSV
f. Il-mazzita kielet Ingrid. OVS

If the subject is focussed, it has to be serialized to the left of the verb:

- (3) Min fetaħ l-bieb?
who-msg open-3msg df-door-msg
'Who opened the door?'

- (4) a. Norma feth-et il-bieb. SVO
 Norma open-3fsg df-door-msg
 'Norma opened the door.'
- b. *Fethet Norma l-bieb. VSO
- c. *Norma il-bieb fethet. SOV
- d. *Il-bieb fethet Norma. OVS
- e. *Il-bieb Norma fethet. OSV
- f. *Fethet il-bieb Norma. VOS

If the subject is focused and the object is realized both as a clitic and a full NP, the following orders are possible:

- (5) a. Norma feth-it-u l-bieb. SVoO
 Norma open-3fsg-3msg df-door-msg
 'Norma opened the door.'
- b. Feth-it-u Norma l-bieb. VoSO
- c. Norma l-bieb feth-it-u. SOVo
- d. Il-bieb feth-it-u Norma. OVoS
- e. Il-bieb Norma feth-it-u. OSVo
- f. *Feth-it-u l-bieb Norma. VoOS

I use the small 'o' for clitics and the capital 'O' for full NPs.

With the subject topic and the object a clitic, we get:

- (6) a. Ingrid kil-it-ha l-mazzita. SVoO
 Ingrid ate-3msg-3fsg df-blood.sausage
- b. Kil-it-ha l-mazzita Ingrid. VoOS
- c. Kil-it-ha Ingrid l-mazzita. VoSO
- d. Ingrid l-mazzita kil-it-ha. SOVo
- e. Il-mazzita Ingrid kil-it-ha. OSVo
- f. Il-mazzita kil-it-ha Ingrid. OVoS

Fabri (1993, p. 145) provides the following table as a condensed overview of the data:

focus subject			topic subject		
intransitive verb	transitive verb		intransitive verb	transitive verb	
	without dO-clitic	with dO-clitic		without dO clitic	with dO clitic
semantic/pragmatic restricted	SVO only	*VoOS	absolutely free	*VSO	absolutely free

According to Fabri (1993, p. 138) adjuncts can be placed anywhere in the clause.

- (7) a. Illum Pawlu gie.
 today Pawlu came
- b. Pawlu gie 'llum.

- c. Pawlu illum ġie.
- d. Ġie 'llum Pawlu.
- e. Ġie Pawlu illum.

2 The Analysis

2.1 Subject Position

Following Fabri, I assume that Maltese is a configurational language, that is a language that combines the verb with its complements to form a VP which is then combined with the subject to form a complete clause. This is modelled in HPSG by mapping complements and subjects, which are both represented on the ARG-ST list, to different lists: all complements are mapped to COMPS and the subject is mapped to SPR (Sag, Wasow and Bender, 2003, Chapter 4).

Since the head-specifier schema in (8) does not specify the order between subject (the element in the NON-HEAD-DTRS list) and VP (the head daughter) we get both orders, which is needed for intransitive verbs.

$$(8) \text{ head-specifier-phrase} \rightarrow \left[\begin{array}{l} \text{SYNSEM|LOC|CAT|SPR} \langle \rangle \\ \text{HEAD-DTR|SYNSEM|LOC|CAT} \left[\begin{array}{l} \text{SPR} \langle \boxed{} \rangle \\ \text{COMPS} \langle \rangle \end{array} \right] \\ \text{NON-HEAD-DTRS} \langle [\text{SYNSEM} \boxed{}] \rangle \end{array} \right]$$

However, the analysis also allows VoOS with a DO clitic and a focused subject. This order has to be ruled out by a linearization constraint that rules out focused subjects that follow a topic (clitic).

The order VSO without an object clitic is correctly excluded, since the subject can only combine with a VP (something with an empty COMPS list), that is V and O have to be combined before the subject is combined with the result.

2.2 Object Fronting

Until now we can account for the patterns SV(O) and V(O)S. If one assumes that Maltese is a SVO language, other orders have to be related to this basic order. In what follows I will explain the analysis of OSV and SOV.

Building on work in the framework of GPSG (Gazdar, Klein, Pullum and Sag, 1985), Pollard and Sag (1994) developed an analysis for non-local dependencies. The basic idea is that a placeholder (trace) is used in the position in which a certain element is expected and that the information about the missing object is passed up in the tree until it is finally bound off at a higher node by its filler.¹ Figure 1 on the following page shows the details of the analysis of (2e). The trace is combined with the verb to form a VP. The verb contains a description of the object that it requires in its COMPS list. This description is identified with the trace. Since the trace shares its local properties

¹There have been attempts to develop traceless analyses of nonlocal dependencies (Bouma, Malouf and Sag, 2001). The lexical variants have been criticized by Levine and Hukari (2006). Analyses that involve unary projections instead of empty elements are a notational variant of the analysis presented here. See also Müller, 2002, Chapter 6.2.5.1 and Müller, To Appear for discussion.

