Abstract: In Spanish, several constituents have their unmarked position after the sentence’s main verb (direct objects, locative adjuncts, depictives etc.). The linearity of linguistic expressions implies that if two such postverbal constituents appear in a given sentence they must be ordered in a certain way. The present paper examines information focus and syntactic weight as possible factors in postverbal constituent order. Based on data from two experimental studies it will be shown that (i) these factors indeed play a role in postverbal constituent order in Spanish and that (ii) postverbal constituent order is characterized at the same time by optionality and preferences (e.g. although a direct object (dO) and a depictive (DEP) can be ordered as DEP-dO or dO-DEP, the order dO-DEP is clearly preferred over DEP-dO). To account for the optionality and preferences, the data will be modelled in a (simplified) Stochastic Optimality Theory grammar without assuming a basic constituent order.

Keywords: constituent order, Spanish, optionality and preferences, Stochastic Optimality Theory

1 Introduction

Several factors in the ordering of constituents in a sentence have been identified in the literature: the semantic role of the constituents, their syntactic function, their animacy, their information structural status, and their syntactic weight (cf. Siewierska 1995 and Bader and Häussler 2010 for an overview). In this paper, we will take a closer look at two of these factors and we will examine, based on experimental data, to which extent syntactic weight and information focus influence postverbal constituent order in Spanish.

The term postverbal constituent order refers here to the order of constituents which have their unmarked position after the sentence’s main verb; in Spanish, such constituents are, for example, direct objects (dO) (1a.), indirect objects (iO), locative adjuncts (LOC) (1b.), temporal adjuncts (TEMP), depictives (DEP) (1c.).
The linearity of linguistic expressions implies that if two (or more) postverbal constituents co-occur in a sentence, they must be ordered in a certain way. Thus the co-occurrence of a direct object and depictive may result in an order where the direct object precedes the depictive (cf. (2a.)) or in an order where the direct object follows the depictive (cf. (2b.)).

The main empirical claim put forth in this paper is that both information focus and syntactic weight have an impact on postverbal constituent order. This claim will be supported by two different types of experimental data: data from a semi-spontaneous production experiment where participants had to answer orally questions related to a visual stimulus, and data from a forced-choice experiment in which participants had to indicate their preference between two (auditory) stimuli. Based on these two types of evidence it will be shown that narrow information focus and increased syntactic weight increase the frequency with which the respective constituent occurs in sentence final position. Further, specific aspects such as the question of basic constituent order, the position of narrow information focus in Spanish, and the question whether information focus or syntactic weight is the stronger factor will be discussed against the foil of the empirical results.

A second main goal of this paper, besides supporting these empirical claims, is to account for a specific result, namely, the optionality and preferences found in the data. Basically, it is argued that neither narrow information focus nor increased syntactic weight force the final position and thus the respective ordering principles apply as preferences rather than as
rules. For example, one result from the production experiment is that narrowly focused direct objects (in the context of a depictive) are placed preferably in sentence final position, but they are also placed in prefinal position. Thus, participants produced both orders in (3), although they produce (3b.) more often than (3a.).

(3) (Context: What does Juanita paint barefoot?)

a. Juanita pinta [el armario]F descalza dO-DEP
Juanita paints the wardrobe barefoot
‘Juanita paints barefoot the wardrobe’

b. Juanita pinta descalza [el armario]F DEP-dO
Juanita paints barefoot the wardrobe
‘Juanita paints barefoot the wardrobe’

The optionality of the two orders raises questions about the way in which the factors focus and weight can be integrated in a model of grammar. What does a grammar look like that allows for such optionality? Further, it is not only the optionality that needs be accounted for, but also the fact that the options often do not have the same status or frequency. In the case of the options given in (3), the order DEP-[dO]F is produced more often than [dO]F-DEP. We will account for both the optionality and the preferences between the options in a Stochastic Optimality Theory (OT) grammar (cf. Boersma and Hayes, 2001). Typically, the implementation of constituent order variation in OT syntax involves (i) assumptions about a basic order (or configuration) and (ii) movement-related constraints that are punished by every trace created during the syntactic derivation (cf. Gabriel, 2007, 2010 and Adli, 2011 for applications to Spanish constituent order). In Section 4 we will present an account of the experimental data which involves neither a basic order nor movement related constraints.

The remainder of the paper is structured as follows. The alleged relevance of information focus and syntactic weight will be introduced in Section 2.¹ Section 3 presents and discusses the results from two experimental studies on postverbal constituent order in Spanish. Section 4 describes how the results – and in particular the optionality and preferences found in the data – can be accounted for in a Stochastic OT grammar without assuming a basic constituent order and movement-related constraints.

¹ This description closely follows that given in Heidinger (2013).
Two factors in postverbal constituent order

2.1 FocusFinal

Focus is one of the four levels of information structure distinguished in Krifka (2007). Following Rooth (1985, 1992), he defines focus as follows: “Focus indicates the presence of alternatives that are relevant for the interpretation of linguistic expressions” (Krifka 2007: 18).

Thus, in the example in (4) *a new car* is focus because for this part of the sentence alternatives that are relevant for the interpretation of the sentence exist: the focus *a new car* specifies that among all the things that John might have bought, he actually bought a new car.

As concerns the size of the focus one can distinguish between sentence focus vs. VP focus vs. narrow focus, as in (5).

Example (5):

(a) (Context: What happened?)

[John bought a new car]$_F$ sentence focus

(b) (Context: What did John do yesterday?)

He [bought a new car]$_F$ VP focus

(c) (Context: What did John buy?)

He bought [a new car]$_F$ narrow (argument) focus

But foci can not only be categorized with respect to their size but also with respect to the relation that the focused constituent has to its context. *A new car* in (6a.) clearly has a different relation to the context than *a new car* has in (6b.). While the focus in (6b.) contrasts with an element of the preceding context, no such relation holds in (6a.): the focus just contributes new information to the discourse (in this case it is information that is explicitly requested in the preceding question). Based on these distinct relations with the preceding context, information focus as in (6a.) and contrastive focus as in (6b.) are distinguished.

Example (6):

(a) (Context: What did John buy?)

He bought [a new car]$_F$ information focus

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2 The other levels are givenness (as indicating that a denotation is already present in the Common Ground of speaker and hearer), topic (as specifying what a statement is about), and frame setting/delimitation.
b. (Context: John bought a house, right?)  
No, he bought [a new car] \( _f \) contrastive focus

Given the overall topic of this paper, we will not provide an overview on focus marking strategies in Spanish,\(^3\) but zoom in on the relevant issues: the relation between narrow information focus and constituent order in this language. Two basic views can be found in the literature on the syntactic position of narrow information focus in Spanish: (i) narrow information foci always appear in sentence final position (cf. Martín Butragueño, 2005; Revert Sanz, 2001; Rodríguez Ramalle, 2005; Zubizarreta, 1998, 1999), (ii) narrow information foci do not always appear in sentence final position (cf. Gabriel 2007, 2010). A prominent exponent of the first view is Zubizarreta (1998, 1999). Zubizarreta (1999: 4228ff.) distinguishes between two types of nuclear accents in Spanish: a neutral and an emphatic accent. The first is used in the case of information focus, the latter in the case of contrastive focus. Crucially, the neutral nuclear accent needs to be in sentence final position. Since the nuclear accent must lie within the focus domain, the sentence final position of the neutral nuclear accent implies that information focus is in sentence final position. We will refer to this principle according to which the information focus shall be placed in sentence final position (as in (7)) as FOCUSFINAL. The first formulation of this principle as an OT-constraint can be found in Costa (1998: 270f.) as ALIGNFOCUS: the constraint requires foci to be located at the rightmost position of the sentence and is violated by prefinal foci.

\[(7) \quad \text{(Context: What did Juan buy?)} \]

\[
\begin{array}{l}
\text{Juan compró [una CAsa] } _f \\
\text{Juan bought a house} \\
\text{‘Juan bought a house’}
\end{array}
\]

It follows from Zubizarreta’s (1998, 1999) view, that narrow information focus on constituents causes deviations from basic word order if the focused constituent’s basic position is not the sentence final position.\(^4\) Let us consider the order between the postverbal constituents direct object and locative adjunct and assume that the basic order between the constituents is that the direct object appears before the locative adjunct (as in (8a.)). FOCUSFINAL implies that the focused constituent ends up in final position; if both postverbal constituents are expressed, this results in an order where the locative adjunct precedes the

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\(^3\) Cf. Leonetti (2011) for a description of Spanish in the context of other Romance languages.

\(^4\) In Zubizarreta (1998: 124), such word order alterations are called \( p \)-movement (short for prosodic movement) since they are prosodically motivated in that the focused constituent ends up in the position where the sentence’s neutral nuclear accent lies. López (2009: Section 5.2.4), on the other hand, argues that what Zubizarreta refers to with the term \( p \)-movement is not prosodically motivated.
direct object (cf. (8b.)), in deviation from the basic order. According to authors such as Zubizarreta (1998, 1999), changes in constituent order as in (8b.) are obligatory, since the focused constituent must end up in sentence final position (even if this is not its basic position).

(8) S-V-dO-LOC to S-V-LOC-dO

a. (Context: What did María do?)
   María [compró el diario en el kiosco]₀ dO-LOC (basic order)
   María bought the newspaper at the kiosk
   ‘María bought the newspaper at the kiosk’

b. (Context: What did María buy at the kiosk?)
   María compró en el kiosco [el diario]₀ LOC-dO
   María bought at the kiosk the newspaper
   ‘María bought the newspaper at the kiosk’

As mentioned above, not all researchers share the view that in Spanish narrow information foci must be in final position. Gabriel (2007, 2010) has presented evidence from semi-spontaneous production experiments which show that narrow information foci can also appear in non-final positions in Spanish. His main finding is that prefinal narrow information foci as in (9) are in fact possible in Spanish.

