Exclamative Sentences and Extreme Degree Quantification

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1. Introduction

It has been pointed out in the literature that exclamative sentences denote high or extreme degree (Postma, 1996; Masullo, 2005; among others). This means that an exclamative like (1a) expresses that the degree to which the property of intelligence holds is an extreme value. Thus, the sentence in (1a) could be paraphrased as in (1b), where we have a canonical extreme degree modifier (extremadamente ‘extremely’):

(1) a. ¡Qué inteligente es Juan!
    ‘How intelligent John is!’
    b. Juan es extremadamente inteligente.
    ‘John is extremely intelligent.’

In spite of the parallelism that has been established between exclamative wh-phrases and extreme degree modifiers, little attention has been paid to determining whether the former behave exactly as the latter. The goal of this chapter is to compare exclamative wh-phrases with extreme degree

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I would like to thank Ignacio Bosque for his very useful comments and suggestions. Needless to say, all possible remaining errors are my own.
modifiers such as extremadamente (henceforth “extremadamente modifiers” in Spanish). The paradigm of extremadamente modifiers includes the adverbs extremadamente and sumamente, as well as so-called morphological elatives (inteligent-isimo, super-inteligente, etc.). Notice that adverbs such as sorprendentemente ‘surprisingly,’ increíblemente ‘unbelievably,’ horriblemente ‘horribly,’ etc., are not in that paradigm. As I will show in section 4, these modifiers behave in a rather different way. At this point, it is enough to mention that whereas extremadamente modifiers can appear in an exclamative wh-phrase, adverbs such as sorprendentemente cannot:

(2) a. ¡Qué extremadamente inteligente es Juan!
   ‘How extremely intelligent John is!’
   b. *¡Qué sorprendentemente inteligente es Juan!
   ‘How surprisingly intelligent John is!’

The comparison between exclamative wh-phrases and extremadamente modifiers will allow me to propose that exclamative wh-phrases do not denote extreme degree. They can convey an implicature of extreme degree, but this value is not a component of their meaning. Although one might argue that this idea is already present in the literature (Gutiérrez-Rexach, 1996, 2008; Castroviejo, 2006; Villalba, 2008b), I will deal with the issue from a different point of view, since I will focus on the (in)compatibility of exclamative wh-phrases and extremadamente modifiers in negative environments. I will offer new data in favor of that proposal and develop two semantic analyses: one of exclamative wh-phrases and another one of extremadamente modifiers. I will study the behavior of these elements in negative contexts. Both types of modifiers are incompatible with negation (see [3]), which makes them positive polarity items:

(3) a. *¡Qué inteligente no es Juan!
      ‘How intelligent John is not!’
   b. *Juan no es extremadamente inteligente.¹
      ‘John is not extremely intelligent.’

¹ This example is ungrammatical if pronounced out of the blue, but it becomes grammatical if the negative operator has an external interpretation (Bosque, 1980a; Szabolcsi, 2004). In other words, the sentence in (3b) is grammatical when it refutes a previous statement or a
The ungrammaticality of (3) could be an argument in support of the idea that exclamative wh-phrases have the same denotation as extremadamente modifiers. The reason is that, according to semantic approaches of polarity, the sensitivity of positive polarity items is due to the fact that their semantics is incompatible with the context in which they are rejected (Israel, 1996; Giannakidou, 1998; Lahiri, 1998; Tovena, 1998; Chierchia, 2004, 2006; among others). Given that, the ungrammaticality of (3) could arise from certain incompatibility between negation and extreme degree denotation. However, this argument makes incorrect predictions. I will show that, despite appearances, exclamative wh-phrases and extremadamente modifiers do not have the same distribution in negative environments. This provides evidence against the proposal that the denotation of exclamative wh-phrases equals that of extremadamente modifiers, that is, extreme degree.

This chapter is divided as follows: section 2 shows that exclamative wh-phrases and extremadamente modifiers are sensitive to different negative environments. It also proves that exclamative wh-phrases, unlike extremadamente modifiers, do not denote extreme degree. Section 3 offers two analyses: one of exclamative wh-phrases and another of extremadamente modifiers. The differences between them allow us to explain the asymmetries of these items regarding their distribution in negative environments. Section 4 gives further evidence for my hypothesis on modifiers such as sorprendentemente ‘surprisingly.’ Section 5 concludes the discussion.

2. Exclamative Wh-Phrases and Extremadamente Modifiers as Positive Polarity Items

In this section I will analyze the behavior of exclamative wh-phrases and extremadamente modifiers as positive polarity items. In section 2.1 I will establish a classification of both types of items that allows us to explain why some of them can co-occur with negation in spite of being positive polarity items. In section 2.2 I will argue against the idea that exclamative wh-phrases and extremadamente modifiers have the same denotation. I will show that these elements have a different distribution in negative contexts, which leads us to conclude that they do not have the same interpretation.

presupposed proposition. This interpretation, possible but irrelevant, must be excluded in all examples throughout this chapter.

2. See Masullo (2003, 2005) for a syntactic approach to this phenomenon.
2.1. DEGREE EXCLAMATIVES VS. AMOUNT EXCLAMATIVES

It has been pointed out in the literature that exclamative wh-phrases and extremadamente modifiers are positive polarity items, so that they cannot be in the scope of negation (Hernanz, 2001; González Rodríguez, 2008, 2010). The ungrammaticality of (4) illustrates the incompatibility between these elements and negation:

(4)  a. *¡Qué alto no es Juan!
    ‘How tall John is!’
    b. *Juan no es extremadamente alto.
    ‘John is not extremely tall.’

