

A TYPOLOGICAL APPROACH TO THE ORDERING OF ADVERBIALS: WEIGHT, ARGUMENTHOOD AND EPP¹

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1. Introduction

The analysis of adverbial expressions has been an area frequently forgotten in the linguistics literature. Besides the wide range of grammatical classes that can fulfill this category, such as AdvP, PP, NP, etc., many of these expressions appear in different positions in the sentence. However, there have been some relevant attempts to elaborate a coherent description of this grammatical class, providing a unifying account. In this respect, Cinque (1999) attributed the different kinds of adverbials to the existence of multiple aspectual projections, based on their position with respect to each other. The underlying position of the different types of adverbials was claimed to be universal. Nevertheless, this method was unable to explain the alternation in positions that frequency adverbials show. In their grammar, Fernández Lagunilla and Anula Rebollo (1995) also derived the position of adverbials from the existence of different syntactic projections in different positions in the tree. Both analyses would require the incorporation of a complicated movement theory to successfully describe the multiplicity of positions in which adverbials can appear and both approaches fail in this respect.

Apart from the two purely syntactic systems described above, there have been more descriptive analyses of this subject, like the extensive description presented in Rodríguez Ramalle (2000). In this paper, I will adopt a variationist approach to describe the ordering of frequency adverbials in Spanish. This approach is based on the belief that different factors interact with each other to bring about the final collocation of constituents in a given sentence. Specifically I will consider three factors, building on Mayoral Hernández (2004): (i) argumenthood, (ii) type of verb and (iii) the position of a co-occurring agreeing subject. The results will be

¹ This research was partially supported by a 'La Caixa' Fellowship. I would like to thank Jack Hawkins, Carmen Silva-Corvalán and Mario Saltarelli. I would also like to thank the contributions and comments made by Violeta Demonte, Rebeka Campos, Abe Kazemzadeh, and Tomomasa Sasa. However, any possible mistake is my own responsibility.

related to the Extended Projection Principle (EPP) and will be assigned typological relevance.

The results obtained in Mayoral Hernández (2004) indicated that the argumental condition of the constituents that co-occur with a frequency adverbial in postverbal position did not have an influence on the collocation of postverbal elements, which goes against the existing literature (Hawkins 1994, 1999, 2000..., Wasow and Arnold 2003). However, these contradictory results might be due to the fact that the definition of argument adopted in Mayoral Hernández (2004) was too wide, including many PPs and other XPs. Here I will adopt a more restricted definition of argumenthood to find out the relevance of this factor.

Another factor that might trigger the adverbial alternation is the nature of the verb. Mayoral Hernández (2004) showed that the position of overt agreeing subjects in Spanish determines to a large extent the choice between preverbal and postverbal adverbials. In this paper I will analyze if the subject effects on position are derived from the type of verb rather than from the subject position itself. While accusative, copulative or unergative verbs will tend to have preverbal subjects, unaccusatives will show a higher percentage of postverbal subjects. In this way, the factor that triggers the alternation would be the nature of the verb, while the subject position would only be a secondary effect.

The data used for this research have been obtained from the online corpus CREA (Corpus de Referencia del Español Actual). The use of the statistical tool SPSS and the Pearson's Chi Square test will ensure the statistical significance of this analysis.

2. Alternation of frequency adverbials

The adverbial expressions that denote frequency in Spanish can be realized by different syntactic and morphological categories. Thus they can appear as DPs or NPs (1), AdvPs (2), PPs (3), etc.

- | | |
|---|---|
| (1) <i>Todos los martes</i> Juan come patatas.
Every Tuesday Juan eats potatoes. | (2) Juan come patatas <i>frecuentemente</i>
Juan frequently eats potatoes. |
| (3) Juan come patatas <i>en muchas ocasiones</i> .
Juan eats potatoes on many occasions. | |

Moreover, frequency adverbials can appear in different positions in the sentence without altering necessarily the meaning of the sentence, although they cannot appear in the middle of a different XP, for example in between a determiner and the modified noun, as sentence (4) shows.

- (4) *Juan habla a sus *todos los martes* padres.
*Juan talks to his every Tuesday parents.

There are four possible positions that will be analyzed in this paper. Examples (5) to (8) have been extracted from the corpus CREA:

- (5) Before a co-occurring XP in preverbal position
- a. '**Frecuentemente** los miembros de las comunidades reciben cursos de protección ambiental.'
 - b. Frequently the members of the communities receive courses on environmental protection.
- (6) After any co-occurring preverbal XP:
- a. 'Los agentes del SIN **frecuentemente** realizan redadas en empresas...'
 - b. The SIN agents frequently carry out raids in companies...
- (7) Immediately adjacent to the right of the verb:
- a. 'la actividad del citado empresario trasciende **frecuentemente** el mero aspecto comercial'
 - b. The activity of the aforementioned businessman frequently transcends the merely commercial aspect.
- (8) Following any co-occurring postverbal XP, at sentence final position:
- a. 'La situación ha sido muy tensa **frecuentemente**'
 - b. The situation has frequently been very tense.