(9) (Context: What did María buy at the kiosk?)
   María compró [el diario]₀ en el kiosco. S-V-[dO]₀-LOC
   María bought the newspaper at the kiosk
   ‘María bought the newspaper at the kiosk’

Gabriel (2007, 2010) has tested in his experiments (amongst other things) the encoding of narrow information focus of postverbal constituents such as direct objects, indirect objects and locative adjuncts.⁵ As concerns the order of a locative adjunct and a narrowly focused direct object, Gabriel’s results clearly show that the sentence final position of the focused direct object is far from obligatory. In fact, the following data from Gabriel (2010) on Argentinian Spanish (cf. Table 1) show that in situ focalization of the direct object in prefinal position is preferred over the focalization of the direct object in sentence final position (through p-movement). Note that orders with prefinal and final narrow information foci not

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⁵ Gabriel (2007, 2010) has also investigated the position of focused subjects, both in contrastive and non-contrastive contexts; he shows that preverbal narrowly focused subjects are possible in non-contrastive contexts (cf. also Gutiérrez Ordóñez, 1997; Silva Corvalán, 1984; Uth, 2014).
only differ in the order of constituents, but also in their intonation contours. Since the nuclear accent needs to lie within the focus domain, prefinal foci imply that the nuclear accent is not in final, but in prefinal position. Another prosodic consequence of prefinal foci is the deaccentuation of post-focal material which results in a characteristic “low valley” of the F0-contour (cf. Gabriel, 2007, 2010 on Spanish, and Cardinaletti, 2001, 2002 on Italian).\(^6\)

<table>
<thead>
<tr>
<th></th>
<th>abs.</th>
<th>%</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S-V-[dO]→LOC</td>
<td>19</td>
<td>38</td>
<td><em>in situ</em> in prefinal position</td>
</tr>
<tr>
<td>S-V-LOC-[dO]ₖ</td>
<td>7</td>
<td>14</td>
<td><em>p-movement</em></td>
</tr>
<tr>
<td>[dO]→V-S</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>rest (e.g. reduced answers)</td>
<td>22</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>50</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Order of LOC & [dO]ₖ (Gabriel 2010: 213, 216f.; adapted)

The conclusion is that in Spanish a strong relation between narrow information focus and the sentence final position exists: (i) for several authors, the final position is the only acceptable position for narrow information focus in Spanish and (ii) experimental data from Gabriel (2007, 2010) suggests that constituents may (but need not) take up the final position due to narrow focalization. Thus, we must expect that narrow focalization has an impact on postverbal constituent order since it may cause alterations in the constituent order: constituents with a non-final basic position take up (more often) the final position if they are narrowly focused.

2.2 \textbf{Endweight}

The idea that the length or complexity of constituents has an impact on their ordering and that long and complex constituents tend to be placed in sentence final position is not new (cf. Behaghel 1909, 1930, 1932). However, a consistent line of research on the topic has only been established since the 1990s through the respective works of John A. Hawkins and Thomas Wasow (cf. Hawkins, 1992, 1994, 2000, 2001; Wasow, 1997a, b, 2002; Wasow and Arnold, 2003; Arnold et al., 2000).

The basic idea is that constituents tend to be ordered in such a way that long(er) constituents follow short(er) constituents; Wasow (1997b) refers to this tendency as \textit{endweight}. A much investigated example is \textit{Heavy NP Shift} in English. In this alternation a

\(^6\) Post-focal material could in principle be analyzed as right-dislocated or still part of the core sentence. In the case of right-dislocation \textsc{FocusFinal} would still be obeyed since the post-focal material is outside the core sentence (cf. Zubizarreta, 1998). A general dispreference for right-dislocation in Spanish has been shown by Villalba (2011). Our main argument against an interpretation as right-dislocation comes from the absence of a resumptive clitic pronoun in the case of post-focal direct objects. A detailed discussion based on Italian data is provided in Cardinaletti (2001, 2002).
direct object and a prepositional phrase appear as postverbal constituents. The basic order is that where the direct object precedes the prepositional phrase, in the shifted order the prepositional phrase precedes the direct object.\textsuperscript{7} Crucially, while the basic order is possible independent of the constituents’ weight, the shifted order is licensed by the increased weight of the direct object (cf. (10)).

(10) Heavy NP Shift (HNPS)

a. basic: dO-PP
The waiter brought the wine to the table.
The waiter brought the wine we had ordered to the table.

b. shifted: PP-dO
??The waiter brought to the table the wine.
The waiter brought to the table the wine we had ordered.

(Arnold et al. 2000: 28)

On the basis of a corpus study, Arnold et al. (2000: 36f.) show that the frequency of the shifted order increases if the direct object is longer than the PP; in cases where the dO is four or more words longer than the PP, the shifted order is more frequent than the basic order (irrespective of whether the dO expresses given or new information).

An important issue is how weight can be measured and what type of weight is actually relevant (cf. the survey in Wasow (1997a: 85)). Wasow (1997a) shows convincingly that it’s not the isolated heaviness of the constituents, but their heaviness relative to other constituents that matters; in recent work on weight effects, almost exclusively this relative weight is considered. The principle short-before-long means therefore that the shorter constituent precedes the longer element (and there is no need to define what short or long means). Independently of whether a relative or a categorical conception of weight is applied, it is necessary to define how weight is measured, i.e., what is counted in order to measure a constituent’s weight. Candidates for the measurement of weight are words, syllables, phonological phrases, syntactic nodes, phrasal nodes. Based on data from Heavy NP shift and the dative alternation in English, Wasow (1997a: 91-93) has compared the predictive power of three measurements of weight: phrasal nodes, nodes, and words. He comes to the conclusion that the three measures have almost the same predictive power. Thuillier (2012: 227) comes to a similar conclusion in her comparison of the predictive power of the weight measures words, syntactic nodes, and syntagmatic nodes.

\textsuperscript{7} The fact that $dO$-PP is the basic order is shown by the reduced grammaticality of the order $PP$-$dO$ in cases where the direct object is not heavy.
As concerns Spanish, to our knowledge no large-scale studies primarily devoted to the impact of syntactic weight on constituent order (which would be comparable to those conducted by Wasow and Hawkins). Nonetheless, syntactic weight has been referred to by several authors. These references to weight usually occur in relation to a specific phenomenon: the order of depictives and other adjuncts (cf. Demonte and Masullo 1999: 2483), the position of adverbials in sentence initial and/or final position (cf. Dufter 2009: 107), subject-predicate order in the case of a sentence initial adverbial phrase (cf. Fernández Ramírez 1986: 458), the order of subject and verb (cf. Fernández Soriano 1993: 131; Hernanz and Brucart 1987: 78), subject inversion in Spanish relative clauses (cf. Gutiérrez-Bravo, 2005). 8

However, one can also find research on Spanish in which the factor weight is empirically tested in quantitative studies. One such example is Bellosta von Colbe’s (2005) work on the order of direct and indirect objects. Based on a corpus of 1538 sentences including both dO and iO, he examined for both orders, i.e., V-dO-iO and V-iO-dO, how often the first constituent is shorter than the second one (1<2), how often they have the same weight (1=2), and how often the first one is longer than the second (1>2); as a measure of weight he counted the words (cf. Bellosta von Colbe 2005: 107). His main finding is that the orders with short-before-long are much more frequent than those with long-before-short; this holds for both V-dO-iO and V-iO-dO (cf. Table 2; based on Bellosta von Colbe (2005: 108)).

<table>
<thead>
<tr>
<th></th>
<th>V-dO-iO</th>
<th>V-iO-dO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;2</td>
<td>76.86%</td>
<td>80.79%</td>
</tr>
<tr>
<td>1=2</td>
<td>16.92%</td>
<td>10.95%</td>
</tr>
<tr>
<td>1&gt;2</td>
<td>6.22%</td>
<td>8.26%</td>
</tr>
<tr>
<td></td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table 2: Syntactic weight and the order of dO and iO in Spanish

Another example is Delbecque (1987, 1991) who has analyzed factors in the order of subject and verb in Spanish. Based on corpus data, she shows that the length of the subject is a factor in that long subjects tend to appear postverbally more often than short subjects (cf. Delbecque 1991: 118, 122). Finally, Valverde Ibáñez (2009) has analyzed the syntactic position of constituents with argument status in Spanish. One of her corpus-based findings is that these constituents appear with a very high frequency after the verb if they have the form of a finite or non-finite clause (99.5% and 98.0% respectively); she attributes this to the

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8 The role of syntactic weight in NP-internal order in Spanish is mentioned in Hernanz and Brucart (1987: 167-168) and Bogard (2009: §2.4.3.5).
increased syntactic weight of constituents with the form of a clause and to the fact that such long constituents tend to appear in sentence final position (cf. Valverde Ibáñez 2009: 259).

In summary, there are many languages for which the impact of weight on constituent order has been shown. Spanish is among the many languages for which relatively little is known about the impact of weight – given the small number of studies that take up this issue. Nevertheless, we expect from the above survey that weight does have an impact on postverbal constituent order in Spanish: it may cause alterations in postverbal constituent order because a long or heavy constituent with a non-final basic position might end up in sentence final position.