I must hasten to point out that the grammaticality of the sentences in (5) does not constitute a counterexample to this conclusion:

(5)  a. ¡Cuántos criterios no tuvo en cuenta!
    ‘How many criterions he did not take into account!’
    b. *No tuvo en cuenta muchísimos criterios. 3
    ‘He did not take into account a lot of criterions.’

The difference between (4) and (5) lies in whether the quantitative DP expresses degree or amount (see Bosque, this volume). In (4), the quantifier modifies an adjective associated with a scale, measuring the degree to which the property holds, whereas in (5), it measures the amount of entities expressed by the restrictor.

This asymmetry affects the (im)possibility of having exclamative wh-phrases and extremadamente modifiers in negative sentences. As is shown in (4) and (5), whereas amount phrases may appear in a negative sentence (see [5]), degree phrases cannot (see [4]). Let me consider the behavior of these two types of phrases in detail and, specifically, the question of why the grammaticality of (5) does not contradict the claim that exclamative wh-phrases and extremadamente modifiers are positive polarity items.

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3. The grammaticality judgment is restricted to the lower scope reading of the quantifier. Muchísimos ‘many-ísimos’ does not have an exact equivalent in English. The suffix -ísimo denotes extreme value.
Degree modifiers always have narrower scope than other operators in a sentence (Kennedy, 1997; Morón Pastor, 2004). Thus, the only possible reading of (6) is the one in (6a), in which *muy ‘very’* has narrow scope with respect to negation and is the constituent refuted.

(6) Carmen no es muy alta.
*Carmen is not very tall."

a. There is a degree d, such that Carmen is tall to degree d, and d is not a high degree on the scale of tallness. [Neg > Very]
b. #There is not a degree d, such that d is a high degree on the scale of tallness, and Carmen is tall to degree d. *[Neg > Very]
c. #There is a degree d, such that d is a high degree on the scale of tallness, and Carmen is not tall to degree d. *[Very > Neg]

This means that in (6a) it is negated that Carmen has the property “tallness” to a high degree. The readings in (6b) and (6c) are not available. (6b), where negation takes wide scope, is not possible because it denies the existence of a high degree on the scale. The unavailability of the interpretation in (6c), in which the degree operator is not within the scope of negation, is due to the fact that this reading does not associate the individual with a degree on the scale.

Given that degree quantifiers always have narrow scope, the only expected interpretation in (4), repeated here as (7), is the one in (8a), where the wh-phrase has narrow scope and is refuted by negation. However, this reading is unavailable.5 This proves that neither exclamative wh-phrases nor

4. This led Kennedy (1997) to propose that degree modifiers are not operators. In contrast, Morón Pastor (2004) argues that this fact does not necessarily mean that they are not operators.

5. Contrary to my judgments, as well as Kennedy’s (1997) view, Gutiérrez-Rexach (2001, p. 175) and Villalba (2004, p. 15) defend that degree wh-phrases always have wide scope. To illustrate this, Villalba offers the example in (i) and points out that the only possible interpretation is the one in (a):

(i) How expensive all the books are!

a. Only one degree d exists such that d is the maximal degree on the scale of expensiveness and such that for every y, y = book, y is expensive to degree d.
b. *[For every y, y = book, only one degree d exists such that d is the maximal degree on the scale of expensiveness and such that y is expensive to degree d.]

I disagree. In my view the correct interpretation of this sentence is the one in (b), but removing “only.” This naturally provides the reading according to which each book has a different price. Notice that if we assume that degrees are intervals on a scale (Kennedy, 1997, 2001; Schwarzschild & Wilkinson, 2002), the latter interpretation does not cancel the existence of
extremadamente modifiers can be in the scope of negation. As expected, the readings in (8b) and (8c) are not possible. The former denies the existence of a maximal degree on the scale. In the latter, the individual in question is not associated with a degree on the scale:

(7)  a. *¡Qué alto no es Juan!
     ‘How tall John is!’
 b. *Juan no es extremadamente alto.
     ‘John is not extremely tall.’

(8)  a. #There is a degree d, such that Carmen is tall to degree d, and
d is not the maximal degree on the scale of tallness. *[Neg > Quantifier]
b. #There is not a degree d, such that d is the maximal degree on
the scale of tallness, and Carmen is tall to degree d. *[Neg > Quantifier]
c. #There is a degree d, such that d is the maximal degree on the
scale of tallness, and Carmen is not tall to degree d. *[Quantifier > Neg]

Amount quantifiers are able to establish different scope relations with other operators. The sentence in (9) is ambiguous between the interpretations in (a) and (c):

(9)  El violinista no tocó muchas sinfonías.
     ‘The violinist did not play many symphonies.’
    a. ‘There are symphonies that the violinist played, and these are
not many.’ [Neg > Many]
    b. #‘There are not many symphonies that the violinist played.’
        *[Neg > Many]
    c. ‘There are many symphonies that the violinist did not play.’
        [Many > Neg]

In the former reading, the quantifier has narrow scope; in the latter, it takes scope over negation. Notice that the reading in which negation has wide scope is only possible if it affects the appraisal of the amount, as in (a),

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a maximal degree on the scale. Any degree included in the highest interval is grammatically codified as an extreme degree.
but not if the resulting interpretation implies the non-existence of a certain number of symphonies, as in (9b).