In the previous examples the position of the adverbial can be changed without altering the meaning. However, Kovacci (1999) noted that there are some asymmetries between postverbal and preverbal frequency adverbials that can cause a change in meaning. For example, she explained that postverbal adverbials are circumstantial, so they behave like adjuncts. Also she mentioned that a sentence with postverbal adverbial, such as (9a), would imply the text without it (9b) and could be paraphrased using *como* "how" or *cuando* "when", like in (9c). The following examples show these properties:

- (9) a. Mis amigos comen patatas frecuentemente
My friends eat potatoes frequently
- b. Mis amigos comen patatas
My friends eat potatoes.
 - c. Es frecuentemente cuando/como mis amigos comen patatas.
It's frequently when/how my friends eat potatoes.

Following Kovacci (1999), preverbal adverbials modify the whole sentence, while the sentences including them do not imply the text without them and cannot be paraphrased using *como* "how" or *cuando* "when". However, in (10) we can see that a sentence containing a preverbal adverb (10a) does entail the same sentence without the adverb (10b) and can be paraphrased using *como* "how" or *cuando* "when" (10c).

- (10) a. Frecuentemente mis amigos comen patatas
My friends eat potatoes frequently"
- b. Mis amigos comen patatas
My friends eat potatoes"
 - c. Es frecuentemente cuando/como mis amigos comen patatas
It's frequently when/how my friends eat potatoes.

The previous examples show that there is not a necessary change in meaning derived from the alternation. It is also necessary to bear in mind that even in the cases

where there might be a slight change in meaning, due to quantifier scope for example, abundant research has shown that ambiguity avoidance is not relevant when accounting for ordering alternations (Hawkins 2000, Wasow and Arnold 2003). It might be possible to get different meanings from certain sentences whose only difference is the position of the adverbials, but the examples in (10) show that for most native speakers of Spanish there is no difference in meaning derived from the adverbial alternation.

Now let's imagine that some native speakers might be able to get a difference in meaning between (9a) and (10a), opposing the most frequent judgments. This would only show that there is variation when it comes to the interpretation of a given sentence, which would make the current analysis the most appropriate, since the variationist approach is designed to explain variation. Thus, an account based on the existence of meaning differences associated to different positions would be difficult to hold.

Finally, I must acknowledge that some sentences, as Kovacci (1999) noted, do not leave place for variation and can only be interpreted in a single way because of different syntactic phenomena. However, this research is not concerned with this kind of single meaning sentences derived from syntactic constraints.

3. Hypotheses

In order to give an explanation to the variable ordering of frequency adverbials in Spanish, I have tested the validity of three hypotheses: *argumenthood*, *type of verb* and *subject position*. Following Mayoral Hernández (2004) I have also added the *weight* hypothesis to make the current analysis more complete, although no further comments on this issue have been made, accepting previous results.

3.1. Argumenthood

In the linguistic literature dealing with constituent ordering (Hawkins 2000, Wasow and Arnold 2003,...) lexical dependencies appear as a factor that is able to determine the collocation of postverbal constituents. There is a strong preference for place arguments immediately adjacent to the verb, as long as there are not weight effects involved. Thus sentence (11a) would be preferred rather than (11b).

- (11) a. John waited for his mother in the rain.
 b. John waited in the rain for his mother.

However, Mayoral Hernández (2004) showed that the collocation of frequency adverbials with respect to other co-occurring XPs in postverbal position was not influenced by argumenthood, which contradicts previous research. Nevertheless, this fact might be due to the definition of argumenthood adopted in his analysis. Following Hawkins (2000), he considered arguments not only direct objects (DOs) but also all the PPs whose interpretation depended on the meaning of the verb, or vice versa, using the tests in (12) and (13):

- (12) Verb entailment test
 "If [X V PP PP] entails [X V], then assign V_i . If not, assign $V_{d...}$." (op. cit: 242)

In the previous definition, V_i means ‘independent verb’, which is a verb whose interpretation does not depend on the appearance of any other element, while V_d refers to a dependent verb that needs a PP to be interpreted. PPs that are necessary for the interpretation of the verb are considered arguments if one follows this definition.

(13) Pro-verb entailment test

If [X V PP] entails [X Pro-V PP] or [something Pro-V PP] for any pro-verb sentence listed below, then assign P_i . If not. Assign P_d .

Pro-verb sentences: X *did something* PP; X *was* PP; *something happened* PP; *something was the case* PP; *something was done (by X)* PP. (op. cit: 242-243).