3 Empirical studies

3.1 General remarks

The decision to investigate the impact of focus and weight using experimental methods is motivated by the following reasons. The existing literature suggests that both weight and focus do not influence constituent order in a categorical, but in a gradual manner; i.e., they create tendencies or preferences and not strict rules. If this also holds for the phenomenon under investigation here, namely postverbal constituent order in Spanish, the phenomenon can only be adequately described if its gradual nature can be captured.\(^9\) Further, the combination of two experimental methods allows us to gain a comprehensive understanding of the impact of weight and focus in production and perception. Parts of the results from the production and the forced-choice experiment have been presented in Heidinger (2013, 2014a) respectively.

3.2 Two experimental methods

The empirical basis of this study on postverbal constituent order in Spanish comes from two types of experimental evidence: a production experiment and a forced-choice experiment. In the following, the experimental methods will be introduced. As will become apparent, the production experiment only tests the impact of focus, while the forced-choice experiment tests both focus and weight.

- Production experiment\(^{10}\)

The data on the encoding of narrowly focused constituents was collected in a production experiment in which participants had to answer questions in relation to a visual stimulus. The experiment was conducted from February 6th to February 13th 2012 at the Universidad de...

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\(^9\) Note that if the impact of weight and focus would not be gradual, but categorical, this would also be captured in the experimental studies as they were conducted in the investigation described here.

\(^{10}\) The experimental set-up used in the production experiment is inspired by the experiments reported in Gabriel (2007, 2010).
Córdoba in Córdoba, Spain. The 36 participants were students at the Universidad de Córdoba, predominantly studying humanities: age, 18–24; sex, 30 female vs. 6 male; 33 grew up in Andalucía, three in other parts of Spain. All are monolingual native speakers of Iberian Spanish. The participants were compensated with eight euros each.

The experiment was carried out individually with each of the 36 participants. It consisted of four visual stimuli and for each stimulus the participants had to answer orally five questions. The course of the experiment was explained to the participants using one stimulus. After the explanation, the participants could practice with another stimulus. Only after this, the four stimuli which counted for the analysis were presented to the participants.

The stimuli were presented to the participants on slides on a computer screen. The questions were integrated as audio files in the slides and played by clicking on the respective icon on the slide. Although the participants did not maneuver through the experiment themselves, they nevertheless determined the pace of the experiment with their response time. The participants’ answers were recorded and analyzed with respect to syntactic structure and encoding of information structure.

When showing the picture for the first time, additional information on the situation was given in written form (cf. Figure 1). The purpose of the written information is to introduce the acting character, to evoke the elements of the picture which are relevant for the questions and to minimize the participants’ effort in searching for the suitable lexical items when answering the questions. In order to avoid priming of a certain word order, the written information was not presented in sentence form, but loosely distributed over the picture (cf. Figure 1). On the level of syntactic functions, the elements that are profiled in the picture correspond to subject (Juanita), verb (trabajar ‘work’), depictive (empapada ‘soaked’) and locative adjunct (en el jardín ‘in the garden’).

![Imagen 1](image.png)

**Fig. 1:** Stimulus (with additional written information)
After showing the picture with the additional information to the participants for about eight
to ten seconds, the picture was shown again, but without the additional information. Instead,
the questions that the participants had to answer were played by clicking on an icon in the
picture. The questions were presented in audio in order to make the situation more authentic.
After each question the participants had to give their answer and only after that the
experimenter moved on to the next question. Once all five questions for a given stimulus
were answered, the experimenter moved on to the next stimulus, presenting again first the
stimulus with the written information and only after that the stimulus without the information,
but with the questions.

The focus-background.partition of the answers and the type of focus were controlled
through the questions. For the above stimulus, the questions are given in Table 3 together
with the focus-background.partition of the answer. In the case of the contrastive focus, the
question contains false information, i.e., information that does not correspond to the situation
described by the picture. This false information was corrected by the participants in their
answers.

<table>
<thead>
<tr>
<th>Question</th>
<th>Focus structure answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>¿Dónde trabaja Juanita empapada? ‘Where does Juanita work soaked?’</td>
<td>[LOC]F</td>
</tr>
<tr>
<td>Juanita trabaja seca en el jardín, ¿verdad? ‘Juanita works dry in the garden, right?’</td>
<td>[DEP]CF</td>
</tr>
<tr>
<td>¿Qué pasa aquí? ‘What happens here?’</td>
<td>[sentence]F</td>
</tr>
<tr>
<td>¿Cómo trabaja Juanita en el jardín? ‘How does Juanita work in the garden?’</td>
<td>[DEP]F</td>
</tr>
<tr>
<td>Juanita trabaja empapada en el bosque, ¿verdad? ‘Juanita works soaked in the woods, right?’</td>
<td>[LOC]CF</td>
</tr>
</tbody>
</table>

Table 3: Questions and focus structure of answers (Stimulus 1)

In addition to stimuli where the second postverbal constituent (next to the depictive) is a
locative adverbial, the experiment also included stimuli where the second postverbal
constituent is a direct object. Both structures, $S+V+DEP+LOC$ and $S+V+DEP+dO$, were filled
with two different lexicalizations resulting in the four visual stimuli mentioned above. Table 4
shows the lexical material in the four stimuli and the syntactic functions of the constituents.
The elements in parentheses are the false items of information in the questions for
contrastive focus.
1. **Juanita - trabajar - empapado (seco) - en el jardín (en el bosque)**  
Juanita - work - soaked (dry) - in the garden (in the woods)  

2. **Juanita - pintar - descalzo (calzado) - el armario (el suelo)**  
Juanita - paint - barefoot (with.shoes.on) - the wardrobe (the floor)  

3. **Pepito - abrir - borracho (sobrio) - la puerta (la ventana)**  
Pepito - open - drunk (sober) - the door (the window)  

4. **Pepito - bailar - disfrazado (desnudo) - en la sala (en el aula)**  
Pepito - dance - disguised (naked) - in the living.room (in the classroom)  

<table>
<thead>
<tr>
<th></th>
<th>Lexicalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S+V+DEP+LOC</td>
</tr>
<tr>
<td>2</td>
<td>S+V+DEP+dO</td>
</tr>
<tr>
<td>3</td>
<td>S+V+DEP+dO</td>
</tr>
<tr>
<td>4</td>
<td>S+V+DEP+LOC</td>
</tr>
</tbody>
</table>

Table 4: Lexicalizations

The questions in the experiment were presented in audio form. For this purpose, three monolingual native speakers of Iberian Spanish were recorded: a female speaker raised in the province of Cádiz, a male speaker raised in the province of Badajoz and a female speaker raised in the province of Salamanca.

As mentioned above, 36 persons participated in the experiment. The experiment involved four visual stimuli and for each of them five questions were asked. This amounts to a total of 720 answers (144 answers for stimuli with sentence focus, 288 answers for narrow information focus, and 288 answers for contrastive focus). Technical problems occurred during the recording of the answers of two participants; as a consequence a total of 7 answers could not be used for analysis (one for a stimulus with sentence focus, three for stimuli with narrow information focus, and three for stimuli with contrastive focus). Note that only a subset of the answers, namely those with narrow information focus and sentence focus, are relevant here and will be presented in Section 3.3.11

- Forced-choice experiment

The second experiment, which covers both focus and weight, is a forced-choice experiment which was conducted by the author in Cáceres (Spain), in February 2013. A total of 40 persons participated in the experiment; but only the data of the 39 monolingual native speakers of Iberian Spanish were considered (one participant was a native speaker of a variety of American Spanish). All participants were students from the Universidad de Extremadura, Cáceres. The experiment was conducted in two runs, with 20 participants each, in the language laboratory of the university, under the author’s supervision and

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11 The results for the contrastive focus are discussed in Heidinger (2014b). The main result is that contrastive foci appear predominantly in situ, and focus fronting is totally absent in the data (cf. also Gutiérrez-Bravo, 2006 who has first observed a dispreference for focus fronting in Mexican Spanish, and Gabriel, 2007, 2010 and Adli, 2011 for indepth empirical studies which show that other strategies are preferred over focus fronting in Spanish).
guidance. The total duration of the experiment was approximately 25 minutes including an instruction phase, a practice phase and the experiment *sensu stricto*. The participants were not compensated individually, instead a draw for a monetary prize of 30 euros was held after both turns.

The experiment is a forced-choice experiment where participants have to indicate their preferred choice between two options. The stimulus material consisted of short question-answer dialogs. The answers of the dialogues were always presented in two variants, which differed with respect to the order of the two postverbal constituents. For each dialog, participants had to indicate the variant of the answer that they considered more natural in the context of the question (cf. (11)).

(11) ¿Qué hizo Juan?
   ‘What did Juan do?’
   o Juan bailó disfrazado en su casa.  
     Juan danced disguised in his house
   ‘Juan danced disguised in his house’
   o Juan bailó en su casa disfrazado.  
     Juan danced in his house disguised
   ‘Juan danced disguised in his house’

All answers contained two different postverbal constituents: either a subject-oriented depictive (DEP) and a direct object (dO) (as in (12a.)), or a subject-oriented depictive and a locative adjunct (LOC) (as in (12b.)).

(12) a.   María pintó un armario descalza.  
     María painted a wardrobe barefoot
     ‘Maria painted barefoot a wardrobe’
 b.   Juan bailó disfrazado en su casa.  
     Juan danced disguised in his house
     ‘Juan danced disguised in his house’

In order to assess the impact of information focus and weight, three general experimental conditions were determined: (i) a neutral condition in which the answer has a VP-focus and both postverbal constituents in the answer have their neutral syntactic weight (as in (11)), (ii) a narrow-information-focus condition in which one postverbal constituent of the answer is narrow information focus and both postverbal constituents have their neutral syntactic weight.
(as in (13)), and (iii) an increased-weight condition in which one of the postverbal constituents has an increased syntactic weight (as in (14)).