Since amount modifiers may establish different scope relations with other operators, the quantifiers in (5), repeated here as (10), may have wide scope over negation.

(10) a. ¡Cuántos criterios no tuvo en cuenta!
   ‘How many criterions he did not take into account!’
   b. No tuvo en cuenta muchísimos criterios.
   ‘He did not take into account a lot of criterions.’

This is illustrated in (11c). The reading resulting from the negation having wide scope (as in [11a]) is expected (see [9a]), but is not available:

(11) a. #There were criterions that he took into account, and these were not many. *[Neg > Quantifier]
   b. #There were not many criterions that he took into account. *[Neg > Quantifier]
   c. There were many criterions that he did not take into account. [Quantifier > Neg]

This shows that, when exclamative wh-phrases and extremadamente modifiers express amounts, they behave in the same way as they do when they denote degrees: they are rejected in the scope of negation. On the other hand, the reading in (11b) is not expected because it denies the existence of a certain number of criterions that someone did not take into account.

Notice that the grammaticality of (10a) does not imply that amount exclamatives are always compatible with negation. Their compatibility depends on whether or not the wh-phrase is able to display a wide scope reading. If this scope relation cannot be established, the sentence is ungrammatical, as in (12), where cuánto is followed by a mass noun:

(12) *¡Cuánto coraje no tuvo!
   ‘How much courage he did not have!’

This sentence, unlike (10a), does not allow for the reading in which negation has narrow scope (“There were much courage that he did not have”). According to González Rodríguez (2008), exclamative wh-phrases may take scope over negation if the latter is able to affect the wh-phrase’s denotation.
This happens when the wh-phrase allows the individualization of the wh’s domain, as in (10), where it is easy to imagine a situation in which cuántos criterios refers to a specific set of individuals. In (7) and (12), the individualization of the wh-phrase’s domain is not possible, and, as a consequence, the quantifier cannot have wide scope either. In section 3 I will deal with the impossibility that exclamative wh-phrases and extremadamente modifiers take narrow scope with respect to negation.

Summarizing, neither exclamative wh-phrases nor extremadamente modifiers can have narrow scope with respect to negation, regardless of whether they express amount or degree. When they denote amount, they have wide scope and, therefore, are not incompatible with negation. However, the only reading available is the one resulting from that scope relation. Since I am only interested in the reading in which quantifiers display narrow scope with respect to negation, I will avoid the use of amount modifiers, which are able to outscope negation causing the grammaticality of the sentence.

2.2. AGAINST A UNIFIED ANALYSIS

In the previous section I have shown that exclamative wh-phrases and extremadamente modifiers behave as positive polarity items. According to semantic theories of polarity, the sensitivity of positive polarity items is due to the fact that their denotation is incompatible with the semantics of the contexts in which they are rejected. As a consequence, if two expressions have the same denotation, both of them must be incompatible with the same contexts. This situation is apparently found with exclamative wh-phrases and extremadamente modifiers: both denote extreme degree and cannot co-occur with negation. However, facts are more complex. As shown below, both types of modifiers have a different behavior if we take into account other negative environments.

In order to describe the behavior of exclamative wh-phrases and extremadamente modifiers as positive polarity items, one must pay attention to their (in)compatibility with several negative contexts. Since Ladusaw’s (1980) work, negative contexts, which license negative polarity items, have been characterized as downward-entailing environments (Hoeksema, 1983; van der Wouden, 1997; Zwarts, 1998; among others). Following this theory, there are three types of polarity triggers: downward-entailing functions,

6. For a detailed explanation of this restriction see González Rodríguez (2008).
anti-additive functions and anti-morphic functions. Van der Wouden (1997) shows that these contexts are also relevant for positive polarity items, which are incompatible with certain environments. Depending on whether positive polarity items cannot co-occur with downward-entailing, anti-additive or anti-morphic operators, van der Wouden distinguishes between strong, medium and weak positive polarity items, respectively.

Consider first the behavior of exclamative wh-phrases and extremadamente modifiers in anti-morphic contexts. Sentential negation is anti-morphic. As shown in (7), exclamative wh-phrases and extreme degree quantifiers cannot be within the scope of negation, and, therefore, they are at least sensitive to anti-morphic environments. The preposition sin ‘without’ is an anti-additive function and allows us to check whether exclamative wh-phrases and extremadamente modifiers are sensitive to anti-additive contexts. As the contrast between (13a) and (13b) shows, extremadamente modifiers are compatible with sin (see [13a]), whereas exclamative wh-phrases are not (see [13b]):

(13) a. Les sedujo sin ser extremadamente simpático.
   ‘He seduced them without being extremely nice.’
   b. *¡Sin qué labia les sedujo!
   ‘Without such a loquacity he seduced them!’

