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September 2009

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Acknowledgements

We are very grateful to the following staff and students who acted as reviewers:
Lahcen Alami
Morris Al-Omar
Doug Arnold
Bob Borsley
Julian Good
Wyn Johnson
Despina Kazana
Nancy Kula
Bojana Petric
Andrew Radford
Erifili Roubou
Louisa Sadler
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Implementing a fragment of Modern Greek Grammar, using the Xerox Linguistics Environment (XLE)

Kakia Chatsiou

Abstract

This paper presents a computational grammar of a fragment of Modern Greek, following the principles of the Lexical Functional Grammar (LFG) Parallel Grammar (ParGram) Project (P.A.R.C, 2008) a collaborative effort among researchers in industrial and academic institutions whose objective is to build wide coverage deep-parsing grammars for a wide variety of languages. The grammar is built using the Xerox Linguistics Environment (XLE) parser (P.A.R.C, 2009) and at the moment covers the syntax of basic clause and word order phenomena in Modern Greek, and the syntax of pu-Restrictive Relative Clauses, with particular focus on the distribution of the gap/resumptive relativisation strategy.

In our paper, we present a brief overview of the XLE system, and the Parallel Grammar (ParGram) initiative. We present the fragment of Modern Greek, focusing on the coverage and the main assumptions underlying the current version of the grammar. We conclude by evaluating our grammar and discussing areas in need of immediate improvement to be dealt with in future versions as well as some future development directions.

1 Introduction

This paper presents a computational grammar of a fragment of Modern Greek, built following the principles of the Lexical Functional Grammar (LFG) Parallel Grammar (ParGram) Project (P.A.R.C, 2008), a collaborative effort among researchers in industrial and academic institutions around the world whose aim is to produce wide coverage deep-parsing grammars for various languages. The Modern Greek grammar is built manually using the Xerox Linguistics Environment (XLE) parser (P.A.R.C, 2009a) and the current version covers the syntax of basic clause and word order phenomena, and the syntax of pu-Restrictive Relative Clauses, with particular focus on the distribution of the gap/resumptive relativisation strategy.

The paper is organised as follows: in section 2, we present a brief overview of the XLE system and an overview of the Parallel Grammar (ParGram) initiative. Section 3 presents
the grammar fragment of Modern Greek, illustrating the coverage and the main assumptions underlying the current version as well as a brief evaluation of the system. Finally, in section 4 we present areas of possible improvement for future versions as well as future development directions.

2 About the Xerox Linguistics Environment (XLE)

The Xerox Linguistics Environment (XLE) is a platform for implementing Lexical Functional Grammars (LFG). LFG is a theory of grammar initially set forth in Bresnan & Kaplan (1982): It is a lexical theory, since the lexicon plays an active role when accounting for linguistic phenomena and functional since it uses primitive grammatical functions like SUBJ(ect), OBJ(ect) and OBL(ique) to account for the grammatical role of each element in the sentence.

The basic mechanism behind the LFG formalism is the existence of different levels of representation. In their paper, Bresnan & Kaplan (1982) defined two levels of representation: the constituent structure (c-structure) and the functional structure (f-structure). The c-structure is where dominance and precedence relations between constituents are expressed and is represented via a phrase structure tree (Dalrymple, 2001:92). The f-structure, is where grammatical relations are represented. It is reserved for encoding more abstract syntactic notions such as grammatical functions, case, agreement and generally “everything apart from categorical status, linearization and dominance” (Asudeh, 2004:38) and is represented by an attribute value matrix (AVM)². Examples of

² The validity of the f-structure representation is ensured by complying to a number of well-formedness conditions: the consistency/uniqueness condition which ensures that “each attribute in each f-structure will have at most one value” (Dalrymple, 2001: 39); the completeness condition which ensures that all governable elements (such as SUBJ, OBJ and so on) are realised and that if one of the elements of the argument list is missing, the f-structure will be incomplete and will be ruled out as ill-formed, (Dalrymple, 2001:37) ; finally the coherence condition which certifies that there are no additional governable elements in the f-structure and that the presence of an extra governable grammatical function in the f-structure results in its being ruled out as incoherent (Dalrymple, 2001:39). The properties of f-structures will not concern us here in detail; for further information see among others Bresnan (2001), Dalrymple (2001), Falk (2001) and Sells (1985:44-46). It is worth noting that c-structures may vary among languages, but their corresponding f-structures are quite similar. This is an observation at the core of all ParGram projects, which aim at the creation of ‘parallel’ grammars keeping the f-structure as similar as possible across languages, and using the c-structure to depict the structural differences across languages.
the c-structure of the sentence *Mary saw a banana* and its corresponding f-structure are shown in (1) below:

The c-structure is linked to the f-structure by means of the $\phi$-projection, represented as a set of f-structure annotations on the c-structure nodes. F-structure information is passed on to the mother node using the ↑ from the daughter node (↓). For example, the $\langle \uparrow \text{SUBJ} \rangle \downarrow$ notation under the subject NP node, indicates that the f-structure of the current node will be part of the SUBJ f-structure of the mother S node. A detailed presentation of the LFG formalism and the way the mapping from the c- to the f-structure works, goes beyond the scope of this paper; the reader is thus referred to Bresnan (2001), Dalrymple (2001) and Falk (2001) among others for an introduction to the theory and its latest developments.

XLE is a platform for developing such grammars developed at *Palo Alto Research Center (PARC)*. It is implemented in C and is available under Unix, Linux and MacOS operating systems. XLE includes a parser, a generator, and a finite state morphological analyser and it can be used both for parsing and generation of natural languages. It includes tools for other grammar development activities, such as performance analysis and test-suites and has built-in debugging, grammar maintenance and finite state tools to facilitate the job of the grammar developers.
XLE has been used for a range of Natural Language Applications ranging from Machine translation, using the Transfer System (P.A.R.C, 2007), to Computer Assisted Language Learning (Butt and King, 2007). XLE has been used by researchers involved in the Parallel Grammar (ParGram) project, with academic and industrial participating members from across the world. Figure 1 shows the participating members' locations, as well as the languages they have been working on (as of January 2009).

Figure 1: ParGram Participating Sites

XLE has also been used as the core technology employed in a novel search engine which aims at improving the way we find information by enabling the user to form queries using natural language. It is currently under development at Powerset, a company recently acquired by Microsoft. Powerset is using FreeBase as its semantic knowledge database, and its technology is currently being used to improve the searching experience in Microsoft’s Bing (www.bing.com) search engine.

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3 Some of the project's objectives include building broad coverage grammars which will parse and generate a wide range of a language’s phenomena, and providing linguistically motivated analyses for the phenomena under consideration. All grammars are guided by a common set of linguistic principles and a commonly agreed-upon set of grammatical analyses and features as well as a similar treatment of core cross-linguistic phenomena. Finally, with respect to the methods used in grammar engineering, all members apply a common set of methods and evaluation strategies and at the same time try to achieve a balance between efficiency, performance, readability and maintainability across grammars.

4 Powerset's search engine (www.powerset.com) aims at improving users’ searching experience of Wikipedia by allowing them to type full questions/sentences in the search box as well as keywords. On the results page, the user gets a summary of the search results compiled from different articles.
Let us now have a closer look at the XLE implementation of the Modern Greek grammar fragment.

2 XLE Implementation of a fragment of Modern Greek

The current version of the fragment is a preliminary effort to develop a large-scale LFG Computational grammar for Modern Greek. Being built following the principles underlying similar Parallel Grammar projects, it shares the objectives and principles outlined above, aiming at being parallel to similar projects for other languages as well as balancing maintainability and achieving large coverage. The current main focus is on the syntactic rules and thus the lexicon is kept as minimal as possible. Future versions are expected to focus on its expansion employing the use of the XLE’s built-in Finite State Morphological analyser.

2.1 Some assumptions

One of the main assumptions underlying the current version of the fragment concern Modern Greek constituent order. Contrary to the standard view proposed in the literature\(^5\), we assume just for the current fragment that all possible word orders (such as VSO, SVO, OSV and OVS) in declarative main clauses are equally acceptable and grammatical. This is rather simplifying things, since the degree of acceptability of the different word orders varies across speakers; such a simplification was necessary since the main focus of the implementation lied on the implementation of *pu*-Restrictive Relative Clauses. Future versions will certainly refine the grammar to account for these differences.

\(^5\) Although there seems to be an overall agreement in the literature concerning VSO as the basic constituent order of subordinate clauses (Tzartzanos, 1963:276; Lascaratou, 1998:161; Mackridge, 1985:237) and the rather fixed constituent order within a nominal phrase (Markantonatou, 1992:255-256; Lascaratou, 1998:63), there seems to be great controversy with regards to constituent order in declarative sentences. As Holton et al (1997:426) point out, due to its rich morphological marking system, Modern Greek demonstrates a relative freedom in the way constituents are ordered within an independent clause, as seen in example (3) where each constituent order will produce well-formed (but not equally acceptable for all speakers) sentences.
Following recent proposals by some scholars (Alexopoulou, 1999; Tsiplakou, 1998; Tzanidaki, 1996 among others), who have argued against a configurational account for Modern Greek, based on evidence from the similar status of subject and object (Tzanidaki, 1996), the absence of dummy subjects (Alexopoulou, 1999:7) and the availability of VP ellipsis (Alexopoulou, 1999; Tsiplakou, 1998), we represent Modern Greek word order non-configurationally, similarly to the representation in (2):

(2) 

Our grammar fragment presently focuses on building rules of the syntax. We have also not accounted for the morphology of the lexical items in the lexicon section in the current version, but instead, we have introduced a separate lexical entry for each different form according to case, gender, number and person.

2.2 Fragment Coverage

In this section we present the current grammar fragment coverage. Our grammar accounts for basic word order phenomena, basic agreement patterns (like subject-verb agreement and internal DP agreement), basic subcategorization frames and account for the pro-drop character of the language. To these, we added the LFG analysis of pu-Restrictive Relatives and the distribution of the gap/resumptive strategy in local and long distance dependences presented in Chatsiou (in preparation). Sections 2.2.1 and 2.2.2 include a discussion of the phenomena implemented in the fragment and how we went about implementing them in XLE.
2.2.1 Phenomena treated in the c-structure

Our fragment accounts for all possible word orders of declarative clauses, as illustrated in example (3):

(3) a. VSO
taise i yineka ton papagalo
fed.3SG the.FSG.NOM woman.FSG.NOM the.MSG.ACC parrot.MSG.ACC

b. SVO
i yineka taise ton papagalo
the.FSG.NOM woman.FSG.NOM fed.3SG the.MSG.ACC parrot.MSG.ACC

c. OSV
ton papagalo i yineka taise
the.MSG.ACC parrot.MSG.ACC the.FSG.NOM woman.FSG.NOM fed.3SG

d. OVS
ton papagalo taise i yineka
the.MSG.ACC parrot.MSG.ACC fed.3SG the.FSG.NOM woman.FSG.NOM

'e. VOS
taise ton papagalo i yineka
fed.3SG the.MSG.ACC parrot.MSG.ACC the.FSG.NOM woman.FSG.NOM
'The woman fed the parrot.'

f. SOV
i yineka ton papagalo taise
the.FSG.NOM woman.FSG.NOM the.MSG.ACC parrot.MSG.ACC fed.3SG
'The woman fed the parrot.'

All these c-structures share the same f-structure, shown in (4) below:

(4) f-structure of 'The woman fed the parrot.'

6 The reader familiar with LFG, might find that this f-structure looks a bit different from standard LFG notation (also compare with the f-structure in (1)). XLE’s output f-structure has [1:woman], [7:parrot] where one would expect (↑SUBJ↑OBJ). This is just a convention; [1:woman] points to the f-structure of the woman predicate, and is re-entrant with the SUBject’s f-structure (both have 1 as their index).
This is implemented using the *shuffle operator* (P.A.R.C., 2009b) which 'shuffles' the elements on the right-hand side of the S rule. The syntax of this operator is illustrated in (6):

(5) \[ S \rightarrow \text{DP1;} \quad \text{V;} \quad \text{DP2}. \]

(6) \[ S \rightarrow [ \text{DP1 }], \quad [ \text{V }], \quad [ \text{DP2 }]. \]

Modern Greek is a pro-drop language, as shown in (7):

(7) \[ \text{petai} \]
\[ \text{fly,3SG} \]
\'S/he flies.'

This is achieved quite straightforwardly, by making the subject-DP optional in the c-structure rules and by adding an optional equation on the lexical entry of the verbs that assigns a PRED value to the SUBJ f-structure in case this is not present otherwise, as in (8).

(8) \(\text{the optional subject DP in the S rule}\)
\[ S \rightarrow [ \quad ( \text{DP : (} \uparrow \text{SUBJ} \left( \right) = ! \right) ) \quad ] \quad , \quad \ldots \]

\(\text{(The lexical entry of a pro-drop verb)}\)

---

7 The S rule in (5) illustrates the ordinary XLE syntax for writing phrase structure rules and succeeds for any string of elements containing a DP1, followed by a V and a DP2 in that order. The S rule in (6), however, succeeds for any string of elements, provided that it contains a DP1, a V and a DP2 in any order. This is indicated by including the elements we wish to 'shuffle' in square brackets ([ ]) and separating them with a comma (,) as opposed to separating them with a semicolon (;), as shown in (5). Thus, the rule in (6) can be satisfied by any of the following orders:

(i) \[ \text{DP1 - V - DP2} \]
\[ \text{DP1 - DP2 - V} \]
\[ \text{V - DP1 - DP2} \]
\[ \text{V - DP2 - DP1} \]
\[ \text{DP2 - V - DP1} \]
\[ \text{DP2 - DP1 - V} \]

8 Again here, XLE notation slightly deviates from the standard LFG one: \(\uparrow\) corresponds to the \(\uparrow\) arrow; ! corresponds to the \(\downarrow\) arrow. Note that the way we denote optionality of constituents in rules, marked with round brackets ( ) is different from denoting optionality of the f-structure annotations, which is marked with curly brackets ( ). The same curly brackets denote disjunction when they appear in a rule, as in (13). Finally \(\in\) stands for the \(\in\) (element) notation.

8
The current fragment also includes an implementation of the analysis of Modern Greek *pu* -Restrictive Relative Clauses presented in Chatsiou (in preparation), where we put forward an LFG analysis of the treatment of the distribution of the gap/resumptive relativisation strategy in Modern Greek Restrictive, Non-restrictive and Free Relative Clauses.

A detailed examination of the characteristics of relative clauses goes beyond the scope of this paper; we will however briefly refer to some of the most important characteristics that are of interest to the implementation. One of them is the internal constituent order of *pu*-RRCs. In particular, contrary to the controversy that the same issue has raised for independent declarative clauses (Tzartzanos, 1963; Siewierska et al, 1998; Philippaki-Warburton, 1985; Tsimpli, 1996; Holton et al, 1997; Alexopoulou, 1999), it is generally agreed in the literature that the ‘basic’ or underlying constituent order of relative clauses is relatively fixed (Tzartzanos, 1963:276; Mackridge, 1985:237). As shown in (9) and illustrated in examples (10) and (11), *pu*-Restrictive Relative clauses are introduced by a complementizer or a relative pronoun, followed by a resumptive pronoun, followed by the verb of the relative clause, and by zero or more instances of any nominal or adverbial elements in any order.

(9) complementizer/relative pronoun + (resumptive pronoun) + V + XP*

(10) o papagalos *pu* edose o andras tis yinekas
      the.MSG.NOM parrot.MSG.NOM that gave.3SG the.MSG.NOM man.MSG.NOM
      the.FSG.GEN woman.FSG.GEN
      ‘The parrot that the man gave to the woman.’


Resumptive pronouns in *pu*-RRCs can be obligatorily present, optional or obligatorily absent, depending on the context. See ex. (25) for a table presenting the distribution of resumption in *pu*-RRCs.
The elements following the verb may occur in any order\(^\text{11}\); the complementizer, the resumptive pronoun and the verb, however, should occur in that order. We capture these two different behaviours by using the declarative clause $S$ in the $C'$ rule, in which all elements are ‘shuffled’ using the *shuffle operator* (\([\])\) for the elements to appear in free word order after the $V$. The complementizer, the resumptive, the verb and the antecedent DP appear in fixed order. This is why they appear outside the shuffling operator as illustrated in (12) [lines 3-9].

\[
\begin{align*}
1 & \text{DP } \rightarrow \text{ D; N'}. \\
2 & \text{N' } \rightarrow \text{ N; (CP: !$ (" ADJUNCT)).} \\
3 & \text{CP } \rightarrow \{e: \{(\text{ADJUNCT $\wedge$} \} \\
4 & \quad (\wedge \text{COMPFORM}= \text{pu} \\
5 & \quad \quad \{\wedge \text{COMPFORM}= \text{ot}$ \} \\
6 & \quad \text{DP}; \\
7 & \quad \text{C'}. \\
8 & \text{C'} \rightarrow \text{ C; S}. \\
9 & \text{S} \rightarrow \{\{(\text{DP: (\wedge \text{SUBJ})=}!)\}, \\
10 & \quad \{(\text{V; CP: (\wedge \text{COMP})=}!)\}, \\
11 & \quad \{(\text{NP: (\wedge \text{OBJ}|OBJ2)}=! \(! \text{PRONTYPE})=c \text{ rp}\}; \\
12 & \quad \text{V}, \\
13 & \quad \{(\text{DP: (\wedge \text{OBJ})=}!\} \\
14 & \quad \{(\text{DP: (\wedge \text{OBJ2})=}!) \\
15 & \quad \{(\text{DP: (\wedge \text{OBL})=}! \(! \text{CASE})=\text{acc} \(! \text{PFORM})=\text{cse})\} \}.
\end{align*}
\]

2.2.2 Phenomena treated in the f-structure

The fragment accounts for some basic subcategorization frames (transitive, intransitive and ditransitive verbs including the realisation of indirect objects as either a genitive DP or an accusative PP,\(_m\)) as illustrated in examples (13) to (16):

\(^{11}\) As previously explained, each of the possible orders differs in terms of their degree of markedness; we will however assume here that all these orders are equivalent.
The VP rule below summarizes the four subcategorization frames:

(17)  
\[
\text{VP} \rightarrow [ V: ^!= ] , \\
\{ (\text{DP}: (^\text{OBJ})=!) \} , \\
\{ (\{ \text{DP}: (^\text{OBJ2})=! (\text{CASE})=\text{gen} \} ) \} , \\
\text{PP: (^\text{OBL})=! (\text{CASE})=\text{acc} (\text{!PFORM})=c \text{se}) \} ] .
\]

Both the DP\text{gen} and the PP\text{se} are alternative manifestations of the indirect object, but they are assigned a different grammatical function: the genitive DP is an OBJ2 and the PP introduced by the se particle is an OBLique.