(13) **Narrow-information-focus condition**

¿Cómo bailó Juan en su casa?

'How did Juan dance at his house?'

a. Juan bailó en su casa [disfrazado].

Juan danced disguised in his house

b. Juan bailó en su casa.

Juan danced disguised in his house

(14) **Increased-weight condition**

¿Qué hizo Juan?

'What did Juan do?'

a. Juan [bailó en la casa decorada por sus hermanas disfrazado].

Juan danced disguised in the house decorated by his sisters

b. Juan [bailó disfrazado en la casa decorada por sus hermanas].

Juan danced disguised in the house decorated by his sisters

To determine the impact of a given factor on postverbal constituent order, data from the neutral condition and the respective non-neutral condition must be compared. Recall that both factors presumably favor the sentence final position of the respective constituent. To verify, for example, the impact of narrow information focus, a constituent’s percentage of occurrence in final position in the neutral condition and in the narrow-information-focus condition need to be compared. Applied to the stimuli in (11) and (13), the basic idea is thus as follows: how often do participants choose LOC-DEP (and not DEP-LOC) in the neutral condition (as in (11)) and how often do they choose it in the narrow-information-focus condition (as in (13))? As mentioned, the prediction would be that they choose LOC-DEP more often in the case of the narrow-information-focus condition than in the neutral condition. The impact of the syntactic weight, the second factor we are interested in, is verified in the
same way: how often do participants choose DEP-LOC in the neutral condition and how
often is DEP-LOC chosen in the increased-weight condition (as in (14))? The impact of the two factors is thus measured through the increase in the percentage
occurrence in the final position of the respective constituent (for DEP (& LOC), LOC (& DEP),
DEP (& dO), and dO (& DEP)). The respective measures are $\Delta_{\text{Focus}}$ and $\Delta_{\text{Weight}}$, which are
calculated as in (15) and (16) below: $\Delta_{\text{Focus}}$ is the difference between the percentage
occurrence of a constituent in final position in the narrow-information-focus condition and the
percentage occurrence of a constituent in final position in the neutral condition.

(15) $\Delta_{\text{Focus}}$: % Finalposition$_{\text{Focus}}$ $\text{minus}$ % Finalposition$_{\text{Neutral}}$

$\Delta_{\text{Weight}}$ is the difference between the percentage occurrence of a constituent in final
position in the increased-weight condition and the percentage occurrence of a constituent in
final position in the neutral condition.

(16) $\Delta_{\text{Weight}}$: % Finalposition$_{\text{Weight}}$ $\text{minus}$ % Finalposition$_{\text{Neutral}}$

In order to determine the impact of information focus and syntactic weight on postverbal
constituent order in such a way, the following variables had to be controlled for in the
experiment: syntactic functions of the two postverbal constituents (DEP & LOC, DEP & dO),
focus-background partition of the answer (VP-focus, narrow focus on one postverbal
constituent), and syntactic weight of the postverbal constituents (neutral, increased weight of
one postverbal constituent). This amounts to a total of ten conditions, as in Table 5. Each of
the conditions was lexicalized in two different ways, which results in a total of twenty stimuli
(i.e. mini-dialogs with two variants of the answer) which were presented to each participant in
the experiment.
Note that in this experimental set-up, the two factors information focus and syntactic weight were controlled for separately, i.e., only one factor is tested at a time. There are no conditions in which syntactic weight and narrow information focus directly compete.

The focus-background partition of the answer was controlled for by the type of question (e.g., the question in (11) triggers a VP-focus). The weight was controlled for by presenting the constituents either with their neutral weight (DEP = one word (adjective), dO = two words (determiner + noun), LOC = three words (preposition + determiner + noun)) or with an increased weight (at least four additional words – at least two of which are content words; e.g., en su casa ‘in his house’ vs. en la casa decorada por sus hermanas ‘in the house decorated by his sisters’).

In the experiment, the stimuli were presented to each participant on a separate computer screen using LimeSurvey. Only one mini-dialog was presented on the screen at a time. While the questions of the dialog were presented in written and audio format, the two variants of the answer were presented in audio format only. To listen to the audio, participants had to click on a player embedded in LimeSurvey.

12 The auditory stimuli were produced by monolingual native speakers of Iberian Spanish. While the questions of the dialogs were produced by three different speakers (two female, one male), the answers were all produced by a fourth (female) speaker. This fourth speaker is a linguistically trained person who knows about information structural notions such as focus. Each of the forty answers in the experiment was produced three times by this speaker and two other speakers had to choose for each of the forty answers the version which sounded most natural to them in the context of the question; only this version was then used in the experiment. All stimuli used in the experiment showed a clearly perceivable nuclear stress within the focus domain.
3.3 Results

Beginning with the evidence on the impact of narrow information focus, there are two sources of evidence to be examined: (i) the production experiment, (ii) the forced-choice experiment. Starting with the production experiment, Table 6 and Figure 3 show the percentage of occurrence in final position under two conditions for the postverbal constituents DEP, dO and LOC. The table reads as follows: under the neutral condition (= sentence focus), 31.88% of the participants produced the order LOC-DEP (with DEP in final position) and not DEP-LOC (with DEP in prefinal position); under the condition with narrow information focus on the DEP, 55.07% of the participants produced the variant LOC-DEP and not DEP-LOC etc. In addition, the table indicates the \( \Delta \)-values, i.e., the value whereby the percentage of the occurrence in final position under the non-neutral condition (narrow information focus) deviates from the percentage of occurrence in final position under the neutral condition.

<table>
<thead>
<tr>
<th></th>
<th>neutral condition</th>
<th>narrow-information-focus condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEP (&amp; LOC)</td>
<td>31.88</td>
<td>55.07 (( \Delta ) = 23.19)</td>
</tr>
<tr>
<td>LOC (&amp; DEP)</td>
<td>68.12</td>
<td>92.54 (( \Delta ) = 24.42)</td>
</tr>
<tr>
<td>DEP (&amp; dO)</td>
<td>84.72</td>
<td>91.30 (( \Delta ) = 6.58)</td>
</tr>
<tr>
<td>dO (&amp; DEP)</td>
<td>15.28</td>
<td>63.89 (( \Delta ) = 48.61)</td>
</tr>
</tbody>
</table>

Table 6: Percentage of occurrence in final position (production experiment)

The results of the production experiment clearly show that narrow information focus has an impact on postverbal constituent order in Spanish. It applies to all four constituents that
the focalization increases the percentage of occurrence of the respective constituent in final position (compared to the neutral condition) (cf. Table 6 and Figure 2).

Despite this preference we find optionality and variation in our results. The following data from the production experiment show that in the context of narrow information focus on the locative adjunct the participants placed the narrow focus in final position as well as in prefinal position.

(17) a. Juanita trabaja empapada [en el jardín]F (pb020289)
   Juanita works soaked in the garden
   ‘Juanita works soaked in the garden.’

b. Juanita trabaja [en el jardín]F empapada (aa291291)
   Juanita works in the garden soaked
   ‘Juanita works soaked in the garden.’

Turning to the results from the forced-choice experiment we see a very similar picture. The results are presented in the same way as for the production experiment. Again we compare the percentage of occurrence in final position under two conditions: a neutral condition (where the constituents have their neutral weight and both postverbal constituents are part of the focus) and the narrow-information-focus condition (where the constituents have their neutral weight, but one postverbal constituent is narrowly focused).

<table>
<thead>
<tr>
<th></th>
<th>neutral condition</th>
<th>narrow-information-focus condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEP (&amp; LOC)</td>
<td>41.03</td>
<td>64.10 (Δ = 23.07)</td>
</tr>
<tr>
<td>LOC (&amp; DEP)</td>
<td>58.97</td>
<td>76.92 (Δ = 17.95)</td>
</tr>
<tr>
<td>DEP (&amp; dO)</td>
<td>71.79</td>
<td>87.18 (Δ = 15.39)</td>
</tr>
<tr>
<td>dO (&amp; DEP)</td>
<td>28.21</td>
<td>87.18 (Δ = 58.97)</td>
</tr>
</tbody>
</table>

Table 7: Percentage of occurrence in final position (forced-choice experiment)
The results of the forced-choice experiment clearly show that narrow information focus has an impact on constituent order. It applies to all constituents that the focalization significantly increases the percentage of occurrence of the respective constituent in final position compared to the neutral condition (cf. Table 7 and Figure 3) ($p < 0.05$ (McNemar)).

Turning to the impact of weight, the results from the forced-choice experiment need to be examined. We compare again the percentage of occurrence of constituents in the final (as opposed to prefinal) position under two different conditions: neutral and, in this case, increased weight. Table 8 shows the percentage of occurrence in final position under these two conditions for the postverbal constituents DEP, dO and LOC (cf. also Figure 4); in addition, the table indicates the $\Delta$-values, i.e., the value whereby the percentage of occurrence in final position under the increased-weight condition deviates from the percentage of occurrence in final position under the neutral condition.

The results clearly show that syntactic weight has an impact on postverbal constituent structure. It applies to all four constituents that the increase in syntactic weight increases the percentage of occurrence of the respective constituent in final position (compared to the neutral condition) ($p < 0.05$ (McNemar)).