The behavior of exclamative wh-phrases and extremadamente modifiers in downward-entailing environments is also different. For example, raramente ‘rarely’ is a downward-entailing operator, and exclamative wh-phrases cannot have narrow scope with respect to it (see [14a]). In contrast, extremadamente modifiers can co-occur with that operator without causing ungrammaticality (see [14b]):

7. A function is downward-entailing iff \( X \subseteq Y \rightarrow f(Y) \subseteq f(X) \); that is, downward-entailing functions support inferences from sets to subsets ("His children rarely eat vegetables" \( \rightarrow \) "His children rarely eat spinach"). A function is anti-additive iff \( (X \cup Y) = f(X) \cap f(Y) \). That is, a disjunction in the scope of an anti-additive function is equivalent to a wide scope conjunction. "Without," for example, is anti-additive because "John went to work without eat or sleep" is equivalent to "John went to work without eat and without sleep." A function is anti-morphic if (a) \( f(X \cup Y) = f(X) \cap f(Y) \) and (b) \( f(X \cap Y) = f(X) \cup f(Y) \). Thus, an anti-morphic function is characterized by the following properties: (a) a disjunction in its scope is equivalent to a wide scope conjunction, and (b) a conjunction in its scope is equivalent to a wide scope disjunction. Sentential negation is an anti-morphic function because "It wasn't John who ran or swam" is equivalent to "It wasn't John who ran and it wasn't John who swam," and "It wasn't John who ran and swam" is equivalent to "It wasn't John who ran or it wasn't John who swam."

(14) a. *¡Qué motivados están raramente sus empleados!  
    ‘How rarely motivated his employees are!’
    b. Sus empleados raramente están extremadamente motivados.  
    ‘His employees are rarely extremely motivated.’

The data above show that exclamative wh-phrases and extremadamente modifiers are positive polarity items. However, whereas the former are sensitive to downward-entailing contexts, the second are only incompatible with anti-morphic environments. In other words, exclamative wh-phrases are strong positive polarity items, whereas extremadamente modifiers are weak positive polarity items. Assuming that the sensitivity of positive polarity items is due to their denotation, the asymmetries illustrated above demonstrate that exclamative wh-phrases and extremadamente modifiers do not have the same meaning, contrary to what it might appear.

3. Widening a Domain of Quantification vs. Closing an Open Scale

After demonstrating that exclamative wh-phrases and extremadamente modifiers have a different distribution and, as a consequence, a different denotation, I will introduce a semantic analysis of each of these quantifiers. In section 3.1. I will focus on extremadamente modifiers. I will defend the claim that they denote extreme degree because they close an open scale and associate some individual with the maximal value on that scale. In section 3.2 I will argue that exclamative wh-phrases widen a domain of quantification, in line with Zanuttini and Portner (2003). This proposal allows us to explain that, whereas exclamative wh-phrases are rejected in downward-entailing contexts, extremadamente modifiers are incompatible with anti-morphic environments.

3.1. Closing an Open Scale

The semantic analysis of extremadamente modifiers that I want to propose is based on the structure of scales developed by Kennedy and McNally (2005a). These authors address the set of degrees that adjectival scales may express and distinguish four types:
a) (Totally) open scales lack a minimal and a maximal element, that is, they do not contain a degree whose value is greater or less than the others in the set. The adjectives *tall* and *short* are associated with open scales, since it is possible to imagine a higher degree with respect to any degree of tallness.9

b) (Totally) closed scales have a minimal and a maximal element. This means that they contain a degree whose value is lower than the others in the set, together with another that is the highest on the scale. *Full* and *empty* are closed scale adjectives because their scale has a limit with respect to the degree in which the property may hold. In the case of *full* this limit determines that the scale has a maximal value; in the case of *empty*, the limit causes the existence of a minimal value.

c) Lower closed scales lack a maximal element but have a minimal one; in other words, they include a degree whose value is the lowest on the scale, but not a degree whose value is greater than that of all the others. This is what happens with *loud* and *quiet*. Whereas there is not a maximal degree associated to the positive adjective *loud*, there is a minimal value with respect to the negative adjective *quiet*.

d) Upper closed scales have a maximal value and lack a minimal one. The adjectives *safe* and *dangerous* are associated with a scale of this type. The reason is that the scale of safety contains some highest degree. However, it does not include a degree whose value is less than the others on the scale.

In order to represent these scales, Kennedy and McNally (2005a, pp. 353–354) assume that “degrees are values that are isomorphic to the real numbers between 0 and 1” and offer the representation of scales illustrated in (15), where $R$ refers to the ordering relations and $\Delta$ is the dimension for the scale:

\[ (15) \text{ A typology of scale structures} \]
\[ \text{a.} \quad <D(0,1), R, \Delta > \text{ (totally) open scale.} \]

9. The minimal value of a scale corresponds to the highest degree that the property denoted by the negative adjective is able to express. Assuming this, one may refer to that extreme by just mentioning the minimal value of the scale or the maximal degree of the negative adjective. This asymmetry does not arise in the other extreme of the scale, the highest one. This extreme corresponds to the maximal value of the scale and to the highest degree of the positive adjective.
b. \(<D[0,1), R, \Delta >\) lower closed scale.
c. \(<D(0,1], R, \Delta >\) upper closed scale.
d. \(<D[0,1], R, \Delta >\) (totally) closed scale.

(Kennedy and McNally 2005a: 354)

Bearing in mind this classification, let me go back to the denotation of extremadamente modifiers. Whereas these modifiers are compatible with open scale adjectives (see [16a]), they cannot co-occur with closed scale adjectives (see [16b]):

(16) a. Su madre es extremadamente guapa.
   ‘His mother is extremely beautiful.’
b. *El vaso está extremadamente lleno.
   ‘The glass is extremely full.’