Examples like (18) are successfully ruled out by application of the coherence condition (Dalrymple, 2001:39) using information from the lexical entry of the verb petai (flies) (cf. ex. (9)), which ensures that there are no additional governable elements in the f-structure and that the presence of an extra governable grammatical function (in this case the extra OBJ) in the f-structure results in its being ruled out as incoherent:

(1) 
\[
\text{o papagalos petai} \\
\text{the.MSG.NOM parrot.MSG.NOM fly-3SG} \\
\text{‘The parrot flies.’ (intransitive)}
\]

(2) 
\[
i andres taisan tus papagalus \\
\text{the.MPL.NOM men-MPL.NOM fed-3PL the.MPL.ACC parrot.MPL.ACC} \\
\text{‘The men fed the parrots.’ (transitive)}
\]

(3) 
\[
edose i yineka ton papagalo ston andra \\
gave-3SG \text{ the.FSG.NOM woman.FSG.NOM the.MSG.ACC parrot.MSG.ACC to.the.MSG.ACC andra MSG.ACC} \\
\text{‘The woman gave the parrot to the man.’ (ditransitive with PP\text{se})}
\]

(4) 
\[
i yineka edose ton papagalo tu andra \\
\text{the.FSG.NOM woman.FSG.NOM gave-3SG the.MSG.ACC parrot.MSG.ACC the.MSG.GEN man.MSG.GEN} \\
\text{‘The woman gave the man the parrot.’ (ditransitive with NP\text{gen})}
\]
(18)  * petai o papagalos tin yineka
   flies:3SG the:MSG.NOM parrot:MSG.NOM the:MSG.ACC woman:MSG.ACC
   ‘*The parrot flies the woman.’

The grammar successfully assigns the appropriate case to nominal elements depending on
the requirements of the verb\textsuperscript{12}, as illustrated in examples (19) and (20), successfully ruling
out examples like (21) by application of the consistency/uniqueness condition which
ensures that “each attribute in each f-structure will have at most one value” (Dalrymple,
2001:39):

(19)  o andras taise ton papagalo
   the:MSG.NOM man:MSG.NOM fed:3SG the:MSG.ACC parrot:MSG.ACC
   ‘The man fed the parrot.’

(20)  ton papagalo taise o andras
   the:MSG.ACC parrot:MSG.ACC fed:3SG the:MSG.NOM man:MSG.NOM
   ‘The man fed the parrot.’

(21)  * o papagalos taise o andras
   the:MSG.NOM parrot:MSG.NOM fed:3SG the:MSG.NOM man:MSG.NOM
   ‘The man fed the parrot.’ (intended meaning)

This is accounted for lexically, on the template for each verb frame, as in the example
below:

(21a) \textit{Lexical entry for edose}:

\begin{verbatim}
edose       V      * @ (DTR gave)
     @subj -3sg
     (^ TENSE)=present.
\end{verbatim}

(21b) \textit{Templates}

\begin{verbatim}
DTR(P) =
  { ( ^ PRED)='P<(^ SUBJ) (^ OBJ) (^ OBJ2)>'
    | ( ^ PRED)='P<(^ SUBJ) (^ OBJ) (^ OBL)>'
    | ( ^ SUBJ PRED)='pro'
    ( ^ SUBJ CASE) = nom
    ( ^ OBJ CASE)= acc.
\end{verbatim}

\textsuperscript{12} Usually – but not always – nominative for subjects, accusative for objects or objects of the PP\textsubscript{v}, genitive for indirect objects.
On the DP level, our grammar accounts for number, case and gender agreement within a DP or a PP, as in example (22), successfully ruling out ungrammatical examples like (23). This is achieved again by application of the *consistency/uniqueness condition* as illustrated in the f-structure in (23), where the f-structure is ruled out as ungrammatical, since there are more than one values for the same feature (NUM) in a given f-structure:

(22)  
`tis yinekas  
the.FSG.GEN woman.FSG.GEN  
‘of the woman’`

(23)  
`*tis yineka  
the.FSG.GEN woman.FSG.ACC  
‘of the woman’`

With respect to the implementation of the analysis of the gap/resumptive strategy in local and long distance dependencies in *pu*-RRCs, we opted to account for the fact that the resumptive pronoun has the same form as the unstressed monosyllabic clitic (weak form) of the personal pronoun and the definite article in the lexicon. As shown in (24), this is treated using a disjunction (indicated by the ; notation) over the two types of lexical categories that *tis* can be assigned to: it can either be a D (definite article), a resumptive pronoun (NP) or alternatively a clitic.

(24)  
`tis  
D * (\(^{\text{DEF}}\)=+ (\(^{\text{GEND}}\)=f  
\{(\(^{\text{NUM}}\)=sg (\(^{\text{CASE}}\)=gen  
\text{| (\(^{\text{NUM}}\)=pl (\(^{\text{CASE}}\)=acc)}\};  
NP * \{(\(^{\text{PRED}}\)=’pro’ (\(^{\text{PERS}}\)=3 (\(^{\text{NUM}}\)=sg  
\(^{\text{GEND}}\)=f (\(^{\text{CASE}}\)=gen (\(^{\text{PRONTYPE}}\)=rp;  
NP * (\(^{\text{PRED}}\)=’pro’ (\(^{\text{PERS}}\)=3 (\(^{\text{NUM}}\)=sg  
\(^{\text{GEND}}\)=f (\(^{\text{CASE}}\)=gen (\(^{\text{PRONTYPE}}\)=clitic.

The distribution of resumption in *pu*-RRCs is shown in Figure 3 and is accounted for in the f-structure by a series of f-structure equations in the CP rule in (25).
In the S rule (which is the same rule for declarative clauses, an optional resumptive pronoun is allowed to occur before the verb (only), be defining an optional NP in lines 13-14: \( \text{(NP: } (^\text{SUBJ}|\text{OBJ}|\text{OBJ}2) =! (! \text{PRONTYPE}) = c \text{ rp}) \). The correct assignment of the gap or the resumptive strategy is accounted for by a disjunction on two equations: \( (^\text{TOPIC}) = (^\{\text{COMP}^* \text{SUBJ}|\text{COMP}^* \text{OBJ}\}) \) (line 5) accounts for the distribution of the gap strategy, and \( (^\{\text{COMP} \text{OBJ}|\text{COMP}^* \{\text{OBJ}2|\text{ADJUNCT} \& \text{OBJ}| \text{GFOSS}\}\}) \text{PRONTYPE} = c \text{ rp} \) (line 6) does the same for the distribution of the resumption strategy. \( (^\text{COMPFORM}) = \text{pu} \) (line 2) checks that the \text{pu-RRC} is introduced by a \text{pu} complementizer, and \( (\text{ADJUNCT} \& ^\text{)} \) (line 1) together with the N’ rule (line 2) ensure that the \text{pu-RRC} is going to be an adjunct to its antecedent nominal element.

(25)
The grammar also parses grammatical examples as in (26) where the pu-RRC is embedded within one or more *oti* complement clauses. This is achieved by placing a disjunction on the pu-RRC f-structure information ((^ COMPFORM)=oti, line 7) and simply allowing for an optional *oti* complement CP in the S rule ([V; CP: (^ COMP)=!], line 12). Of course we also need to add the appropriate lexical entry in the lexicon of a verb that subcategorises for *oti* complement clauses as in (27) below:

(26) i yineka pu o Petros ipe oti taise ton papagalo.

The woman Peter said she fed the parrot.

(27) ipe V * (^ PRED) = 'said<(^ SUBJ)(^ COMP)>'

\{(^ SUBJ PRED) = 'pro'\}

\{^ PERS = 3 sg.\}

Finally, the system accepts optional marking of punctuation at the end of a parsed sentence – period (.) and questionmark (?) – and assigns the appropriate clause type (declarative or interrogative respectively) in the f-structure, as in (28) and (29):

(28) o andras taise ton papagalo.

The man fed the parrot.

(29) o andras taise ton papagalo?

Did the man feed the parrot?
2.3 Evaluation

The XLE system comes with a built-in set of test-suite tools that assist grammar developers in checking their grammar progress and detect any bugs and areas of improvement. For the purposes of evaluating our fragment, we built two testfiles testing the coverage of our grammar as described in section 2.2. Testsuite1 demo-gre-v.0.9-basic_testfile.tfl contains test items testing the basic declarative word order, subject-verb agreement, agreement within the DP, the pro-drop character of the language, some basic subcategorization frames for verbs, and optional punctuation. On the other hand, Testsuite2 demo-gre-v.0.9-rrcs_testfile.ftl contains test items relevant to the coverage of pu-RRCs with focus on the distribution of the gap/resumptive strategy in local and long-distance dependencies.

Out of a total 176 items, 108 grammatical test items had 1 parse, 67 ungrammatical test items had 0 parses and 1 item had 2 parses. Although the accuracy of the system might appear too artificial and constructed, it is worth noting that the current version of Modern Greek Grammar is a fragment. As such, it covers a restricted range of phenomena and it is only natural that the test items have been built to suit the phenomena under investigation. So why is it useful or interesting to build a fragment of a grammar in the first place if both the set of phenomena is limited and the testsuites are especially built to match them?

Mainly because it allows us to implement smaller pieces of grammar and test that they are robust and efficient and that they produce the expected output before attempting to incorporate them in a larger grammar. Another advantage is that simultaneous development of complex phenomena in the same grammar may influence both the accuracy of description of the phenomenon as well as the effectiveness of the system. Our choice of implementing a fragment of Modern Greek grammar was due not only to the above advantages but also to the fact that since this was our first attempt to build a computational grammar using the XLE platform, we were also interested in understanding the process of building a grammar and we intended to use this fragment as a starting point for future larger-scale implementations of Modern Greek.
3 Conclusions and Future Development Directions

This paper presented a computational grammar fragment for Modern Greek, built following the principles of the LFG ParGram Project and included among others a basic grammar covering simple word order phenomena, simple agreement phenomena as well as an implementation of an LFG account of the gap/resumption strategy in \textit{pu} Restrictive RCs. It goes without saying that the current fragment of Modern Greek grammar is at its preliminary stage and it is only natural that there are a lot of phenomena not yet been accounted for. It is expected that future versions will build upon the current fragment of Modern Greek grammar to account for the syntax and semantics of \textit{opios}-Restrictive, of Non-Restrictive and Free Relative Clauses, examples of which are shown in (30), (31) and (32) respectively:

(30) \textit{i yineka tin opia vrike o andras ine sto nosokomio}
\texttt{the.FSG.NOM woman.FSG.NOM the.FSG.ACC who.FSG.ACC found.3SG the.MSG.NOM man.MSG.NOM is.3SG to.the.NSG.ACC hospital.NSG.ACC}
‘The woman whom the man found is at the hospital.’ (\textit{opios}-Restrictive RC)

(31) \textit{i Kiki, pu tin agapai o Stelios, ine arosti}
\texttt{the.FSG.NOM Kiki that her.FSG.ACC love.3SG the.MSG.NOM Stelios, is.3SG ill.FSG.NOM}
‘Kiki, that Stelios loves, is ill.’ (\textit{pu}-Non-Restrictive RC)

(32) \textit{opjos irthe efige}
\texttt{whoever.MSG.NOM came.3SG left.3SG}
‘Whoever came, left.’ (\textit{Free Relative RCi})

Another area of improvement of the current version concerns the incorporation of the use of Discourse Functions, where appropriate, to account for the different degrees of markedness and acceptability of the different word orders. Word orders like SOV, VOS, OVS and OSV are usually taken as alternatives to the two basic word orders (SVO and VSO). Their first element is usually taken to be a topicalised/focused element (marked with small capital font in the examples below). An example of an SVO and its corresponding OSV order is given in (33) and (34):
We also intend to enrich our lexicon as appropriate to reflect the phenomena under investigation, as well as expanding out grammar to cover other constructions such as coordination, examples of which are shown in (35) and (36):

(35) i Kiki vrike ton papagalo ke o Stelios ti filise.
    the.FSG.NOM Kiki found.3SG the.MSG.NOM parrot.MSG.NOM and the.MSG.NOM Stelios her.MSG.ACC kissed.3SG
    ‘Kiki found the parrot and Stelios kissed her.’

(36) i yineka ke o andras agapun ton papagalo
    the.FSG.NOM woman.FSG.NOM and the.MSG.NOM man.MSG.NOM love.3PL the.MSG.ACC parrot.MSG.ACC
    ‘The woman and the man love the parrot.’

4 Acknowledgements
I would like to thank the audiences of the 2006 ParGram Meeting, Oxford, the audiences of the 5th Language and Computation Day, Essex, as well as the audiences of LangUE 2007 postgraduate conference and FLATLANDS 2008 at Essex. I am also grateful to Louisa Sadler and two anonymous reviewers for comments and feedback on previous versions of this paper. I am also indebted to the ESRC for funding parts of my study with a 1+3 Quota Studentship No. PTA-2004-031-00112, support which is gratefully acknowledged here. Of course, all remaining errors are my own.

5 References


Considering Teachers’ Beliefs and Classroom Practices in Relation to ESP and EGP Teaching Methodology: A Pilot Study

Reem Issa

Abstract

Investigating the nature of teaching methodology in English for Specific Purposes (ESP) and English for General Purposes (EGP) is crucial before relating the teaching methodology to any context. There have been several researchers (Dudley-Evans and St John, 1998; Hutchinson and Waters, 1987; and Widdowson, 1983) who have investigated the difference between ESP and EGP teaching methodology; however, implementation of such reports about teaching methodology is mainly based on teachers’ and students' beliefs, and teachers' classroom practices. The present study aims to investigate English language teachers’ and students’ beliefs about ESP and EGP teaching methodology at Aleppo University in Syria. Furthermore, the study aims to examine whether such teachers’ beliefs are reflected in their classroom practices.

This pilot study used qualitative instruments to gather data including: essays, interviews, and classroom observations. The results showed that teachers and students believed that there should be some differences between ESP teaching methodology and EGP teaching methodology. Although the teachers were observed to generally follow classroom practices that are consistent with their beliefs, some points of difference between their beliefs and practices existed. Various impediments constrained their practices, including lack of training and other context-dependent factors. It is argued that exploring teachers' and students' beliefs, and teachers' classroom practices is necessary for improving the teaching/learning process. The conclusions and the recommendations of this study will be beneficial and may open the door for more promotion of the teaching/learning process at Aleppo University in Syria.

1 Introduction

When researchers address the issue of EGP and ESP methodology, there appear to be two opposing positions. On the one hand, Hutchinson and Waters (1987) have claimed that although the content of learning in English for Specific Purposes (ESP) may differ from English for General Purposes (EGP), there is no reason to suppose that the methodology of ESP is different from EGP. On the other hand, Dudley-Evans and St. John (1998), and Widdowson (1983) have argued that the difference between ESP and EGP content implies different teaching methodologies. In fact, implementation of reports about teaching
methodology has been mainly based on teachers’ and students’ beliefs which might have an effect on classroom practices (Borg, 2006; Kagan, 1992).

However, little research has been conducted to investigate teachers' beliefs in the field of ESP teaching and, in particular, to investigate whether teachers' beliefs about teaching ESP differ from their beliefs about teaching EGP. Moreover, little empirical work has been done to compare teachers' practices in ESP classes and EGP ones. Yet, many researchers such as Borg (2006), Fenstermacher (1979), Kagan (1992), and Nespor (1987) state that it is important to study teachers' beliefs because such a study has become essential to improve teachers' teaching practices. Therefore, this pilot study aims to investigate two English language teachers’ beliefs and two students' beliefs about ESP and EGP teaching methodology at Aleppo University in Syria. Furthermore, this study aims to examine teachers' practices to see whether English teachers follow the same or different teaching methodologies in their ESP and EGP classes. The pilot study used different types of qualitative data collection methods which helped increase the reliability and validity of the results and the conclusions of the study by cross-validating them.

2 Literature Review

2.1 Distinction between ESP and EGP

ESP began to evolve in the mid 60s in response to awareness that some learners' needs are specific and they are not met by the EFL courses. Since that time, ESP has come into existence and many definitions have been given to ESP which differentiates it from EGP. Strevens (1988 [Dudley-Evans and St. John, 1998: 3]) definition, for example, makes a distinction between four absolute characteristics of ESP and two variable characteristics. The absolute characteristics are that ESP consists of English Language Teaching which is:

- designed to meet specific needs of the learners;
- related in content to particular disciplines, occupations and activities;
- centred to language appropriate to those activities in syntax, lexis, discourse, semantics and so on, and analysis of the discourse;
- in contrast with ‘General English’.

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The variable characteristics are that ESP:
- may be restricted as to the learning skills to be learned;
- may not be taught according to any pre-ordained methodology.

Munby’s (1978) definition further gives a clear distinction between ESP and EGP. Munby defines the ESP courses as: “those where the syllabuses and materials are determined in all essentials by the prior analysis of the communication needs of the learner, rather than the non-learner-centred criteria such as the teacher’s or the institution’s predetermined preference for general English” (Munby, 1978: 2).

Thus, it is clear from the above definitions that researchers have distinguished ESP from EGP. These distinctions have led some researchers to think of ESP teaching methodology and whether it should be different from EGP.

2.2 ESP and EGP Teaching Methodology

Amongst many researchers, Dudley-Evans and St. John (1998) regard that the teaching methodology of ESP should be different from EGP because the specific needs and the specialist knowledge that learners have might lead to a different methodology. As they claim: “ESP may use, in specific teaching situations, a different methodology from that of general English” (Dudley-Evans and St. John, 1998: 4-5). Widdowson (1983) has a similar opinion to Dudley-Evans and St. John (1998) that ESP should have its own methodology which is different from EGP “because ESP has to meet the specific needs of the learners, so it must have its own learning activities and therefore its own methodology” (Widdowson, 1983: 88).

However, compared with Dudley-Evans and St. John (1998), and Widdowson (1983), Hutchinson and Waters (1987) state that although the content of ESP is different from that of EGP, this does not mean that methodology is different. They agree with Dudley-Evans and St. John (1998) that ESP is based on the specific needs of the learners, but they see no reason to suppose that the processes of learning should be any different. They state:
“merely methodologies which have been applied in ESP classrooms, but could just as well have been used in the learning of any kind of English” (Hutchinson and Waters, 1987: 18). Thus, different researchers have different views about ESP and EGP teaching methodology.