<table>
<thead>
<tr>
<th></th>
<th>neutral condition</th>
<th>increased-weight condition</th>
<th>$\Delta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEP (&amp; LOC)</td>
<td>41.03</td>
<td>74.36</td>
<td>33.33</td>
</tr>
<tr>
<td>LOC (&amp; DEP)</td>
<td>58.97</td>
<td>85.90</td>
<td>26.93</td>
</tr>
<tr>
<td>DEP (&amp; dO)</td>
<td>71.79</td>
<td>89.74</td>
<td>17.95</td>
</tr>
<tr>
<td>dO (&amp; DEP)</td>
<td>28.21</td>
<td>61.54</td>
<td>33.33</td>
</tr>
</tbody>
</table>

Table 8: Percentage of occurrence in final position (forced-choice experiment)
The overall summary is that both narrow information focus and syntactic weight have an impact on postverbal constituent order in Spanish. As concerns the frequency with which orderings are produced or chosen, we have seen that narrow information focus and increased syntactic weight increase the frequency with which the respective constituent appears in sentence final position.

3.4 Discussion

3.4.1 Basic order

In Section 2, the possible impact of **FOCUSFINAL** and **ENDWEIGHT** on postverbal constituent order has been described as follows: both factors might cause alterations of postverbal constituent order in that a constituent with a non-final basic position takes up sentence final position (cf. (18) and (19)).

(18) Focus-induced alterations of constituent order

a. \([S-V-A-B]_F\) basic order

b. \(S-V-B-[A]_F\) altered order

(19) Weight-induced alterations of constituent order

a. \(S-V-A-B\) basic order

b. \(S-V-B-A_n\) altered order

The premise of this description was that for any pair of postverbal constituents a basic order could be determined. In the light of our results, both the premise on the basic order and the subsequent description of the impact of **FOCUSFINAL** and **ENDWEIGHT** need to be revised.
Starting with the aspect of basic order, the set of data we need to look at is that for the neutral condition; in these cases both postverbal constituents have the same informational value (both are focus) and have their neutral weight. The results of the forced-choice and production experiments show that the basic order is not always easy to detect. Table 9 gives the participants’ preferences for the ordering of DEP & LOC and DEP & dO under the neutral condition (VP- or sentence focus, neutral weight).

<table>
<thead>
<tr>
<th>Forced-choice</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEP-LOC</strong></td>
<td>58.97%</td>
</tr>
<tr>
<td><strong>LOC-DEP</strong></td>
<td>41.03%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forced-choice</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEP-dO</strong></td>
<td>28.21%</td>
</tr>
<tr>
<td><strong>dO-DEP</strong></td>
<td>71.79%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table 9: Preferred constituent orders under neutral condition

The preferred order is chosen / produced by 58.97% / 68.12% in the case of DEP & LOC and by 71.79% / 84.72% in the case of DEP & dO (cf. Table 11). The preference for one of the two orders is considerably stronger in the case of DEP & dO than in the case of DEP & LOC. This has most probably to do with the fact that in the case of DEP & dO an argument (dO) and an adjunct (DEP) are combined and that for two such constituents there is a strong preference to put the argument closer to its verb; in the case of the two adjuncts, DEP & LOC, no such ordering principle applies and the order is freer under the neutral condition.13

As concerns the impact of focus and weight, two consequences follow from the fact that even the basic orders have the form of preferences rather than rules. Firstly, the two factors can reverse a preference, and secondly, the two factors can reinforce a preference.

b. Preference reinforced: A-B > B-A → A-B ≫ B-A

Applied to our results from the forced-choice and the production experiments, the following picture emerges (cf. also Table 10):

– The preference is reversed in the case of the focalization and the increase in weight of dO (& DEP) and DEP (& LOC): the preferred order under narrow information focus and

13 Note, however, that focalization and increased weight often overrule the principle of positioning the argument and not the adjunct closer to the verb.
increased weight is not the same as that under the neutral condition (which counts as the
basic order).

– The preference is reinforced in the case of the focalization and the increase in weight of
DEP (& dO) and LOC (& DEP): here the preferred order under narrow information focus and
increased weight is the same as that under the neutral condition, but the preference for this
order is even stronger than in the neutral condition.

<table>
<thead>
<tr>
<th>Preferred order</th>
<th>Impact of focus and weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral/Basic</td>
<td>Narrow Information Focus</td>
</tr>
<tr>
<td>DEP-LOC</td>
<td>DEP-[LOC]₁ᶠ</td>
</tr>
<tr>
<td>(&gt; LOC-DEP)</td>
<td>(&gt; [LOC]₁ᶠ-DEP)</td>
</tr>
<tr>
<td>dO-DEP</td>
<td>DEP-[dO]₁ᶠ</td>
</tr>
<tr>
<td>(&gt; DEP-dO)</td>
<td>(&gt; [dO]₁ᶠ-DEP)</td>
</tr>
</tbody>
</table>

Table 10: Impact of the factors: reversal vs. reinforcement of preferences

The fact that even the basic orders have the form of preferences rather than rules also
has consequences for the modeling of the data. Crucially, it is one of the reasons why we will
propose an account of the empirical results in which the concept of basic orders does not
play a role (cf. Section 4.4).

3.4.2 FOCUSFINAL in Spanish

In Section 2, two viewpoints on the position of narrow information focus in Spanish have
been presented: narrow information foci obligatorily appear in sentence final position (cf.
Martín Butragueño, 2005; Revert Sanz, 2001; Rodríguez Ramalle, 2005; Zubizarreta, 1998,
1999) vs. narrow information foci do not necessarily appear in final position (Gabriel 2007,
2010).

As shown in Section 3.3, narrow information focus is a factor in postverbal constituent
order in Spanish because narrowly focused constituents take up the sentence final position
more frequently than under the neutral condition. Further, we have seen that narrowly
focused constituents appear preferably, but not exclusively in final position (cf. Table 11).
Our results clearly suggest that the first view, according to which narrow information focus is limited to the final position, is too strict; in 20–25% of cases on average, participants chose the prefinal position for the narrowly focused constituent. At the same time, however, our results suggest a strong relation between narrow information focus and the final position because on average 75–80% of the focused constituents are in final position. Consequently, although the second view, that narrow information foci are not limited to the final position, is correct, it does not entirely capture our results because it leaves out the preference for the focus in sentence final position. Our results thus suggest – at least for postverbal constituents – a third view: narrow information focus in Spanish is not limited to the sentence final position, but preferably appears in sentence final position.

### 3.4.3 Focus vs. weight

Both narrow information focus and increased weight have an impact on postverbal constituent order in Spanish. However, we are not only interested in whether syntactic weight and information focus are determining factors or not, but also in the strength of the two factors and the question whether one factor is stronger than the other. Beginning with the results from the forced-choice experiment, the values that we must look at are the change values, i.e., the difference between the percentage occurrence in final position in neutral condition and the respective non-neutral condition. If one compares the average change values for the two factors it becomes apparent that they have basically the same strength: the average change values for the two factors are very similar, \( \Delta = 28.85 \) for narrow information focus and \( \Delta = 27.89 \) for increased weight. Thus the results from the forced-choice experiment suggest that the two factors are equally strong in their impact on constituent order. How do these results fit with other studies in which the impact of weight and information structure have been compared? An explicit comparison of syntactic weight and information structure can be found in Siewierska (1993) on Polish and Hawkins (1992, 1994) on English. The authors use the same measures for weight and for information structure,
namely Hawkins' EIC ratio and Givón's (1983) “referential distance” (RD). However, they come to different conclusions with respect to the importance of the two factors. While for Hawkins (1994) syntactic weight is the most important factor (which even makes other factors superfluous), Siewierska (1993) concludes for Polish that information structure makes better predictions: “the more predictable > less predictable principle is reflected more consistently in the corpus than the short > long one” (Siewierska 1993: 251).

Although syntactic weight is measured differently and a different level of information structure is considered in our study (focus vs. givenness), our results can nevertheless be compared to those reported in Hawkins (1992, 1994) and Siewierska (1993): our results neither support Hawkins' assumption that weight is more important than information structure and nor do they support Siewierska's (1993) conclusion that information structure is more important than weight either.

4 Accounting for optionality and preferences

4.1 Starting point

The aim of this last section is to account for two related findings from the experimental studies: (i) of two logically possible variants of postverbal constituent order both are in fact produced and chosen in the forced-choice and in the production experiment, (ii) the two variants of constituent order which are produced or chosen do not have the same status in that one is preferred over the other. Let us consider, for example, a narrowly focused direct object in the context of a DEP (cf. 21)). In this case, both [dO]Ｆ-DEP and DEP-[dO]Ｆ have been produced and chosen in the experiments, but DEP-[dO]Ｆ has been produced and chosen more often than [dO]Ｆ-DEP.

(21) (Context: What did María paint barefoot?)

<table>
<thead>
<tr>
<th></th>
<th>prod.</th>
<th>f.-ch.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>María pintó [el armario]Ｆ descalza.</td>
<td>36.11%</td>
</tr>
<tr>
<td></td>
<td>‘Maria painted barefoot the wardrobe'</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>María pintó descalza [el armario]Ｆ.</td>
<td>63.89%</td>
</tr>
<tr>
<td></td>
<td>‘Maria painted barefoot the wardrobe'</td>
<td></td>
</tr>
</tbody>
</table>

4.2 Optionality and preferences in Stochastic Optimality Theory

In pre-theoretical terms, syntactic optionality is "[…] a situation in which different ways of saying what seems to be the same thing show a clear correspondence in form" (Müller 2001:

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14 RD can be interpreted as a measure for givenness and counts the number of sentences between the present occurrence of a referent and its previous occurrence in a text or discourse.
The challenge that such a situation poses for any theory of grammar has been dealt with in different ways (cf. Adli 2006). In the following we assume that the various options we encounter in our data result from a single grammar. Using Optimality Theory terminology, we assume a single grammar that maps a single input onto two (or more) outputs (cf. Kager 2010: 404; Figure 5).