The term *dependent preposition* (P_d) refers to a preposition whose interpretation depends on the meaning of the verb, while *independent preposition* (P_i) is used to indicate that the PP headed by that preposition is independent from the event expressed by the verb. Dependent prepositions were considered arguments in Hawkins (2000) and Mayoral Hernández (2004). Following the previous definition, since *John played on the playground* entails *John did something on the playground*, then *on the playground* would be P_i and would not be considered an argument.

The consequence of having adopted this wide definition of argumenthood is that a high percentage of postverbal PPs were considered arguments, which might be the reason why Mayoral Hernández (2004) did not find a statistically significant difference between arguments and adjuncts.

In order to avoid the previous issue only the elements in (14) a-c have been considered arguments. The following variants were analyzed:

(14) Both in preverbal and postverbal position:

- a. Subject: argument that agrees with the verb.
- b. Direct and indirect objects.
- c. Predicates: attributive (i) and predicative (ii) complements.
 - i. *Juan es el doctor* ‘John is the doctor’ or *Juan es agradable* ‘John is nice’
 - ii. *Juan viene cansado* ‘John comes tired’
- d. Other XPs: PPs that are not IOs, and CPs that are not Subject, DO or IO.
- e. No XP

Thus, the argument hypothesis predicts that the restrictive interpretation of argumenthood adopted here as shown in (14) will influence the ordering of frequency adverbials, unlike Hawkins’ (2000) definition.

3.2. Subject presence

Mayoral Hernández (2004) showed that the presence of an overt subject influences the choice between preverbal and postverbal adverbials. It seems that when there is an overt preverbal subject, frequency adverbials will tend to appear in postverbal position. However, when the subject is postverbal or it is omitted, adverbials will normally appear in preverbal position. Because of the data provided in his analysis, Mayoral Hernández (2004) states that the position of subjects determine the choice between preverbal and postverbal adverbials. Thus the subject hypothesis

predicts that agreeing subjects will tend to appear in complementary distribution with frequency adverbials.

However, the literature dealing with unaccusativity in Spanish has related the appearance of certain postverbal subjects to the unaccusative nature of the verb. Thus, the presence of postverbal plural subjects in Spanish has been claimed to be an exclusive feature of unaccusative verbs. Also, the theme properties associated with unaccusative subjects and their underlying complement of V position could make us think that unaccusative verbs, but not unergatives and transitives, should show a higher percentage of postverbal occurrences in languages that allow for this position, like Spanish. Because of this, one might be led to think that the position of overt subjects is not the relevant factor that could determine the collocation of adverbials (*contra* Mayoral Hernández 2004), but a derived one. The type of verb would, therefore, be the relevant factor that determines the choice between preverbal and postverbal positions, while the position of overt subjects could be easily derived from the argument structure of verbs.

Summarizing, if the kind of verb was in fact the factor that determines subject position, Mayoral Hernández's (2004) claim might be inadequate. However, if the kind of verb is not the determining factor the current analysis would support an EPP effect (Fernández Soriano 1999), where the adverbials behave as subjects.

3.3. Type of verb

As I mentioned in the previous section, unaccusative verbs in Spanish have the peculiarity of allowing for the occurrence of postverbal plural subjects with no determiner. The linguistics literature dealing with this matter associates this feature to the underlying complement of V position of unaccusative subjects. Because of this underlying position, it would also be plausible to imagine that postverbal subjects should frequently appear with unaccusative verbs, but not with transitive or unergative verbs. Mayoral Hernández (2004) showed that overt subjects and frequency adverbials tend to appear in complementary distribution. Therefore, the type of verb could be the factor that determines the choice between preverbal and postverbal positions, and not the position of the subject.

In order to analyze the relevance of the type of verb factor, the following classes have been adopted:

1. Transitive verbs, which are those that take an overt direct or indirect object.
2. Following Mendikoetxea (1999), unaccusative verbs are those that can be included in the following groups:
 - 2.a. Verbs of change of state or location, such as *abrir(se)* "open", *hundir(se)* "sink", *caer* "fall", *florecer* "bloom",...
 - 2.b. Verbs of appearance or existence, such as *aparecer* "appear", *llegar* "arrive", *existir* "exist", *venir* "come", *suceder* "happen",...

When a verb could not clearly be inscribed in the unaccusative class French and Dutch were used for feedback, since both languages show overt unaccusative morphology (use of auxiliaries *être* and *zijn* "to be")

with unaccusatives and *avoir* and *hebben* ‘to have’ with transitive and unergative verbs in French and Dutch respectively).

3. Reflexive verbs. Spanish reflexive pronoun ‘se’ precedes verbs with reflexive meaning.
4. Intransitive verbs are those with no overt object and agentive subject.
5. Copular verbs are those that take an attributive or predicative complement.
6. Impersonal verbs are characterized by their inability to appear with an overt subject.
7. Verbs with passive morphology.
8. Pronominal passive. The use of the pronominal clitic *se* can make a verb with active form acquire a passive meaning. For example, a sentence like (15a) could have an unaccusative interpretation with no overt agent, like in (15b), or a passive interpretation with a covert agent/cause (15c). Sentences like (16a) can only have a passive interpretation, since verbs such as *construir* ‘to build’ always imply the presence of a volitional agent.