This fact seems to come into conflict with the extreme degree denotation of a modifier such as extremadamente. Moreover, it is not possible to dissolve the paradox by arguing that extremadamente does not express extreme degree, but just a high degree on the scale. Evidence for the extreme degree denotation of extremadamente comes from the impossibility of continuing (16a) with expressions such as pero menos que ‘but less than,’ as in (17).

(17) Su madre es extremadamente guapa, #pero menos que María.
   ‘His mother is extremely beautiful, but she is less beautiful than Mary.’

Since extremadamente associates the individual with the maximal value on the scale, it is not possible to add adversative tags implying the existence of a higher degree.\(^{10}\) One should then conclude that extremadamente modifiers denote extreme degree and, at the same time, modify open scale adjectives (that is, scalar adjectives without a maximal value). Any analysis of these modifiers must offer a satisfactory answer to this paradox. My proposal is

\(^{10}\) Castroviejo (2006, p. 27) points out that the ungrammaticality of *How very cute he is!—though he's not extremely cute is due to the incompatibility between exclamative and declarative modalities. I agree with her that denoting extreme degree does not constitute an explanation of the ungrammaticality of that sentence, since I have proposed that exclamative quantifiers do not have that denotation. However, notice that the situation is not the same in (17), where there is no combination of modalities.
that *extremadamente* modifiers close an open scale and associate the subject of predication with the maximal value on the scale that has been closed. The meaning of modifiers such as *extremadamente* is illustrated in (18):\(^{11}\)

\[
(18) \quad [[\text{extremadamente}]] = \{G_{(0, 1)} G_{[0, 1], 3} \land \lambda G \lambda x. \exists d [d = \max(S G) \land G(d)(x)]
\]

This proposal allows us to solve the paradox of denoting extreme degree with respect to an open scale. Moreover, this analysis accounts for the incompatibility between *extremadamente* modifiers and the particle *no*. Remember that in a sentence like (19), the only expected reading is the one in (19a), where *extremadamente agradable* has narrow scope with respect to negation and is the refuted constituent. The readings in (19b) and (19c) are not expected. The former expresses that the individual has a property to the maximal value, but under this reading, that specific degree does not exist. The latter is not expected because degree phrases always have narrow scope:

\[
(19) \quad *\text{Roberto no es extremadamente agradable.}
\]
‘Roberto is not extremely nice.’
\[
\text{a. } \#\text{There is a degree } d, \text{ such that Roberto is nice to degree } d, \text{ and } d \text{ is not the maximal degree on the scale of niceness.}
\]
\[
*([\text{Neg} \triangleright \text{Quantifier}]
\]
\[
\text{b. } \#\text{There is not a degree } d, \text{ such that } d \text{ is the maximal degree on the scale of niceness, and Roberto is nice to degree } d.
\]
\[
*([\text{Neg} \triangleright \text{Quantifier}]
\]
\[
\text{c. } \#\text{There is a degree } d, \text{ such that } d \text{ is the maximal degree on the scale of niceness, and Roberto is not nice to degree } d.
\]
\[
*[\text{Quantifier} \triangleright \text{Neg}]
\]

The relevant question is why the reading in (19a), although expected, is not available; in other words, why (19) cannot have the same interpretation as the sentence “Roberto is not very nice” (“There is a degree d, such that Roberto is tall to degree d, and d is not a high degree on the scale of niceness”). The answer to this question is related to the meaning of

\(^{11}\) I use Kennedy and McNally’s (2005a) notation here: \(G\) refers to arguments that have the semantic type of adjectives associated with scales; \(d\), to arguments of type “degree”; \(x\), to arguments of type “entity”; \(S G\), to the scale associated with a gradable adjective; and \(\text{max}\), to the maximal element of the scale.
extremadamente modifiers. Assuming my semantic analysis of these quantifiers, the unavailability of the interpretation in (19a) can be easily explained. When extremadamente is refuted, the relevant meaning of the modifier is the one that associates the individual with the maximal degree on the scale. The problem is that if the scale has not been closed before, that denotation is not available because the existence of a maximal degree has not been established. It is not possible to deny the degree in which an individual has a property if that degree does not exist.

3.2. WIDENING A DOMAIN OF QUANTIFICATION

As I have shown, exclamative wh-phrases are not sensitive to the same contexts as extremadamente modifiers, and, therefore, their denotation has to be different. In this section, I will address the semantics of exclamative wh-phrases and I will derive their polar sensitivity (Israel, 1996; Giannakidou, 1998; Lahiri, 1998; Tovena, 1998; Chierchia, 2004, 2006; among others). As noted by Zanuttini and Portner (2003), exclamative quantifiers are operators that bind a variable, inducing a scalar implicature. These elements express that the scale in question has been extended far beyond the speaker’s expectations. Based on Kadmon and Landman (1993), Zanuttini and Portner (2003) name this property “widening” because the bound variable is out of the domain of quantification expected by the speaker. For instance, in (20), the expected domain with regards to prices of a plane ticket would be that in (21a). The exclamative operator would then widen the domain as in (21b):

(20) ¡Qué caro ha sido el billete!
‘How expensive the ticket was!’

