



- 36 (1) a. Juan compró un coche . S-V-dO  
 37 Juan bought a car  
 38 'Juan bought a car'
- 39 b. Juan bailó en el jardín. S-V-LOC  
 40 Juan danced in the garden  
 41 'Juan danced in the garden'
- 42 c. Juan bailó borracho. S-V-DEP  
 43 Juan danced drunk  
 44 'Juan danced drunk'

45

46 The linearity of linguistic expressions implies that if two (or more) postverbal constituents  
 47 co-occur in a sentence, they must be ordered in a certain way. Thus the co-occurrence of a  
 48 direct object and depictive may result in an order where the direct object precedes the  
 49 depictive (cf. (2a.)) or in an order where the direct object follows the depictive (cf. (2b.)).

50

- 51 (2) a. Juan compró la casa borracho. S-V-dO-DEP  
 52 Juan bought the house drunk  
 53 'Juan bought the house drunk'
- 54 b. Juan compró borracho la casa. S-V-DEP-dO  
 55 Juan bought drunk the house  
 56 'Juan bought the house drunk'

57

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

69 A second main goal of this paper, besides supporting these empirical claims, is to account  
 70 for a specific result, namely, the optionality and preferences found in the data. Basically, it is  
 71 argued that neither narrow information focus nor increased syntactic weight force the final  
 72 position and thus the respective ordering principles apply as preferences rather than as

73 rules. For example, one result from the production experiment is that narrowly focused direct  
74 objects (in the context of a depictive) are placed preferably in sentence final position, but  
75 they are also placed in prefinal position. Thus, participants produced both orders in (3),  
76 although they produce (3b.) more often than (3a.).

77

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

79 a. Juanita pinta [el armario]<sub>F</sub> descalza dO-DEP

80 Juanita paints the wardrobe barefoot

81 'Juanita paints barefoot the wardrobe'

82 b. Juanita pinta descalza [el armario]<sub>F</sub> DEP-dO

83 Juanita paints barefoot the wardrobe

84 'Juanita paints barefoot the wardrobe'

85

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

98 The remainder of the paper is structured as follows. The alleged relevance of information  
99 focus and syntactic weight will be introduced in Section 2.<sup>1</sup> Section 3 presents and discusses  
100 the results from two experimental studies on postverbal constituent order in Spanish. Section  
101 4 describes how the results – and in particular the optionality and preferences found in the  
102 data – can be accounted for in a Stochastic OT grammar without assuming a basic  
103 constituent order and movement-related constraints.

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<sup>1</sup> This description closely follows that given in Heidinger (2013).

104 2 Two factors in postverbal constituent order

105 2.1 FOCUSFINAL

106 Focus is one of the four levels of information structure distinguished in Krifka (2007).<sup>2</sup>  
107 Following Rooth (1985, 1992), he defines *focus* as follows: “Focus indicates the presence of  
108 alternatives that are relevant for the interpretation of linguistic expressions” (Krifka 2007: 18).  
109 Thus, in the example in (4) *a new car* is focus because for this part of the sentence  
110 alternatives that are relevant for the interpretation of the sentence exist: the focus *a new car*  
111 specifies that among all the things that John might have bought, he actually bought a new  
112 car.

113

114 (4) (Context: What did John buy?)

115 John bought [a new car]<sub>F</sub>

116

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

119

120 (5) a. (Context: What happened?)

121 [John bought a new car]<sub>F</sub> sentence focus

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

123 He [bought a new car]<sub>F</sub> VP focus

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

125 He bought [a new car]<sub>F</sub> narrow (argument) focus

126

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

134

135 (6) a. (Context: What did John buy?)

136 He bought [a new car]<sub>F</sub> information focus

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<sup>2</sup> 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.

137           b.       (Context: John bought a house, right?)  
138                    No, he bought [a new car]<sub>F</sub>                    contrastive focus

139

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

157

158 (7)       (Context: What did Juan buy?)  
159            Juan compró [una CAsa]<sub>F</sub>  
160            Juan bought a house  
161            ‘Juan bought a house’

162

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

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<sup>3</sup> Cf. Leonetti (2011) for a description of Spanish in the context of other Romance languages.

<sup>4</sup> 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.

170 direct object (cf. (8b.)), in deviation from the basic order. According to authors such as  
171 Zubizarreta (1998, 1999), changes in constituent order as in (8b.) are obligatory, since the  
172 focused constituent must end up in sentence final position (even if this is not its basic  
173 position).

174

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

176 a. (Context: What did María do?)

177 María [compró el diario en el kiosco]<sub>F</sub> dO-LOC (basic order)

178 María bought the newspaper at the kiosk

179 'María bought the newspaper at the kiosk'

180 b. (Context: What did María buy at the kiosk?)

181 María compró en el kiosco [el diario]<sub>F</sub> LOC-dO

182 María bought at the kiosk the newspaper

183 'María bought the newspaper at the kiosk'

184

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

190

191 (9) (Context: What did María buy at the kiosk?)

192 María compró [el diario]<sub>F</sub> en el kiosco. S-V-[dO]<sub>F</sub>-LOC

193 María bought the newspaper at the kiosk

194 'María bought the newspaper at the kiosk'

195

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

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<sup>5</sup> 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).

204 only differ in the order of constituents, but also in their intonation contours. Since the nuclear  
 205 accent needs to lie within the focus domain, prefinal foci imply that the nuclear accent is not  
 206 in final, but in prefinal position. Another prosodic consequence of prefinal foci is the  
 207 deaccentuation of post-focal material which results in a characteristic “low valley” of the F0-  
 208 contour (cf. Gabriel, 2007, 2010 on Spanish, and Cardinaletti, 2001, 2002 on Italian).<sup>6</sup>  
 209

	abs.	%	
S-V-[dO] <sub>F</sub> -LOC	19	38	← <i>in situ</i> in prefinal position
S-V-LOC-[dO] <sub>F</sub>	7	14	← <i>p-movement</i>
[dO] <sub>F</sub> -V-S	2	4	
rest (e.g. reduced answers)	22	44	
total	50	100	

210 Table 1: Order of LOC & [dO]<sub>F</sub> (Gabriel 2010: 213, 216f.; adapted)  
 211

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

## 220 2.2 ENDWEIGHT

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

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

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<sup>6</sup> Post-focal material could in principle be analyzed as right-dislocated or still part of the core sentence. In the case of right-dislocation FOCUS<sub>FINAL</sub> 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).

230 direct object and a prepositional phrase appear as postverbal constituents. The basic order is  
231 that where the direct object precedes the prepositional phrase, in the shifted order the  
232 prepositional phrase precedes the direct object.<sup>7</sup> Crucially, while the basic order is possible  
233 independent of the constituents' weight, the shifted order is licensed by the increased weight  
234 of the direct object (cf. (10)).

235

236 (10) Heavy NP Shift (HNPS)

237 a. basic: dO-PP

238 The waiter brought the wine to the table.

239 The waiter brought the wine we had ordered to the table.

240 b. shifted: PP-dO

241 ??The waiter brought to the table the wine.

242 The waiter brought to the table the wine we had ordered.

243 (Arnold et al. 2000: 28)

244

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

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

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<sup>7</sup> 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.

264 As concerns Spanish, there are to our knowledge no large-scale studies primarily devoted  
 265 to the impact of syntactic weight on constituent order (which would be comparable to those  
 266 conducted by Wasow and Hawkins). Nonetheless, syntactic weight has been referred to by  
 267 several authors. These references to weight usually occur in relation to a specific  
 268 phenomenon: the order of depictives and other adjuncts (cf. Demonte and Masullo 1999:  
 269 2483), the position of adverbials in sentence initial and/or final position (cf. Duffer 2009: 107),  
 270 subject-predicate order in the case of a sentence initial adverbial phrase (cf. Fernández  
 271 Ramírez 1986: 458), the order of subject and verb (cf. Fernández Soriano 1993: 131;  
 272 Hernanz and Brucart 1987: 78), subject inversion in Spanish relative clauses (cf. Gutiérrez-  
 273 Bravo, 2005).<sup>8</sup>

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

283

	V-dO-iO		V-iO-dO	
1<2	76.86%	(754)	80.79%	(450)
1=2	16.92%	(166)	10.95%	(61)
1>2	6.22%	(61)	8.26%	(46)
	100.00%	(981)	100.00%	(557)

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

285

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

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<sup>8</sup> 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).

293 increased syntactic weight of constituents with the form of a clause and to the fact that such  
294 long constituents tend to appear in sentence final position (cf. Valverde Ibáñez 2009: 259).