- (15) a. El barco se hundió. b. El barco se hundió solo.
 The ship sank. The ship sank by itself.
- c. El barco se hundió para simular un ataque pirata.
 The ship was sunk to imitate a pirate attack.
- (16) a. Se construyó un puente. b. *El puente se construyó solo.
 A bridge was built. The bridge built by itself.

Therefore, the type of verb hypothesis predicts that unaccusative verbs will be characterized by a higher appearance of postverbal subjects, which will imply the appearance of preverbal adverbials. Unergatives (intransitives), transitives, and copulas will have a higher occurrence of preverbal subjects, which will imply postverbal adverbials. Pronominal passives will have a higher appearance of postverbal subjects, in the same way as unaccusatives... However, this paper will only be concerned about the position of adverbials in sentences with unaccusative, transitive, copulas and unergative verbs. If the previous predictions hold, we might be able to derive the position of adverbials without the need to consider the position of overt subjects.

3.4. Weight

Following Hawkins (1994, 1999, 2000, 2001), weight will be determined by the number of words that a certain constituent has. A higher number of words increases the weight of the constituent. The concept of weight is linked to universal processing constraints, since a higher number of words would increase the number of syntactic nodes that have to be processed before a certain constituent can be interpreted. This analysis is based on the belief that syntactic constituents can be interpreted when the head has been mentioned. The weight hypothesis predicts that (17a) will be easier to process than (17b) because there is a smaller number of words (or nodes) that need to be processed to interpret the sentence.

(17) a. John **waited for** Peter **in** the dark but moonlit night.

1 2 3 4

b. John **waited in** the dark but moonlit night **for** Peter.

1 2 3 4 5 6 7 8

Therefore, the weight of the different constituents will interact with each other and the heavier ones will tend to appear at the end of the sentence. When there are differences in weight between two different constituents, the weight hypothesis predicts that the heavier element will tend to appear at the end of the sentence in a higher percentage of occurrences.

In this paper, we will adopt Mayoral Hernández's (2004) results about weight, and no further comment will be added. However, this factor has been included in the present research to provide a more generalizing and complete analysis.

4. Tests

The aim of this paper is to provide a statistically supported analysis of frequency adverbial alternation in Spanish. A total number of 1,033 Spanish sentences, obtained from the online Corpus de Referencia del Español Actual (CREA), were analyzed for the purpose of this research. Three adverbs were selected for this study: *frecuentemente* "frequently", *en muchas ocasiones* "on many occasions" and *en más de una ocasión* "on more than one occasion" because they represent instances of adverbials with different weights, ranging from one to five words. These sentences were annotated using the coding in (18).

- (18) 1. Dependent variable: Position of adverbs:
- Before XP in Prev. b
 - Adjacent to the left of the verb 1
 - After XP in Postv. a
 - Adjacent to the right of the verb d
2. Weight of co-occurring postverbal XP
- XP with 1 or 2 words 1
 - XP with 3 or 4 words 3
 - XP with 5 or 6 words 5
 - XP with 7 words or more 7
 - No co-occurring XP z
3. Weight of co-occurring preverbal XP
- XP with 1 or 2 words 2
 - XP with 3 or 4 words 4
 - XP with 5 or 6 words 6
 - XP with 7 words or more m
 - No co-occurring XP c
4. Argumenthood of postverbal XP
- XP argument r
 - XP non-argument n
 - No XP i

5. Argumenthood of preverbal XP	
— XP argument	s
— XP non-argument	x
— No XP	P
6. Adverbs	
— <i>Frecuentemente</i>	f
— <i>En muchas ocasiones</i>	e
— <i>En más de una ocasión</i>	+
— <i>Diariamente</i>	t
7. Position of Agreeing subject	
— Preverbal subject	v
— Postverbal subject	u
— Omitted subject	o
— <i>Wh-</i> subject	w
8. Argumenthood of Preverbal XP(D/IO)	
— Subject	S
— DO or IO	O
— Predicative	A
— Other XP	X
— No XP	Z
9. Argumenthood of Postverbal XP(D/IO)	
— Subject	E
— DO or IO	D
— Predicative	V
— Other XP	P
— No XP	C
10. Type of verb	
— Transitive	T
— Unaccusative	U
— Intransitive	I
— Reflexive	F
— Copula	K
— Impersonal	—
— Passive	M
— Pronominal passive	R

The argumenthood codes in (18.4) and (18.5) represent the wide definition of argumenthood adopted by Mayoral Hernández (2004), which was based on Hawkins (2000), as indicated in section 3.1. of this paper. However, (18.8) and (18.9) represent the narrower definition of argumenthood that has been tested here.