(21) a. D1: {400 euros, 500 euros, 600 euros}.
    b. D2: {400 euros, 500 euros, 600 euros, 700 euros, 800 euros, 900 euros}.

This proposal allows us to explain the polar sensitivity of exclamative wh-phrases. Zanuttini and Portner (2003, p. 50, footnote 15) suggest that there is a certain relation between the widening that exclamative sentences convey and the one involved in the meaning of the negative polarity item any (Kadmon & Landman, 1993), but they do not explore the nature of that relation. I would like to propose that this relation exists and also that it is
essential to understand the sensitivity of exclamative wh-phrases, in a manner parallel to Kadmon and Landman’s (1993) and Chierchia’s (2004) account of the polar sensitivity of *any*. As Kadmon and Landman (1993) point out, *any* widens a domain of quantification because, in an NP of the form *any NP*, the quantifier *any* extends the interpretation of the common noun. Thus, in (22), for example, *any* widens the domain of quantification in D₁ to the one illustrated in D₂:

(22) a. I don’t have any potatoes.
   b. D₁: {cooking potatoes}.
   c. D₂: {cooking potatoes, non-cooking potatoes}.
   (adapted from Kadmon & Landman, 1993, p. 359)

According to Chierchia (2004), the domain-widening function must be universally closed. This closure is subject to a strengthening condition, that is, the result must be a stronger statement, giving rise to a gain of information. In the case of *any*, the closure “must lead to something stronger than the corresponding meaning with a plain indefinite” (Chierchia, 2004, p. 76).

The combination between the widening effect and the strengthening principle allows Kadmon and Landman (1993) and Chierchia (2004) to derive the sensitivity of *any*, which implies that this item can only occur in downward-entailing contexts. When it appears in these environments, the strengthening condition is satisfied, the reason being that downward-entailing operators create entailments from sets to subsets. As shown in (23), the statement in which the domain has been extended (see [23a]) entails the one in which the domain has not been widened (see [23b]):

(23) a. wide: We don’t have potatoes, cooking or others.
   b. → narrow: We don’t have cooking potatoes.
   (Kadmon & Landman, 1993, p. 370)

In contrast, the strengthening condition is not satisfied when *any* occurs in affirmative contexts, since the direction of the entailments is the opposite. As shown in (24), the result of the widening in affirmative environments does not lead to a stronger statement, violating the strengthening principle:

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12. Kadmon and Landman (1993) argue that this requirement is a lexical property of *any*.

(24) a. WIDE: We have potatoes of SOME kind (cooking or other).
   b. → NARROW: We have cooking potatoes.
   (Kadmon & Landman, 1993, p. 370)

The use of *any* in these contexts leads to a loss of information, causing the ungrammaticality of the sentence:

(25) *I have any potatoes.

Assuming this approach to negative polarity, and accepting that exclamative *wh*-phrases widen a domain of quantification, the incompatibility between these modifiers and downward-entailing contexts can be naturally explained. Exclamative *wh*-phrases are positive polarity items because they induce a domain-extension that creates a stronger statement, not in downward-entailing contexts, but in affirmative environments. Thus, when exclamative quantifiers occur within the scope of a downward-entailing operator, the strengthening condition is not satisfied, causing the ungrammaticality of the sentence. As I have pointed out, exclamative quantifiers extend the interval of the scale that is relevant to localize the subject of predication. The widening involved in exclamative quantifiers is illustrated in (26), where $D_1$ constitutes the initial domain and $D_2$ exemplifies the widened domain:

(26) a. ¡Qué alto es Juan!
   ‘How tall John is!’
   b. $D_1$: {1.70m(eters), 1.80m.}. [narrow domain]
   c. $D_2$: {1.70m., 1.80m., 1.90m., 2m., 2.10m.}. [widened domain]

Exclamative quantifiers widen the domain of quantification toward the top of the scale, expressing that the degree to which the property holds is higher than the one expected by the speaker. As a consequence of the direction in which the quantifier extends the domain, the resulting statement is stronger than it would be without the widening process in affirmative contexts. In other words, the widening associated with exclamative quantifiers leads to a gain of information. Given a degree $x$ and a degree $y$, such that $x$ is higher on the scale than $y$, the sentence “John is $x$” entails “John is $y$.” In other words, the direction of entailments is the one indicated by the arrow in (27):

(27)      2.30m  2.20m  2.10m  2m  1.90m  1.80m  1.70m
Therefore, as shown in (28), if it is the case that an individual is two meters tall, it must also be the case that he is 1.90 meters tall, 1.80 meters tall, etc.:\textsuperscript{14}

\begin{equation}
(28) \text{John is 2 meters tall } \rightarrow \text{John is 1.80 meters tall.}
\end{equation}

This shows that the widening of the quantification induced by exclamative quantifiers satisfies the strengthening constraint in affirmative contexts.\textsuperscript{15} In contrast, this principle is not satisfied in downward-entailment environments, in which the widening induced by exclamative quantifiers leads to a loss of information. Let us consider a negative context in particular. The result of the widening induced by the exclamative wh-phrase in the negative sentence illustrated in (29a) is the same as the one in the affirmative construction. That is, the interval of the relevant scale is extended toward the top (see \[29b–29c\]):

\begin{equation}
(29) \begin{aligned}
a. & \text{¡Qué alto no es Juan!} \\
& \text{‘How tall John is not!’}
\end{aligned}
\end{equation}

\begin{equation}
\begin{aligned}
b. & \text{D1: \{1.70m., 1.80m.\}. [narrow domain]} \\
c. & \text{D2: \{1.70m., 1.80m., 1.90m., 2m., 2.10m.\}. [widened domain]}
\end{aligned}
\end{equation}