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

### 302 **3 Empirical studies**

#### 303 **3.1 General remarks**

304 The decision to investigate the impact of focus and weight using experimental methods is  
305 motivated by the following reasons. The existing literature suggests that both weight and  
306 focus do not influence constituent order in a categorical, but in a gradual manner; i.e., they  
307 create tendencies or preferences and not strict rules. If this also holds for the phenomenon  
308 under investigation here, namely postverbal constituent order in Spanish, the phenomenon  
309 can only be adequately described if its gradual nature can be captured.<sup>9</sup> Further, the  
310 combination of two experimental methods allows us to gain a comprehensive understanding  
311 of the impact of weight and focus in production and perception. Parts of the results from the  
312 production and the forced-choice experiment have been presented in Heidinger (2013,  
313 2014a) respectively.

#### 314 **3.2 Two experimental methods**

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

##### 320 • Production experiment<sup>10</sup>

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

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<sup>9</sup> 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.

<sup>10</sup> The experimental set-up used in the production experiment is inspired by the experiments reported in Gabriel (2007, 2010).

324 Córdoba in Córdoba, Spain. The 36 participants were students at the Universidad de  
325 Córdoba, predominantly studying humanities: age, 18–24; sex, 30 female vs. 6 male; 33  
326 grew up in Andalucía, three in other parts of Spain. All are monolingual native speakers of  
327 Iberian Spanish. The participants were compensated with eight euros each.

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

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

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

348

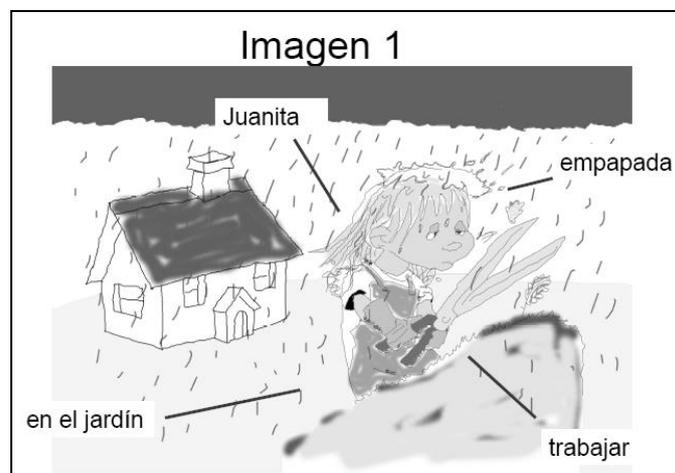


Fig. 1: Stimulus (with additional written information)

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350

351

352 After showing the picture with the additional information to the participants for about eight  
 353 to ten seconds, the picture was shown again, but without the additional information. Instead,  
 354 the questions that the participants had to answer were played by clicking on an icon in the  
 355 picture. The questions were presented in audio in order to make the situation more authentic.  
 356 After each question the participants had to give their answer and only after that the  
 357 experimenter moved on to the next question. Once all five questions for a given stimulus  
 358 were answered, the experimenter moved on to the next stimulus, presenting again first the  
 359 stimulus with the written information and only after that the stimulus without the information,  
 360 but with the questions.

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

367

	Question	Focus structure answer
1	¿Dónde trabaja Juanita empapada? 'Where does Juanita work soaked?'	[LOC] <sub>F</sub>
2	Juanita trabaja seca en el jardín, ¿verdad? 'Juanita works dry in the garden, right?'	[DEP] <sub>CF</sub>
3	¿Qué pasa aquí? 'What happens here?'	[sentence] <sub>F</sub>
4	¿Cómo trabaja Juanita en el jardín? 'How does Juanita work in the garden?'	[DEP] <sub>F</sub>
5	Juanita trabaja empapada en el bosque, ¿verdad? 'Juanita works soaked in the woods, right?'	[LOC] <sub>CF</sub>

368

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

369

370 In addition to stimuli where the second postverbal constituent (next to the depictive) is a  
 371 locative adverbial, the experiment also included stimuli where the second postverbal  
 372 constituent is a direct object. Both structures, *S+V+DEP+LOC* and *S+V+DEP+dO*, were filled  
 373 with two different lexicalizations resulting in the four visual stimuli mentioned above. Table 4  
 374 shows the lexical material in the four stimuli and the syntactic functions of the constituents.  
 375 The elements in parentheses are the false items of information in the questions for  
 376 contrastive focus.

377

1	<i>Juanita - trabajar - empapado (seco) - en el jardín (en el bosque)</i> Juanita - work - soaked (dry) - in the garden (in the woods)	S+V+DEP+LOC
2	<i>Juanita - pintar - descalzo (calzado) - el armario (el suelo)</i> Juanita - paint - barefoot (with.shoes.on) - the wardrobe (the floor)	S+V+DEP+dO
3	<i>Pepito - abrir - borracho (sobrio) - la puerta (la ventana)</i> Pepito - open - drunk (sober) - the door (the window)	S+V+DEP+dO
4	<i>Pepito - bailar - disfrazado (desnudo) - en la sala (en el aula)</i> Pepito - dance - disguised (naked) - in the living.room (in the classroom)	S+V+DEP+LOC

378

Table 4: Lexicalizations

379

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

384 As mentioned above, 36 persons participated in the experiment. The experiment involved  
385 four visual stimuli and for each of them five questions were asked. This amounts to a total of  
386 720 answers (144 answers for stimuli with sentence focus, 288 answers for narrow  
387 information focus, and 288 answers for contrastive focus). Technical problems occurred  
388 during the recording of the answers of two participants; as a consequence a total of 7  
389 answers could not be used for analysis (one for a stimulus with sentence focus, three for  
390 stimuli with narrow information focus, and three for stimuli with contrastive focus). Note that  
391 only a subset of the answers, namely those with narrow information focus and sentence  
392 focus, are relevant here and will be presented in Section 3.3.<sup>11</sup>

393 • Forced-choice experiment

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

<sup>11</sup> 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).

401 guidance. The total duration of the experiment was approximately 25 minutes including an  
402 instruction phase, a practice phase and the experiment *sensu stricto*. The participants were  
403 not compensated individually, instead a draw for a monetary prize of 30 euros was held after  
404 both turns.

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

411

412 (11) ¿Qué hizo Juan?

413 'What did Juan do?'

414 o Juan bailó disfrazado en su casa. DEP-LOC

415 Juan danced disguised in his house

416 'Juan danced disguised in his house'

417 o Juan bailó en su casa disfrazado. LOC-DEP

418 Juan danced in his house disguised

419 'Juan danced disguised in his house'

420

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

424

425 (12) a. María pintó un armario descalza. dO & DEP

426 María painted a wardrobe barefoot

427 'Maria painted barefoot a wardrobe'

428 b. Juan bailó disfrazado en su casa. DEP & LOC

429 Juan danced disguised in his house

430 'Juan danced disguised in his house'

431

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

437 (as in (13)), and (iii) an increased-weight condition in which the answer has a VP-focus and  
438 one of the postverbal constituents has an increased syntactic weight (as in (14)).

439

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

441 ¿Cómo bailó Juan en su casa?

442 'How did Juan dance at his house?'

443 a. Juan bailó en su casa [disfrazado]<sub>F</sub>.

444 Juan danced in his house disguised

445 'Juan danced disguised in his house'

446 b. Juan bailó [disfrazado]<sub>F</sub> en su casa.

447 Juan danced disguised in his house

448 'Juan danced disguised in his house'

449

450 (14) *Increased-weight condition*

451 ¿Qué hizo Juan?

452 'What did Juan do?'

453 a. Juan [bailó en la casa decorada por sus hermanas disfrazado]<sub>F</sub>.

454 Juan danced in the house decorated by his sisters disguised

455 'Juan danced disguised in the house that has been decorated

456 by his sisters'

457 b. Juan [bailó disfrazado en la casa decorada por sus hermanas]<sub>F</sub>.

458 Juan danced disguised in the house decorated by his sisters

459 'Juan danced disguised in the house that has been decorated

460 by his sisters'

461

462 To determine the impact of a given factor on postverbal constituent order, data from the  
463 neutral condition and the respective non-neutral condition must be compared. Recall that  
464 both factors presumably favor the sentence final position of the respective constituent. To  
465 verify, for example, the impact of narrow information focus, a constituent's percentage of  
466 occurrence in final position in the neutral condition and in the narrow-information-focus  
467 condition need to be compared. Applied to the stimuli in (11) and (13), the basic idea is thus  
468 as follows: how often do participants choose LOC-DEP (and not DEP-LOC) in the neutral  
469 condition (as in (11)) and how often do they choose it in the narrow-information-focus  
470 condition (as in (13))? As mentioned, the prediction would be that they choose LOC-DEP  
471 more often in the case of the narrow-information-focus condition than in the neutral condition.  
472 The impact of the syntactic weight, the second factor we are interested in, is verified in the

473 same way: how often do participants choose DEP-LOC in the neutral condition and how  
474 often is DEP-LOC chosen in the increased-weight condition (as in (14))?