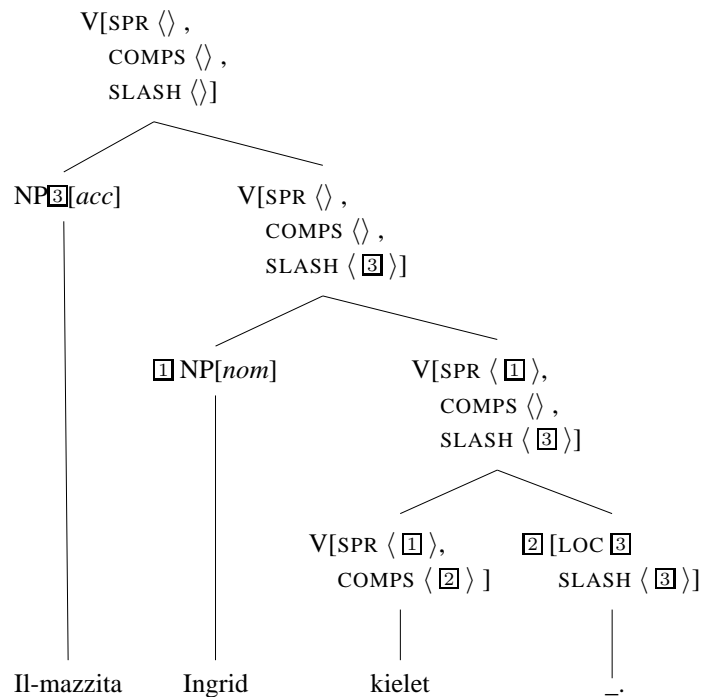


Figure 1: Analysis of the OSV order

(those under LOC) with the element in SLASH, the information about the missing object is recorded somewhere. This information is passed up to the dominating nodes by the Nonlocal Feature Principle (Pollard and Sag, 1994, p. 164):

Principle 1 (Nonlocal Feature Principle)

For each nonlocal feature, the INHERITED value of the mother is the union of the INHERITED values of the daughters minus the TO-BIND value on the head daughter.

The top-most node in Figure 1 is licensed by the head-filler schema, that is given in (9):

$$\begin{array}{l}
 \text{head-filler-phrase} \rightarrow \\
 (9) \left[\begin{array}{l}
 \text{HEAD-DTR} \left[\begin{array}{l}
 \text{LOC|CAT} \left[\begin{array}{l}
 \text{HEAD} \left[\begin{array}{l}
 \text{VFORM } \textit{fin} \\
 \textit{verb}
 \end{array} \right] \\
 \text{COMPS } \langle \rangle
 \end{array} \right] \\
 \text{NONLOC|TO-BIND|SLASH } \langle \text{1} \rangle
 \end{array} \right] \\
 \text{NON-HEAD-DTRS } \left\langle \left[\begin{array}{l}
 \text{LOC } \text{1} \\
 \text{NONLOC|INHER|SLASH } \langle \rangle
 \end{array} \right] \right\rangle
 \end{array} \right]
 \end{array}$$

This schema combines a VP that is missing an element (the element in SLASH) with this missing element (the non-head daughter). Due to the nonlocal feature principle the information in SLASH is not passed to the mother node. The nonlocal dependency ends in the head filler phrase.

A linearization constraint ensures that the filler is serialized to the left of the non-head daughter.

Note that the schema differs from the one in Sag et al., 2003, p.438 in not mentioning the SPR value of the head-daughter. This allows the head daughter to be a full clause or a VP. Therefore this schema accounts not only for the OSV order in (2e) but also for the SOV order in (2d).

2.3 Clitic Dislocation

As was discussed in the data section, full NPs can be used in addition to clitics on the verb. The phenomenon of clitic dislocation is also known from other languages. Alexopoulou and Kolliakou (2002) discuss Clitic Left Dislocation in Greek. The analysis adopted here is based on theirs. I assume that clitics are attached to a verb by a lexical rule (Monachesi, 1999; Miller and Sag, 1997). This lexical rule introduces a *local* objects under NONLOC|INHER|CLD. The information is projected to dominating nodes and can be bound off by full NPs. The schema that binds off elements in CLD is parallel to the head-filler schema:

$$(10) \quad \begin{array}{l} \text{head-cld-phrase} \rightarrow \\ \left[\begin{array}{l} \text{HEAD-DTR} \\ \text{NON-HEAD-DTRS} \end{array} \left[\begin{array}{l} \text{LOC|CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{VFORM } \textit{fin} \\ \textit{verb} \end{array} \right] \\ \text{COMPS } \langle \rangle \end{array} \right] \\ \text{NONLOC|TO-BIND|CLD } \langle \boxed{\square} \rangle \end{array} \right] \right] \end{array} \right]$$