Cross-tabulations were applied to compare the factors, and the Pearson's Chi-Square test was used to elucidate the relationship between them and, therefore, their statistical significance.

5. Results

5.1. Weight effects

Through the use of the statistical program SPSS, Mayoral Hernández (2004) showed that both the weight of the adverbials and the weight of any co-occurring postverbal XP could determine the collocation of postverbal constituents when differences in weight were in play. He also showed that when there are both an adverbial and an XP in preverbal position, heavier XPs tend to appear attached to the left of the verb in a higher percentage of occurrences. These results supported the previous theories on constituent ordering (Hawkins 1994, 1999, 2000...) and Wasow and Arnold (2003) and provided new information on preverbal ordering: in VO languages the heavier elements tend to be placed in the rightmost position available.

Here we will adopt these results and incorporate them to the current analysis to reach a better understanding of the factors that trigger frequency adverbial alternation in Spanish. As an example, table 1, extracted from Mayoral Hernández (in press), shows how the weight of the adverbial expressions determines their ordering in postverbal positions, with a Pearson's Chi-Square value of $P < 0.05$.

TABLE 1. Ordering of postverbal adverbials, depending on weight²

Position of adverbials	Type of adverb			Total
	En más de una ocasión	En muchas ocasiones	Frecuentemente	
Adjacent to the right of the verb	176 73.3%	50 84.7%	63 94.0%	289 79.0%
After XP in postverbal position	64 26.7%	9 15.3%	4 6.0%	77 21.0%
Total	240 100.0%	59 100.0%	67 100.0%	366 100.0%
Chi-Square tests				
	Value	df	Asymp. Sig. (2-sided)	
Pearson Chi-Square	14.922 ^a	2	.001	
Likelihood Ratio	17.527	2	.000	

When it comes to the position of the adverbials in the sentence, table 2 shows that the default positions are those immediately adjacent to the verb, with a total of 80.8% occurrences.

² The numerical data in every cell represent the total number of tokens and the percentage within the column.

TABLE 2. Influence of weight on adverbials

Position of adverbials	Type of adverb			Total
	En más de una ocasión	En muchas ocasiones	Frecuentemente	
Before XP in preverbal position	26 6.4%	47 15.5%	24 7.4%	97 9.4%
Adjacent to the left of the verb	155 38.4%	127 41.8%	135 41.5%	417 40.4%
Adjacent to the right of the verb	161 39.9%	98 32.2%	159 48.9%	418 40.5%
After XP in postverbal position	62 15.3%	32 10.5%	7 2.2%	101 9.8%
Total	404 100.0%	304 100.0%	325 100.0%	1,033 100.0%

However, although weight could explain postverbal ordering and it proved a determining factor in the collocation of preverbal XPs, its influence on preverbal adverbials was not so clear, which suggested the incorporation to the analysis of other factors. Table 3 shows how weight does not have the desired effect on adverbial ordering, since the two rows are not the mirror image of each other, and there is not a direct increase or decrease of the percentages related to weight differences.

TABLE 3. Influence of weight on preverbal adverbials

Position of adverbials	Type of adverb			Total
	En más de una ocasión	En muchas ocasiones	Frecuentemente	
Before XP in preverbal position	26 72.2%	47 78.3%	24 46.2%	97 65.5%
Adjacent to the left of the verb	10 27.8%	13 21.7%	28 53.8%	51 34.5%
Total	36 100.0%	60 100.0%	52 100.0%	148 100.0%

The incorporation to the analysis of different factors should improve its general validity. In the next section the argumenthood factor will be analyzed, adopting a narrower definition than the one used in Mayoral Hernández (2004).

5.2. Argumenthood

The effects of argumenthood or lexical dependencies on constituent ordering have been clearly shown in the linguistics literature. Hawkins (2000), for example, showed that postverbal arguments tend to appear immediately adjacent to the right of the verb in VO languages like English or Spanish, while they tend to precede the verb in OV languages like Japanese. However, Mayoral Hernández (2004) found no difference between arguments and adjuncts when analyzing the collocation of frequency adverbials and XPs in postverbal position, although he noticed that argumenthood does seem to influence the collocation of preverbal XPs.

These contradictory results might be due to the wide definition of argument adopted in his paper, as we noted before. A more restrictive definition of argumenthood, as indicated in section 3.1, was predicted to yield different results.

In spite of the narrower definition of argumenthood adopted in the present research, the influence of argumenthood on postverbal positions was not statistically significant, with a P value of 0.429 ($P > 0.05$), as shown in table 4.