475 The impact of the two factors is thus measured through the increase in the percentage  
476 occurrence in the final position of the respective constituent (for DEP (& LOC), LOC (& DEP),  
477 DEP (& dO), and dO (& DEP)). The respective measures are  $\Delta_{\text{Focus}}$  and  $\Delta_{\text{Weight}}$ , which are  
478 calculated as in (15) and (16) below:  $\Delta_{\text{Focus}}$  is the difference between the percentage  
479 occurrence of a constituent in final position in the narrow-information-focus condition and the  
480 percentage occurrence of a constituent in final position in the neutral condition.

481

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

483

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

487

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

489

490 In order to determine the impact of information focus and syntactic weight on postverbal  
491 constituent order in such a way, the following variables had to be controlled for in the  
492 experiment: syntactic functions of the two postverbal constituents (DEP & LOC, DEP & dO),  
493 focus-background partition of the answer (VP-focus, narrow focus on one postverbal  
494 constituent), and syntactic weight of the postverbal constituents (neutral, increased weight of  
495 one postverbal constituent). This amounts to a total of ten conditions, as in Table 5. Each of  
496 the conditions was lexicalized in two different ways, which results in a total of twenty stimuli  
497 (i.e. mini-dialogs with two variants of the answer) which were presented to each participant in  
498 the experiment.

499

		neutral weight	increased weight DEP	increased weight {LOC dO}
DEP & LOC	[VP] <sub>F</sub>	<i>DEP-LOC</i>	<i>DEP-LOC</i>	<i>DEP-LOC</i>
		<i>LOC-DEP</i>	<i>LOC-DEP</i>	<i>LOC-DEP</i>
	[DEP] <sub>F</sub>	<i>DEP-LOC</i>		
		<i>LOC-DEP</i>		
	[LOC] <sub>F</sub>	<i>DEP-LOC</i>		
		<i>LOC-DEP</i>		
DEP & dO	[VP] <sub>F</sub>	<i>DEP-dO</i>	<i>DEP-dO</i>	<i>DEP-dO</i>
		<i>dO-DEP</i>	<i>dO-DEP</i>	<i>dO-DEP</i>
	[DEP] <sub>F</sub>	<i>DEP-dO</i>		
		<i>dO-DEP</i>		
	[dO] <sub>F</sub>	<i>DEP-dO</i>		
		<i>dO-DEP</i>		

Table 5: Conditions tested in forced-choice experiment

500

501

502 Note that in this experimental set-up, the two factors information focus and syntactic  
503 weight were controlled for separately, i.e., only one factor is tested at a time. There are no  
504 conditions in which syntactic weight and narrow information focus directly compete.

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

512 In the experiment, the stimuli were presented to each participant on a separate computer  
513 screen using LimeSurvey. Only one mini-dialog was presented on the screen at a time. While  
514 the questions of the dialog were presented in written and audio format, the two variants of  
515 the answer were presented in audio format only.<sup>12</sup> To listen to the audio, participants had to  
516 click on a player embedded in LimeSurvey.

<sup>12</sup> 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.

517 **3.3 Results**

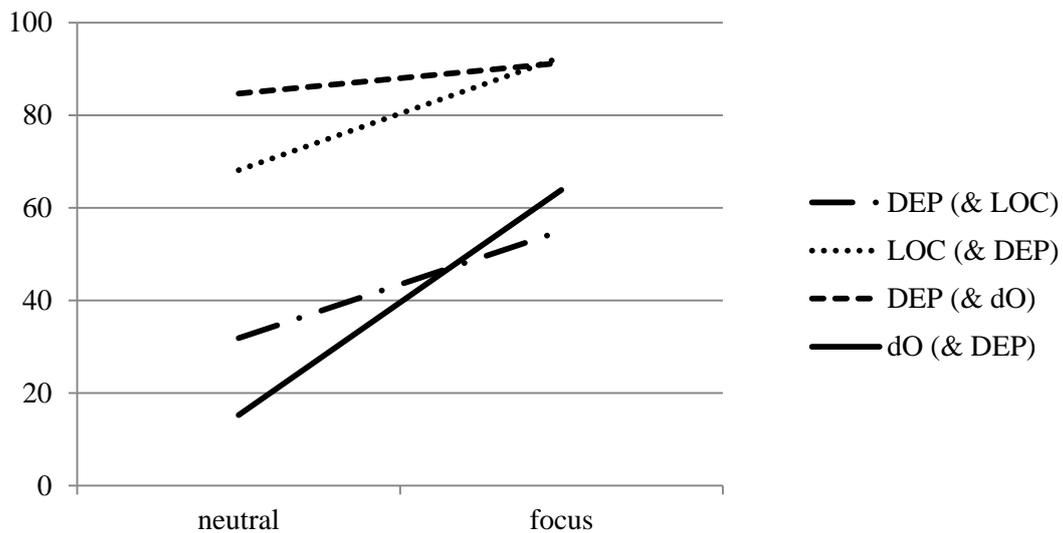
518 Beginning with the evidence on the impact of narrow information focus, there are two  
 519 sources of evidence to be examined: (i) the production experiment, (ii) the forced-choice  
 520 experiment. Starting with the production experiment, Table 6 and Figure 3 show the  
 521 percentage of occurrence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

530

	neutral condition	narrow-information-focus condition
DEP (& LOC)	31.88	55.07 ( $\Delta = 23.19$ )
LOC (& DEP)	68.12	92.54 ( $\Delta = 24.42$ )
DEP (& dO)	84.72	91.30 ( $\Delta = 6.58$ )
dO (& DEP)	15.28	63.89 ( $\Delta = 48.61$ )

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

532



533 Fig. 2: Percentage of occurrence in final position (production experiment)

535

536 The results of the production experiment clearly show that narrow information focus has  
 537 an impact on postverbal constituent order in Spanish. It applies to all four constituents that

538 the focalization increases the percentage of occurrence of the respective constituent in final  
539 position (compared to the neutral condition) (cf. Table 6 and Figure 2).

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

544

545 (17) a. Juanita trabaja empapada [en el jardín]<sub>F</sub> (pb020289)

546 Juanita works soaked in the garden

547 'Juanita works soaked in the garden.'

548 b. Juanita trabaja [en el jardín]<sub>F</sub> empapada (aa291291)

549 Juanita works in the garden soaked

550 'Juanita works soaked in the garden.'

551

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

558

	neutral condition	narrow-information-focus condition
DEP (& LOC)	41.03	64.10 ( $\Delta = 23.07$ )
LOC (& DEP)	58.97	76.92 ( $\Delta = 17.95$ )
DEP (& dO)	71.79	87.18 ( $\Delta = 15.39$ )
dO (& DEP)	28.21	87.18 ( $\Delta = 58.97$ )

559 Table 7: Percentage of occurrence in final position (forced-choice experiment)

560

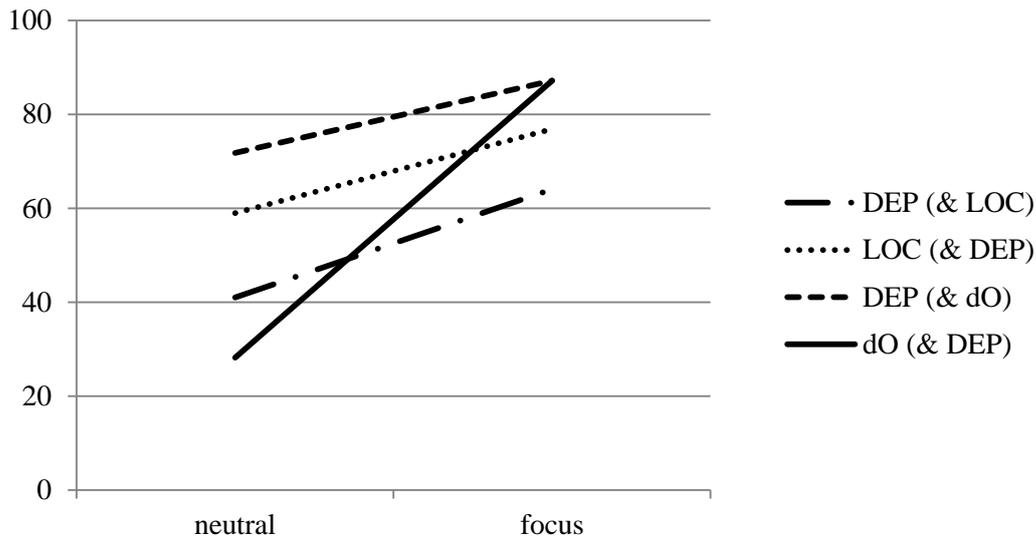


Fig. 3: Percentage of occurrence in final position (forced-choice experiment)

561  
562  
563

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

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

576 The results clearly show that syntactic weight has an impact on postverbal constituent  
577 structure. It applies to all four constituents that the increase in syntactic weight increases the  
578 percentage of occurrence of the respective constituent in final position (compared to the  
579 neutral condition) ( $p < 0,05$  (McNemar)).