2.3 Teachers' and Students' Beliefs

Beliefs are given different definitions by different researchers. For example, Sigel (1985) defines beliefs as “mental constructions of experience- often condensed and integrated into schemata or concepts” (Sigel, 1985: 351). Calderhead (1996 [cited in Chan, 1999: 2]) further states that there are five main areas in which teachers have been found to have significant beliefs. The five areas are: beliefs about learners and learning, beliefs about teaching, beliefs about subject, beliefs about learning to teach, and beliefs about self and the teaching role. Such areas are rather interrelated with each other. However, confusion centres on the distinction between beliefs and knowledge.

2.3.1 Beliefs and Knowledge

Fenstermacher (1994) indicates that the two concepts are not interchangeable because knowledge is stronger than a belief. As he claims: “objectively reasonable beliefs may not be a sufficiently strong standard to sustain the concept of knowledge” (Fenstermacher, 1994: 33). Ernest (1989), moreover, states that knowledge is the cognitive outcome of thought and belief the effective outcome. He also adds that the effect of beliefs is more useful in understanding and predicting how teachers make decisions (Ernest, 1989 cited in Pajares, 1992: 310-311). Finally, Roehler et al. (1988) add that beliefs are static and remain unchanged in the teachers’ minds, while knowledge evolves as new experiences are interpreted.

On the other hand, Borg (2006: 35) argues that beliefs and knowledge are only different theoretically, but not practically. He justifies this claim on the basis that an analysis of these concepts in teacher cognition research suggests that they characterize the same phenomenon; thus, Borg (1999) and (2006) uses the term 'cognition' to cover the two
concepts—beliefs and knowledge. Kagan (1990, 1992) agrees with Borg (2006) and he regards beliefs as a form of knowledge. Finally, Verloop et al. (2001: 446) conclude that beliefs and knowledge are the same because it is difficult to separate the components of knowledge and beliefs in the teacher's mind.

It can be concluded from the above review of the debate about the nature of beliefs that the difference between teachers’ beliefs and knowledge is vague; however, whether teachers’ knowledge and beliefs can be regarded as same or different from each other depends on the context (Pajares, 1992: 326).

2.3.2 The Relationship between Beliefs and Attitudes

Generally, teachers’ attitudes about teaching, learning and education have been referred to as “teachers’ beliefs” (Pajares, 1992: 316). However, Ajzen (2005: 3) defines attitude as “a disposition to respond favorably or unfavorably to an object, person, institution, or event” and Clemente (2001) further states that what teachers think and believe determine their own attitudes towards their job as teachers.

2.3.3 Matches and Mismatches between Teachers’ and Students’ Beliefs about Foreign Language Learning

Some learners’ beliefs are quite different from what is commonly recognized by language teachers. This might result in a gap between the teachers’ and the students’ beliefs. However, understanding the gap between teachers’ and learners’ beliefs is the first step to bridge it. For example, in a study carried out by Kingsley and Maria (1997), it was found that there are significant differences existing in teachers’ and college students' beliefs about foreign language learning. Thus, while students believed that everyone can learn a foreign language, teachers believed that people who speak more than one language are very intelligent. Spratt (1999), moreover, presents examples of the differences between tertiary level students' and their teachers' beliefs at a university in relation to classroom activities. Results show that there is a 50% correspondence between teachers’ and students’ beliefs in
relation to the types of activities (communicative or non-communicative) and activities in certain areas (e.g. speaking, writing).

However, only a few studies report some similarities between teachers’ and students’ beliefs and preferences. For example, in a study by Green (1993) in an ESL course, it was found that both teachers and students express a preference for communicative activities. Horwitz, (1990) illustrates the difference between teachers’ and students’ beliefs, and the tension that arises from such mismatches:

Many teachers using communicative approaches have encountered students who complain if their every mistake is not corrected, or if the teacher requires them to say something they have not practiced. At the same time, students who value the communication of meaning over grammatical accuracy may bristle when their utterances are corrected constantly. This sort of clash of expectations between students and teachers about language learning can lead to a lack of student confidence in and satisfaction with the language class (Horwitz, 1990: 24-25).

Green (1993) further concludes that these gaps between teachers’ and learners’ beliefs probably result in negative outcomes and problems for many language learners. However, any influence of teachers’ beliefs may be related to the influence of contextual factors such as the institutional or the cultural effects (Basturkmen et al., 2004; Kern, 1995; and Lee, 1998).

2.3.4 The Relation between Teachers’ Beliefs and their Classroom Practices

It is generally believed that what teachers do in classrooms is a reflection of what they believe or know (Richards and Lockhart, 1994). The beliefs of teachers and their values serve as the background to much of the teachers’ decision making and actions. Moreover, such beliefs motivate teachers’ instructional practices (Burns, 1992).
While some studies (Pepin, 1999) conclude that there is a positive relationship between teachers’ beliefs and their classroom practices, other cases (Lee, 1998) conclude that there is not a significant relationship between teachers’ beliefs and their classroom practices. Lee’s (1998) study, for example, explores English language teachers' beliefs about teaching and learning writing and their classroom practices in a Hong Kong context. This study concludes that there is a gap between teachers’ beliefs about writing and their practices. Pepin's (1999) study, on the other hand, explores teachers' beliefs about teaching and learning mathematics, and teachers' practices in England, France, and Germany. This study concludes that teachers’ beliefs about mathematics are reflected in their classroom practices.

2.3.5 Factors Influencing Teachers’ Classroom Practices

The reason why teachers’ beliefs have an impact on their classroom practices in some cases while not in others may be due to the fact that teaching situations differ according to different contexts. Holliday (1994: 87) states that there are many factors which might affect English language teaching methodology and teachers' practices in classrooms; many of these factors are related to school politics and they are rooted in the 'professional-academic' cultures. Borg (2003) indicates that teachers’ practices are shaped by the social, psychological and environmental realities of the schools and the classrooms. These factors include the school, the curriculum mandates, the classroom, and the availability of resources. Zacharias (2005) gives an example of how some teachers like published materials because these provide natural and authentic exposure to language, while others do not because they are often poorly edited and their content is inconsistent. However, the option to use such materials or not is affected by external factors like the curriculum and the availability of materials. Moreover, Borg (2003), Fenstermacher (1994), and Meijer, Verloop and Beijaard (1999) state that both experience and practical knowledge play a role in reflecting instructional practices. Meijer, Verloop and Beijaard (1999) and Meijer, Zanting, and Verloop (2002) all state that practical knowledge is the knowledge that teachers generate as a result of their experiences as teachers and reflections on these experiences. Reid's study (1993), for example, comments on how teaching ESL writing is
negatively affected by teachers’ lack of experience, knowledge, and education about teaching composition.

Therefore, both external and internal factors play a role in affecting teachers’ practices. However, the best way to examine how teachers’ beliefs are manifested in their instructional practices is through classroom observation (Kern, 1995). Borg (2006: 231) states that observation has a central role to play in the study of teacher cognition by providing a concrete descriptive basis in relation to what teachers know, think, and believe.

Thus, this pilot study aims to investigate teachers’ and students' beliefs about ESP and EGP teaching methodology. Moreover, it examines teachers’ practices to see whether teachers follow the same or different teaching methodologies in ESP and EGP classes.

3 The Study

3.1 Rationale for the Pilot Study

A Pilot study aims to detect possible flaws in the data collection methods, identify unclear or ambiguous questions, and give the chance for researchers to notice non-verbal behaviour (Welman et al., 2005). Furthermore, it helps to find out if the questions can yield the kind of data required (Nunan, 1992). Pilot work, finally, can be rewarding because it helps the researcher to 'conceptualize' and 're-conceptualize' the study aims and make preparations for the main field work and analysis (Oppenheim, 1992). Therefore, it is essential to pilot every question, every question sequence, every inventory and every scale in the study.

3.2 Context of the Study

The study takes place at the University of Aleppo in Syria. In this university, English is a compulsory subject for all students in all the faculties. In their first year of study, students are taught 'EGP' for four hours a week in each term. In the second year, students are taught 'ESP' for four hours a week in each term. Such courses are taught by language teachers in both
years. In teaching these English courses, different textbooks are used in different faculties. For example, the ‘Quest’ (1999) is used for teaching the EGP courses. For the ESP courses, ‘English in Medicine’ (2005) is used for Medicine students, and ‘Oxford English for Electrical and Mechanical Engineering’ (1995) is used for Electrical and Mechanical Engineering students. All the above materials and any other materials are provided by the university administrators to the teachers who use them without adaptation to make such materials suit students' needs. Finally, it should be mentioned that the university does not have a self-access learning centre. Each faculty has got its own library which contains the books related to the discipline of study. The available resources include boards, markers, textbooks and dictionaries. Computers and Internet facilities are very limited, though in the stage of development.

Concerning the tests in such courses, students are tested two times a year in order to be promoted from one class to a higher one. Scores are distributed as follows: 100% for the students’ final exams in each term of the academic year. The tests cover reading, grammar, writing, and vocabulary. Listening and speaking are not tested. Teachers design the tests on the basis of what they teach students during the terms, but not on the basis of what benefits students to achieve their aims. Therefore, most of the tests' elements depend on students' memorization of what is already taught in the term. As a result, students view the tests as an end itself rather than a means.

### 3.3 Research Questions

This study attempts to answer the following questions:

1- Do teachers’ and students’ beliefs about teaching ESP differ from their beliefs about teaching EGP?

2- Do language teachers’ classroom practices differ in their ESP classes and EGP classes?
3- Are teachers’ beliefs congruent with their classroom practices? If not, what factors might explain any incongruence of teachers’ beliefs and practices in their EGP and ESP language classrooms?

3.4 Research Methodology

Qualitative data collection methods were employed in this study. The methods included: reflective essays, interviews, and observations. Reflective essays were used in this research in order to elicit teacher’ reflections on their experience and personal beliefs, and to elicit students' own opinions and beliefs. Tsang (2004) states that using reflection can assist teachers in understanding their beliefs about teaching. Pre-observation semi-structured interviews were also conducted to provide both teachers' and students' beliefs and opinions. Moreover, short post-observation short interviews were conducted in this research because they could give the teachers the opportunity to talk about their beliefs in relation to the context (Borg, 2006). However, the reason behind using interviews and not using questionnaires is that the validity of the findings of some questionnaire-based studies of beliefs has been questioned. There are many researchers such as Oppenheim (1992) who state that there are serious objections to using single questions to measure beliefs because these are usually “multi-faceted” and have to be approached from several directions. Borg (2006) also adds that questionnaires usually reflect the ideas of the researcher rather than the teacher; thus, interviews can give teachers more opportunity and time to speak about their teaching than in the questionnaires which are limited to a 'set schedule of invariant' questions (Mangubhai et al., 2004: 294 cited in Borg, 2006: 204). Finally, semi-structured observations were used to provide data about teachers’ practices, and check the verity of the participants' answers in the interviews because interviews alone do not allow us to draw conclusions about what teachers actually do in classrooms (Borg, 2006). It is for this reason that interviews are often combined with classroom observations.
3.5 The Subjects

The participants in the pilot study were two female language teachers - one teacher from the Engineering Faculty and another one from the Medicine Faculty, and two students of those teachers. Participant teachers were selected on the basis of the following criteria: Teachers should have taught ESP classes before so it would not be their first time to teach ESP, they should be teaching both ESP and EGP classes in the same faculty at the time of the study, and they were similar in their age and their teaching experience. Participating students were also selected after making sure that they were students of the same teachers selected so that their beliefs could be compared with their teachers’. Moreover, participant students were similar in their age, level of proficiency, and learning experience.

3.6 The Procedure

There were four main steps in the data collection. First, as soon as the teachers and the students became familiar with the research purposes and agreed to participate in the research, I distributed the essay topics to them with the instructions. The instructions of the essays indicated that the participants were free to write in English or in Arabic, the approximate length should be between 1 and 2 pages, the deadline for returning the topics was a week, and the information given in the essays would be confidential.

There were two essay topics for the teachers and two essay topics for the students. The essay topics for the teachers were: 1) What would you like to improve in your teaching methods and how? Please provide your own reasons referring to both General English courses and the ESP courses you teach at the University of Aleppo. 2) What, in your opinion, makes a good English teacher with references to both General English and ESP courses at the University of Aleppo? The justification for the choice of such topics is that they served to infer some aspects of teachers’ beliefs about English teaching methodology and to understand the influence of the teaching background and the context on teachers’ beliefs and practices. These objectives correspond to the first and the third research questions.
The essay topics for the students were: 1) According to your experience, what aspects should receive more attention in the ESP courses more than in the General English ones, and why? Please provide your own reasons referring to both General English courses and ESP courses you learn at the University of Aleppo. 2) Is there anything would you like to have in the EFL courses that is currently not included in the present ones? Please explain with reference to the ESP and the General English courses that you take at the University of Aleppo. The justification for the choice of such topics is that they served to understand students' beliefs and preferences about the English courses and compare them with the teachers'. All the participants wrote the essays and returned them within one week.

Then, I conducted semi-structured interviews with both teachers and students and I recorded all the interviews after obtaining the permission from the participants. Before conducting the interviews, all the participants were given a consent form through which they were familiarized with the following: what the purpose of the interview was, what language could be used in the interview, how the interview would be recorded, and what the interview questions would be about. All the interviews were conducted in English according to the participants' choice. The interviews included questions with regard to the topic of the research such as: beliefs about the English language, beliefs about the difference between ESP and EGP, beliefs about the roles of teachers in classrooms, and other related questions. In addition to these questions, other questions were employed such as probing questions, closing questions, structuring questions, and interpreting questions and silence.

After that, I attended and tape-recorded two classes taught by each teacher. Before the observations, teachers were familiarized with the purpose of observations. Although teachers had to be told what the purpose of observations was, it would have been counter-productive to give them many details which would certainly have influenced their behaviour; therefore, they were simply told that the study involved comparing the EGP and ESP teaching practices. My role was a complete and a non-participant observer. All the observations combined between structured and unstructured approaches. They were
structured in the sense that sheets were used in order to tick particular observed pre-specified behaviours like the use of the mother tongue by teachers and the use of the mother tongue by students. They were unstructured in the sense that more detailed behaviour of participants was summarized during the observations which proved to be useful for later analysis.

Finally, I conducted post-observation short interviews with teachers to give them a chance to articulate their beliefs in relation to their teaching contexts. Thus, teachers were asked questions which aimed to explore their beliefs and rationales in relation to specific practices. Examples of such questions were: I have noticed that you stop your students from using Arabic in your classes; do you have certain principles underlying that?, why do you form discussions through group work?. Short interviews were also conducted with students after the observations to see whether their teachers taught in the same way they normally did. Each method was piloted in 2008.

3.7 Data Analysis

With regard to the interviews, each interview was transcribed. Then, coding was done through reading texts and adding informative labels on the margins. After that, these labels were given names and narrower labels were clustered under them. Names of categories and sub-categories were derived from the literature and from my own insights. An example of a main category is the use of the mother tongue, while an example of a sub-category is the purpose of the use of the mother tongue in ESP classes. Finally, interpreting data and drawing conclusions involved selecting the main themes and elaborating on them.

Reflective essays were also coded in a similar way to the coding of the interviews; thus, coding was done using labels of categories and sub-categories. Lastly, the findings of the essays data were then combined with the interviews' findings to support each other.

Finally, observation notes were taken during the classes supplemented by 'observation schemes' based on a framework derived from Spada and Frohlich (1995). Such observation
schemes allowed me to record events quickly. After the observations, the observational data were analyzed and coded for key instructional episodes such as the use of the mother tongue and the roles of teachers in classrooms. Such concepts were matched against the concepts obtained from the essays and the interviews.

4 The Findings

The discussion in the following sections is based on data derived from essays and interviews with both teachers and students.

4.1 Teachers' and Students' Beliefs about ESP and EGP Methodology

4.1.1 Teachers' Beliefs

First of all, concerning the teaching experience of the two teachers, both teacher A and teacher B stated that they teach ESP without any prior training and it was not their own decision to become ESP teachers. Thus, teacher A mentioned in the interview that the Institute "selected [her] as an ESP teacher - that is all". Similarly, teacher B said "they assigned me ESP teaching". Moreover, both teachers gave an indication of possible reasons of why they were selected to teach ESP. Teacher A said "The staff in the Institute thinks that I am a kind of good teacher in EGP", and teacher B said "When I came back from England…". Therefore, both teachers seem to have been selected to teach ESP either because of their previous experience in teaching EGP and reputation as good teachers or because of their English proficiency and expertise. Moreover, teacher A commented "it is funny" that she was selected to teach ESP on the basis of being a good EGP teacher revealing that she did not find it an appropriate way to appoint ESP teachers.

In relation to the goals of EGP and ESP courses, teacher A seems to have different opinions and beliefs from teacher B. For example, while teacher A mentioned that "both ESP and EGP courses should aim at communication", teacher B argued that "the goals of ESP should be different from EGP". Teacher A believed that ESP and EGP courses share one general goal which is 'communication', but she added that these courses differ in specific
goals; thus, ESP "should focus greatly on the communication with people and the terminology that students need in their fields"; however, EGP courses should help students "to communicate with the foreigners or to communicate broadly". In contrast to teacher A, teacher B acknowledged that the goals of ESP and EGP are much different; thus, while EGP courses "should focus on the language", ESP courses "should focus on specific skills and strategies, specific terminology and communication with people in their discipline".

Both teachers, moreover, claimed that ESP teaching should be different from EGP teaching and they gave different opinions about how teaching should be different. For example, teacher A stated that in EGP "we concentrate on communication more than the content…students can swing from communicative to grammar-based methods", but in ESP "we concentrate on the content…students need more communicative method and focus on content of their discipline". In the study, I asked the teacher about what she meant by 'communication' and by 'content'. The teacher stated that by communication, she meant having conversation and talking with people; by 'content', she meant the subject knowledge of the discipline. In her essay, teacher A added that different aspects can be more important in teaching ESP. For example, ESP teaching methodology should "involve more critical thinking on the part of the students", should "integrate the use of technology" and, finally, should "encourage students to work in groups or in teams". In addition to that, the teacher commented in her interview that training to improve the skill of critical thinking is highly required. That is to say: "teachers should provide students with strategies and tools that enable them to be autonomous in their learning". However, teacher B has different opinions on how teaching ESP can be different from EGP. She believed that in EGP "we communicate with students in different ways, so it is more fun". When the teacher was asked about what she meant by communication, she stated that communication is the ability to deliver the message without paying too much attention to grammar. In ESP, she said "we should be more serious and confident and the methodology should be different". However, she agreed with teacher A that more practice and autonomy are needed in ESP. Although both teachers have slightly different opinions about how ESP teaching methodology can be different from EGP one, both teachers believed that grammar teaching is not that important in ESP classes, but communication is important in both ESP and EGP classes. However,
teachers commented that communication does not take place in their classrooms because of many factors. Such factors include: the nature of textbooks and activities which do no encourage communication, the nature of the classroom itself, and the big number of students.