TABLE 4. Influence of argumenthood on the position of postverbal adverbials

Position of adverbials	Argumenthood of postverbal XP		Total
	Co-occurring postverbal XP is argumental	Co-occurring postverbal XP is non-argumental	
Adjacent to the right of the verb	106 75.2%	135 78.9%	241 77.2%
After XP in postverbal position	35 24.8%	36 21.1%	71 22.8%
Total	141 100.0%	171 100.0%	312 100.0%
Chi-Square tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.625 ^b	1	.429
Likelihood Ratio	.623	1	.430

The results of this research support Mayoral Hernández's (2004) observations. Even when only DOs and IOs were considered arguments the P value is still far greater than 0.05, which implies that the fact that any co-occurring postverbal XP is an argument or an adjunct does not influence the position of postverbal frequency adverbials. However, there is a kind of XP that proved to behave differently from other arguments and adjuncts: predicative complements. Predicative complements are the only type of XP whose appearance influences adverbial ordering, as shown in table 5.

TABLE 5. Influence of argumenthood on the position of postverbal adverbials:
Predicative Complements

Position of adverbials	Argumenthood of postverbal XP		Total
	Predicative complement	Other XPs	
After XP in postverbal position	25 41.0%	76 22.2%	101 25.0%
Adjacent to the right of the verb	36 59.0%	267 77.8%	303 75.0%
Total	61 100.0%	343 100.0%	404 100.0%
Chi-Square tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.790 ^b	1	.002
Likelihood Ratio	8.977	1	.003

Although these tables show that argumenthood does not have a statistically significant influence on the collocation of postverbal constituents, it is worth noting that Mayoral Hernández (2004) showed that the argument condition of preverbal XPs is statistically significant. Thus, subjects tend to appear immediately adjacent to the left of the verb when only preverbal positions are taken into account³. Table 6 shows that the argument or adjunct condition of preverbal XPs is a statistically significant factor, with a P value of .000. Our data only confirms Mayoral Hernández's (2004) analysis.

At this point we have seen that weight has an important influence on the collocation of postverbal XPs, while the argument/non-argument distinction is highly relevant when determining preverbal ordering. However, we still need a factor that can explain when an adverbial will appear in preverbal or postverbal position. This is why Mayoral Hernández (2004) introduced the *subject position* factor, while the present research will try to explain it through the incorporation of the *type of verb* factor.

³ Out of 1033 sentences analyzed in this research in which an argument and an adverbial co-occurred in preverbal position (a total of 147 sentences), only two contained a non-subject argument. The rest of the sentences, i.e. 145, contained a subject and an adverbial. Since it is very uncommon to have left dislocations in Spanish unless they are separated by commas, it is not possible to provide an analysis of preverbal non-subject arguments in this research.

Table 6. Influence of argumenthood on the position of preverbal adverbials

Position of adverbials	Argumenthood of preverbal XP		Total
	Co-occurring preverbal XP is argumental	Co-occurring preverbal XP is non-argumental	
Before XP in preverbal position	93 69.4%	2 15.4%	95 64.6%
Adjacent to the left of the verb	41 30.6%	11 84.6%	52 35.4%
Total	134 100.0%	13 100.0%	146 100.0%
Chi-Square tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.126 ^b	1	.000
Likelihood Ratio	14.814	1	.000

5.3. Subject position

Mayoral Hernández (2004 and *in press*) noted that frequency adverbials tend to appear in complementary distribution with the co-occurring agreeing subject. Therefore, when the subject appears in postverbal position, frequency adverbials tend to appear in preverbal position, and *vice versa*. These facts are illustrated in table 7, where a Pearson's Chi-Square of $P=.000$ is provided.

TABLE 7. Influence of overt subjects on adverbial ordering

Position of adverbials	Subject Position		Total
	Postverbal	Preverbal	
Postverbal position	28 33.3%	239 64.8%	267 58.9%
Preverbal position	56 66.7%	130 35.2%	186 41.1%
Total	84 100.0%	369 100.0%	453 100.0%
Chi-Square tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.941 ^b	1	.000
Likelihood Ratio	27.636	1	.000

However, as seen in section 3, these effects might be due to the class of verb that appears in the sentence. Postverbal subjects can be the result of the appearance of unaccusative verbs, while preverbal subjects should occur when the main verb is transitive, unergative or a copula.

5.4. Type of verb

As predicted in section 3.3 the type of verb does determine the position of the subject and, therefore, adverbial ordering. The analysis shows that intransitives, copulas and transitives are not significantly different with respect to subject position, and in fact Pearson's Chi-Square could not find a statistically significant difference between them, as shown in table 8, with a P value of .678. The subject tends to appear in preverbal position with these types of verbs and there are no significant differences between them in their percentages of appearance in postverbal or preverbal position.