580

	neutral condition	increased-weight condition
DEP (& LOC)	41.03	74.36 ( $\Delta = 33.33$ )
LOC (& DEP)	58.97	85.90 ( $\Delta = 26.93$ )
DEP (& dO)	71.79	89.74 ( $\Delta = 17.95$ )
dO (& DEP)	28.21	61.54 ( $\Delta = 33.33$ )

Table 8: Percentage of occurrence in final position (forced-choice experiment)

581  
582

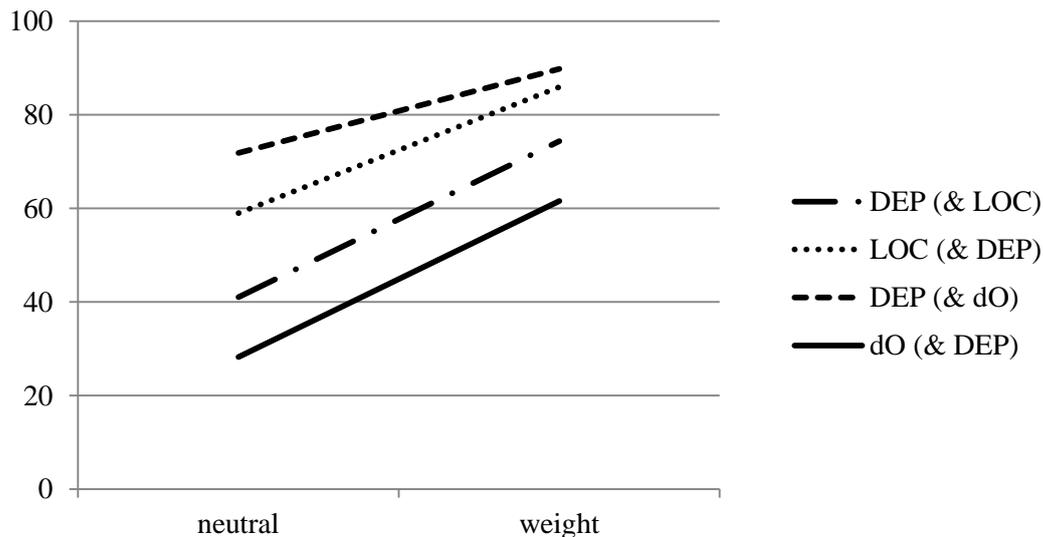


Fig. 4: Percentage of occurrence in final position (forced-choice experiment)

583  
584  
585

586 The overall summary is that both narrow information focus and syntactic weight have an  
587 impact on postverbal constituent order in Spanish. As concerns the frequency with which  
588 orderings are produced or chosen, we have seen that narrow information focus and  
589 increased syntactic weight increase the frequency with which the respective constituent  
590 appears in sentence final position.

591 **3.4 Discussion**

592 **3.4.1 Basic order**

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

597

598 (18) Focus-induced alterations of constituent order

- 599 a. [S-V-A-B]<sub>F</sub> basic order
- 600 b. S-V-B-[A]<sub>F</sub> altered order

601

602 (19) Weight-induced alterations of constituent order

- 603 a. S-V-A-B basic order
- 604 b. S-V-B-A<sub>n</sub> altered order

605

606 The premise of this description was that for any pair of postverbal constituents a basic  
607 order could be determined. In the light of our results, both the premise on the basic order and  
608 the subsequent description of the impact of FOCUSFINAL and ENDWEIGHT need to be revised.

609 Starting with the aspect of basic order, the set of data we need to look at is that for the  
 610 neutral condition; in these cases both postverbal constituents have the same informational  
 611 value (both are focus) and have their neutral weight. The results of the forced-choice and  
 612 production experiments show that the basic order is not always easy to detect. Table 9 gives  
 613 the participants' preferences for the ordering of DEP & LOC and DEP & dO under the neutral  
 614 condition (VP- or sentence focus, neutral weight).  
 615

	Forced-choice	Production
<i>DEP-LOC</i>	58.97%	68.12%
<i>LOC-DEP</i>	41.03%	31.88%
	100.00%	100.00%
<i>DEP-dO</i>	28.21%	15.28%
<i>dO-DEP</i>	71.79%	84.72%
	100.00%	100.00%

616 Table 9: Preferred constituent orders under neutral condition  
 617

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

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

628

- 629 (20) a. Preference reversed:  $A-B > B-A \rightarrow B-A > A-B$   
 630 b. Preference reinforced:  $A-B > B-A \rightarrow A-B \gg B-A$

631

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

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

---

<sup>13</sup> Note, however, that focalization and increased weight often overrule the principle of positioning the argument and not the adjunct closer to the verb.

636 increased weight is not the same as that under the neutral condition (which counts as the  
637 basic order).

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

642

Neutral/Basic	Preferred order		Impact of focus and weight
	Narrow Information Focus	Increased Weight	
DEP-LOC	DEP-[LOC] <sub>F</sub> (> [LOC] <sub>F</sub> -DEP)	DEP-LOC <sub>h</sub> (> LOC <sub>h</sub> -DEP)	Preference reinforced
(> LOC-DEP)	LOC-[DEP] <sub>F</sub> (> [DEP] <sub>F</sub> -LOC)	LOC-DEP <sub>h</sub> (> DEP <sub>h</sub> -LOC)	Preference reversed
dO-DEP	dO-[DEP] <sub>F</sub> (> [DEP] <sub>F</sub> -dO)	dO-DEP <sub>h</sub> (> DEP <sub>h</sub> -dO)	Preference reinforced
(> DEP-dO)	DEP-[dO] <sub>F</sub> (> [dO] <sub>F</sub> -DEP)	DEP-dO <sub>h</sub> (> dO <sub>h</sub> -DEP)	Preference reversed

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

644

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

### 649 3.4.2 FOCUSFINAL in Spanish

650 In Section 2, two viewpoints on the position of narrow information focus in Spanish have  
651 been presented: narrow information foci obligatorily appear in sentence final position (cf.  
652 Martín Butragueño, 2005; Revert Sanz, 2001; Rodríguez Ramalle, 2005; Zubizarreta, 1998,  
653 1999) vs. narrow information foci do not necessarily appear in final position (Gabriel 2007,  
654 2010).

655 As shown in Section 3.3, narrow information focus is a factor in postverbal constituent  
656 order in Spanish because narrowly focused constituents take up the sentence final position  
657 more frequently than under the neutral condition. Further, we have seen that narrowly  
658 focused constituents appear preferably, but not exclusively in final position (cf. Table 11).

659

	Forced-choice experiment		Production experiment	
	final	prefinal	final	prefinal
DEP (& LOC)	64.10	35.90	55.07	44.93
LOC (& DEP)	76.92	23.08	92.54	7.46
DEP (& dO)	87.18	12.82	91.30	8.70
dO (& DEP)	87.18	12.82	63.89	36.11
average	78.85	21.15	75.70	24.30

660 Table 11: Percentage of narrowly focused constituents in final and in prefinal position

661  
662 Our results clearly suggest that the first view, according to which narrow information focus  
663 is limited to the final position, is too strict; in 20–25% of cases on average, participants chose  
664 the prefinal position for the narrowly focused constituent. At the same time, however, our  
665 results suggest a strong relation between narrow information focus and the final position  
666 because on average 75–80% of the focused constituents are in final position. Consequently,  
667 although the second view, that narrow information foci are not limited to the final position, is  
668 correct, it does not entirely capture our results because it leaves out the preference for the  
669 focus in sentence final position. Our results thus suggest – at least for postverbal  
670 constituents – a third view: narrow information focus in Spanish is not limited to the sentence  
671 final position, but preferably appears in sentence final position.

### 672 3.4.3 Focus vs. weight

673 Both narrow information focus and increased weight have an impact on postverbal  
674 constituent order in Spanish. However, we are not only interested in whether syntactic weight  
675 and information focus are determining factors or not, but also in the strength of the two  
676 factors and the question whether one factor is stronger than the other. Beginning with the  
677 results from the forced-choice experiment, the values that we must look at are the change  
678 values, i.e., the difference between the percentage occurrence in final position in neutral  
679 condition and the respective non-neutral condition. If one compares the average change  
680 values for the two factors it becomes apparent that they have basically the same strength:  
681 the average change values for the two factors are very similar,  $\Delta = 28.85$  for narrow  
682 information focus and  $\Delta = 27.89$  for increased weight. Thus the results from the forced-choice  
683 experiment suggest that the two factors are equally strong in their impact on constituent  
684 order. How do these results fit with other studies in which the impact of weight and  
685 information structure have been compared? An explicit comparison of syntactic weight and  
686 information structure can be found in Siewierska (1993) on Polish and Hawkins (1992, 1994)  
687 on English. The authors use the same measures for weight and for information structure,

688 namely Hawkins' EIC ratio and Givón's (1983) "referential distance" (RD).<sup>14</sup> However, they  
 689 come to different conclusions with respect to the importance of the two factors. While for  
 690 Hawkins (1994) syntactic weight is the most important factor (which even makes other  
 691 factors superfluous), Siewierska (1993) concludes for Polish that information structure makes  
 692 better predictions: "the more predictable > less predictable principle is reflected more  
 693 consistently in the corpus than the short > long one" (Siewierska 1993: 251).