With reference to the roles and responsibilities of teachers in classrooms, both teachers commented that teachers should have different roles in ESP and EGP classes. Thus, teacher A stated that she does not have to interfere in EGP classes, but in ESP classes she needs to participate: "I should participate in ESP but not in EGP". Teacher B, in contrast to teacher A, said that she only monitors students in ESP, but in EGP she interferes with the students. Both teachers gave their reasons for why they take such roles. Thus, teacher A commented that she needs to participate in ESP classes to make sure that students are doing the right thing. However, teacher B explained that she needs to interfere in EGP classes because she cares about what students are saying and how they are using the language. But in ESP, she feels that she does not have enough information and vocabulary to participate and correct students' answers. Therefore, this teacher suggested that teachers of ESP "should have more confidence. This can be done through a project and cooperation with specialists".

Finally, both teachers indicated that mother tongue should not be used in English classes but, if needed, it can be used in certain situations. However, teachers have different opinions on the importance of and the reasons for using Arabic in different classes. Thus, teacher A commented that she tries to avoid using Arabic in EGP classes unless she needs to explain complex ideas, but in ESP she sometimes needs Arabic to explain some medical terms. In contrast with teacher A beliefs, teacher B believed that Arabic "has to be used" in EGP classes because of the different levels in the classes. But in ESP Arabic can be needed if students do not understand an idea.
4.1.2 Students' Beliefs about ESP and EGP Methodology

First of all, concerning the goals of ESP and EGP courses, while student A suggested that there is not that much difference between the goals of the courses, student B suggested that there are important differences between ESP and EGP goals. Both students, further, gave their opinion on what the goals of each course should be. Similar to his teacher's beliefs, student A believed that communication should be the general aim of both ESP and EGP courses, but, according to him, while the goal of EGP "is only to teach students how to communicate", the goals of ESP courses are many: "they should teach students how to read, know information, and get some specific vocabulary in Medical English". On the other hand, student B- also similar to his teacher's beliefs- believed that the goals of ESP are different from EGP; ESP courses should teach students "how to communicate with specialists and should teach only specific knowledge", but EGP courses should enable students "to get general experience only to understand the people".

However, with reference to teaching ESP and EGP, student A has the same opinions as his teacher. He believed that although grammar is important in EGP, it is not that important in ESP courses because "it does not affect the ideas"; however, communication is important in both ESP and EGP teaching. On the other hand, different to what his teacher believed, student B believed that grammar is not that important either in ESP or in EGP teaching; however, communication is more important in ESP because "students need to communicate with people in their specialization".

The two students also suggested certain skills and activities to be more important in ESP teaching than in EGP. For example, while student A suggested more pictures, speaking, video, and writing to be used in ESP teaching; student B wrote in his essay that teachers in ESP "should concentrate on the vocabulary…in addition to the basics in grammar", while in EGP students "might need to practice other more skills like writing, grammar and reading". However, both students referred to the importance of some activities which they do not have in their classes. For example, student A wrote in his essay that pronunciation and conversation activities are important to be taught in English classes, but they are
'ignored' by his teachers. On the other hand, student B referred to the need for group work and communicative activities which are important but they are not present in their classes.

Finally, both students have similar opinions to their teachers' that Arabic should not be used in English classes; however, if needed, Arabic can be used in some classes but not in others. For example, student A suggested that Arabic can only be used in ESP classes but not in EGP ones. He further thought that Arabic can be used in ESP classes "to explain medical ideas and vocabulary, but not to explain grammar or other things". However, student B, and in contrast to student A, suggested that Arabic can be used in "lower levels like in EGP classes" to understand ideas, but it should not be used at all in ESP classes. Yet, this student commented that his teacher needs to use Arabic in ESP classes because she is not experienced with the students' specialization.

4.2 Teachers' Classroom Practices in ESP and EGP Classes

The discussion in the following sections is based on data derived from observing teachers' ESP and EGP classes.

4.2.1 Teacher A's Classroom Practices in Comparison with her Beliefs

In teacher A lessons, it is observed that while this teacher's teaching methodology was more content-based in her ESP classes (the teacher emphasizes learning the subject more than learning the language), her teaching methodology in EGP classes ranged between communication and grammar teaching. This is consistent with what the teacher said in her interview. Yet, oral communication among students was given very little time in both EGP or in ESP classes. However, the teacher tried to involve students in oral communication and speaking which she regarded to be important in English classes. One example of an oral communication activity in an EGP class is given in the following segment which was based on involving students to talk about advantages and disadvantages of psycho-analysis:
T. What about psychoanalysis, what can you tell me about the advantages and disadvantages of psychoanalysis? What can you tell me? Something?
S. Psychoanalysis helps patients to be aware of unconscious behaviour.
T. Ok, one disadvantage of the psychoanalysis?
S. Psychoanalysis helps patients to be aware of (teacher interrupts)
T. To help the patient to be aware? Is this a disadvantage? The disadvantage is something negative I think, so you cannot put it here under the disadvantages. So "to help the patient be aware" is an advantage, who can give me another advantage?
S. To help the patient control his behaviour.
T. Good, something else?

Despite this teacher's positive beliefs about the use of role-plays and project work, the teacher did not use any of such activities in the two observed classes, and most of her activities ranged between reading, vocabulary, and grammar activities in both ESP and EGP classes. However, when the teacher was asked in the post observation interview about the reason behind not using role-plays in her classes, she stated that the nature of the classroom and the number of students do not allow her to use such activities because there will be a chaos in classes. In addition to that, she referred to the nature of textbooks which do not include such activities.

Moreover, it is observed that this teacher played different roles in her ESP and EGP classes as she indicated in her interview. Thus, while in EGP classes, the teacher explained grammar rules and meanings of words to the students and gave students feedback on what they say; in her ESP classes, the teacher only monitored students and she listened to them when they did vocabulary or reading exercises. Therefore, the teacher seemed to be a dominator more in EGP classes and she seemed to be a monitor in ESP classes. The exchange below shows how the teacher explained a grammar rule to the students in her EGP class:
T. What is the key word for passive?
Ss. Verb to be.
T. Ok, verb to be and past participle, and past participle is usually formed by adding 'ed' to what?
Ss. To regular verb.
T. Yes, to regular verb. Here we have the tense is present simple, so what is the tense of verb to be here we have?
Ss. Is, am, are.
T. Ok 'was, were' are also used for the past. Now give me something about the present perfect.
Ss. Have, has and past participle.
T. So you notice here the use of the past participle always. Now if we have modals like 'shall', 'must' and others, we use them plus 'be'.

This is somehow inconsistent with the teacher's stated beliefs in the interviews when she stated that she does not have to interfere in EGP classes, but she has to be a participant in ESP classes to make sure that students are using the right vocabulary and doing the right thing. When the teacher was asked in the post observation interview about why she involved herself much in the EGP classes, she indicated that she had to involve herself with the students because of the time limit and because the students' level is not that good and they normally depend on her for the explanation of everything.

Finally, the teacher never used Arabic in her classes and this is consistent with her stated beliefs in the interview. Moreover, this teacher's students were also good in English and they avoided the use of Arabic in their English classes.

4.2.2 Teacher B's Classroom Practices in Comparison with her Beliefs

In teacher B lessons, it is observed that the teaching methodology seemed to be more teacher-centred in both ESP or in EGP classes. Students were passive, i.e. they were dependent on the teacher and they did not seem to be autonomous in their learning although
the teacher indicated in her interview that students should be autonomous in their learning and should depend on themselves. Moreover, the teacher tried to be involved with the students and to communicate with them all the time in her different classes. Thus, in her EGP classes, the teacher explained the content and the vocabulary to the students in detail and in her ESP classes, she involved herself in the activities and students were dependent on the teacher for explanation of different ideas. In the example below, the teacher involved herself in an activity focusing on vocabulary before a reading text, she explained everything and translated word meanings for the students, and students only listened to the teacher and wrote translations of words without trying to guess meanings or participate in the discussions:

T. We are going to speak about normal and abnormal people.
Ss. Ok.
T. (Teacher reads: Bill began preaching to groups of people about God). So preaching means talking about God. On Friday every week in Muslim prayers, we have preacher or preaching.
S. (One student gives an Arabic translation of the word to make sure it is true) [\(\text{wa}\text{ʕez}\)].
T. Preachers talk about God, when they give religious speech, they (the teacher repeats the Arabic translation of the word \([\text{wa}\text{ʕez}]\)). Preach is the verb and preacher is the noun.
Now number two, Bill is now drawing large audiences.
S. Attracting.
T. Yes, drawing has many meanings, it can mean [yarsum], it can mean withdraw money from the bank, and here draw audience mean attract.

However, again, this is inconsistent with what the teacher stated in the interview when she mentioned that students need to be more autonomous in English classes especially in ESP ones. The teacher was asked in the post observation interview about the reason for doing everything for the students and not giving students the chance to guess meanings and think of answers. She stated that the big number of the students and the time limit prevent her from giving the students the chance to think and give answers.

With regard to the activities, the teacher focused only on reading and vocabulary activities
in the two observed EGP and ESP classes, but she did not include any writing or communicative activities which she regarded to be important in English classes. In her post observation interview, the teacher referred to the obstacles which prevent her from using oral communication or practicing productive skills in her classes. Such obstacles are like the nature of the textbooks which concentrate only on a few skills, the nature of classrooms, and the number of students.

Finally, the teacher often used Arabic in her classes and this is consistent with what she referred to in the interview. An example where the teacher used the mother tongue in an EGP class is presented in the extract below:
T. Depression can be a slight or a major one. Depression can be a slight one after an accident, but major depression is this is your life.
S. (One student gives an Arabic translation of the word to make sure of the meaning) [lib almarad]
T. (The teacher explains the difference between the two concepts: 'major' and 'slight' depression in Arabic: [hu ektıʔab raʔisi: ma hu ektıʔab muʔaqat]- major depression.
S. ektıʔab daʔim.
T. ektıʔab daʔim.
S. (One student asks gives an Arabic translation of the word to make sure he understands the word: [änseh, major yaʔni murádef la 'severe?]
T. It could be in a way (the teacher gives two words in Arabic to explain the meaning of the word: [qawi ṭauʔasasi], it could be.

Although the teacher used Arabic both to explain complex ideas and difficult words in ESP classes, she used Arabic in her EGP classes for different purposes: to explain content, meanings of words, give feedback and check understanding. Moreover, this teacher's students used Arabic in both ESP and EGP classes for many purposes like explaining the content, communicating and giving meanings of words.
Discussion

This initial study showed that teacher (A) believed there should be differences in the teaching methodology between ESP and EGP, and in her classes, she practiced some of these differences. Moreover, this teacher's beliefs were almost consistent with her student's. However, there was some inconsistency between this teacher’s beliefs and her practices. Teacher (B) also believed that there should be differences in the teaching methodology between ESP and EGP, but in her teaching classes, she did not show much of these differences. Thus, there was somehow a difference between what the teacher believed and what she did in her classes. Although this teacher and her student had similar views about ESP and EGP, there were some points of difference between the two parties' views.

The findings with regard to the teaching methodology in ESP and EGP coincide with Dudley-Evans and St. John's (1998), and Widdowson (1983). Dudley-Evans and St. John (1998) and Widdowson (1983) indicate that ESP teaching methodology should be different from EGP. Concerning the similarities and differences between teachers' beliefs and their students', the findings come in line both with the findings of Spratt’s (1999) who concludes that teachers and students have different beliefs from each other, and with Green’s (1993) who concludes that teachers and students express the same preferences and beliefs. Finally, concerning the incongruence between teachers' beliefs and their practices, both of the teachers indicate in their essays, pre-interviews, and post observation interviews that experience, knowledge, and the teaching context have effects on their teaching practices. These findings are acknowledged by Basturkmen et al. (2004), Holliday (1994), and Kern (1995). These researchers show that teachers' beliefs and practices are affected by the teaching context, the culture, and the teachers' teaching experiences.

Conclusions and Implications

While this pilot study has undertaken a qualititative investigation of teachers' and students'
beliefs, and has provided an explanation of teachers' classroom practices, there remains much to be explored in this area. For example, the pilot study has shown that the use of reflective essays has been proved to be effective in eliciting teachers' and students' reflections on their beliefs and opinions especially in this research context where teachers and students, for the first time, are given the chance to reflect on their beliefs and practices. Moreover, the interviews and the observation classes have also been proved to be good and effective methods for understanding beliefs and practices. However, the interviews and the observations are too few to reach any conclusive answers about the teachers' and students' beliefs or about teachers' practices.

Therefore, for the main study, I have decided to answer the research questions using the same methods of data collection, but with conducting more interviews and observing more number of classes in order to have a better understanding of teachers' beliefs and practices. Moreover, I have decided to design less structured interviews so that teachers and students would be able to express their opinions and beliefs freely. In addition to that, I decided not to give essays for the students because I realized that reflection of students was not significant for my research questions. Finally, I have decided to include more detailed stimulated-recall interviews with the teachers after the observations to have a clearer explanation of some incongruence between teachers' beliefs and practices.

Future research is needed to investigate the factors which might make the teaching methodology of ESP different from EGP such as the influence of the used textbooks, the needs of the students, and other contextual factors. Moreover, future research is needed to investigate students' beliefs and to understand the relationship between their beliefs and their teachers'. Finally, future research is needed to understand the factors that may have an effect on both teachers' and students' beliefs and on teachers' classroom practices.

References


Experimental approaches to Spanish stress placement

Veronica D.C. Villafana Rojas

Abstract

This paper presents the results of an empirical study on Spanish speakers’ knowledge of Spanish main stress patterns. The focus of this study was two-fold: (1) to further explore and test the assertions made by Aske (1990), Eddington (2000, 2004a, 2004b) Bárkányi (2002), Face (2004), and Waltermire (2004) that Spanish stress placement on novel words is not rule-governed but assigned by analogy; (2) to find a syllable type combination that favours antepenultimate stress being assigned to trisyllabic words over penultimate or final stress.

One hundred and seventeen native speakers of Spanish in total participated in this research. Participants were divided into two groups and two different sets of words were used for each; seventy-six participants were asked to assign stress to ninety-five nonce words in isolation, and forty-one participants assigned stress to ten nonce words which were contextualised in a sentence. The results supported the prediction that speakers access their lexicon when assigning stress to novel words. In addition, evidence was found to suggest that in a trisyllabic word with a complex onset in the antepenultimate syllable followed by two open syllables, antepenultimate stress is preferred over penultimate or final stress.

1 Introduction

Phonologically speaking, Spanish stress placement has drawn the attention of many linguists. In general, there are two main approaches one may follow when studying Spanish stress: the generativist and the psychological. The former postulates rules (stress-assigning algorithms) which explain all of the data correctly, and the later, also called the ‘patterns-in-the-lexicon’ approach (following Aske 1990), assumes that stress in novel words is governed by patterns in the mental lexicon and by analogies to these patterns (Bárkányi 2002).

Within the rule-based approach (Harris 1969, 1983, 1991, 1992, 1996; Halle, Harris and Vergnaud 1991; Dunlap 1991; Roca 1997), it has been suggested that Spanish stress

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placement presents marked and unmarked patterns depending on the syllable structure of the word, and on where stress falls. Talking about nominal forms in particular, the unmarked pattern accounts for most of the nouns in Spanish. It includes the consonant-final nouns which receive final stress and the vowel-ending nouns which receive penultimate stress; there is no unmarked antepenultimate stress in nouns in Spanish. The marked forms, on the other hand, are visibly different from the unmarked forms in that they have a written accent mark (´) to indicate where stress falls and phonologically speaking, some are believed to be lexically marked with extrametricality like the word hábil ‘able’ (Dunlap 1991 and Harris 1992), or lexically marked as exceptions to the rules like the word sábana ‘sheet’.

The psychological or patterns-in-the-lexicon approach (Aske 1990; Eddington 2000, 2004a, 2004b; Bárányi 2002; Face 2004; Waltermire 2004) does not consider that Spanish stress placement is rule-governed, but rather that stress is a lexical property of a word, so when assigning stress to new words, the system works on the basis of analogical associations.

The present study follows the psychological approach and aims to provide further evidence to suggest that since there are certain patterns that emerge when stress is assigned to nonce words, and these patterns parallel those of actual words; it can be argued that speakers access their mental lexicon and assign stress to nonce words by analogy.

The main contribution that this study seeks to make is to find evidence to suggest that in trisyllabic words when the antepenultimate syllable contains a complex onset and is followed by two open syllables, native speakers favour assigning antepenultimate stress. In order to test this claim the set of nonce words includes words with complex onsets in their antepenultimate syllable.

2 Materials

This proposal resembles previous studies within the patterns-in-the-lexicon approach in that nonce words were used with the purpose of reinforcing the idea that nonce word probes
help us to have a better understanding of how Spanish stress is assigned since the speakers
do not already know the phonological properties of these words\(^2\). New sets of words were
created for the present study for two reasons: 1) the aim of this study required trisyllabic
words with complex onsets; 2) some problems were found in the words used by Waltermire
(2004) (see section 5.2.1). In order to create these words, the guidelines for creating nonce
words suggested by Hochberg (1988), were used.

Ninety-five words were created in order to test the effect of syllable structure in assigning
stress to nonce words in Spanish. Of these ninety-five words, forty were disyllabic and
fifty-five were trisyllabic (see Appendix A). Apart from combining open ‘L’ (CV) and
closed ‘H’ (CVC)\(^3\) syllables to create the nonce forms, two new syllable types were
created: H* and L* the former containing a complex onset, a nucleus and a coda (CCVC)
and the latter formed by a complex onset and a nucleus (CCV). There were five nonce
words for each of the 19 different syllable combinations (H= closed, L= open, H*= closed
closed syllables (H) had one of the following consonants as a word-internal coda: /l/, /g/,
/d/, /m/, /p/, /r/, /n/; and the following consonants as a word-final coda: /l/, /d/, /n/, /s/, /r/.
The complex onsets were used both word initially and word internally and were formed by
the following combinations\(^5\): /pl/, /pr/, /gl/, /gr/, /kl/, /kr/, /dr/, /tl/, /tr/, /fl/ and /fr/.

\(^2\) Waltermire (2004) says “Nonce word probes are ideal in that speakers do not have direct access to the words
in question, they do not know their phonological properties and must make inferences about these
properties based on something other than previously stored information.” (2004:173).