![Fig. 5: Optionality (variation within a single grammar)](image)

The challenge within optimality theory is the following: if a grammar is a constraint hierarchy (i.e. a set of ranked constraints) and if two output candidates differ with respect to their constraint violation profile, one of them must be better (i.e. more harmonic) than the other with respect to the grammar, and the grammar would map the input only to the most harmonic output and the other candidate would simply be unavailable. Further the phenomenon that needs to be accounted for in our case is not only optionality, but weighted optionality. We not only need a grammar that accounts for more than one output (for a given input), but also for differences in the frequency of these outputs. A model that can account for both optionality and quantitative differences in the options is Stochastic OT (cf. Boersma and Hayes, 2001; for applications in the domain of Spanish constituent order see Gabriel, 2007, 2010).

Stochastic OT can model data where a given input is only mapped to a single output as well as data where an input is mapped to more than one output. In Stochastic OT, variation and optionality result from the specific interaction between constraints. Constraints are located on a constraint ranking scale (CRS) according to their ranking value. Depending on their ranking value, they are ranked either higher or lower than a given other constraint; in Figure 6, $C_1$ is ranked higher than $C_2$.

---

15 An example where optionality is taken to be the result of different grammars can be found in Costa’s (1998: 336-338; 2001: 186) account of variation in Spanish basic word order: SVO vs. VSO. He assumes two varieties of Spanish which differ in the ranking of the constraints STAY and SUBJ-CASE. The grammar with the ranking STAY $\gg$ SUBJ-CASE yields the basic order VSO, the grammar with the ranking SUBJ-CASE $\gg$ STAY has the basic order SVO (STAY is violated by movement, SUBJ-CASE is violated if nominative case is not assigned in Spec,IP (cf. Costa 1998: 316)).
During the speech process, that is, when the position of each constraint is evaluated in order to compute the optimal candidate, “[...] the position of each constraint is temporarily perturbed by a random positive or negative value” (Boersma and Hayes 2001: 47). As a consequence the constraints are located at a single point of the CSR according to their ranking value, but also cover ranges of the CSR to the left and the right of their ranking value. In Figure 7 the two constraints are located in such a distance from each other that their ranges do not overlap. In such a situation there is a categorical ranking between the two constraints. Regardless of the position of $C_1$ within its range at evaluation time and the position of $C_2$ within its range at evaluation time, $C_1$ will always be ranked higher than $C_2$; there is thus a categorical ranking between $C_1$ and $C_2$.

However it might also be that two constraints are positioned on the constraint ranking scale in such a way that their ranges overlap. This case is illustrated in Figure 8. Since the constraints might be located at any point within their range at evaluation time, overlapping constraints allow the possibilities of the ranking $C_2 \succ C_3$, but also $C_3 \succ C_2$. The quantitative weighting of the options can be accounted for in the following way: the distance between the constraints on the ranking scale not only determines whether they overlap or not, but, if they do, also how often the respective rankings hold. Given the position of $C_2$ and $C_3$ on the ranking scale the ranking $C_2 \succ C_3$ is more frequent than $C_3 \succ C_2$ (cf. Figures 9 and 10; */2/ and */3/ mark the position of the constraints at selection time).
Note that in this version of OT, there is always a specific ranking between two constraints at a given evaluation time; constraints are thus not tied in the sense that they are unranked. The crucial point is that they can be ranked in different ways (if their position on the CRS is close enough) and that the relative position of overlapping constraints determines how often the respective possible rankings occur at evaluation time.

4.3 The account

4.3.1 Input

We assume that the input, on the basis of which the candidates are generated, minimally includes the following syntactically relevant information: the verb with its argument structure; the syntactic type of the constituents (PP, AP, etc.); the syntactic function of the constituents (subject, direct object, depictive, etc.), which in turn specifies whether the respective constituents are arguments or adjuncts; a focus feature (F) if a constituent is focused; a heaviness feature (h) if a constituent has increased weight. Hence, the input for a sentence with a direct object and a narrowly focused DEP would include the following information: V(S, dO), NP_S, NP_dO, AP_{DEP-F}. In order to make the following presentation more readable, we will present the input in a rather reduced way, and list only the two postverbal constituents together, the focus feature and the heaviness feature. For the above example, the information on the input would thus be dO & DEP_F.

4.3.2 Relevant constraints

The following presentation is limited to those constraints that are relevant to differences between the candidates in our data. We will not include constraints such as STRESS_FOCUS, which is violated if the sentence’s main stress is not located within the domain of focus; we...

Fig. 9: Common result: C_2 \gg C_3 (cf. Boersma and Hayes 2001: 48)

Fig. 10: Rare result: C_3 \gg C_2 (cf. Boersma and Hayes 2001: 48)
assume that this constraint is never violated in the data and thus categorically dominates all
other constraints which will be discussed in the following.

FOCUSFINAL. This constraint is satisfied if the narrow information focus is in sentence final
position. In Spanish, this constraint seems to be motivated by the fact that the final position is
the designated position of the neutral nuclear stress and that focus and stress shall align. But
FOCUSFINAL is further motivated by the more general principle of given-before-new. The
placement of new information at the end of the sentence gives the speaker more time to plan
the respective utterance by starting with known information and it also creates textual
cohesion in that given information is closer to the preceding context (where it has been
mentioned). FOCUSFINAL is satisfied in (22a.) and violated in (22b.).

(22) a. No violation of FOCUSFINAL
María pintó el armario [descalza].
María painted the wardrobe barefoot
‘Maria painted barefoot the wardrobe’

b. Violation of FOCUSFINAL
María pintó [descalza] el armario.
María painted barefoot the wardrobe
‘Maria painted barefoot the wardrobe’

ENDWEIGHT. The basic idea behind this constraint is that constituents should be ordered in
such a way that the heavier constituent follows the lighter constituent. We assume that
information on the weight of constituents is part of the input. In the context of the present
study, an important restriction has to be made in this respect. In our experiments we have
tested only the effect of weight under the following condition. One of the two postverbal
constituents has an increased weight, and this constituent is heavier than the second
postverbal constituent (independently of the neutral weight of the constituents). We have not
systematically tested weight effects concerning constituents that differ with respect to their
neutral weight, e.g., a direct object consisting of two words and depictive consisting of one
word.

In the context of our experimental data, the constraint can be easily formalized since the
pertinent stimuli involve a postverbal constituent with increased weight and a postverbal
constituent with neutral weight. As the former always exceeds the latter in number of words,
the constraint is violated if the constituent with neutral weight follows the constituent with
increased weight and it is not violated if the constituent with neutral weight precedes the
constituent with increased weight.
It would be desirable to extend the analysis of the impact of \textsc{Endweight} to all sorts of weight differences. But this requires further collection of data since different types of weight differences seem to have different effects. For example, as concerns the order of dO and DEP, the data from our experiments shows that the difference in neutral weight (dO = two words vs. DEP = one word) is not sufficient to bring the dO in the sentence final position. The order dO-DEP is strongly preferred over DEP-dO despite the fact that this results in an order where the lighter constituent ends up in the sentence final position. If we compare this to the cases with increased weight, it becomes obvious that the effect of the latter type of weight difference is different. In the case of a dO with increased weight and a DEP with neutral weight, the order DEP-dO is clearly preferred.

In the following, the constraint \textsc{Endweight} will thus be applied in a rather restricted way: we only consider weight differences between the neutral and the increased weight. We will not take into account the weight difference between \textit{descalza} and \textit{el armario} in (22), for example, but only weight differences such as between \textit{descalza} and \textit{el armario garabateado por sus hermanos} in (23). Relevant examples for the constraint are given in (23): \textsc{Endweight} is violated in (23a.) and satisfied in (23b.).\footnote{Further, it should be noted that we only consider weight differences between the two postverbal constituents leaving aside all other constituents in the sentence,}

\begin{verbatim}
(23) a. Violation of \textsc{Endweight}

María pintó el armario garabateado por sus hermanos, descalza.

María painted the wardrobe smudged by her brothers barefoot

'María painted barefoot the wardrobe smudged by her brothers.'

b. No violation of \textsc{Endweight}

María pintó descalza el armario garabateado por sus hermanos.

María painted barefoot the wardrobe smudged by her brothers

'María painted barefoot the wardrobe smudged by her brothers.'

\end{verbatim}

\textbf{Proximity Constraints.} We assume that proximity constraints evaluate candidates with respect to the distance between two elements in a sentence that maintain a specific relation. The three proximity constraints used in the following refer to (i) the direct object as an argument and the verb as its head, (ii) the subject-oriented depictive, as a modifier that is bound to the event denoted by the verb, and the verb itself, (iii) the locative adjunct as a modifier and the verb as the constituent that introduces the modified element, namely the event argument.\footnote{One reviewer raises the question of how proximity constraints fit with the pervasiveness of non-adjacency in grammar. We assume that grammars are not fully determined by proximity because proximity constraints face antagonistic constraints. These antagonistic constraints may be other proximity constraints, but also...}
Minimize the number of intervening constituents between a direct object and the verb.

b. **PROX_DEP**

Minimize the number of intervening constituents between a depictive and the verb.

c. **PROX_LOC**

Minimize the number of intervening constituents between a locative adjunct and the verb.