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

## 700 4 Accounting for optionality and preferences

### 701 4.1 Starting point

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

710

711	(21)	(Context: What did María paint barefoot?)	prod.	f.-ch.
712	a.	María pintó [el armario] <sub>F</sub> descalza. María painted the wardrobe barefoot 'Maria painted barefoot the wardrobe'	36.11%	12.82%
713				
714				
715	b.	María pintó descalza [el armario] <sub>F</sub> . María painted barefoot the wardrobe 'Maria painted barefoot the wardrobe'	63.89%	87.18%
716				
717				

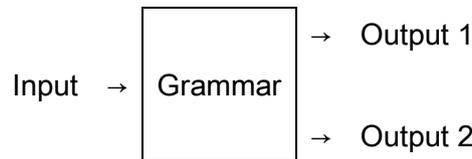
### 718 4.2 Optionality and preferences in Stochastic Optimality Theory

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

---

<sup>14</sup> 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.

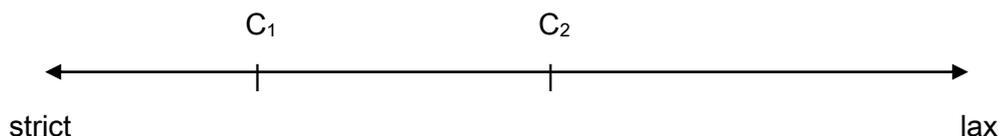
721 289). The challenge that such a situation poses for any theory of grammar has been dealt  
 722 with in different ways (cf. Adli 2006). In the following we assume that the various options we  
 723 encounter in our data result from a single grammar.<sup>15</sup> Using Optimality Theory terminology,  
 724 we assume a single grammar that maps a single input onto two (or more) outputs (cf. Kager  
 725 2010: 404; Figure 5).



727 Fig. 5: Optionality (variation within a single grammar)

728  
 729 The challenge within optimality theory is the following: if a grammar is a constraint  
 730 hierarchy (i.e. a set of ranked constraints) and if two output candidates differ with respect to  
 731 their constraint violation profile, one of them must be better (i.e. more harmonic) than the  
 732 other with respect to the grammar, and the grammar would map the input only to the most  
 733 harmonic output and the other candidate would simply be unavailable. Further the  
 734 phenomenon that needs to be accounted for in our case is not only optionality, but *weighted*  
 735 optionality. We not only need a grammar that accounts for more than one output (for a given  
 736 input), but also for differences in the frequency of these outputs. A model that can account  
 737 for both optionality and quantitative differences in the options is Stochastic OT (cf. Boersma  
 738 and Hayes, 2001; for applications in the domain of Spanish constituent order see Gabriel,  
 739 2007, 2010).

740 Stochastic OT can model data where a given input is only mapped to a single output as  
 741 well as data where an input is mapped to more than one output. In Stochastic OT, variation  
 742 and optionality result from the specific interaction between constraints. Constraints are  
 743 located on a constraint ranking scale (CRS) according to their *ranking value*. Depending on  
 744 their ranking value, they are ranked either higher or lower than a given other constraint; in  
 745 Figure 6, C<sub>1</sub> is ranked higher than C<sub>2</sub>.

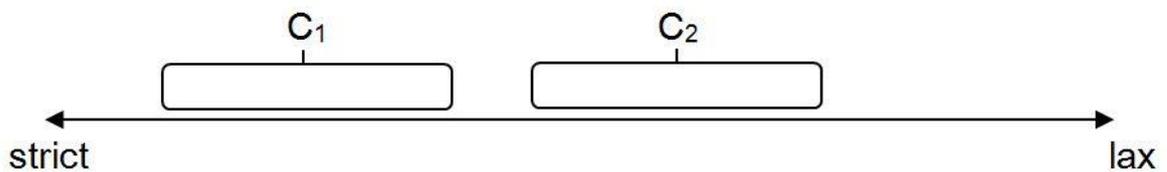


<sup>15</sup> An example where optionality is taken to be the result of different grammars can be found in Costa's (1998: 336-338; 2001: 186) account of variation in Spanish basic word order: SVO vs. VSO. He assumes two varieties of Spanish which differ in the ranking of the constraints STAY and SUBJ-CASE. The grammar with the ranking STAY » SUBJ-CASE yields the basic order VSO, the grammar with the ranking SUBJ-CASE » 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)).

750  
751

Fig. 6: Constraint ranking scale

752 During the speech process, that is, when the position of each constraint is evaluated in  
753 order to compute the optimal candidate, “[...] the position of each constraint is temporarily  
754 perturbed by a random positive or negative value” (Boersma and Hayes 2001: 47). As a  
755 consequence the constraints are located at a single point of the CSR according to their  
756 ranking value, but also cover ranges of the CSR to the left and the right of their ranking  
757 value. In Figure 7 the two constraints are located in such a distance from each other that  
758 their ranges do not overlap. In such a situation there is a categorical ranking between the two  
759 constraints. Regardless of the position of  $C_1$  within its range at evaluation time and the  
760 position of  $C_2$  within its range at evaluation time,  $C_1$  will always be ranked higher than  $C_2$ ;  
761 there is thus a categorical ranking between  $C_1$  and  $C_2$ .



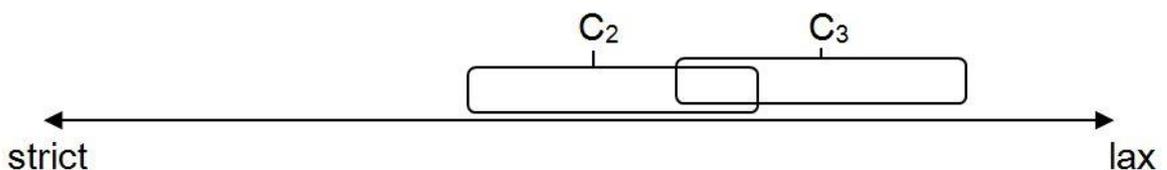
762  
763  
764

Fig. 7: Constraint ranking scale with ranges (categorical ranking between  $C_1$  and  $C_2$ ) (cf. Boersma and Hayes 2001: 47)

765

766 However it might also be that two constraints are positioned on the constraint ranking  
767 scale in such a way that their ranges overlap. This case is illustrated in Figure 8. Since the  
768 constraints might be located at any point within their range at evaluation time, overlapping  
769 constraints allow the possibilities of the ranking  $C_2 \gg C_3$ , but also  $C_3 \gg C_2$ . The quantitative  
770 weighting of the options can be accounted for in the following way: the distance between the  
771 constraints on the ranking scale not only determines whether they overlap or not, but, if they  
772 do, also how often the respective rankings hold. Given the position of  $C_2$  and  $C_3$  on the  
773 ranking scale the ranking  $C_2 \gg C_3$  is more frequent than  $C_3 \gg C_2$  (cf. Figures 9 and 10; /•2/  
774 and /•3/ mark the position of the constraints at selection time).

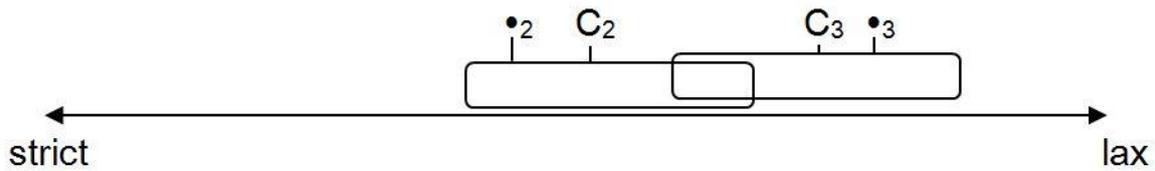
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776  
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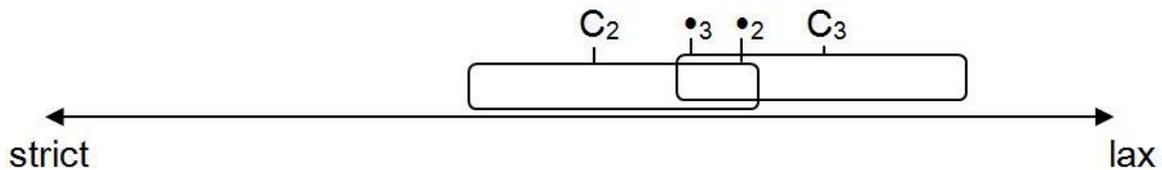
Fig. 8: Constraint ranking scale with ranges (free ranking between  $C_2$  and  $C_3$ ) (cf. Boersma and Hayes 2001: 48)

779



780  
781  
782

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



783  
784  
785

Fig. 10: Rare result:  $C_3 \gg C_2$  (cf. Boersma and Hayes 2001: 48)

786 Note that in this version of OT, there is always a specific ranking between two constraints  
787 at a given evaluation time; constraints are thus not tied in the sense that they are unranked.  
788 The crucial point is that they can be ranked in different ways (if their position on the CRS is  
789 close enough) and that the relative position of overlapping constraints determines how often  
790 the respective possible rankings occur at evaluation time.