TABLE 8. Position of subject with transitive, intransitive and copulative verbs

Position of subject	Type of verb			Total
	Intransitive	Copulative	Transitive	
Postverbal	6 12.2%	12 15.4%	23 11.5%	41 12.5%
Preverbal	43 87.8%	66 84.6%	177 88.5%	286 87.5%
Total	49 100.0%	78 100.0%	200 100.0%	327 100.0%
Chi-Square tests				
	Value	df	Asymp. Sig. (2-sided)	
Pearson Chi-Square	.777 ^a	2	.678	
Likelihood Ratio	.748	2	.688	

However, the results in table 9 show that, when compared to intransitive, copulative and transitive verbs, unaccusatives tend to have postverbal subjects in a significantly higher percentage. With a Pearson's Chi-Square of $P = .000$. These statistical data show that the unaccusative nature of the verbs have an overt influence on constituent ordering.

But at this point, it is necessary to ask if there is still need of a subject hypothesis or if we can do without it. If subject position is indeed derived from the class of verb that appears in the sentence, then excluding this factor would result in a more economical theory.

TABLE 9. Position of subject with transitive, intransitive, copulative and unaccusative verbs

Position of subject	Type of verb		Total
	Intransitive, transitive and copulative	Unaccusative	
Postverbal	41 12.5%	25 33.8%	66 16.5%
Preverbal	286 87.5%	49 66.2%	335 83.5%
Total	327 100.0%	74 100.0%	401 100.0%
Chi-Square tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.809 ^b	1	.000
Likelihood Ratio	17.102	1	.000

5.5. Subject position revisited

In order to find out if we still need the subject position factor, as Mayoral Hernández (2004 and in press) claim, we need to come up with a context in which unaccusativity cannot interfere. If we only take into consideration sentences in which the verb is transitive, intransitive or copulative, after we have seen that they behave very similarly with respect to subject position, we should be able to find out if subject position is still relevant when determining the ordering of frequency adverbials in Spanish.

In table 10, only sentences in which the verb is transitive, intransitive or copulative have been selected. However, we can still see that the influence of subject position is very relevant, since it tends to appear in complementary distribution with frequency adverbials, as Mayoral Hernández suggested before. Pearson's Chi-Square test $P=.003$ supports Mayoral Hernández (2004) theory.

When only sentences with unaccusative verbs are selected, there is still a statistically significant influence of the subject position on adverbial ordering, as shown in table 11, where $P<0.05$. These data oblige us to accept that the presence of an overt subject determines the choice between preverbal and postverbal positions, which makes this factor indispensable.

As suggested in Mayoral Hernández (in press) the complementary distribution in which agreeing subjects and adverbials appear could be linked to EPP effects, in which adverbials can fulfill the EPP when subjects are not occupying preverbal positions or they are omitted. This EPP effect can be linked to the work by Fernández Soriano (1989, 1999a and 1999b), in which datives and preverbal XPs with locative meaning (locative subjects) are claimed to fulfill the EPP. Bear in mind that the re-

sults provided in this paper are not based on theory internal explanations, but on actual data analyzed through statistical software (SPSS). We would like to suggest that a statistical analysis of language in use, specially written texts, can be a tool to test linguistic hypotheses, apart from theory internal explanations.

TABLE 10. Position of adverbials depending on subject position with transitive, intransitive and copulative verbs

Position of adverbial	Position of Subject		Total
	Postverbal	Preverbal	
Postverbal	16 39.0%	180 62.9%	169 59.9%
Preverbal	25 61.0%	106 37.1%	131 40.1%
Total	41 100.0%	286 100.0%	327 100.0%
Chi-Square tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.539 ^b	1	.003
Likelihood Ratio	8.351	1	.004

TABLE 11. Position of adverbials depending on subject position with unaccusative verbs

Position of adverbial	Position of Subject		Total
	Postverbal	Preverbal	
Postverbal	10 40.0%	35 71.4%	45 60.8%
Preverbal	15 60.0%	14 28.6%	29 39.2%
Total	25 100.0%	49 100.0%	74 100.0%
Chi-Square tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.861 ^b	1	.009
Likelihood Ratio	6.818	1	.009

6. Conclusion

A variationist approach that incorporates different factors as triggers of the alternation in position of frequency adverbials has been proven adequate. As discussed in the last section, the validity of a linguistic theory can be tested through the use of statistical analyses or through the use of theory internal explanations. We would like to suggest that the use of written text can reflect the linguistic competence and Saussure's *langue* easier than spoken language (see Newmeyer 2003 for a discussion on this subject).

In this paper we have shown that a restrictive definition of *argumenthood*, in which only direct and indirect objects were considered as internal arguments, cannot provide a better generalization than Hawkins' (2000) definition of dependency. These results support Mayoral Hernández's (2004 and *in press*) analysis, where he adopted Hawkins' *wide* definition of argumenthood. We also proved that the only XP that has the argument properties suggested by Hawkins for English, i.e. the tendency to appear immediately adjacent to the verb, is the predicative complement.

The results obtained about the importance of argumenthood as a factor that determines the collocation of adverbials and other XPs show that it cannot account for postverbal ordering, but it explains preverbal positions. In this respect, subjects tend to appear immediately adjacent to the verb. In postverbal position, frequency adverbials behave like arguments, in the sense that they tend to appear immediately adjacent to the verb.