\(^3\) We could have used ‘O’ to refer to open syllables and ‘C’ to refer to closed syllables, but to avoid confusion
with ‘C’ standing for consonant and ‘C’ standing for closed syllable, H will be used to refer to closed
syllables and “L” will be used to refer to open syllables.

\(^4\) All of these consonants can be used to form word-internal codas, but not word-final ones. Here are some
examples from real Spanish words (dots are used to show syllable boundaries): cos.mé.ti.co ‘cosmetics’,
‘acquisition’.

\(^5\) Here are some real Spanish words containing these consonants as word-final codas (dots are used to show
‘fear’.

\(^6\) The combination allowed in Spanish consists of an obstruent and a liquid (Harris 1983:31). Here are some
examples of real words containing complex onsets both word internally and word initially (dots are used
to show syllable boundaries): plá.sí.ti.co ‘plastic’, ap.lau.so ‘applause’, pro.gram.mín, sor.pre.sa
open syllables (CV) ended in one of the following vowels: /a/, /e/, /i/, /o/, and /u/. In the words used by Face (2000) and Waltermire (2004), only the vowel /a/ was used word finally, in order to guarantee that the forms, which were presented in isolation, were regarded as nouns. In the present study, however, all the vowels of Spanish were used because it was clearly stated in the questionnaire that the nonce words were to be used as nouns (see Appendix C), so there was no reason for the participants to treat them as verb conjugations.

Apart from the ninety-five nonce words; ten real Spanish words with final stress were used to create nonce forms segmentally identical to the real words except that they lacked the final consonant of the real word (see Appendix B). This was done in order to further support the claims made by Aske (1990) when he used real words lacking their final consonant, that Spanish native speakers do not make absolute abstract generalizations about stress patterns because they do not seem to use such generalizations when encountering never-before-seen words.

The hundred and five words were randomized (following Waltermire, to avoid the tendency to choose the same stress patterns for certain syllable weight combinations, as this could ruin the results) in one questionnaire (henceforth questionnaire one). Questionnaire one was divided into two parts: part A containing 53 words, and part B containing 52 words (see Appendix C). Questionnaire one was answered by 76 participants. Each participant responded to both parts of the questionnaire, with a short break between parts. Dividing the whole set of words into two parts served to avoid boredom, fatigue or mechanical answers by the participants. (The procedure of the experiment is given in section 4).

tla.co.yo ‘tlacoyo (name of a Mexican dish)’, a.dlas ‘atlas’. It is important to mention that the combination /tl/ as a complex onset is mainly found in Mexican Spanish, where many examples can be found.

Waltermire (2004:177) explains “It should be noted that the only word-final vowel for any of the nonce forms was /a/. This is important due to the morphological function of stressed word-final /i/, /e/ and /o/, which are the past tense endings for regular verbs in Spanish for first person singular (–/é/ for first conjugation verbs and –/í/ for second and third conjugation verbs) and third person singular (all of which end in –/ó/)”.

The instructions indicated: “Remember that all the words will be nouns and will be in the singular form. For example, they could complete the following phrases: I want a/an…, Please lend me your…, Where is the…? Recuerda que todas estas palabras serían sustantivos y esta sería su forma singular, por ejemplo podrían completar las frases: Quiero un / una…, Préstame tu…, Dónde está el / la…?”
There was a second questionnaire (questionnaire two) that included only the nonce words with complex onsets in their antepenultimate syllables (H*LL and L*LL) in contextualized sentences (see Appendix D). The reason only these combinations were included was to fulfil the main aim of the present study\(^9\), to find evidence to suggest that native speakers are likely to assign antepenultimate stress in trisyllabic words when the antepenultimate syllable contains a complex onset and is followed by two open syllables.

### 3 Subjects

The experiment was conducted with the cooperation of 117 participants who were all native speakers of Spanish. 76 participants answered questionnaire one (parts A and B) containing the words in isolation, and 41 completed the second questionnaire, where the words were presented in contextualized sentences. Out of the 76 participants who were given questionnaire one, 65 were Mexican, 2 Argentinean, 1 Peruvian, 1 Colombian and 7 Spanish. The 76 participants ranged in age from 18 to 34. 40 of the Mexicans study at the Universidad Autónoma del Estado de México in Mexico and completed the questionnaire there (these questionnaires were then sent here). 5 Spaniards completed the questionnaire in Murcia where they live and work. The rest of the participants including the four Latin-Americans and 2 Spaniards study at the University of Essex in Colchester.

Out of the 41 participants who completed the second questionnaire, 35 were Mexican, 1 Chilean, 1 Spanish, 1 Venezuelan, 1 Peruvian, 1 Colombian, and 1 Argentinean\(^{10}\). Out of the 35 Mexicans, 23 are students of the Universidad Autónoma del Estado de México in Mexico. The rest, including those of other nationalities, are studying at the University of Essex in Colchester. They range in age from 18 to 32.

\(^9\)This second questionnaire was distributed after having gathered the results from the first one. The reason for including another questionnaire with the words in a contextualized sentence was to see if this would produce different results from the one where the words were presented in isolation.

\(^{10}\)The objective was to form a group of participants representing many different nationalities (taking into account the accent varieties among the Spanish speaking countries), unfortunately not many Latin-Americans willing to take the questionnaire from were found.
4 Procedure

In order to test whether or not Spanish native speakers are psychologically cognizant with stress placement based on syllable structure, 95 nonce words were created and randomized in a written questionnaire (questionnaire one) and divided into two sets of nonce words, one including 48 words and the other 47 words. These words were combined with 10 nonce forms (5 in each part of the questionnaires and also randomized) segmentally identical to ten real Spanish words except that they lacked the final consonant of the real word. These words were used with the aim of corroborating Face’s (2003) claim that accentuation is assigned analogically. Questionnaire one was given to 76 native speakers of Spanish. This questionnaire presented the nonce words in isolation, resembling the way Waltermire (2004) carried out his experiment. When the subjects received part A of questionnaire one, they were told to read the instructions carefully and once they had read them, they were asked to repeat what they had to do in order to make sure they had completely understood the task.11 They were asked to mark stress with a written accent mark (´) on each nonce form according to how they would pronounce it if it were an actual word in Spanish; that is, following their intuitions regarding stress. They were asked to choose the pronunciation that best sounded like a real Spanish word. Upon completion of part A, all participants were given 5 minutes to relax before completing part B so that the words from the first part were no longer fresh in their minds. Part B contained the same instructions as part A.12 Some of the participants skipped them in part B, but others decided to reread them.

11 It is worth noting that more than half of the participants mentioned the grammatical rules in Spanish regarding stress; they argued that they did not need to mark stress in words ending in a vowel, /u/ or /l/ because these received penultimate stress. Thus for words ending in a vowel, /u/ or /l/ that could potentially present oxytonic (menú ‘menu’) or proparoxytonic (fábula) stress, they decided that these words had to be pronounced with penultimate stress even before they had read each word carefully (having just scanned the whole page). That is, words ending in a vowel, /u/, or /l/ were assigned penultimate stress regardless of their pronunciation. This is why it was really important to clarify that they had to decide how the words were to be stressed.

12 The instructions were included in both parts of the questionnaire because the participants were given the option of answering each part on a different day, only 1 participant answered the questionnaires on separate days.
To ensure that the nonce words were perceived as nouns, 10 sentences with one nonce word each were presented in a second questionnaire. Each of these ten nonce words had a complex onset in the antepenultimate syllable. Questionnaire two contained similar instructions to those of the previous questionnaire. Their task was to indicate stress with a written accent mark (´) for each underlined nonce word, choosing the pronunciation that best sounded like a real Spanish word. All participants were asked to read the instructions carefully and repeat what they had to do before marking stress in order to make sure they had understood the task properly\textsuperscript{13}. There was no time limit given to answer any of the questionnaires; speakers were encouraged to reflect on their choices as much as needed.

5 Results and Discussion

Taking into account that the interaction between stress and syllable structure is dissimilar in disyllabic and trisyllabic words, the results are divided into disyllabic and trisyllabic categories. A total of 7,980 tokens resulted from the 105 responses of each of the 76 participants in questionnaire one. Of these 7,980 tokens, 3,040 were disyllabic words, 4,180 trisyllabic words and 760 were the real oxytonic words whose last consonant had been omitted. Disyllabic words could only be assigned final (oxytonic) or penultimate (paroxytonic) stress (see Table 1), whilst trisyllabic words included antepenultimate (proparoxytonic) stress.

\textsuperscript{13} Contrary to what happened in the previous questionnaires, when the native speakers were given this questionnaire, just one person mentioned the grammar rules regarding stress assignment.
## 5.1 Disyllabic words

Table 1: Distribution of syllable stress for disyllabic words according to the different syllable weight combinations (L= open, H= closed, H*= closed with complex onset).

<table>
<thead>
<tr>
<th>Weight combinations</th>
<th>Penult. Stress</th>
<th>Final stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>L L</td>
<td>81.84 %</td>
<td>69/38</td>
</tr>
<tr>
<td></td>
<td>311/3</td>
<td></td>
</tr>
<tr>
<td>H H</td>
<td>19.73 %</td>
<td>305/3</td>
</tr>
<tr>
<td></td>
<td>75/38</td>
<td>8</td>
</tr>
<tr>
<td>L H</td>
<td>17.36 %</td>
<td>314/3</td>
</tr>
<tr>
<td></td>
<td>66/38</td>
<td>8</td>
</tr>
<tr>
<td>H L</td>
<td>80.52 %</td>
<td>74/38</td>
</tr>
<tr>
<td></td>
<td>306/3</td>
<td>0</td>
</tr>
<tr>
<td>L H*</td>
<td>13.15 %</td>
<td>330/3</td>
</tr>
<tr>
<td></td>
<td>50/38</td>
<td>8</td>
</tr>
<tr>
<td>H*L</td>
<td>89.73 %</td>
<td>39/38</td>
</tr>
<tr>
<td></td>
<td>341/3</td>
<td>0</td>
</tr>
<tr>
<td>H*H</td>
<td>34.21 %</td>
<td>250/3</td>
</tr>
<tr>
<td></td>
<td>130/3</td>
<td>8</td>
</tr>
<tr>
<td>H H*</td>
<td>22.89 %</td>
<td>293/3</td>
</tr>
<tr>
<td></td>
<td>87/38</td>
<td>8</td>
</tr>
</tbody>
</table>

A rule-based perspective expects native speakers to apply the rules when assigning stress to nonce words. For example, applying Roca’s (1997) ‘rightmost stem accent’ rule, vowel-final nonce words would receive penultimate stress while the consonant-final would receive final stress. At first glance the results reported above seem to support the ruled-based approach. Most of the participants tend to assign stress following the rightmost stem accent rule. However, there are also instances when vowel-final nonce words are assigned final stress, and consonant-final words penultimate stress. There are real Spanish words which present this stress pattern and Harris (1992) suggests that in these words the word-final
vowel and the inflectional consonant are marked lexically as extrametrical. Being nonce
words, the ones used in this study cannot be lexically marked because they do not have a
proper lexical entry.

The patterns-in-the-lexicon approach, on the other hand, predicts variation in the
performance of native speakers as it is argued that speakers access their lexicon where they
find that most disyllabic words ending in a vowel are assigned penultimate stress, and those
ending in a consonant, final stress. Stress is then assigned by analogy.

The most interesting results in disyllabic words are those where the words contain two
closed syllables HH, H*H and HH*. While in the nonce words containing a complex onset
in the penultimate syllable, stress seems to have been slightly more often preferred in this
penultimate syllable (34.21%) than in those without a complex onset (19.73%), final stress
is still favoured (80.26% in HH, 77.10% in H*H and 65.68% in H*H). Note however that
when the closed penultimate syllable presents a complex onset and the final is also a closed
syllable (H*H), the one with the complex onset is slightly less often chosen to carry stress.
Can this be attributed to the lack of frequency of real disyllabic Spanish words formed by
two closed syllables but with a complex onset in their penultimate syllable? Unfortunately
this falls out of the scope of the present study; this question can only be left for future
research.

5.2 Trisyllabic words

5.2.1 Words in isolation

The importance of analogy in stress assignment to novel words in Spanish becomes more
evident in trisyllabic words (see Table 2). In contrast to disyllabic words, there is no
unmarked antepenultimate stress in nouns in Spanish. In other words, whenever a word
presents antepenultimate stress, it is always marked.

As mentioned in section 1, most of the nouns in Spanish belong to the unmarked pattern. It
is not surprising that the results in Table 2 show that most consonant-final forms received
final stress while most of the vowel-final words received penultimate stress. Echoing Face (2004:124) these results suggest that the speakers are aware of the fact that the majority of words present this pattern. If say, the rightmost stem accent rule proposed by Roca (1997) were to be responsible for these results, we would not expect any vowel-ending nonce form to be assigned final or antepenultimate stress; just as we would not expect consonant-ending forms to receive antepenultimate or penultimate stress.

The reason these results are not expected in a rule-based approach is that the words in Spanish that have final or antepenultimate stress and end in a vowel, as well as the words that have antepenultimate or penultimate stress and are consonant-final, are said to be marked lexically. The words used in this study, however, are not real Spanish words and cannot therefore be marked in the mental lexicon as exceptions to the rules.

Table 2: Distribution of syllable stress for trisyllabic words according to the different syllable combinations (L= open, H= closed, H*= closed with complex onset L*= open with complex onset).

<table>
<thead>
<tr>
<th>Weight combinations</th>
<th>Antepenult. stress</th>
<th>Penult. stress</th>
<th>Final stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.L.L</td>
<td>56/380</td>
<td>298/380</td>
<td>26/380</td>
</tr>
<tr>
<td>L.L.H</td>
<td>44/380</td>
<td>73/380</td>
<td>263/380</td>
</tr>
<tr>
<td>L.H.L</td>
<td>33/380</td>
<td>296/380</td>
<td>51/380</td>
</tr>
<tr>
<td>H.L.L</td>
<td>145/380</td>
<td>206/380</td>
<td>29/380</td>
</tr>
<tr>
<td>H.L.H</td>
<td>55/380</td>
<td>76/380</td>
<td>249/380</td>
</tr>
<tr>
<td>L.L.H*</td>
<td>44/380</td>
<td>57/380</td>
<td>279/380</td>
</tr>
<tr>
<td>L.H*L</td>
<td>37/380</td>
<td>310/380</td>
<td>33/380</td>
</tr>
<tr>
<td>H.L.H*</td>
<td>61/380</td>
<td>122/380</td>
<td>45/380</td>
</tr>
<tr>
<td>H*L.L</td>
<td>213/380</td>
<td>122/380</td>
<td>45/380</td>
</tr>
<tr>
<td>L*L.L</td>
<td>196/380</td>
<td>122/380</td>
<td>62/380</td>
</tr>
</tbody>
</table>

Furthermore, Harris (1983) maintains that antepenultimate stress in words that have a closed penultimate syllable is impossible in Spanish. When discussing this issue, Bárkányi (2002) shows that the 21st edition of the Dictionary of the Spanish Real Academy (DRAE) includes only one word with antepenultimate stress and this syllable structure, and suggests
that we should not consider the DRAE as “an absolute point of reference” highlighting the presence of recent borrowing in Modern Spanish such as “Róbinson”, or “badminton”. Bárkányi proposes that these borrowings could form a subgroup in the mental lexicon and be used by the speakers when assigning stress to new words.

Also worth noting in Table 2 is the fact that the nonce forms with the syllable structure L*LL and H*LL are mostly assigned antepenultimate stress. Remember that antepenultimate stress is always marked as lexical in the rule-based approach and because it is rather uncommon in the Spanish lexicon, the patterns-in-the-lexicon approach does not predict that trisyllabic words will be mainly assigned antepenultimate stress. In other words, neither approach seems to predict this preference.

When discussing antepenultimate stress, Waltermire’s (2004) argument is that antepenultimate stress is the least frequently found in real Spanish words. Echoing Bárkányi (2002), Waltermire (2004:180) mentions that only 3,226 (9.4%) out of 33,105 nouns taken from the 21st edition of the DRAE receive antepenultimate stress. This percentage is quite similar to the results of the experiment he carried out, where 12.4% of the trisyllabic words used were assigned antepenultimate stress. In the present study however, the overall percentage of antepenultimate stress assignment in trisyllabic words is twice as high as those found in real Spanish words (21.6%).

There are two reasons why the results of this study differ so much from those found by Waltermire (2004). Firstly, among the nonce trisyllabic words Waltermire used, there were some that contained real Spanish disyllabic words such as: landanson ‘name of a special dance’, linlenton ‘lazy’ (used in informal speech), torencor ‘resentment’, pontumba ‘grave’, polcada ‘each’, jansoda ‘soft drink’, and tortina ‘bath’, among others. In view of the fact that this detail may have prevented the participants from assigning antepenultimate stress to these words, one may believe that the results obtained by Waltermire are biased. Therefore Waltermire’s results may falsely coincide with the percentage found in real Spanish words.

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14 Italic characters are used to show the real Spanish words, each nonce word is followed by the English translation of the real Spanish word.
Spanish words. Secondly, the set of nonce forms used in the current study included complex onsets in all the syllable type combinations used. Note that it is mainly the words with final and penultimate open syllables with complex onsets in their antepenultimate syllables (L*LL and H*LL) that receive antepenultimate stress. If we were not to take these words into account (bearing in mind that these syllable combinations had not been used in previous studies), the percentage of antepenultimate stress drops from 21.65% to 14.50%, which is closer to the percentage of real Spanish words with antepenultimate stress.

As stated above, in previous studies (Bárkányi 2002; Face 2002, 2004; Waltermire 2004), antepenultimate stress has always been disfavoured. Bárkányi (2002) shows that of the 3,126 words contained in the DRAE, which have antepenultimate stress, 12.96% have an open penultimate and final syllable. Both Face (2004) and Waltermire (2004) agree that antepenultimate stress is the second favoured in trisyllabic words where the final and penultimate syllables are open. In the present study, the results obtained in the syllable combinations HLL and LLL coincide with these claims. However, when the antepenultimate syllable has a complex onset, it is this syllable (out of the three final syllables) that is most likely to be stressed (see Table 3).

Table 3: Comparison of the distribution of syllable stress for trisyllabic nonce words containing a complex onset in their antepenultimate syllable with those without a complex onset.