#### 791 4.3 The account

##### 792 4.3.1 Input

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

##### 804 4.3.2 Relevant constraints

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

808 assume that this constraint is never violated in the data and thus categorically dominates all  
809 other constraints which will be discussed in the following.

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

818

- 819 (22) a. No violation of FOCUSFINAL  
820 María pintó el armario [descalza]<sub>F</sub>.  
821 María painted the wardrobe barefoot  
822 'Maria painted barefoot the wardrobe'
- 823 b. Violation of FOCUSFINAL  
824 María pintó [descalza]<sub>F</sub> el armario.  
825 María painted barefoot the wardrobe  
826 'Maria painted barefoot the wardrobe'

827

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

838 In the context of our experimental data, the constraint can be easily formalized since the  
839 pertinent stimuli involve a postverbal constituent with increased weight and a postverbal  
840 constituent with neutral weight. As the former always exceeds the latter in number of words,  
841 the constraint is violated if the constituent with neutral weight follows the constituent with  
842 increased weight and it is not violated if the constituent with neutral weight precedes the  
843 constituent with increased weight.

844 It would be desirable to extend the analysis of the impact of ENDWEIGHT to all sorts of  
 845 weight differences. But this requires further collection of data since different types of weight  
 846 differences seem to have different effects. For example, as concerns the order of dO and  
 847 DEP, the data from our experiments shows that the difference in neutral weight (dO = two  
 848 words vs. DEP = one word) is not sufficient to bring the dO in the sentence final position. The  
 849 order dO-DEP is strongly preferred over DEP-dO despite the fact that this results in an order  
 850 where the lighter constituent ends up in the sentence final position. If we compare this to the  
 851 cases with increased weight, it becomes obvious that the effect of the latter type of weight  
 852 difference is different. In the case of a dO with increased weight and a DEP with neutral  
 853 weight, the order DEP-dO is clearly preferred.

854 In the following, the constraint ENDWEIGHT will thus be applied in a rather restricted way:  
 855 we only consider weight differences between the neutral and the increased weight. We will  
 856 not take into account the weight difference between *descalza* and *el armario* in (22), for  
 857 example, but only weight differences such as between *descalza* and *el armario garabateado*  
 858 *por sus hermanos* in (23). Relevant examples for the constraint are given in (23): ENDWEIGHT  
 859 is violated in (23a.) and satisfied in (23b.).<sup>16</sup>

860

- 861 (23) a Violation of ENDWEIGHT  
 862 María pintó el armario garabateado por sus hermanos<sub>h</sub> descalza.  
 863 María painted the wardrobe smudged by her brothers barefoot  
 864 ‘María painted barefoot the wardrobe smudged by her brothers.’
- 865 b. No violation of ENDWEIGHT  
 866 María pintó descalza el armario garabateado por sus hermanos<sub>h</sub>.  
 867 María painted barefoot the wardrobe smudged by her brothers  
 868 ‘María painted barefoot the wardrobe smudged by her brothers.’

869

870 PROXIMITY CONSTRAINTS. We assume that proximity constraints evaluate candidates with  
 871 respect to the distance between two elements in a sentence that maintain a specific relation.  
 872 The three proximity constraints used in the following refer to (i) the direct object as an  
 873 argument and the verb as its head, (ii) the subject-oriented depictive, as a modifier that is  
 874 bound to the event denoted by the verb, and the verb itself, (iii) the locative adjunct as a  
 875 modifier and the verb as the constituent that introduces the modified element, namely the  
 876 event argument.<sup>17</sup>

---

<sup>16</sup> Further, it should be noted that we only consider weight differences between the two postverbal constituents leaving aside all other constituents in the sentence,

<sup>17</sup> 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

877

878 (24) a. PROX\_ARG

879 Minimize the number of intervening constituents between a direct object and the verb.

880 b. PROX\_DEP

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

882 c. PROX\_LOC

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

885

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

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

906 To evaluate the candidates with respect to the proximity constraints we count the number  
907 of intervening constituents. This requires a specification of what counts as an intervening  
908 constituent. We assume that the proximity constraints evaluate a given syntactic item  
909 independently of its underlying hierarchical syntactic structure. In the evaluation of proximity  
910 constraints only relevant constituents are counted, and *relevant* refers in this case to  
911 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<sub>F</sub>* & *DEP*, FOCUSFINAL prefers the order V-DEP-dO while PROX\_ARG prefers V-dO-DEP).

912 consider (25). The only constituents that are relevant for the proximity between V and the  
 913 depictive are the verb under V, the depictive AP, and the intervening locative PP; the NP that  
 914 is contained within the PP is not relevant because a sequence such as (25b.) is not an  
 915 alternative to (25a.). The level where such alternative orders are situated is the level of  
 916 syntactic functions.

917

- 918 (25) a. Bailó en su casa disfrazado.  
 919 danced in his/her house disguised  
 920 'He danced disguised in his house.'  
 921 b. \*Bailó en disfrazado su casa.  
 922 danced in disguised his/her house

923

924 We assume that three types of elements are relevant in the evaluation of a given syntactic  
 925 structure with respect to the proximity constraints:

926 (i) constituent  $C_{P1}$  is the first constituent of the pair of constituents for which the proximity  
 927 needs to be evaluated;

928 (ii) constituent  $C_{P2}$  is the second constituent of the pair of constituents for which the  
 929 proximity needs to be evaluated;

930 (iii) constituents  $C_R$  which intervene between  $C_{P1}$  and  $C_{P2}$  and which are relevant for the  
 931 evaluation of the proximity.

932 Accordingly, the syntactic structure in (26) is evaluated as follows with respect to the  
 933 proximity constraints: PROX\_DEP is violated once because there is one relevant intervening  
 934 constituent, and PROX\_LOC is not violated due to the lack of relevant intervening constituents  
 935 (cf. (27) and (28)).

936

- 937 (26) VP  
 938 / \  
 939 V' AP  
 940 / \  
 941 V' PP  
 942 / \  
 943 V P NP  
 944 *bailó en su casa*

945

- 946 (27) PROX\_DEP  
 947 a.  $C_{P1}$  -  $C_R$  -  $C_{P2}$   
 948 b. V LOC DEP

949

950 (28) PROX\_LOC

951 a. C<sub>P1</sub> - C<sub>P2</sub>

952 b. V LOC

953

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

955 (29) a. FOCUSFINAL

956 b. ENDWEIGHT

957 c. PROX\_ARG

958 d. PROX\_DEP

959 e. PROX\_LOC

### 960 4.3.3 Constraint rankings

961 In order to deduce the ranking of the constraints we need to look at the violation profiles  
962 and the frequencies of the candidates. Based on the data from the forced-choice experiment  
963 and the production experiment, we will first determine the ranking between FOCUSFINAL and  
964 the proximity constraints. Based on the data from the forced-choice experiment, we will then  
965 determine the ranking between ENDWEIGHT and the proximity constraints. Recall from §4.2  
966 that optionality between linear orders is accounted for by the overlap of the pertinent  
967 constraints and that preferences between linear orders are accounted for by the relative  
968 positions of the pertinent constraints on the Constraint Ranking Scale.<sup>18</sup>

969 Tables 12–14 present the candidates and the candidates’ violation profiles and  
970 frequencies for the inputs *DEP<sub>F</sub> & LOC<sub>F</sub>*, *DEP<sub>F</sub> & LOC* and *DEP & LOC<sub>F</sub>*.<sup>19</sup>

971

	FOCUSFINAL	PROX_DEP	PROX_LOC	forced-choice	production
[S-V-DEP-LOC] <sub>F</sub>			*	58.97%	68.12%
[S-V-LOC-DEP] <sub>F</sub>		*		41.03%	31.88%
				100.00%	100.00%

972

Table 12: Violation profiles and frequencies for *DEP<sub>F</sub> & LOC<sub>F</sub>*

973

	FOCUSFINAL	PROX_DEP	PROX_LOC	forced-choice	production
S-V-[DEP] <sub>F</sub> -LOC	*		*	35.90%	44.93%

<sup>18</sup> 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.