Crucially, the result of the domain expansion in (29) does not lead to a stronger statement, but to a weaker one, the opposite of what we attest in affirmative sentences (see \[28\]). The reason is that (30a) does not imply (30b). In fact, (30a) entails that John is not 2.5 meters tall, three meters tall, and so on (see \[30c\]):\textsuperscript{16}

\begin{equation}
14. \text{Notice that this reading arises when the sentence is interpreted as in (ia), but not when it is paraphrased as in (ib):}
\end{equation}

\begin{equation}
(i) \begin{aligned}
a. & \text{John reaches two meters tall.} \\
b. & \text{John is exactly two meters tall.}
\end{aligned}
\end{equation}

Since exclamative sentences express the former reading, the second interpretation must be excluded.

\begin{equation}
15. \text{I will not address the question whether this requirement is a lexical property of exclamative quantifiers (Kadmon & Landman, 1993) or a condition that the universal closure associated with the domain expansion must satisfy (Chierchia, 2004).}
\end{equation}

\begin{equation}
16. \text{Remember that I am not dealing with the interpretation of (30a), which can be paraphrased as “John is not exactly two meters tall” (see footnote 14). According to this reading, (30a) does not entail (30b). In contrast, this relation holds under the other reading (“John does not reach two meters”), as shown by the anomaly of “John does not reach two meters, although he reaches 2.25 meters.”}
\end{equation}
(30) a. John is not two meters tall.
   b. - John is not 1.80 meters tall.
   c. → John is not 2.10 meters tall.

The negative operator reverses entailments, so that the direction of the entailments is the one indicated by the arrow in (31):

(31) Downward-entailment contexts

Since the negative operator, just like the rest of downward-entailing functions, reverses scalar entailments, the widening associated with exclamative wh-phrases does not satisfy the strengthening condition. The violation of this principle causes the ungrammaticality of the sentence in (29), as well as the ungrammaticality of the exclamatives in which the wh-phrase must be interpreted within the scope of a downward-entailing function.

To summarize, the fact that exclamative wh-phrases and extremadamente modifiers are sensitive to different contexts provides evidence strong enough as to argue that they have a different denotation. The latter close an open scale and express that the degree to which a property holds is the maximal value on the scale. In contrast, the former do not denote extreme degree, but they widen a domain of quantification; in other words, they express that the bound variable is out of the domain of quantification expected by the speaker. As Zanuttini and Portner (2003) point out, this could give rise to an implicature of extreme degree. However, as I have argued, exclamative wh-phrases widen a domain of quantification, but, unlike extremadamente modifiers, they do not express extreme degree. This explains the different distribution of these modifiers in negative environments.

4. Further Evidence

More empirical evidence for my proposal comes from a certain type of quantifiers that extend a domain of quantification without being exclamatives, such as sorprendentemente ‘surprisingly,’ increíblemente ‘amazingly,’ etc.
Morzycki (2008) argues that when these operators modify an adjective, they widen a domain of quantification toward the top of some scale. This author considers that the semantic contribution of these adverbs is related to one of the corresponding adjectives. By doing so, he deals with the relationship between sentences such as the ones in (32):

\[(32)\]

a. Carmen es sorprendentemente alta.  
   ‘Carmen is surprisingly tall.’  

b. Es sorprendente cómo de alta es Carmen.  
   ‘It is amazing how tall Carmen is.’

According to Morzycki, both sentences express that Carmen is tall, so that the surprising information is the degree in which Carmen owns this property. This author claims that the meaning of adverbs such as *sorprendentemente* is similar to the one of embedded exclamatives. Given this, Morzycki extends Zanuttini and Portner’s analysis of exclamatives to adverbs such as *sorprendentemente*. Following these linguists, Morzycki assumes that exclamative sentences denote a set of propositions; for example, the exclamative sentence *What surprising things he eats!* has the denotation in (33):

\[(33)\]  
\[
[[\text{What surprising things he eats!}]] = \{p: p \text{ is true and there is a surprising thing } x \text{ such that } p \text{ is the proposition that he eats } x\}
\]

(Morzycki, 2008, p. 110)

In consequence, when *sorprendente* ‘surprising’ embeds an exclamative clause, its semantics is the one in (34), where the adjective selects a set of propositions. This set contains a proposition that is surprising:

\[(34)\]  
\[
[[\text{amazing}]] = \lambda E_{<s, d, t>} \exists p[E(p) \land \text{amazing}(p)]
\]

(Morzycki, 2008, p. 111)

Consequently, the denotation of a sentence like that in (35a), is the one illustrated schematically in (35b):

\[(35)\]

a. It is amazing how tall Clyde is.