As concerns **PROX_DEP**, one might wonder if the target that pulls the depictive towards the left is not the verb, but the sentence's subject, i.e., the element that the depictive predicates over. The reason why we assume that it is not the subject, but the verb that attracts the depictive comes from cases where a narrowly focused subject is placed in sentence final position. Although we have not collected experimental data on this matter, our informants’ intuitions are that the preferred order DEP-LOC also holds in the case of a sentence final subject: V-DEP-LOC-[S]f > V-LOC-DEP-[S]f. Therefore, we assume that the depictive is attracted by the verb and not by the subject. The most probable explanation as to why the depictive should be placed adjacent to the verb is that, semantically, depictives are predicates that are bound to the event denoted by the verb. The syntactic proximity constraint seems to mirror this semantic proximity.

As concerns **PROX_LOC**, we assume, based on Maienborn (2001), that the locative adjuncts used in the experiments are external modifiers in the sense that they modify the event as a whole and not a part of it (an example of an internal locative modifier would be *Eva signed the contract on the last page where on the last page* does not indicate the location of the whole signing event). Semantically, external locative modifiers add a semantic constraint on the verb’s eventuality argument by determining its location (cf. Maienborn 2001: 216). Hence the verb and the locative are linked via the event argument that is introduced by the verb and modified by the locative. Again we assume that the syntactic proximity constraint mirrors this semantic proximity.

To evaluate the candidates with respect to the proximity constraints we count the number of intervening constituents. This requires a specification of what counts as an intervening constituent. We assume that the proximity constraints evaluate a given syntactic item independently of its underlying hierarchical syntactic structure. In the evaluation of proximity constraints only relevant constituents are counted, and *relevant* refers in this case to constituents that are relevant for possible alternatives in the ordering. To illustrate this constraints which are independent of proximity (e. g., in the case of dO: & DEP, FOCUSFINAL prefers the order V-DEP-dO while **PROX_ARG** prefers V-dO-DEP).
consider (25). The only constituents that are relevant for the proximity between V and the
depictive are the verb under V, the depictive AP, and the intervening locative PP; the NP that
is contained within the PP is not relevant because a sequence such as (25b.) is not an
alternative to (25a.). The level where such alternative orders are situated is the level of
syntactic functions.

danced in his/her house disguised
‘He danced disguised in his house.’

b. *Bailó en disfrazado su casa.
danced in disguised his/her house

We assume that three types of elements are relevant in the evaluation of a given syntactic
structure with respect to the proximity constraints:
(i) constituent C_{P1} is the first constituent of the pair of constituents for which the proximity
needs to be evaluated;
(ii) constituent C_{P2} is the second constituent of the pair of constituents for which the
proximity needs to be evaluated;
(iii) constituents C_{R} which intervene between C_{P1} and C_{P2} and which are relevant for the
evaluation of the proximity.

Accordingly, the syntactic structure in (26) is evaluated as follows with respect to the
proximity constraints: PROX_DEP is violated once because there is one relevant intervening
constituent, and PROX_LOC is not violated due to the lack of relevant intervening constituents
(cf. (27) and (28)).

(26) VP
   / \ 
  V'  AP
  / \  disfrazado
  V'  PP
  / \ / \ 
 V  P  NP
 bailó en su casa

(27) PROX_DEP

a. C_{P1} - C_{R} - C_{P2}
b. V  LOC  DEP
(28) PROX LOC
   a. $C_{p1} \cdot C_{p2}$
   b. V LOC

The full set of constraints for which the candidates are evaluated is given in (29).

(29) a. FOCUS FINAL
   b. ENDWEIGHT
   c. PROX ARG
   d. PROX DEP
   e. PROX LOC

4.3.3 Constraint rankings

In order to deduce the ranking of the constraints we need to look at the violation profiles and the frequencies of the candidates. Based on the data from the forced-choice experiment and the production experiment, we will first determine the ranking between FOCUS FINAL and the proximity constraints. Based on the data from the forced-choice experiment, we will then determine the ranking between ENDWEIGHT and the proximity constraints. Recall from §4.2 that optionality between linear orders is accounted for by the overlap of the pertinent constraints and that preferences between linear orders are accounted for by the relative positions of the pertinent constraints on the Constraint Ranking Scale.\(^\text{18}\)

Tables 12–14 present the candidates and the candidates’ violation profiles and frequencies for the inputs $DEP_F \& LOC_F$, $DEP_F \& LOC$ and $DEP \& LOC_F$.\(^\text{19}\)

\begin{table}[h]
\begin{tabular}{|c|c|c|c|c|}
\hline
 & FOCUS FINAL & PROX DEP & PROX LOC & forced-choice & production \\
\hline
[S-V-DEP-LOC]$_F$ & & * & & 58.97\% & 68.12\% \\
[S-V-LOC-DEP]$_F$ & & * & & 41.03\% & 31.88\% \\
\hline
\end{tabular}
\caption{Violation profiles and frequencies for $DEP_F \& LOC_F$}
\end{table}

\begin{table}[h]
\begin{tabular}{|c|c|c|c|c|}
\hline
 & FOCUS FINAL & PROX DEP & PROX LOC & forced-choice & production \\
\hline
S-V-[DEP]$_F$-LOC & * & & * & 35.90\% & 44.93\% \\
\hline
\end{tabular}
\end{table}

\(^{18}\) Unlike Boersma and Hayes (2001) we do not rely on the exact frequencies of the candidates in our constraint rankings. Instead our constraint rankings rely on (and thus reflect) the preferences between candidates, i.e. which candidate is used more frequently.

\(^{19}\) Note that these tables are not OT tableaux. They show constraint violations of candidates with respect to certain constraints, but they do not represent the ranking of the constraints. The ranking is represented by means of the position of constraints on the constraint ranking scale (as, for example, in (31)).
The frequencies of the two candidates for DEP<sub>F</sub> & LOC<sub>F</sub> in Table 12 show that PROX<sub>DEP</sub> is positioned higher on the CRS than PROX<sub>LOC</sub>: participants prefer the candidate which violates PROX<sub>LOC</sub> over the candidate that violates PROX<sub>DEP</sub>. The resulting ranking PROX<sub>DEP</sub> » PROX<sub>LOC</sub> is important for the interpretation of the results for the narrowly focused DEP (cf. Table 13). The candidate which does not violate PROX<sub>LOC</sub> and FOCUSFINAL, but violates PROX<sub>DEP</sub> is preferred over the candidate which violates PROX<sub>LOC</sub> and FOCUSFINAL. Under the assumption that PROX<sub>DEP</sub> is ranked higher than PROX<sub>LOC</sub>, the frequencies in Table 13 suggest that FOCUSFINAL is ranked higher than PROX<sub>DEP</sub>: the violation of PROX<sub>DEP</sub> is accepted for the sake of a non-violation of FOCUSFINAL and not for a non-violation of PROX<sub>LOC</sub>. The resulting constraint ranking is given in (30).

(30) FOCUSFINAL » PROX<sub>DEP</sub> » PROX<sub>LOC</sub>

Although the results for the narrowly focused LOC in Table 14 are not further instructive with respect to the constraint ranking, they are fully in line with the constraint ranking deduced from Tables 12 and 13.

Another important aspect besides the relative order between the constraints is that their ranges overlap, which is the prerequisite for the observed optionality (cf. (31)). Although FOCUSFINAL is ranked higher than PROX<sub>DEP</sub> the participants of the experiments nevertheless choose and produce candidates which violate FOCUSFINAL and satisfy PROX<sub>DEP</sub> (cf. Table 13).
In sum, the optionality between DEP-[LOC]$_F$ and [LOC]$_F$-DEP is accounted for by the fact that the pertinent constraints overlap, and the preference for the order DEP-[LOC]$_F$ is accounted for by the relative positions of the constraints on the Constraint Ranking Scale (towards the lax or strict end of the scale).

Turning to the combination of a depictive with a direct object, Tables 15–17 show the candidates and the candidates’ violation profiles and frequencies for the inputs $DEP_f & dO_f$, $DEP & dO_f$ and $DEP_f & dO$.

<table>
<thead>
<tr>
<th></th>
<th>FOCUS</th>
<th>PROX_ARG</th>
<th>PROX_DEP</th>
<th>forced-choice</th>
<th>production</th>
</tr>
</thead>
<tbody>
<tr>
<td>[S-V-DEP-dO]$_F$</td>
<td></td>
<td>*</td>
<td></td>
<td>28.21%</td>
<td>15.28%</td>
</tr>
<tr>
<td>[S-V-dO-DEP]$_F$</td>
<td></td>
<td>*</td>
<td></td>
<td>71.79%</td>
<td>84.72%</td>
</tr>
</tbody>
</table>

Table 15: Violation profiles and frequencies for $DEP_f & dO_f$

<table>
<thead>
<tr>
<th></th>
<th>FOCUS</th>
<th>PROX_ARG</th>
<th>PROX_DEP</th>
<th>forced-choice</th>
<th>production</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-V-DEP-[dO]$_F$</td>
<td></td>
<td>*</td>
<td></td>
<td>87.18%</td>
<td>63.89%</td>
</tr>
<tr>
<td>S-V-[dO]-DEP$_F$</td>
<td></td>
<td>*</td>
<td></td>
<td>12.82%</td>
<td>36.11%</td>
</tr>
</tbody>
</table>

Table 16: Violation profiles and frequencies for $DEP & dO_f$

<table>
<thead>
<tr>
<th></th>
<th>FOCUS</th>
<th>PROX_ARG</th>
<th>PROX_DEP</th>
<th>forced-choice</th>
<th>production</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-V-[DEP]-dO$_F$</td>
<td></td>
<td>*</td>
<td></td>
<td>12.82%</td>
<td>8.70%</td>
</tr>
<tr>
<td>S-V-dO-[DEP]$_F$</td>
<td></td>
<td>*</td>
<td></td>
<td>87.18%</td>
<td>91.30%</td>
</tr>
</tbody>
</table>

Table 17: Violation profiles and frequencies for $DEP_f & dO$

Again we can deduce the relation between the two proximity constraints by looking at the neutral input $DEP_f & dO_f$: the ranking of the proximity constraints is PROX_ARG » PROX_DEP (cf. Table 15). As concerns the position of FOCUS, we must now take into account the input $DEP & dO_f$ (cf. Table 16). The candidate which does not violate FOCUS and
PROX_DEP, but violates PROX_ARG is preferred over the candidate which violates FOCUSFINAL and PROX_DEP, but does not violate PROX_ARG. Under the assumption that PROX_ARG is ranked higher than PROX_DEP, the frequencies in Table 16 suggest that FOCUSFINAL is ranked higher than PROX_ARG: the violation of PROX_ARG is accepted for the sake of a non-violation of FOCUSFINAL and not for a non-violation of PROX_DEP. The resulting ranking is FOCUSFINAL » PROX_ARG » PROX_DEP; again the variation and optionality in the data shows that the constraints are positioned in such a way on the CRS that their ranges overlap (cf. (32)).