<sup>19</sup> 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)).

S-V-LOC-[DEP] <sub>F</sub>		*		64.10%	55.07%
				100.00%	100.00%

Table 13: Violation profiles and frequencies for  $DEP_F$  &  $LOC$

974  
975

	FOCUSFINAL	PROX_DEP	PROX_LOC	forced-choice	production
S-V-DEP-[LOC] <sub>F</sub>			*	76.92%	92.54%
S-V-[LOC] <sub>F</sub> -DEP	*	*		23.08%	7.46%
				100.00%	100.00%

Table 14: Violation profiles and frequencies for  $DEP$  &  $LOC_F$

976  
977

978 The frequencies of the two candidates for  $DEP_F$  &  $LOC_F$  in Table 12 show that PROX\_DEP is  
979 positioned higher on the CRS than PROX\_LOC: participants prefer the candidate which  
980 violates PROX\_LOC over the candidate that violates PROX\_DEP. The resulting ranking  
981 PROX\_DEP » PROX\_LOC is important for the interpretation of the results for the narrowly  
982 focused DEP (cf. Table 13). The candidate which does not violate PROX\_LOC and  
983 FOCUSFINAL, but violates PROX\_DEP is preferred over the candidate which violates  
984 PROX\_LOC and FOCUSFINAL. Under the assumption that PROX\_DEP is ranked higher than  
985 PROX\_LOC, the frequencies in Table 13 suggest that FOCUSFINAL is ranked higher than  
986 PROX\_DEP: the violation of PROX\_DEP is accepted for the sake of a non-violation of  
987 FOCUSFINAL and not for a non-violation of PROX\_LOC. The resulting constraint ranking is  
988 given in (30).

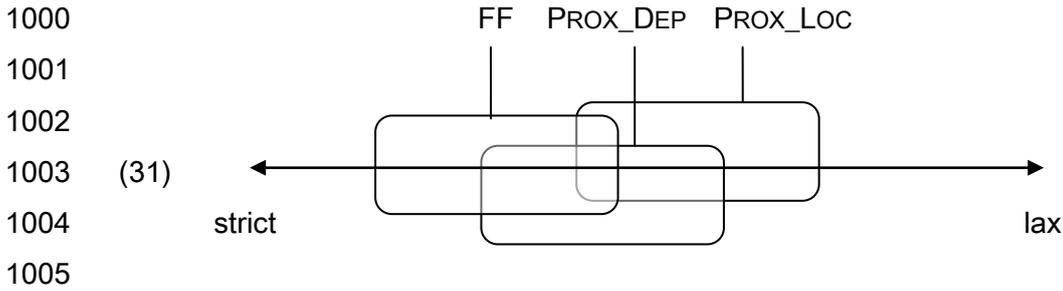
989

990 (30) FOCUSFINAL » PROX\_DEP » PROX\_LOC

991

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

995 Another important aspect besides the relative order between the constraints is that their  
996 ranges overlap, which is the prerequisite for the observed optionality (cf. (31)). Although  
997 FOCUSFINAL is ranked higher than PROX\_DEP the participants of the experiments  
998 nevertheless choose and produce candidates which violate FOCUSFINAL and satisfy  
999 PROX\_DEP (cf. Table 13).



1006 In sum, the optionality between  $DEP-[LOC]_F$  and  $[LOC]_F-DEP$  is accounted for by the fact  
1007 that the pertinent constraints overlap, and the preference for the order  $DEP-[LOC]_F$  is  
1008 accounted for by the relative positions of the constraints on the Constraint Ranking Scale  
1009 (towards the lax or strict end of the scale).

1010 Turning to the combination of a depictive with a direct object, Tables 15–17 show the  
1011 candidates and the candidates' violation profiles and frequencies for the inputs  $DEP_F$  &  $dO_F$ ,  
1012  $DEP$  &  $dO_F$  and  $DEP_F$  &  $dO$ .

1013

	FOCUSFINAL	PROX_ARG	PROX_DEP	forced-choice	production
$[S-V-DEP-dO]_F$		*		28.21%	15.28%
$[S-V-dO-DEP]_F$			*	71.79%	84.72%
				100.00%	100.00%

1014 Table 15: Violation profiles and frequencies for  $DEP_F$  &  $dO_F$

1015

	FOCUSFINAL	PROX_ARG	PROX_DEP	forced-choice	production
$S-V-DEP-[dO]_F$		*		87.18%	63.89%
$S-V-[dO]_F-DEP$	*		*	12.82%	36.11%
				100.00%	100.00%

1016 Table 16: Violation profiles and frequencies for  $DEP$  &  $dO_F$

1017

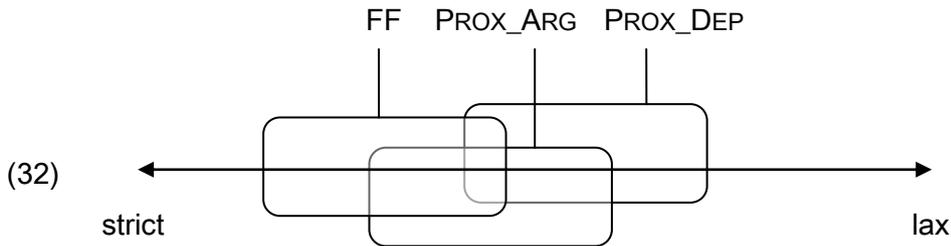
	FOCUSFINAL	PROX_ARG	PROX_DEP	forced-choice	production
$S-V-[DEP]_F-dO$	*	*		12.82%	8.70%
$S-V-dO-[DEP]_F$			*	87.18%	91.30%
				100.00%	100.00%

1018 Table 17: Violation profiles and frequencies for  $DEP_F$  &  $dO$

1019

1020 Again we can deduce the relation between the two proximity constraints by looking at the  
1021 neutral input  $DEP_F$  &  $dO_F$ : the ranking of the proximity constraints is  $PROX\_ARG \gg PROX\_DEP$   
1022 (cf. Table 15). As concerns the position of FOCUSFINAL, we must now take into account the  
1023 input  $DEP$  &  $dO_F$  (cf. Table 16). The candidate which does not violate FOCUSFINAL and

1024 PROX\_DEP, but violates PROX\_ARG is preferred over the candidate which violates  
 1025 FOCUSFINAL and PROX\_DEP, but does not violate PROX\_ARG. Under the assumption that  
 1026 PROX\_ARG is ranked higher than PROX\_DEP, the frequencies in Table 16 suggest that  
 1027 FOCUSFINAL is ranked higher than PROX\_ARG: the violation of PROX\_ARG is accepted for the  
 1028 sake of a non-violation of FOCUSFINAL and not for a non-violation of PROX\_DEP. The resulting  
 1029 ranking is FOCUSFINAL » PROX\_ARG » PROX\_DEP; again the variation and optionality in the  
 1030 data shows that the constraints are positioned in such a way on the CRS that their ranges  
 1031 overlap (cf. (32)).



1039 As concerns the impact of weight and the position of the respective constraint ENDWEIGHT,  
 1040 we must look at the results from the forced-choice experiment. For the ranking of the  
 1041 proximity constraints we rely on the same data as above, namely the preferences for the  
 1042 orders in the neutral context. The deduced rankings are PROX\_DEP » PROX\_LOC and  
 1043 PROX\_ARG » PROX\_DEP. For the relation between ENDWEIGHT and the proximity constraints  
 1044 we must also consider inputs where one of the constituents has increased weight. Crucially,  
 1045 the preferences show that ENDWEIGHT is ranked higher than both proximity constraints.

1046 First, under the assumption that PROX\_DEP is ranked higher than PROX\_LOC, the  
 1047 frequencies in Table 18 suggest that ENDWEIGHT is ranked higher than PROX\_DEP: the  
 1048 violation of PROX\_DEP is accepted for the sake of a non-violation of ENDWEIGHT and not for  
 1049 the non-violation of PROX\_LOC. The resulting ranking is given in (33).