The *type of verb* hypothesis has been shown to influence the position of the subject, which fulfills the predictions of the unaccusative hypothesis. Unaccusative verbs tend to have postverbal subjects in a higher percentage than transitive, intransitive and copulative verbs. The present study provided for the first time a statistical analysis of one of the purported features of unaccusative verbs: postverbal subjects.

Even if the type of verb could determine, to a certain extent, the position of agreeing subjects, we have also proven that the *subject position* factor is indispensable, since it determines the choice between preverbal and postverbal adverbs, as Mayoral Hernández (2004 and *in press*) showed. Because of this, we have come to the conclusion that this factor cannot be substituted or entirely derived from the kind of verb.

The fact that adverbials tend to appear in complementary distribution with subjects, could suggest that *EPP* can be fulfilled by both agreeing subjects and frequency adverbials, as seen before.

Finally, adopting the results obtained by Mayoral Hernández (2004 and *in press*), we have seen that *weight* determines the collocation of postverbal constituents (Mayoral Hernández 2004 and *in press*). Weight has been claimed to be a typological universal in the literature, and therefore this analysis has typological validity.

Summarizing, the main contributions of this paper have been to provide a detailed description of subject position with different verb classes. As predicted, postverbal subjects tend to appear with unaccusative verbs. We have also shown that a more restricted definition of argumenthood does not provide better results than a

wider definition. We have finally shown that a statistical analysis of linguistic phenomena obtained from a corpus can be an excellent tool when testing linguistic theories, like the unaccusative hypothesis.

References

- Bosque, I. and Demonte, V. (eds.), 2000, *Gramática descriptiva de la lengua española*, Madrid, Espasa.
- Cinque, G., 1999, *Adverbs and functional heads: A crosslinguistic perspective*, New York and Oxford, Oxford U.P.
- Corpus de Referencia del Español Actual (CREA)*, in www.rae.es
- Fernández Lagunilla, M. & Anula Rebollo, A., 1995, *Sintaxis y cognición. Introducción al conocimiento, el procesamiento y los déficits sintácticos*. Madrid. Editorial Síntesis.
- Fernández Soriano, O., 1989, *Rección y ligamiento en español: Aspectos del parámetro del sujeto nulo*. Doctoral dissertation, Universidad Autónoma de Madrid.
- , 1999a, “Two types of impersonal sentences in Spanish: Locative and dative subjects”, *Syntax* 2: 2, 101-40.
- , 1999b, “Datives in construction with unaccusative *se*”, *CatWPL* 7.
- Hawkins, J., 1994, *A performance theory of order and constituency*, CUP, Cambridge.
- , 1999, “Processing complexity and filler-gap dependencies across grammars”, *Lg* 75.2. 224-85.
- , 2000, “The Relative order of Prepositional Phrases in English: Going beyond Manner-Place-Time”, *Language Variation and Change* 11, 231-66.
- , 2001, “Why are categories adjacent?”, *JL* 37.1, 1-34.
- , in press, “Efficiency and complexity in grammars: Three general Principles”. In: M. Polinsky & J. Moore (eds.), *Explanation in Linguistics*, CSLI Publications, Stanford.
- Kovacci, O., 1999, “El adverbio”. In Bosque and Demonte (eds.).
- Mayoral Hernández R., 2004, “Importance of weight and argumenthood on the ordering of adverbial expressions”, *WCCFL 23 Proceedings*. Somerville, MA: Cascadilla Press.
- , in press, “On the position of frequency adverbials in Spanish”, *USC Working Papers in Linguistics*.
- Newmeyer, F. J., 2003, “Grammar is grammar and usage is usage”, *Lg* 79.4.
- Rodríguez Ramalle, T., 2000, *Algunos aspectos de la sintaxis semántica de los adverbios y de ciertas expresiones adverbiales*. Doctoral dissertation, Universidad Autónoma de Madrid.
- Rojo, G., 1999, “Sobre los complementos adverbiales”, in *VVAA, Profesor Francisco Marsá /Jornadas de Filología*, Universidad de Barcelona, 153-71.
- Schutze, C. T. & Gibson, E., 1999, “Argumenthood and English prepositional phrase attachment”, *Journal of Memory and Language* 40, 409-431.
- Silva-Corvalán, C., 1982, “Subject expression and placement in Mexican-American Spanish”, in Amastae, J., and L. Elias-Olivares (eds.). *Spanish in the United States: Sociolinguistic Aspects*, N. Y., Cambridge U. P., 93-120.
- Wasow, T. & Arnold, J., 2003, “Post-verbal constituent ordering in English”, in Rohdenburg, G. & Britta, M. (eds.), *Determinants of Grammatical Variation in English*, Mouton de Gruyter, Berlin.