<table>
<thead>
<tr>
<th>Weight combination</th>
<th>Antepenult. stress</th>
<th>Penult. Stress</th>
<th>Final stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>L L L</td>
<td>56/380</td>
<td>298/380</td>
<td>26/380</td>
</tr>
<tr>
<td>L*LL</td>
<td>196/380</td>
<td>122/380</td>
<td>62/380</td>
</tr>
<tr>
<td>H L L</td>
<td>145/380</td>
<td>206/380</td>
<td>29/380</td>
</tr>
<tr>
<td>H*LL</td>
<td>213/380</td>
<td>122/380</td>
<td>45/380</td>
</tr>
</tbody>
</table>

A possible explanation for the preference of assigning stress to syllables with complex

---

15 It is important to remember that Face (2004: 124) discards any role of syllable weight and attributes this lack of preference to the amount of real Spanish words with antepenultimate stress, thus suggesting that stress is assigned by analogy. Waltermire (2004), on the other hand, does believe syllable weight determines stress placement and suggests a closed antepenult is only favoured, but not mostly preferred, when combined with a light final and a light penultimate.
onsets may be the presence of real Spanish words with this stress pattern, such as plátano ‘banana’, préstamo ‘loan’, trópico ‘tropic’, crédito ‘credit’ plástico ‘plastic’, gránulo ‘granule’, etc. These results further support the claim that when native speakers assign stress to never-before-encountered words, they access their lexicon and assign stress by means of analogy.

5.2.2 Words in contextualized sentences

To reinforce the claim that speakers did interpret these trisyllabic nonce words containing complex onsets as nouns, a second questionnaire where these words were included in contextualized sentences was given to 41 speakers. Their choices are shown in Table 4.

Table 4: Distribution of syllable stress for trisyllabic words in contextualized sentences.

<table>
<thead>
<tr>
<th>Weight combination</th>
<th>Antepenult. stress</th>
<th>Penult. Stress</th>
<th>Final stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>L*L L</td>
<td>106/205</td>
<td>51.70%</td>
<td>25.85%</td>
</tr>
<tr>
<td>H* L L</td>
<td>111/205</td>
<td>54.14%</td>
<td>28.78%</td>
</tr>
</tbody>
</table>

As can be seen in Table 5 (below), the percentages obtained in this questionnaire are very similar to the ones obtained when the words were presented in isolation. This reinforces both the claim that speakers did treat the nonce words as nouns even when they were presented in isolation, and the claim that antepenultimate syllables with complex onsets are favoured for stress assignment when they are combined with open syllables.

Table 5: Comparison of the distribution of syllable stress for words containing complex onsets presented in isolation with those included in contextualized sentences.

<table>
<thead>
<tr>
<th>Weight combination</th>
<th>Antepenult. stress</th>
<th>Penult. stress</th>
<th>Final stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>L*L L</td>
<td>51.70%</td>
<td>25.85%</td>
<td>22.43%</td>
</tr>
<tr>
<td>in context</td>
<td>51.57%</td>
<td>32.10%</td>
<td>16.31%</td>
</tr>
<tr>
<td>Isolated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H* L L</td>
<td>54.14%</td>
<td>28.78%</td>
<td>17.07%</td>
</tr>
<tr>
<td>in context</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.3 **Nonce forms segmentally identical to ten real words except that they lack the final consonant of the real word**

The remaining results to be shown and discussed include the nonce forms segmentally identical to the real Spanish words except that they lack the final consonant of the real word. These words also address the question of whether or not accentuation is assigned by analogy in Spanish (see Table 6). Face (2003) claimed it is, using his results as evidence since 59% of the vowel-final words and 37% of the s-final words were perceived as having final stress (reported in Eddington 2004b: 118).

Table 6: Distribution of syllable stress for nonce forms segmentally identical to real words except that they lack the final consonant of the real word.

<table>
<thead>
<tr>
<th>Antepenult. stress</th>
<th>Penult. Stress</th>
<th>Final stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>115/760</td>
<td>300/760</td>
<td>345/760</td>
</tr>
<tr>
<td>15.13%</td>
<td>39.86%</td>
<td>45.39%</td>
</tr>
</tbody>
</table>

Although the overall results shown in Table 6 clearly seem to support Face’s (2003) claim that accentuation is assigned by analogy, if we observe the speakers’ preferences word by word (see Table 7) we can see that it is mainly the words ending in <d> where stress is preferred on the final vowel.

This can be explained by bearing in mind that in some dialects of Spanish, it is very common to find people who, in spoken language, tend to omit the final consonant of oxytonic words ending in the consonant <d>16. Therefore the choices made could be interpreted as indicating that the speakers were aware that these <d>-final words were in fact real Spanish words but with their final consonant missing. We can claim then, that the participants assigned stress to these words as if they were their real counterparts.

---

16 In Mexican Spanish this tendency is also found when the words end in the consonant <c> phonetically realised as [k], thus it is very common to find people uttering ‘Metepé<es>’, ‘Tlacotepé<es>’, ‘Zinacantepé<es>’, (all proper names with oxytonic stress and ending in <es>) just as they would say, ‘factual’ ‘faculty’, ‘hospitalidad’ ‘hospitality’, or ‘felicidad’ ‘happiness’ (all oxytonic and d-final).
Table 7: Stress assignment for real Spanish words whose last consonant was omitted.

<table>
<thead>
<tr>
<th>Real words with no final consonant</th>
<th>Antepenult stress</th>
<th>Penult. Stress</th>
<th>Final stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>so.li.ci.tu(d)</td>
<td>3/76 3.94%</td>
<td>21/76 27.63%</td>
<td>52/76 68.42%</td>
</tr>
<tr>
<td>la.ti.tu(d)</td>
<td>6/76 7.89%</td>
<td>16/76 21.05%</td>
<td>54/76 71.05%</td>
</tr>
<tr>
<td>pron.ti.tu(d)</td>
<td>9/76 11.84%</td>
<td>15/76 19.73%</td>
<td>52/76 68.42%</td>
</tr>
<tr>
<td>i.gual.da(d)</td>
<td>6/76 7.89%</td>
<td>27/76 35.52%</td>
<td>43/76 56.57%</td>
</tr>
<tr>
<td>fa.cul.ta(d)</td>
<td>5/76 6.57%</td>
<td>30/76 39.47%</td>
<td>41/76 53.94%</td>
</tr>
<tr>
<td>vo.lun.ta(d)</td>
<td>2/76 2.63%</td>
<td>12/76 15.78%</td>
<td>62/76 81.57%</td>
</tr>
<tr>
<td>tem.po.ra(l)</td>
<td>53/76 69.73%</td>
<td>17/76 22.36%</td>
<td>6/76 7.89%</td>
</tr>
<tr>
<td>ma.nan.tia(l)</td>
<td>1/76 1.31%</td>
<td>68/76 89.47%</td>
<td>7/76 9.21%</td>
</tr>
<tr>
<td>de.lan.ta(l)</td>
<td>5/76 6.57%</td>
<td>50/76 65.78%</td>
<td>21/76 27.63%</td>
</tr>
<tr>
<td>co.me.do(r)</td>
<td>25/76 32.89%</td>
<td>44/76 57.89%</td>
<td>7/76 9.21%</td>
</tr>
</tbody>
</table>

Notice that if we were to take into account only the results from the other 4 remaining words, Face’s (2003) suggestion could not be supported at all, due to the fact that final stress is not favoured in any of these 4 words. This means that no evidence was found to support stress being assigned to this set of words by means of analogy.

6 Conclusion

The results obtained in the present study represent further evidence to sustain the argument that stress placement in Spanish is a lexical property of words, in accordance with the patterns-in-the-lexicon approach. The evidence relies on the participants’ preference to assign stress to made-up words which bears a resemblance to the most frequent patterns found in Spanish: final stress to consonant-final words and penultimate stress to vowel-final words.

It has been pointed out that though the rules proposed by the rule-based approach could be thought to account for some of the answers obtained in the present study, this approach would not expect participants to assign final stress to vowel-final words, penultimate stress to consonant-final words, or antepenultimate stress in general. The answers given by the participants in this study include examples of the choices just mentioned. If the rule-based
approach were to account for these results, it would require the participants to have applied a lexical rule such as extrametricality, to the new forms. Bearing in mind that the words used for this research are nonce forms, they are not yet part of the mental lexicon and cannot therefore be already marked lexically as exceptions. The patterns-in-the-lexicon approach, on the other hand, expects this variety in the speakers’ responses because this parallels the patterns found in real words.

The fact that the participants assigned stress to the nonce forms without applying rule-based algorithms represents evidence to support Bárányi’s claim that “the apparent sensitivity of the [Spanish] system is a lexical heritage but is not an active rule or constraint” in Modern Spanish (2002:391).

Furthermore, the participants’ choices in assigning antepenultimate stress to 9.2% of the nonce words with a closed penultimate syllable, suggest that a claim such as “antepenult stress is impossible if there is a closed penult” (Harris 1983) cannot be taken as entirely correct.

Finally, the participants’ preference of assigning antepenultimate stress to the nonce words with the syllable structure H*LL and L#LL is used as evidence to propose an answer to Waltermire’s question—suggesting that these syllable type combinations actually favour antepenultimate stress over final or penultimate.

**Acknowledgements**

I would like to thank Wyn Johnson and Ariel Vázquez for their help in administering part of the questionnaires used to carry out this study.

\[17\] In his 2004 paper Waltermire raises the question: what types of syllable weight combinations (if any) favour antepenultimate stress?
References


Waltermire, Mark (2004). ‘The effect of syllable weight on the determination of spoken stress in Spanish’. In Timothy Face (ed.) Laboratory Approaches to Spanish
APPENDICES

Appendix A

Nonce words containing all syllable combinations

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>L</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>tibe</td>
<td>tosgal</td>
<td>fagal</td>
<td>bagme</td>
</tr>
<tr>
<td>pira</td>
<td>lortil</td>
<td>metud</td>
<td>fedca</td>
</tr>
<tr>
<td>noso</td>
<td>destud</td>
<td>sodad</td>
<td>pimbo</td>
</tr>
<tr>
<td>madi</td>
<td>fordan</td>
<td>lapal</td>
<td>sorfe</td>
</tr>
<tr>
<td>sime</td>
<td>gasnol</td>
<td>tadon</td>
<td>topsa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L</th>
<th>H*</th>
</tr>
</thead>
<tbody>
<tr>
<td>laplen</td>
<td>pragde</td>
</tr>
<tr>
<td>deflas</td>
<td>frembo</td>
</tr>
<tr>
<td>potrel</td>
<td>drosfa</td>
</tr>
<tr>
<td>mepron</td>
<td>trisga</td>
</tr>
<tr>
<td>tebran</td>
<td>brante</td>
</tr>
</tbody>
</table>

| L | L | L | L | H | H | L | L | H | H | L | L | L | H | L | L | H | H | L | L | H | H | L | L | H | H | H | H |
| sodena | canetud | matemba | tompebo | bonsetud |
| delafa | degasel | decosfa | pasdulo | pestimil |
| mopada | fedutad | fobinte | fortepa | manferal |
| saboga | toberal | lafenta | montibe | sondebal |
| lanada | samodad | debinsa | rusdola | jarsetad |

<table>
<thead>
<tr>
<th>L</th>
<th>L</th>
<th>H*</th>
</tr>
</thead>
<tbody>
<tr>
<td>fapagron</td>
<td>faprento</td>
<td>plasdemor</td>
</tr>
<tr>
<td>notiples</td>
<td>leglasde</td>
<td>grastedon</td>
</tr>
<tr>
<td>periflon</td>
<td>declorpa</td>
<td>trempotad</td>
</tr>
<tr>
<td>gafidres</td>
<td>nadrengo</td>
<td>cronletud</td>
</tr>
<tr>
<td>badepran</td>
<td>pafronde</td>
<td>drantilan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L*</th>
<th>L</th>
<th>L</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>frambori</td>
<td>gropelu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>prindula</td>
<td>bridula</td>
<td></td>
<td></td>
</tr>
<tr>
<td>crostico</td>
<td>clotise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tramsaro</td>
<td>fradulo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>promtile</td>
<td>tlasipe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

L syllable has onset but no coda.
H syllable has onset and coda.
H* syllable has a complex onset and a coda.
L* syllable has a complex onset but no coda.

Appendix B

Words with final unmarked stress whose final segment was omitted:

<table>
<thead>
<tr>
<th>latitu(d)</th>
<th>manantia(l)</th>
<th>faculta(d)</th>
<th>comedo(r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prontitu(d)</td>
<td>tempora(l)</td>
<td>igualda(d)</td>
<td></td>
</tr>
<tr>
<td>Solicitu(d)</td>
<td>delanta(l)</td>
<td>volunta(d)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C

Questionnaire 1 - Part A

Si estas palabras fueran sustantivos nuevos en español, ¿dónde caería el acento *hablado*?
Por ejemplo la palabra sandiples, ¿dónde suena mejor el acento *hablado*?
Si crees que suena mejor *sandiples*, anota un acento sobre la /el/, ahora sandiplés.
Si crees que suena mejor *sandipes*, anota un acento sobre la /il/, ahora sandíples.
Si crees que suena mejor *sandiplés*, anota un acento sobre la /al/, ahora sándíples.
Recuerda que todas estas palabras serían sustantivos y esta sería su forma singular, por ejemplo podrían completar las frases:

Quiero un / una…
Préstame tu…
¿Dónde está el /la…?

<table>
<thead>
<tr>
<th>tebran</th>
<th>Sodena</th>
<th>drosfa</th>
<th>Delafo</th>
</tr>
</thead>
<tbody>
<tr>
<td>mendron</td>
<td>Crostol</td>
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Edad: _______________  País de nacimiento: _______________________

Questionnaire 1 - Part B

Same instructions as in Questionnaire A, but with the following set of words:

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<td>saboga</td>
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Appendix D

Questionnaire 2

Si las palabras subrayadas en los enunciados siguientes fueran sustantivos nuevos en español, ¿dónde caería el acento *hablado*?

Por ejemplo la palabra *sandiples*, ¿dónde suena mejor el acento *hablado*?

Si crees que suena mejor: Préstame tu *sandiples*, anota un acento sobre la /e/.

Si crees que suena mejor: Préstame tu *sandiples*, anota un acento sobre la /i/.

Si crees que suena mejor: Préstame tu *sandiples*, anota un acento sobre la /al/.

Quisiera un *frambori* muy moderno para mi departamento nuevo.

¿Me podrías prestar tu *gorpelu*?

Ana acaba de comprar una *prindula* nueva.

José me regaló un *crostico* azul el día de mi cumpleaños.

Tomás y Natalia quieren un *clotise* como el de Martha.

¿Dónde está la *bridula* que compraste?

Carlos puso el *tramsaro* sobre la mesa.

Pásame el *fradulo*, por favor.

Carmen trajo el *promtile* de su casa.

Saca el *tasipe* del horno.

Edad: ____________________ País de nacimiento: ____________________
A-movement out of control clauses and the status of CP phases

Keisuke Yoshimoto

Abstract

The primary purpose of this paper is to show that CPs are divided into some which constitute phases and others which do not, against the view of Chomsky (2001) that CPs are generally phases. The rationale comes from the fact that heavy NP shift is allowed out of control infinitives which are considered to be CP, whereas it is not allowed out of that-indicatives and for-to infinitives. The same is also true in scrambling out of Japanese control clauses. This suggests that control infinitives do not form phases because otherwise extraction out of them would violate the Phase Impenetrability Condition. This is a conceptually preferable consequence in the sense that it is now possible to treat CPs and vPs uniformly as they both split into phasal and non-phasal counterparts.

1. Introduction

This paper discusses CP phases which pose a challenge for any kind of theory trying to relate PRO and its controller across a clause boundary. Chomsky (2001) suggests that syntactic structures are built up in phases and that the Language Faculty can hold only a restricted amount of structure in its active memory at a time. Phases are considered to be phrases that are propositional in nature; and in his theory, they are CP and transitive vP (abbreviated as v*P and thereby differentiated from unaccusative/passive verb phrases): This is because v*P has a full argument structure including an external thematic argument and CP has a force indicator (Chomsky 2001:12). Once a phase has been completed, the complement/domain of the phase head is transferred to the phonological and semantic components, and thereafter the elements in the complement/domain of the phase head become inaccessible to further syntactic operations. From this follows the Phase Impenetrability Condition (henceforth PIC) cited below.

(1) Phase Impenetrability Condition (PIC) (Chomsky 2000:108)
In phase $\alpha$ with head H, the domain of H is not accessible to operations outside $\alpha$, only H and its edge (specifier) are accessible to such operations.

What is interesting about phases is that while vP is divided into two types, i.e., one which

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constitutes a phase and the other which does not\(^2\), depending on whether \(vP\) has an external thematic argument (transitive/unergative \(vP\) are phases but passive/unaccusative \(vP\) are not), \(CP\) is generally regarded as a phase. In this paper, I raise an objection to this view and argue that there are \(CP\) clauses which are not phases. The evidence for this claim comes from data suggesting that \(A\)-movement is allowed out of control clauses.

The structure of this paper is as follows. In the next section, I will argue that although control clauses are \(CP\)s, heavy \(NP\) shift is permitted out of them in English. Then, in section 3, I will look at Japanese and show that \(A\)-scrambling is allowed from control clauses in Japanese. Section 4 discusses why only certain types of \(vP\) and \(CP\) are phases. And section 5 presents my overall conclusions.

### 2. \(A\)-movement out of English Control Clauses

#### 2.1 The category of control clauses

I begin by examining the categorial status of control infinitives in English. In the GB literature, the category of control clauses was considered as \(CP\). This is because the distribution of \(PRO\) is accounted for by the \(PRO\) theorem (Chomsky 1981) which designates that \(PRO\) appears in the ungoverned position; and this consequently leads to an assumption that control clauses should be \(CP\)s in order to prevent \(PRO\) from being governed by the matrix predicate. Now that government has been dispensed with in minimalism, however, it seems that the theoretical motivation for regarding control clauses as \(CP\)s has *de facto* disappeared. In fact, Bošković (1996) notes, following Law’s (1991) Minimal Structure Principle (MSP)\(^3\), that a structure can contain only as many functional projections as are needed to satisfy lexical requirement, and that control clauses should be \(TPs\) because, due to MSP, it is more economical to have fewer projections satisfying the

\(^2\) In Chomsky (2001:12), the former are called strong phases and the latter are called weak phases. In this paper, I do not use this terminology as weak phases are actually not phases in the sense that the complement of a weak phase head is not transferred to the phonological and semantic components.

\(^3\) Minimal Structure Principle (taken from Bošković 1996:290). Provided that lexical requirements of relevant elements are satisfied, if two representations have the same lexical structure, and serve the same function, then the representation that has fewer projections is to be chosen as the syntactic representation serving the function.
relevant lexical requirements. Although theoretical considerations no longer require control clauses to be CPs, there is independent empirical evidence to show that they are in fact CPs. For instance, Radford (2004:130) notes that a control infinitive can be coordinated with a clause containing an overt complementizer as in (2). If only the same kinds of constituent can be coordinated, it is plausible to conclude that control infinitives are CPs.