1050

	ENDWEIGHT	PROX_DEP	PROX_LOC	
S-V-DEP <sub>h</sub> -LOC	*		*	25.64%
S-V-LOC-DEP <sub>h</sub>		*		74.36%
				100.00%

1051 Table 18: Violation profiles and frequencies (forced-choice experiment) for *DEP<sub>h</sub>* & *LOC*

1052

	ENDWEIGHT	PROX_DEP	PROX_LOC	
S-V-DEP-LOC <sub>h</sub>			*	85.90%
S-V-LOC <sub>h</sub> -DEP	*	*		14.10%
				100.00%

1053 Table 19: Violation profiles and frequencies (forced-choice experiment) for *DEP* & *LOC<sub>h</sub>*

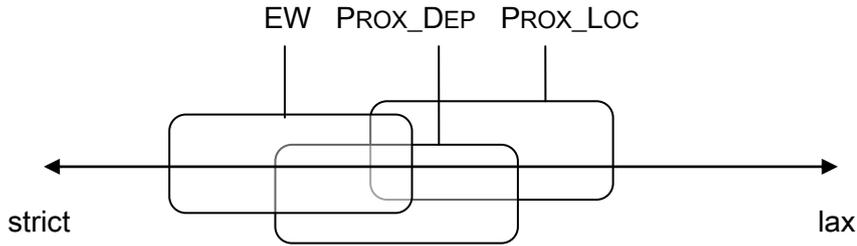
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1055

1056

1057

1058 (33)



1059

1060

1061

1062 Second, under the assumption that PROX\_ARG is ranked higher than PROX\_DEP, the  
 1063 frequencies in Table 21 suggest that ENDWEIGHT is ranked higher than PROX\_ARG: the  
 1064 violation of PROX\_ARG is accepted for the sake of a non-violation of ENDWEIGHT and not of  
 1065 PROX\_DEP. The resulting ranking is given in (34).

1066

	ENDWEIGHT	PROX_ARG	PROX_DEP	
S-V-DEP <sub>h</sub> -dO	*	*		10.26%
S-V-dO-DEP <sub>h</sub>			*	89.74%
				100.00%

1067 Table 20: Violation profiles and frequencies (forced-choice experiment) for *DEP<sub>h</sub>* & *dO*

1068

	ENDWEIGHT	PROX_ARG	PROX_DEP	
S-V-DEP-dO <sub>h</sub>		*		61.54%
S-V-dO <sub>h</sub> -DEP	*		*	38.46%
				100.00%

1069 Table 21: Violation profiles and frequencies (forced-choice experiment) for *DEP* & *dO<sub>h</sub>*

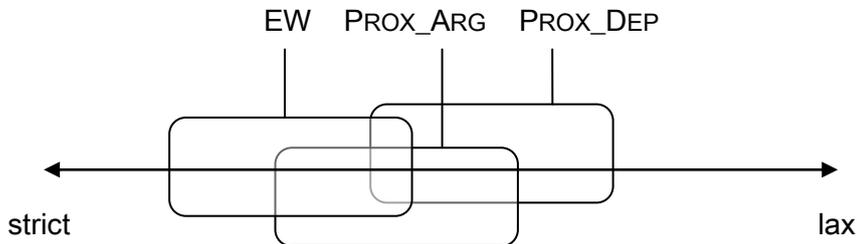
1070

1071

1072

1073

1074 (34)



1075

1076

1077 In summary, we have seen that, based on the data from the forced-choice and the  
 1078 production experiments, the proximity constraints can be ranked with respect to each other  
 1079 and with respect to FOCUSFINAL and ENDWEIGHT. In both cases, FOCUSFINAL and ENDWEIGHT  
 1080 are ranked higher than the respective proximity constraints. As concerns the ranking among  
 1081 the proximity constraints, we have seen that PROX\_ARG is ranked higher than PROX\_DEP and

1082 that PROX\_DEP is ranked higher than PROX\_LOC. The first ranking corresponds to the  
1083 distinction between argument and adjunct where arguments (in this case a direct object) tend  
1084 to be placed closer to the verb than adjuncts (in this case a depictive). The second ranking,  
1085 which concerns the linearization of two adjuncts, shows a more peripheral position for the  
1086 locative adjunct than for the depictive.

1087 The resulting rankings are given in (35); for all four rankings, it holds that the ranges of the  
1088 respective constraints overlap. No matter how strong the preference for one of the two linear  
1089 orders is, its violation is accepted in order to satisfy FOCUSFINAL or ENDWEIGHT.

1090

- 1091 (35) a. FOCUSFINAL » PROX\_DEP » PROX\_LOC  
1092 b. FOCUSFINAL » PROX\_ARG » PROX\_DEP  
1093 c. ENDWEIGHT » PROX\_DEP » PROX\_LOC  
1094 d. ENDWEIGHT » PROX\_ARG » PROX\_DEP

#### 1095 4.3.4 A remark on basic order and STAY

1096 A constraint that is often used in OT accounts of word order phenomena (and OT syntax  
1097 more generally) is STAY (cf. Gabriel 2007, 2010; Adli 2011). The basic idea is that the  
1098 movement of constituents does not come without cost. In OT-terms this translates into a  
1099 constraint STAY which is violated by every trace during the derivation (cf. (36)). For example,  
1100 a structure such as (37) would violate STAY one time because it contains one trace.

1101

- 1102 (36) ECONOMY OF MOVEMENT (STAY)  
1103 Trace is not allowed.  
1104 (Grimshaw 1997: 374)

1105

- 1106 (37) Violation of STAY  
1107 [B<sub>i</sub> [A *t*]]

1108

1109 In order to apply this constraint in the analyses of our data one would have to assume for  
1110 each pair of postverbal constituents a basic order (i.e. the one where both constituents are in  
1111 their base position) and the respective deviation from this basic order is achieved through the  
1112 movement of the lower constituent over the higher one. Under the assumption that A-B is the  
1113 basic order, a candidate with the order B-A would violate STAY at least one more time than a  
1114 candidate with the order A-B. However, as we have seen in Section 3.4, the determination of  
1115 the basic order is far from trivial. Under a neutral condition, i.e., the one where both  
1116 constituents are focus, and both have their neutral weight, both respective orders are  
1117 produced and chosen: dO-DEP and DEP-dO, and LOC-DEP and DEP-LOC. In order to

1118 simplify matters, one could decide to abstract away from the tendencies and simply decide to  
1119 take that order which is chosen more often in the neutral context as the basic one. Under this  
1120 reasoning the basic orders would be dO-DEP and DEP-LOC, and the respective alternative  
1121 orders (DEP-dO, LOC-DEP) would be the derived ones and violate STAY one time each.  
1122 Since such a simplification does not do justice to the observed variation in the experimental  
1123 data, especially in the case of LOC & DEP, we have opted for an account does not involve  
1124 basic order and, as a consequence, movement related constraints such as STAY.

## 1125 **5 Conclusion**

1126 In this paper we have investigated the order of postverbal constituents in Spanish by  
1127 looking at combinations of a depictive and a direct object, and a depictive and a locative  
1128 adjunct. In addition to the syntactic function of the postverbal constituents we have also  
1129 considered the impact of narrow information focus and syntactic weight. Based on data from  
1130 two experimental studies we have shown that postverbal constituent order in Spanish is  
1131 characterized at the same time by optionality and preferences.

1132 As concerns the first characteristic, we have observed optionality with respect to the order  
1133 of syntactic functions, the position of focused constituents and the position of heavy  
1134 constituents. The order is optional with respect to the syntactic functions in the sense that  
1135 both logically possible orders – e.g. DEP-dO and dO-DEP – are produced and chosen.  
1136 Similarly, we have found that focused constituents can be placed in final and prefinal  
1137 position, and that heavy constituents can be placed in final and prefinal position.

1138 Besides optionality, we have also identified clear preferences in our study. As in the case  
1139 of optionality, these preferences concern the syntactic functions, the position of focused  
1140 constituents and the position of heavy constituents. As concerns the syntactic functions, the  
1141 results from the experiments show that dO-DEP is preferred over DEP-dO and DEP-LOC  
1142 over LOC-DEP. Further, the results show that narrowly focused constituents and heavy  
1143 constituents preferably appear in sentence final position. Specific aspects have also been  
1144 discussed against the foil of the empirical results: the question concerning basic constituent  
1145 order, the position of narrow information focus in Spanish, and the question whether  
1146 information focus or syntactic weight is a stronger factor.

1147 Finally, it has been shown in Section 4 how the optionality and the preferences found in  
1148 the data can be accounted for in a Stochastic OT grammar. The specifics of the account are  
1149 that it involves neither assumptions about basic constituent order nor movement related  
1150 constraints. Instead, the data is accounted for with constraints on proximity (PROX\_ARG,  
1151 PROX\_DEP, PROX\_LOC) and constraints referring to the position of narrow information focus  
1152 and heavy constituents (FOCUSFINAL and ENDWEIGHT). Based on the frequencies from the  
1153 production and the forced-choice experiments it has been shown that both FOCUSFINAL and

1154 ENDWEIGHT are ranked higher than the respective proximity constraints; both information  
1155 focus and syntactic weight are thus more important factors in postverbal constituent order  
1156 than the syntactic function of the constituents.

1157

1158

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