In contrast to head-filler phrases, there is no restriction as far as the ordering of the daughters is concerned. The VP consists of the verb and a clitic. Given the right information structural context, the subject can be placed to the right and to the left of the VP, since the head-specifier schema allows for both orders. Therefore we can analyze the orders in (11):

- (11) a. SOVo
 b. OSVo
 c. SVoO
 d. OVoS
 e. VoSO
 f. VoOS (non-focussed subject)

2.4 Adjuncts

The following lexical entry for *illum* ‘today’ can account for the free placement of adjuncts:

$$(12) \left[\begin{array}{l} \text{PHON } \langle \textit{illum} \rangle \\ \text{SYNSEM|LOC} \end{array} \left[\begin{array}{l} \text{CAT} \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{MOD } \text{V}_{[1]} \\ \textit{adv} \end{array} \right] \\ \text{SPR} \langle \rangle \\ \text{COMPS} \langle \rangle \end{array} \right] \\ \text{CONT} \left[\begin{array}{l} \text{RELS} \langle \left[\begin{array}{l} \text{ARG1 } [1] \\ \textit{today} \end{array} \right] \rangle \rangle \end{array} \right] \end{array} \right] \right]$$

Since neither the valence properties nor any nonlocal properties (SLASH or CLD) of the modifiee are specified, the adverb can attach to all verbal projections. I assume the feature PRE-MODIFIER, which can be used to restrict the linearization properties of adjuncts. PRE-MODIFIER has the value '+' for modifiers that have to be linearized to the left of their head and '-' for those that are linearized to the right. For instance the adjective *sabiḥ* has the PRE-MODIFIER value '-', since it has to be serialized postnominally. Since the PRE-MODIFIER value of the adverb is not specified, it can be placed to the left and to the right of the verbal projection it modifies. Therefore all orders in (7) can be analyzed.

2.5 A Technical Problem: Spurious Ambiguities

There is a technical problem that is caused by the fact that the clitic dislocation schema has to allow both SOVo and OSVo. Because of the SOVo order, the schema cannot require that the dislocated object NP attaches to a fully saturated verbal projection. While the flexibility is desired if both the dislocated NP and the subject are located to the same side of the head, we get spurious ambiguities when they are located on different sides. Figure 2 shows an example of such a situation.



Figure 2: The problem of spurious ambiguities

Spurious ambiguities of this type can result in a combinatorial explosion if adjuncts and the pro drop rule are involved. (13) shows an example involving adverbs. Since S Vo Adv O is possible, (13b) cannot be ruled out in general by requiring that adverbs attach only if all dislocated clitics are bound off.

- (13) a. [O S Vo] Adv
 b. O [S Vo Adv]

The solution is to use a feature that marks a projection if some constituent is right-adjoined to it. Schemata that left-adjoin material require that the head-daughter does not contain any right-adjoined material yet. So we get the left structure in Figure 2 and rule out the right structure. The left structure is the one that is cognitively the more plausible one, since humans start to build structure as soon as they hear material.

3 Summary and Outlook

This paper describes the analysis of constituent order in an implemented fragment of Maltese. The analysis makes use of underspecification in the head filler schema and head clitic dislocation schema to allow both SOV and OSV and SOVo and OSVo orders, respectively. The problem of spurious ambiguities that was noted in different contexts before (Kolliakou, 2004, p. 308) was solved, which makes the grammar efficiently processable. The grammar fragment shares a common core with implemented grammars of German, Persian, and Chinese. Important parts of the Maltese language are covered.

In a more recent study, Fabri and Borg (2002) examined the constituent order data in more detail. A more fine grained distinction of contrastive and non-contrastive focus was used and the stress distribution was described. This study has not been taken into account in the present implementation. It could turn out that a non-configurational treatment of Maltese is more appropriate. This would be easier to model than the fixed constituent order + dislocation. Instead of a head-argument schema that allows only the combination of a head with its most oblique non-realized argument, a more general schema could be used that combines any unrealized argument with the head. This is the treatment of constituent order that is usually assumed for German (Müller, 2007).

Neither Fabri (1993) nor Fabri and Borg (2002) discuss ditransitive verbs. The respective empirical work has to be carried out in order to ultimately decide which analysis of constituent order is appropriate.

Of course constituent order interacts with information structure. There is promising work on information structure and the interfaces to phonology, syntax, and semantics in HPSG (Engdahl and Vallduví, 1994; De Kuthy, 2002; Ericsson, 2005; Bildhauer, 2008) and this research will be of great importance as far as further work on Maltese constituent order is concerned.

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