(2) I will arrange to see a specialist and for my wife to see one at the same time.

Other evidence comes from pseudo-cleft sentences (cf. Koster and May 1982, Radford 2004). As shown in (3) and (4), the constituents which can occur in the focus position of pseudo-clefts sentences are not VPs or TPs, but CPs.

(3) a. What he suspected was [CP that Bill saw Monument Valley].
   b. What he wanted was [CP for Bill to see Monument Valley].
   c. *What he suspected that Bill was [VP saw Monument Valley].
      (Koster and May 1982)

(4) a. *What they believe is [TP him to be innocent].
   b. *What we hadn’t intended was [TP you to get hurt].
      (Radford 2004:132)

Interestingly, control infinitives with a PRO subject can also be the focus of pseudo-clefts as shown in (5c).

(5) a. What I’ll try and arrange is [for you to see a specialist].
   b. *What I’ll try and arrange for is [you to see a specialist].
   c. What I’ll try and arrange is [PRO to see a specialist].
      (Radford 2004:131)

Such data from pseudo-clefts suggest that control infinitives are CPs.
2.2 Heavy NP Shift out of Control Clauses

Although control clauses have the same CP status as other clauses containing an overt complementizer, it would seem that control infinitives do not behave like other CP clauses with regard to extraction, as will be illustrated in relation to heavy NP shift. Let us first look at that indicatives. As shown in (6b), when the heavy NP *Gibraltar and the surrounding territory* moves to the right edge of the embedded CP2 from its original position in (6a), the sentence is grammatical (the original position of the heavy NP is shown as a trace *t* for expository convenience).

(6) a. \([CP1 \text{ I had been expecting [CP2 that Britain would cede } \text{Gibraltar and the surrounding territory to Spain} \text{ since 1939}]\].

b. \([CP1 \text{ I had been expecting [CP2 that Britain would cede } \text{Gibraltar and the surrounding territory} \text{ to Spain} \text{ since 1939}]\].

However, when the heavy NP moves to the right edge of CP1 across a clause boundary, the sentence becomes ungrammatical as in (7) (in consequence of Ross’s (1967) right roof constraint). That the heavy NP moves to the end of the matrix clause is apparent from the fact that it appears after *since 1939* which modifies the matrix clause.

(7) *[CP1 \text{ I had been expecting [CP2 that Britain would cede } \text{Gibraltar and the surrounding territory} \text{ since 1939}]].

The same is true of for-to infinitives. As shown in the sentences in (8), the highlighted heavy NP can move to the righthand edge of the embedded CP2, but cannot move to the righthand edge of the matrix CP1 across an intervening clause boundary.

(8) a. \([CP1 \text{ Mary had been intending [CP2 for her daughter to give } \text{her collection of the complete works of Shakespeare to the library} \text{ for quite some time}]\].

b. \([CP1 \text{ Mary had been intending [CP2 for her daughter to give } \text{her collection of the complete works of Shakespeare} \text{ to the library} \text{ for quite some time}]\].

c. *\([CP1 \text{ Mary had been intending [CP2 for her daughter to give } \text{her collection of the complete works of Shakespeare} \text{ to the library} \text{ for quite some time}]\].
On the other hand, heavy NP shift out of control infinitives across a clause boundary is possible as in (9)⁴⁻⁵⁻⁶.

(9) a. [CP₁ I have tried [CP₂ PRO to find out t for certain] over many years \textit{what happened to Ambrose Bierce}].
   b. [CP₁ I’ve been hoping [CP₂ PRO to uncover t] for a number of years now \textit{why Kennedy was assassinated}].
   c. [CP₁ My sister used to love [CP₂ PRO to draw t] for many years \textit{a picture of her dog sleeping on the sofa}].
   d. [CP₁ The University claims [CP₂ PRO to have undertaken t] since last year \textit{three studies which verify the effectiveness of Facilitated Communication}].
   e. [CP₁ Amy continued [CP₂ PRO to play t] for many years \textit{the violin which her uncle gave her}].

Significantly, the fact that heavy NP shift is allowed only from control infinitives gives a better understanding of CP phases. This is because given that all these clauses are CPs and CPs are generally phases, control clauses would be expected to bar extraction in the same way as other CP clauses under PIC. But this prediction is not borne out. Therefore, it can be inferred that control clauses are not phases, and hence CP clauses can be divided into phases and non-phases in the same way as vPs.

It might be objected that heavy NP shift out of control clauses is possible because the adjunction site of heavy NP shift may be an A-bar position, and the movement can stop by the embedded Spec CP position as an escape hatch. Given that the embedded Spec CP position is still accessible for further operations according to PIC, this cyclic movement could make heavy NP shift possible. However, this approach is misguided in two ways. First, if we assume that cyclic movement makes heavy NP shift possible, it cannot explain why it is not possible from \textit{that} indicative clauses and \textit{for-to} infinitives. If heavy NP shift

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⁴ The observation that heavy NP shift is possible out of control clauses was first made by Postal (1974). See also Gazdar (1981) for the similar observation.
⁵ Hirai (2004) argues that heavy NP shift out of realis complements is not allowed. That is, heavy NP shift from the complements of the verbs such as \textit{manage, love, claim} is not permitted as they select realis complements. However, my informants (4 British and 1 Irish) all agree that heavy NP shift out of these complements is allowed as shown in (9c-e) though some of them are not perfect.
⁶ It seems that the verb \textit{continue} can also be used as a raising verb as shown in the examples below.
(i) a. It continued to rain.
   b. There continued to be problems with the engine.
However, the verb \textit{continue} in the sentence (9e) is used as a control verb as it assigns the 0-role AGENT to its subject.
takes place cyclically via embedded Spec CP, it is natural to assume that the same applies to \textit{that} indicative clauses and \textit{for-to} infinitives. However, this alleged cyclic movement does not seem to save the sentences in (7)-(8) which involve heavy NP shift across a clause boundary. It would seem therefore that cyclic movement has nothing to do with the possibility of heavy NP shift. Second, there is evidence that the landing site of heavy NP shift is not an A-bar position. Culicover and Rochemont (1990: 29) suggest that an extraposed NP can serve as an antecedent for a pronoun as shown in (10a) (the highlighted heavy clause is moved from the original position in (10b)).

(10)  a. I sent her, many gifts last year \textit{that Mary didn’t like}.  
    b. *I sent her, many gifts \textit{that Mary didn’t like} last year.

Given that an antecedent in an A-bar position cannot bind a pronoun in an A-position (e.g., *Who does his mother like?), the acceptability of (10a) suggests that the phrase moved by heavy NP shift is actually in an A-position. What is interesting is that this observation further supports the view that heavy NP shift does not transit through the embedded Spec CP position. This is because, if the landing site of heavy NP shift is an A-position, cyclic movement via embedded Spec CP would create a mixed A-A’-A chain, and this is prohibited as an improper movement. Therefore, only way to make heavy NP shift possible is to move a heavy NP directly from an A position to an A position without passing through the embedded Spec CP position.

It should by now be clear that all the embedded clauses in (6)-(9) have the same status. That is, they are all CPs and heavy NP shift out of them does not transit through the embedded Spec CP. Nonetheless, heavy NP shift is only possible from control clauses. Accordingly, one conclusion which this might lead us to is that control clauses are not phases and hence not subject to PIC. As a result, an A-movement operation like heavy NP shift is permitted out of control clauses without violating PIC.

Now let us investigate what exactly the landing site of heavy NP shift is. Frampton (1991) presents the following examples to show that a clause cannot be the adjunction site for heavy NP shift:
(11)  a. I saw [[some of our bravest students] killed] with my own eyes.
    b. I saw [ti killed] with my own eyes [some of our bravest students],
    c. *I saw [ti killed [some of our bravest students]] with my own eyes.

The examples in (11) contain embedded small clauses with heavy subjects. (11c) shows that it is not possible for the heavy NP to be adjoined to the small clause. This contrasts with (11b) in which the heavy NP is adjoined to the matrix VP. This data lead him to conclude that VP is a possible adjoined site for heavy NP shift. Frampton (1991) also cites the example below:

(12)  *ti are intelligent [all the students who can solve this problem],

The reason for (12) being ruled out is that the heavy NP shift involves lowering and leaves an unbound trace in the subject position, assuming that VP is a possible adjunction site for heavy NP shift. If the heavy subject were adjoined to a category such as TP high enough to allow the subject to bind the trace, the sentence should be grammatical.


(13)  a. *He put cigars [[PP in Ben’s box].
    b. *[PP In Ben’s box], he put cigars tj.

(14)  a. *He put cigars [[PP in the box that Ben brought from China].
    b. [PP In the box that Ben brought from China], he put cigars tj.

The sentences in (13a) and (14a) are ruled out by condition C of the binding theory as the pronoun he c-commands the antecedent Ben. In (13b) and (14b), PP is preposed and hence there is no condition C violation. According to Reinhart (1976), the contrast between (13b) and (14b) can be explained if coreference is permitted only when the antecedent is deeply embedded within the moved phrase. Bearing this in mind, let us now look at the examples in (15) (Reinhart 1976).
(15) a. *After days of search, they finally found him, [PP in Dr. Levin’s hotel room].
   b. After days of search, they finally found him, [PP in a sleazy hotel room that Dr. Levin had rented under a false name].
   c. *After days of search, he was finally found [PP in a sleazy hotel room that Dr. Levin had rented under a false name].

(15a) and (15b) are parallel to (13b) and (14b). The contrast between (15a) and (15b) can be explained similarly by the fact that the antecedent Dr. Levin is deeply embedded within PP in (15b) but not in (15a). (15c) is a case in which the pronoun he is in the subject position as opposed to being in the object position in (15a) and (15b). The contrast between (15b) and (15c) seems to be unpredictable because the antecedent Dr. Levin is deeply embedded within PP in both sentences. Thus, the ungrammaticality of (15c) follows from the fact that PP does not escape from the c-command domain of the pronoun he in the subject position, and therefore the sentence is ruled out by condition C of the binding theory. Put simply, PP can escape from the c-command domain of the matrix object in (15b) by rightward movement, but cannot do so from the c-command domain of the matrix subject in (15c). Accordingly, this leads Saito (1991) to conclude that the adjunction site for rightward movement is not TP, but VP as the adjunction site should be above the object position and below the subject position. In this paper, I assume, in terms of minimalist architecture, that the adjunction site of heavy NPs is VP instead of VP. This is because if an object NP ultimately moves to Spec VP, a position which is above the object is considered to be vP.

To recapitulate this section, we have seen that control clauses are CPs but heavy NP shift is allowed out of them. If heavy NP shift involves A-adjunction to vP, it is plausible to think that control clauses are not phases, and thus not subject to PIC. The overall derivation of heavy NP shift out of control clauses is schematized as below (for the sake of simplicity, the structure above matrix v*P is omitted):
(16) a. [CP1 I’ve been hoping [CP2 PRO to uncover t] for a number of years now why Kennedy was assassinated].

As (16b) illustrates, the heavy object why Kennedy was assassinated originates in the embedded object position, and adjoins first to the embedded v*P. This is because, if the embedded v*P is a phase, the heavy object should transit through the edge of the v*P in order to circumvent the PIC. The heavy object subsequently moves into the matrix clause into a position higher than the matrix adverb and adjoins to the matrix v*P. This movement of the heavy object cannot transit through an A-bar position such as the embedded Spec CP since, if the relevant adjoined position is an A-position, this movement via an A-bar position would create a mixed chain. This argument contributes to a better characterization

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7 One could assume that the heavy object adjoins to the embedded CP and it is an A-position, so that the relevant movement would not violate the PIC. This assumption, however, cannot account for why heavy NP shift is not
of phases, because now \( vP \)s and CPs can be captured uniformly in the sense that both of them are divided into phase (abbreviated as \( v^*P \) and \( C^*P \) respectively) and non-phase (\( vP \) and CP).

### 2.3 Is extraposition a PF operation?

In this section, I will argue against the view of Chomsky (2001) that extraposition (rightward movement) is an operation of the phonological component. If extraposition were a PF operation, it would be predicted that extraposition does not obey syntactic constraints like PIC, and heavy NP shift out of control clauses would be allowed irrespective of whether they constitute phases or not. There is, however, evidence to show that extraposition has semantic effects sensitive to syntactic configuration, and thus is not an operation in the phonological component.

Let us first look at binding relations as shown in (17) (repeated here from (10)) (Culicover and Rochemont 1990: 29).

(17)

a. I sent her, many gifts last year that Mary didn’t like.

b.*I sent her, many gifts that Mary didn’t like last year.

In (17), the heavy relative clause *that Mary didn’t like* is moved from its original position in (17b) to the adjoined position in (17a). (17b) is ungrammatical because the pronoun *her* binds its antecedent *Mary* in the relative clause, and this violates Condition C of the binding theory. By contrast, when the relative clause is moved to the adjoined position in (17a), *Mary* succeeds in binding *her*. If binding relations are sensitive to structural configuration, it is plausible to think that extraposition is an operation which takes place prior to the transfer of syntactic structure to the phonological component. Furthermore, Guéron (1980: 650) notes that extraposition saves otherwise ungrammatical sentences in

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8 Although heavy NP shift is generally assumed to involve rightward movement, it is worth mentioning here that there is an alternative view (Kayne 2000a, 2000b, Larson 1988) that this is a leftward movement process.
terms of licensing negative polarity items as shown in (18) and (19).

(18)a.*The names [PP of any of those composers] weren’t called out yet.
   b. The names t weren’t called out yet [PP of any of those composers].

(19)a.*M. thinks that the extraposition transformation [CP which has the slightest effect on LF] hasn’t been found yet.
   b. M. thinks that the extraposition transformation t hasn’t been found yet [CP which has the slightest effect on LF].

In (18) and (19), when the phrases containing a polarity item such as any and slightest are extraposed from the original position (a) to the adjoined position (b), the sentences become grammatical. Negative polarity items are licensed by a c-commanding not, and hence affected by structural configuration. Accordingly, the data in (18b) and (19b) suggest that extraposition in these sentences plays a role in establishing a syntactic relation between negation and the polarity item. If extraposition is an operation in the phonological component as Chomsky maintains, the data presented above on pronoun binding and negative polarity items cannot be accounted for because PF operations have nothing to do with the licensing of pronouns and negative polarity items. Thus, this leads us to consider that extraposition is a syntactic operation taking place prior to the Transfer to the phonological component, and because it is a syntactic operation, extraposition conforms to PIC.

3. A-scrambling out of Japanese control clauses

In section 2, we observed that heavy NP shift is permitted out of control clauses in English. In this section, I will show that the same is true of Japanese control clauses. It has been argued that Japanese allows long-distance A-scrambling to TP quite freely. As shown below, not only (20b) but also (20c) which involves long-distance scrambling to TP is allowed (Saito 1996:12-13):
In (20b), the embedded object is moved to the initial position of the embedded clause by clause-internal scrambling. In (20c), on the other hand, the embedded object is moved to the initial position of the matrix clause by long-distance scrambling across a clause boundary.

As pointed out by Mahajan (1989) in relation to Hindi, phrases moved by clause-internal scrambling and long-distance scrambling have different binding properties. The same is observed in Japanese (cf. Tada 1990). A phrase moved by clause-internal scrambling can serve as the antecedent of a lexical anaphor as shown in (21b) (Saito 1996:13).

(21a) \[ TP Otagai\_i -no sensei\_ga \[ VP karera\_i-o hihanshita] each other-Gen teacher-Nom they-Acc criticized \]
\[ (((Each other,\'s teachers) [criticized them_i])) \]

(21b) \[ TP Karera\_i-o \[ TP [otagai\_i -no sensei\_i]-ga \[ VP t\_i hihanshita]] they-Acc each other-Gen teacher-Nom criticized \]
\[ (((Them, [each other,\'s teachers] [criticized t_i])) \]

(21a) is ruled out because the lexical anaphor *otagai* ‘each other’ is not c-commanded by its antecedent *karera* ‘they’. In (21b), the object is moved to the initial position in the clause by clause-internal scrambling, and as a result, the antecedent *karera* ‘they’ binds the anaphor *otagai* ‘each other’. Since the anaphor needs an antecedent in an A-position, (21b) suggests that clause-internal scrambling is A-scrambling.
By contrast, long-distance scrambling across a clause boundary exhibits different behavior with regard to binding. Consider (22) (from Saito 1996:14)

(22)a.^[TP [Otagaii -no sensei]-ga [VP [CP [TP Hanako-ga karera]-o
Each other-Gen teacher-Nom -Nom they-Acc
hinanshita]-to] itta]]
criticized-Cto said
([Each other’s teachers] [said that Hanako criticized them,])

b.^[TP[Karera-o [TP [otagaii -no sensei]-ga [VP [CP [TP Hanako-ga ti
they-Acc each other-Gen teacher-Nom -Nom
hihamshita]-to] itta]]]
criticized-Cto said
([Them, [each other’s teachers] [said that Hanako criticized ti,]])

(22a) is ruled out because the anaphor *otagai ‘each other’ is not c-commanded by the antecedent *karera ‘they’. In (22b), the embedded object *karera ‘they’ is preposed to the initial position in the matrix clause across the clause boundary by long-distance scrambling. And the result is ungrammatical. This shows that a phrase moved by long-distance scrambling cannot bind the anaphor, and hence long-distance scrambling is not A-scrambling.

Of particular relevance here is that scrambling out of control clauses in Japanese shows the same binding properties as clause-internal scrambling (Nemoto 1991:354). See (23).

(23)a.^[TP [Otagaii -no chichioya]-ga [CP[TP PRO [John to Bob]-o
Each other-Gen gather-Nom and -Acc
rikaishiyoo]-to] kokoromita.
understand-Cto attempted
“Each other’s fathers attempted to understand John and Bob.”

b. [TP[John to Bob]-o [TP [otagaii-no chichioya]-ga [CP[TP PRO Tt
and -Acc each other-Gen father-Nom
rikaishiyoo]-to] kokoromita.
understand-Cto attempted
“John and Bob’s each other’s fathers attempted to understand ti.”