As concerns the impact of weight and the position of the respective constraint ENDWEIGHT, we must look at the results from the forced-choice experiment. For the ranking of the proximity constraints we rely on the same data as above, namely the preferences for the orders in the neutral context. The deduced rankings are PROX_DEP » PROX_LOC and PROX_ARG » PROX_DEP. For the relation between ENDWEIGHT and the proximity constraints we must also consider inputs where one of the constituents has increased weight. Crucially, the preferences show that ENDWEIGHT is ranked higher than both proximity constraints.

First, under the assumption that PROX_DEP is ranked higher than PROX_LOC, the frequencies in Table 18 suggest that ENDWEIGHT is ranked higher than PROX_DEP: the violation of PROX_DEP is accepted for the sake of a non-violation of ENDWEIGHT and not for the non-violation of PROX_LOC. The resulting ranking is given in (33).

<table>
<thead>
<tr>
<th></th>
<th>ENDWEIGHT</th>
<th>PROX_DEP</th>
<th>PROX_LOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-V-DEP&lt;sub&gt;n&lt;/sub&gt;-LOC</td>
<td>*</td>
<td>*</td>
<td>25.64%</td>
</tr>
<tr>
<td>S-V-LOC-DEP&lt;sub&gt;n&lt;/sub&gt;</td>
<td>*</td>
<td></td>
<td>74.36%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table 18: Violation profiles and frequencies (forced-choice experiment) for DEP<sub>n</sub> & LOC

<table>
<thead>
<tr>
<th></th>
<th>ENDWEIGHT</th>
<th>PROX_DEP</th>
<th>PROX_LOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-V-DEP-LOC&lt;sub&gt;n&lt;/sub&gt;</td>
<td>*</td>
<td></td>
<td>85.90%</td>
</tr>
<tr>
<td>S-V-LOC&lt;sub&gt;n&lt;/sub&gt;-DEP</td>
<td>*</td>
<td>*</td>
<td>14.10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100.00%</td>
</tr>
</tbody>
</table>
Second, under the assumption that PROX_ARG is ranked higher than PROX_DEP, the frequencies in Table 21 suggest that ENDWEIGHT is ranked higher than PROX_ARG: the violation of PROX_ARG is accepted for the sake of a non-violation of ENDWEIGHT and not of PROX_DEP. The resulting ranking is given in (34).

<table>
<thead>
<tr>
<th></th>
<th>ENDWEIGHT</th>
<th>PROX_ARG</th>
<th>PROX_DEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-V-DEP_h-dO</td>
<td>*</td>
<td>*</td>
<td>10.26%</td>
</tr>
<tr>
<td>S-V-dO-DEP_h</td>
<td></td>
<td>*</td>
<td>89.74%</td>
</tr>
</tbody>
</table>

Table 20: Violation profiles and frequencies (forced-choice experiment) for \(DEP_h\) & \(dO\)

<table>
<thead>
<tr>
<th></th>
<th>ENDWEIGHT</th>
<th>PROX_ARG</th>
<th>PROX_DEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-V-DEP-dO_h</td>
<td></td>
<td>*</td>
<td>61.54%</td>
</tr>
<tr>
<td>S-V-dO_h-DEP</td>
<td>*</td>
<td>*</td>
<td>38.46%</td>
</tr>
</tbody>
</table>

Table 21: Violation profiles and frequencies (forced-choice experiment) for \(DEP \) & \(dO_h\)

In summary, we have seen that, based on the data from the forced-choice and the production experiments, the proximity constraints can be ranked with respect to each other and with respect to FOCUSFINAL and ENDWEIGHT. In both cases, FOCUSFINAL and ENDWEIGHT are ranked higher than the respective proximity constraints. As concerns the ranking among the proximity constraints, we have seen that PROX_ARG is ranked higher than PROX_DEP and
that PROX\_DEP is ranked higher than PROX\_LOC. The first ranking corresponds to the
distinction between argument and adjunct where arguments (in this case a direct object) tend
to be placed closer to the verb than adjuncts (in this case a depictive). The second ranking,
which concerns the linearization of two adjuncts, shows a more peripheral position for the
locative adjunct than for the depictive.

The resulting rankings are given in (35); for all four rankings, it holds that the ranges of the
respective constraints overlap. No matter how strong the preference for one of the two linear
orders is, its violation is accepted in order to satisfy FOCUS\_FINAL or END\_WEIGHT.

(35)  

a. FOCUS\_FINAL » PROX\_DEP » PROX\_LOC  
b. FOCUS\_FINAL » PROX\_ARG » PROX\_DEP  
c. END\_WEIGHT » PROX\_DEP » PROX\_LOC  
d. END\_WEIGHT » PROX\_ARG » PROX\_DEP

4.3.4 A remark on basic order and \textit{STAY}

A constraint that is often used in OT accounts of word order phenomena (and OT syntax
more generally) is \textit{STAY} (cf. Gabriel 2007, 2010; Adli 2011). The basic idea is that the
movement of constituents does not come without cost. In OT-terms this translates into a
constraint \textit{STAY} which is violated by every trace during the derivation (cf. (36)). For example,
a structure such as (37) would violate \textit{STAY} one time because it contains one trace.

(36) \textit{ECONOMY OF MOVEMENT (STAY)}  
Trace is not allowed.  
(Grimshaw 1997: 374)

(37) Violation of \textit{STAY}  
[B, [A \_d]]

In order to apply this constraint in the analyses of our data one would have to assume for
each pair of postverbal constituents a basic order (i.e. the one where both constituents are in
their base position) and the respective deviation from this basic order is achieved through the
movement of the lower constituent over the higher one. Under the assumption that A-B is the
basic order, a candidate with the order B-A would violate \textit{STAY} at least one more time than a
candidate with the order A-B. However, as we have seen in Section 3.4, the determination of
the basic order is far from trivial. Under a neutral condition, i.e., the one where both
constituents are focus, and both have their neutral weight, both respective orders are
produced and chosen: dO-DEP and DEP-dO, and LOC-DEP and DEP-LOC. In order to
simplify matters, one could decide to abstract away from the tendencies and simply decide to take that order which is chosen more often in the neutral context as the basic one. Under this reasoning the basic orders would be dO-DEP and DEP-LOC, and the respective alternative orders (DEP-dO, LOC-DEP) would be the derived ones and violate STAY one time each. Since such a simplification does not do justice to the observed variation in the experimental data, especially in the case of LOC & DEP, we have opted for an account does not involve basic order and, as a consequence, movement related constraints such as STAY.

5 Conclusion

In this paper we have investigated the order of postverbal constituents in Spanish by looking at combinations of a depictive and a direct object, and a depictive and a locative adjunct. In addition to the syntactic function of the postverbal constituents we have also considered the impact of narrow information focus and syntactic weight. Based on data from two experimental studies we have shown that postverbal constituent order in Spanish is characterized at the same time by optionality and preferences.

As concerns the first characteristic, we have observed optionality with respect to the order of syntactic functions, the position of focused constituents and the position of heavy constituents. The order is optional with respect to the syntactic functions in the sense that both logically possible orders – e.g. DEP-dO and dO-DEP – are produced and chosen. Similarly, we have found that focused constituents can be placed in final and prefinal position, and that heavy constituents can be placed in final and prefinal position.

Besides optionality, we have also identified clear preferences in our study. As in the case of optionality, these preferences concern the syntactic functions, the position of focused constituents and the position of heavy constituents. As concerns the syntactic functions, the results from the experiments show that dO-DEP is preferred over DEP-dO and DEP-LOC over LOC-DEP. Further, the results show that narrowly focused constituents and heavy constituents preferably appear in sentence final position. Specific aspects have also been discussed against the foil of the empirical results: the question concerning basic constituent order, the position of narrow information focus in Spanish, and the question whether information focus or syntactic weight is a stronger factor.

Finally, it has been shown in Section 4 how the optionality and the preferences found in the data can be accounted for in a Stochastic OT grammar. The specifics of the account are that it involves neither assumptions about basic constituent order nor movement related constraints. Instead, the data is accounted for with constraints on proximity (PROX_ARG, PROX_DEP, PROX_LOC) and constraints referring to the position of narrow information focus and heavy constituents (FOCUS_FINAL and ENDWEIGHT). Based on the frequencies from the production and the forced-choice experiments it has been shown that both FOCUS_FINAL and
ENDWEIGHT are ranked higher than the respective proximity constraints; both information focus and syntactic weight are thus more important factors in postverbal constituent order than the syntactic function of the constituents.

References