17. See Morzycki (2008) on the extension of his proposal to the meaning of these modifiers in other structural positions, as in *Surprisingly, John attended the meeting.*
b. $\exists p (\text{‘Clyde is 6 feet 1 inch tall,’ . . . ‘Clyde is 6 feet 4 inches tall.’} \land \text{amazing(p)})$

(Morzycki, 2008, p. 111)

The relevant property of this set of propositions is the degree of tallness; therefore, Morzycki replaces that set with a set of degrees, as illustrated in (36):

(36) amazing $(^\exists p \{\text{‘Clyde is 6 feet 2 inches tall,’ . . . ‘Clyde is 6 feet 3 inches tall,’ . . . ‘Clyde is 6 feet 4 inches tall.’} \land \text{amazing(p)}\})$

(Morzycki, 2008, p. 112)

As said above, Morzycki proposes that the denotation of adverbs such as sorprendentemente is parallel to the one of exclamatives (see [32]). According to Morzycki, (37b) illustrates the interpretation of (37a):

(37) a. Clyde is remarkably tall.
    b. remarkable $(^\exists d \{6 \text{ feet 1 inch, . . . 6 feet 2 inches, . . . 6 feet 3 inches, . . . 6 feet 4 inches} \land \text{Clyde is d-tall}\})$.

(Morzycki, 2008, p. 111)

However, this analysis does not capture one of the two properties that, following Zanuttini and Portner (2003), characterize exclamative sentences and, by extension, adverbs such as sorprendentemente; namely, the widening of a domain of quantification.18 As recalled above, a domain of quantification is widened when the bound variable is out of the domain expected by the speaker. Thus, if the speaker expected that the tallness of Carmen is within the domain in (38a), the exclamative sentence widens the domain into (38b):

(38) a. D1: {1’60, 1’70, 1’80}.
    b. D2: {1’60, 1’70, 1’80, 1’90, 2}.

This implies that exclamatives (and, therefore, adverbs such as sorprendentemente), do not only convey that the degree in which the property holds is surprising, but they entail as well that this degree must be out of the

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18. The other property of exclamatives is that they are factive (Zanuttini & Portner, 2003). I will not discuss whether adverbs such as sorprendentemente have this property.
domain of quantification expected by the speaker. In order to account for this property, Morzycki assumes that contextual domain restrictions (von Fintel, 1994; Westerstal, 1995; Martí, 2003) are included in the extended projection of adjectival phrases. Assuming this postulation, the denotation of a sentence like *Clyde is tall* contains a variable C, which restricts an existential quantifier over degrees on the scale of tallness:

\[
[[\text{Clyde is tall}C]] = \exists d \left[ d \in C \land \text{tall (Clyde)}(d) \land d \geq \text{Stall}_n \right]
\]

(Morzycki, 2008, p. 113)

Bearing in mind this assumption, Morzycki reformulates his semantic analysis of modifiers such as *sorprendentemente* in order to capture their effect of domain widening. This author introduces two variables that restrict the domain of quantification: C, which refers to the expected domain, and C′, which refers to the widened domain and excludes the expected one:

\[
[[\text{Clyde is remarkably tall}C]] = \text{remarkable} \left( \exists d \exists C' \left[ C' \supset C \land d \in C'-C \land \text{tall (Clyde)}(d) \land d \geq \text{Stall} \right] \right)
\]

(Morzycki, 2008, p. 114)

Morzycki’s proposal basically reduces the semantics of adverbs such as *sorprendentemente* to that of exclamative sentences. These adverbs express that the subject of predication has a property to a degree out of the domain of quantification expected by the speaker. Modifiers such as *sorprendentemente*, like exclamative wh-phrases, widen a domain of quantification. Given these assumptions, it is expected that modifiers such as *sorprendentemente* and exclamative wh-phrases are rejected in the same negative environments. The expectation is met. As shown in (41), *sorprendentemente* is incompatible with anti-morphic (see [41a]), anti-additive (see [41b]) and downward-entailing contexts (see [41c]):

\[
\begin{align*}
\text{(41) a. "Sus hijos no son sorprendentemente valientes.} \\
\text{‘His/Her children are not surprisingly courageous.’} \\
\text{b. "*/??Conquistó a María sin ser sorprendentemente guapo.} \\
\text{‘He won Mary without being surprisingly handsome.’} \\
\text{c. "*/??Los asesinos raramente están sorprendentemente locos.} \\
\text{‘Killers are rarely surprisingly crazy.’}
\end{align*}
\]

19. Although this linguist does not reformulate the analysis of embedded exclamatives in the same way, these two variables should be also introduced in embedded exclamatives.
5. Conclusions

This chapter has compared exclamative wh-phrases to extreme degree modifiers such as *extremadamente* in negative environments. I have shown that, although both types of quantifiers are positive polarity items, they are sensitive to different contexts: whereas exclamative wh-phrases are incompatible with downward-entailing operators, modifiers such as *extremadamente* cannot co-occur with anti-morphic operators. Since the sensitivity of a positive polarity item depends on its denotation, that asymmetry provides new evidence that exclamative wh-phrases, unlike modifiers such as *extremadamente*, do not denote extreme degree. My proposal regarding the semantics of these elements is that *extremadamente* modifiers close an open scale and express the degree to which a property holds is the maximal value on the scale. As Zanuttini and Portner (2003) point out, exclamative wh-phrases widen a domain of quantification because they express that the scale in question has been extended far beyond the speaker’s expectations. I have explained how this analysis is able to account for the sensitivity of exclamative wh-phrases and extreme degree modifiers.