(23a) is ruled out because the anaphor *otagai ‘each other’ is not c-commanded by the
antecedent *John to Bob* ‘John and Bob’. In (23b), the antecedent is preposed into the initial position in the matrix clause across the clause boundary, and it succeeds in binding the anaphor *otagai*. Since the anaphor requires an antecedent in an A-position, it is plausible to suppose that the movement in (23b) is A-scrambling. It is important to mention that the control clauses in (23) and the non-control indicative clauses in (22) are both introduced by the same complementizer *to*. Therefore, it is plausible to suppose that control clauses as well as non-control clauses are generally CPs. As we have seen, however, scrambling out of control clauses is A-scrambling to the matrix TP in (23). And A-scrambling cannot transit through the embedded Spec CP position as it would create a mixed A-A’-A chain, and this is precluded as an instance of improper movement. Consequently, one way of explaining the grammaticality of (23b) is to assume that control clauses are not phases, and scrambling out of them involves a direct movement to the matrix TP position without passing through the embedded Spec CP. Provided that control clauses are not phases, this movement does not violate PIC. On the other hand, as shown in (22), scrambling from non-control clauses is A-bar scrambling in Japanese. Hence, it is possible that the movement passes through the embedded Spec CP position as an escape hatch because the chain produced is A-A’-A’; and as a result, the long-distance scrambling out of non-control clauses produces a grammatical sentence like (20c) without violating PIC (when anaphor binding is excluded). A-scrambling out of control clauses in (23b) works as shown in the diagram below:\(^9\):

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\(^9\) It seems that if the embedded object *John to Bill* passes through Spec v*P, it intervenes between T and PRO. Therefore the embedded object would block the Agree between T and PRO due to the Defective Intervention Constraint. One possible solution for this is to assume that the Agree takes place before the embedded object moves to Spec v*P, but this remains to be ascertained.
In (24), I assume that the embedded object *John to Bob* ‘John and Bob’ transits through the edge of both the embedded and matrix $v^*$Ps in the course of reaching the matrix Spec TP because these $v^*$Ps are phases. Furthermore, it is assumed that the Spec $v^*$P position where this object transits through is an $A$-position in order not to create a mixed $A$-$A'$-$A$ chain. By contrast, if the present analysis is on the right track, the embedded object cannot transit through the embedded Spec CP because otherwise it would generate a mixed $A$-$A'$-$A$
chain, given that the landing site for the scrambling out of control clauses is an A-position.

So far, we have only looked at structures in which the landing site of scrambling is Spec TP. But it is also possible in Japanese for the landing site of scrambling to be Spec v*P as is apparent from the word order in (25) (Saito 1996:15).

(25) a. [TP Mary-ga [vP John-ni hon-o watashita]].
   -Nom -to book-Acc handed
   ([Mary [handed a book to John]])

   b. [TP Mary-ga [vP hon-o, [vP John-ni ti watashita]]].
   -Nom book-Acc -to handed
   ([Mary [a book i handed ti to John]])

As discussed in Saito (1985), long-distance vP-adjunction is much more restricted than long-distance TP-adjunction. Compare (26) with (20c).

(26) a.*?[TP John-ga [vPsono hon-o, [vP Bill-ni [CP [TP Mary-ga ti
   -Nom that book-Acc -to -Nom
   motteiru]-to] itta]]
   have-Cto said
   ([John [that book, [said to Bill [that [Mary has ti]]]])

   b. *[TP John-ga [vPsono mati-ni, [vP Bill-ni [CP [TP Mary-ga ti
   -Nom that town-in -to -Nom
   sundeiru]-to] itta]]
   reside-Cto said
   ([John [in that town, [said to Bill [that [Mary lives ti]]]])

(Saito 1996:16)

10 Note that long-distance scrambling out of indicative clauses like (20) shows A'-properties, which suggests that the embedded Spec CP position where the scrambled NP passes through so as to avoid the PIC violation is an A-bar position.

11 Saito (1996) analyses the landing site as Spec VP, but its counterpart in a minimalist framework is Spec vP. Hence, I will use vP hereafter.

12 Saito (1985) judges that sentences in (26) are ?? because they are still acceptable though not perfect. But, my informants (2 Japanese who are linguists) judged that they are not acceptable ((26b) especially is really bad). I agree with them that the sentences in (26) are not acceptable. I tentatively suggest that this ungrammaticality might result from an improper movement, assuming that, if Spec vP is an A-position, the scrambling through the embedded Spec CP (which is an A-bar position) would create an A-A'-A chain.
On the other hand, vP-adjunction scrambling out of control clauses is possible as in (27b).

\[(27)\text{a.}^{\text{TP}} \text{John-ga} \left[ v_P \left[ v_P \text{otagai}_i \text{-no sensei}-ni \right] \right] \text{karera}_i-\text{o-nom each other-Gen teacher-to they-Acc homeru] yooni] tanonda]}].
\text{praise C asked} \\
([\text{John [asked [each other,']s teachers] [PRO to praise them,]}])

\[(27)\text{b.}^{\text{TP}} \text{John-ga} \left[ v_P \text{karera}-o_i \right] \left[ v_P \text{otagai}_i-\text{no sensei}-ni \right] \text{[CP [TP PRO} t_i-\text{nom they-Acc each other-Gen teacher-to homeru] yooni] tanonda]}].
\text{praise C asked} \\
([\text{John [them,] [asked [each other,']s teachers] [PRO to praise t_i]}])\quad \text{(Saito 1996:17)}

The fact that the antecedent karera ‘they’ can bind the anaphor otagai ‘each other’ in (27b) suggests that long-distance scrambling to Spec v*P is A-scrambling. Furthermore, Tada and Saito (1991) claim that the vP-adjoined position is necessarily an A-position. If their assumption is on the right track, the unacceptability of (26) can be accounted for by supposing that A-scrambling moves across a phase boundary violating PIC. In (27b), on the other hand, A-scrambling to the matrix Spec v*P out of control clauses is allowed since control clauses are not phases, and hence A-movement out of them is not subject to PIC. In sum, the derivation of (27b) can be schematized as follows (the structure above v*P is omitted for the sake of simplicity).

\[(28)\text{a.}^{\text{TP}} \text{John-ga} \left[ v_P \text{karera-o}_i \right] \left[ v_P \text{otagai}_i-\text{no sensei}-ni \right] \text{[CP [TP PRO} t_i-\text{nom they-Acc each other-Gen teacher-to homeru] yooni] tanonda]}].
\text{praise C asked} \\
([\text{John [them,] [asked [each other,']s teachers] [PRO to praise t_i]}])
In (28), the embedded object karera-o moves to the matrix Spec v*P without transitting though A-bar position such as the embedded Spec CP so as not to create a mixed chain.

4. What constitutes a phase

In the previous sections, we saw that control clauses do not constitute phases either in English and Japanese. A natural question to ask then is why control clauses are not phases, and whether there is something in common between control clauses and unaccusative/passive vPs. In this section, I attempt to answer this question by looking at feature checking within CP/vP.

Given the strongest minimalist thesis (SMT) of Chomsky (2000:96) which claims that natural language is an optimal solution to legibility conditions at interfaces, there should
not be unvalued uninterpretable features left within the complement/domain of a phase head by the time that the complement/domain of the phase head has been transferred to the phonological and semantic components. This is because uninterpretable features, not having semantic content, cannot be assigned an interpretation at the semantics interface. Uninterpretable features, therefore, should be valued and deleted by Spell-out (though they are still visible to the phonological component). Furthermore, Chomsky (2005, 2006) argues that Agree-features originate on a phase head $v^\ast$ and C and subsequently percolate down to V and T$^\dagger$. If this is the case, the derivation can tell whether all uninterpretable features are valued and deleted when a phase is completed. This amounts to supporting the convergence-based view of phases (Chomsky 2000:107) that phases can be understood as convergent domains in that the complement of a phase head is sent for Transfer only when it contains no unvalued/undeleted uninterpretable features, because otherwise the derivation would crash. Accordingly, the notion phase can be considered parasitic on Transfer, and whether a given CP or vP constitutes a phase is determined in terms of convergence, that is, whether the CP or vP contains unvalued/undeleted features in its complement. The approach which I will pursue here is that control clauses and unaccusative/passive vPs do not constitute phases because they contain uninterpretable features which cannot be valued/deleted within the complement of a phase head C or v.

Let us first consider transitive vPs. In transitive verb phrases, an NP object with interpretable $\phi$-features and an uninterpretable Case feature is introduced in the derivation, and this values and deletes uninterpretable $\phi$-features on V which percolate down from a phase head $v^\ast$. Subsequently, V values an uninterpretable Case feature of the NP as accusative. Thus, all uninterpretable features, i.e., uninterpretable $\phi$-features on V and uninterpretable Case feature of NP are valued and deleted within a verb phrase. This feature checking is roughly schematized in (29).

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$^\dagger$ See Radford (2007:284-8) for the possible problems of obligatory feature inheritance.
(29) Feature-checking within transitive vPs

a. John hit the eight ball. (transitive)

b. \[v_P v^* [v_P V NP]]

[\[\text{uPers} \quad [3\text{-Pers}]\]
[\[\text{uNum} \quad [Sg\text{-Num}]\]
[\[\text{uCase} \quad [\text{Num}\text{-Case}]\]]

c. \[v_P v^* [v_P V NP]]

[\[\text{3-Pers} \quad [3\text{-Pers}]\]
[\[\text{Sg-Num} \quad [Sg\text{-Num}]\]
[\[\text{Acc-Case} \quad [\text{Nom-Case}]\]]

In unergatives like *John is groaning*, the subject does not originate within VP but it is base-generated as the external argument of *v and Case-marked by T. Hence, it can be inferred that there are no uninterpretable features within the complement of v* in the first place.

On the other hand, unaccusative/passive v is defective in that it does not assign accusative Case to an NP in its complement position. An uninterpretable Case feature of the NP is thus valued by the matrix T, and uninterpretable φ-features on T which percolate down from the phase head C are valued by this NP. The fact that uninterpretable φ-features on T are valued by the NP which is first generated in the complement position is apparent since there is person/number agreement between them as in they were arrested. The feature-checking within unaccusative/passive vP is illustrated as in (30).

(30) Feature-checking within unaccusative/passive vPs

a. They were arrested. (passive)

b. They arrived. (unaccusative)

c. \[C_\text{CP} [TP T [v_P v [v_P V NP]]]]

[\[\text{uPers} \quad [3\text{-Pers}]\]
[\[\text{uNum} \quad [\text{Pl-Num}]\]
[\[\text{Past-Tense} \quad [\text{Nom-Case}]\]]

d. \[C_\text{CP} [TP T [v_P v [v_P V NP]]]]

[\[\text{3-Pers} \quad [3\text{-Pers}]\]
[\[\text{Pl-Num} \quad [\text{Pl-Num}]\]
[\[\text{Past-Tense} \quad [\text{Nom-Case}]\]]

The NP in the complement position then moves to Spec TP position to check off the EPP feature on T. The key difference between transitive/unergative vPs and
unaccusative/passive vPs, therefore, is that only the latter have uninterpretable features within the complement of v, while the former presumably have uninterpretable features of their surface subjects in their specifier position.

Let us move on to CPs. In indicatives and for-to infinitives, φ-feature checking takes place independently within the clauses. This can be observed in (31) in which the person, number value of the embedded subject is different from that of the matrix subject.

(31)a. John thinks that we are honest.
   b. John arranged for us to have the tickets.

If φ-feature checking takes place in tandem with Case-feature checking, it is plausible to think that all uninterpretable features are valued and deleted within the embedded clauses. If uninterpretable phi-features on C percolate down to T, T agrees with the subject and assigns nominative Case to it and the subject values and deletes the uninterpretable phi-features on T in that-indicative clauses. It seems, however, that in for-to infinitives like (31b), the complementizer for assigns accusative Case to the embedded subject, and thus Agree-features might not percolate down from C to T. But for the present purposes, it suffices to say that all uninterpretable features are valued and deleted within CPs. Below is an illustration of feature checking within an indicative CP.

(32) Feature-checking within indicative CPs
a. John thinks that we are honest.
   b. [CP C [TP T [vP NP v* [VP ....] 
      [uPers] [1-Pers] 
      [uNum] [PI-Num] 
      [Prs-Tense] [uCase]] 
   c. [CP C [TP T [vP NP v* [VP ....] 
      [uPers] [1-Pers] 
      [PI-Num] [PI-Num] 
      [Prs-Tense] [Nom-Case]]

As illustrated in (32), an uninterpretable Case feature of an NP in Spec v*P is valued as
nominative by T, and uninterpretable person, number features on T are valued by the NP in turn. Thus, all uninterpretable features are valued and deleted in the embedded clauses.

Then, what about feature checking in control clauses? Before plunging into a detailed analysis, I would like to mention partial control here. Partial control is a phenomenon in which the referent of PRO includes the controller and someone else (cf. Landau 2000). Though PRO in partial control refers to a group, it cannot co-occur with adverbs like together, or plural anaphors like each other which require a syntactically plural subject. Let us look at (33):

(33)  a. John told Mary that he preferred [PRO to meet at 6 today].  
    b.* John told Mary that he preferred [PRO to meet each other at 6 today].  
    c. John and Mary met each other at 6 today.  

In (33a), PRO refers conjointly to its controller he and someone else salient in the discourse. Therefore, PRO refers to plural individuals. However, as shown in (33b), the plural anaphor each other which requires a syntactically plural subject cannot appear. This suggests that PRO in partial control behaves like a collective noun like the committee which is semantically plural but syntactically singular, and PRO inherits syntactic number from the controller. Furthermore, in Icelandic, predicate adjectives and passive participles in control clauses agree in number and gender with that of the controller (though the value of Case can be different between the controller and the predicate adjectives/passive participles) as shown in (34). (Thráinsson 1979:362)

(34)Ég bað Maríu að vera tekin/*tekna af lögreglunni.  
I asked Mary(Acc) to be taked(Nom.Sg.F/*Acc) by the.police  
“I asked Mary to be taken by the police.”

If predicate adjectives and passive participles reflect the phi-feature values on the local subject PRO, it can be inferred that PRO has the same phi-feature values as the controller. Thus, I assume that PRO has φ-features which are somehow valued by the controller. If

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14 If an embedded predicate is unaccusative/passive, the goal NP is within VP.
this argument is on the right track, the difference between indicatives and *for-to* infinitives and control clauses is that only control clauses contain uninterpretable \( \varphi \)-features which are not erased within them.

Following the idea of Hicks (2006) that anaphor binding involves an Agree operation between the \( u\varphi \)-features of an anaphor and their interpretable counterpart on its antecedent, I suggest that PRO behaves like anaphors in the sense that \( u\varphi \)-features of PRO are valued by its antecedent via Agree. Feature-checking in control can then be shown as in (35) (object control) and (36) (subject control).

(35)a. John persuaded Mary [PRO to sleep early].
   b. \([v^*P \ [vP\ Mary \ [v\ V \ [CP\ [TP\ PRO\ to\ v^*P\ \ldots\]]\ [u\Pers]\ [Sg-Num]\ [u\Num]]\]\)
   c. \([v^*P \ [vP\ Mary \ [v\ V \ [CP\ [TP\ PRO\ to\ v^*P\ \ldots\]]\ [u\Pers]\ [Sg-Num]\ [u\Num]]\]

(36)a. John tried [PRO to sleep early].
   b. \([v^*P \ [vP\ John\ [v\ V \ [CP\ [TP\ PRO\ to\ v^*P\ \ldots\]]\ [u\Pers]\ [Sg-Num]\ [u\Num]]\]\)
   c. \([v^*P \ [vP\ John\ [v\ V \ [CP\ [TP\ PRO\ to\ v^*P\ \ldots\]]\ [u\Pers]\ [Sg-Num]\ [u\Num]]\]

In object control (35), uninterpretable person, number features of PRO are valued by the

\[\text{Landau (2004, p.841) suggests that PRO has } [-R] \text{ (reference) feature because it lacks any inherent specification of } \varphi \text{-features, and this } [-R] \text{ feature, being anaphoric, acts as an instruction to coindex the } \varphi \text{-features of PRO with those of an antecedent via Agree. But, unlike Hicks (2006), he assumes that PRO agrees with the matrix functional head (T in the case of subject control, and } v^* \text{ in the case of object control) which also agrees with the controller. Therefore, a subject control sentence like } \text{John tried [PRO to leave]} \text{ is derived as follows:}
\]

(i) \( T \ [v^*P \ John\ [v^* \ [vP\ tried\ [TP\ PRO\ to\ \ldots\]]]\ [u\Pers]\ [u\Num]\ [u\Pers]\ [u\Num]]\)

Here, interpretable person and number features of the controller John value uninterpretable counterparts on T and PRO. However, I do not follow his analysis because Agree between T and PRO violates PIC as the matrix \( v^*P \) is a phase.

15 Landau (2004, p.841) suggests that PRO has [-R] (reference) feature because it lacks any inherent specification of \( \varphi \)-features, and this [-R] feature, being anaphoric, acts as an instruction to coindex the \( \varphi \)-features of PRO with those of an antecedent via Agree. But, unlike Hicks (2006), he assumes that PRO agrees with the matrix functional head (T in the case of subject control, and \( v^* \) in the case of object control) which also agrees with the controller. Therefore, a subject control sentence like John tried [PRO to leave] is derived as follows:
matrix object *Mary* through Agree. In subject control in (36), uninterpretable person, number features of PRO are valued by the matrix subject *John* via Agree. This is possible because the matrix subject *John* is still available as a Probe when the matrix *v*P phase is introduced in the derivation, given the VP internal subject hypothesis and the assumption that subject originates within *v*P. It is important to mention that this Agree is only possible provided that control clauses do not constitute phases, since otherwise it would violate PIC.

It has by now become clear that what constitutes phases is *v*P and C*P in which all uninterpretable features are valued and deleted within their complements. Unaccusative/passive *v*Ps contain an uninterpretable Case feature and control CPs have uninterpretable φ-features which cannot be erased within their complements. Therefore, unaccusative/passive *v*Ps and control CPs are not phases since if these uninterpretable features are not erased within their complements and transferred to the interfaces, the legibility requirement will be violated.

5. Conclusion

We have seen that control clauses are CPs but A-movement out of them, i.e., heavy NP shift in English and A-scrambling in Japanese, is allowed. This suggests that control clauses do not constitute phases since if they are phases, A-movement out of them would violate PIC. Moreover, control CPs as well as unaccusative/passive *v*Ps contain uninterpretable features which cannot be valued/deleted within their complements, and these uninterpretable features cannot be interpreted if transferred to the semantics interface. Therefore, it is considered that the presence of unvalued uninterpretable features make control clauses and unaccusative/passive *v*Ps non-phases. This argument is conceptually preferable because by doing so, little *v*P and CP can be treated in the same way that they are divided into phasal and non-phasal counterparts.

Acknowledgements

I am grateful for Professor Andrew Radford for valuable comments on an earlier draft of this paper.
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