

Degree Relatives, Definiteness and Shifted Reference*

Hadas Kotek

Massachusetts Institute of Technology

1. Introduction

English definite descriptions like *the 9kg that this bag weighs* exhibit two properties to be discussed in this paper: they entail that the bag weighs exactly 9kg, and they also *presuppose* that the bag weighs exactly 9kg. This is normally explained by analyzing the definite article as having presuppositions of existence and maximality. The goal of this paper is to show that maximality readings of relative clauses can exist independently of definiteness. To show this, I contrast two kinds of relative clauses in Romanian whose semantics allow us to see exactly this property: degree-denoting relative clauses, which are introduced by the relativizer *cât*, and entity-denoting relative clauses, which can be introduced either by the relativizer *cât* or by the relativizer *care*.

The paper is organized as follows: in section 2, I introduce the relative clause constructions relevant to this paper and survey their main properties. In section 3, I give a compositional semantic analysis of the Romanian relatives. I argue that the different inference and presupposition patterns associated with each kind of relative are crucially explained by the presence of a maximalization operator, which I associate with the relativizer *cât*. Section 4 deals with the different readings available to degree phrases in general and suggests that they are part of a paradigm of shifted references. Section 5 addresses the contrast between the readings available to English maximalizing relatives as opposed to Romanian maximalizing relatives. Section 6 is the conclusion.

* For helpful comments, suggestions and criticism I am grateful to Michael Yoshitaka Erlewine, Kai von Fintel, Danny Fox, Martin Hackl, Irene Heim, and David Pesetsky, as well as the audiences at NELS 40, SNEWS 2010 at Harvard and the MIT LF Reading Group. Many thanks to Alex Grosu for providing judgments and insightful comments on previous drafts of this paper, and to Donca Steriade for providing Romanian judgments. All remaining errors are my own.

2. Romanian Relative Clauses

In this section I introduce the Romanian relative clauses which are the main focus of this paper. Subsection 2.1 focuses on degree-headed relatives, while subsection 2.2 focuses on entity-headed relatives. I survey the properties that characterize each of the two kinds of constructions, focusing on two main properties: the entailment and presupposition facts associated with each construction, and (for the degree relatives) the availability of an entity-denoting reading of the NP modified by the relative.

2.1 Degree Relatives

Romanian relative clauses whose head is a phrase of type $\langle d, t \rangle$ ¹ are obligatorily introduced by the relativizer *cât*. The definite version of such relatives, such as in example (1) below, is attested in a wide array of languages, including (but not restricted to) English, Romanian, Albanian, Bulgarian, French, Hebrew and Turkish. An indefinite version of (1) is far rarer and has so far only been found in Romanian and Albanian. Examples (2)a and (2)b below are the Romanian definite and indefinite versions of (1), respectively (adopted from Grosu 2009):

Definite measure-phrase headed degree relative (English)

(1) [**(The) 9kg that your bag weighs ___*] won't prevent you from boarding the plane.

Definite and indefinite measure-phrase headed degree relatives (Romanian):

- (2) a. [Cele nouă kilograme cât cântărește ___ bagaju-l tău
the² nine kilos how-much weighs luggage-the your
de mână] nu te vor împiedica să te urci în avion
of hand not you will prevent subj. refl. climb in plane
- b. [Nouă kilograme cât cântărește ___ bagajul tău
nine kilos how-much weighs luggage-the your
de mână] nu te vor împiedica să te urci în avion
of hand not you will prevent subj. refl. climb in plane

The examples in (2) share the same rough gloss, given in (1), as well as the same truth conditions: they are true just in case that your bag weighs 9kg and this will not prevent you from boarding the plane. They also share a maximality interpretation: in both cases, your bag must weigh *exactly* 9kg, no more and no less.

¹ Throughout the paper use the sloppy terminology “*head* of the relative clause” to refer to what is the conventional sister of the relative clause.

² I follow Alex Grosu and others in glossing *cel* as the definite article in this construction. *Cel* has another use as a demonstrative, especially when combined with an adjective. However, the version of *cel* used in the examples throughout this paper have a distinct semantic and syntactic behavior and has been argued to be a variant of the definite article -l. For details see e.g. Cornilescu (1993:113-115).

Degree Relatives, Definiteness & Shifted Reference

The definite and indefinite relatives are differentiated by two properties. First, different readings are available to them: the definite relative can have both an *amount reading*, where it denotes properties of amounts or degrees, and a *substance reading*, where it denotes properties of entities. The indefinite relative can only have an amount reading. The examples in (2) above have prominent amount readings. Example (3) below has a prominent substance reading, in which it refers to the actual road between MIT and Harvard, but such a reading is not available if the definite article is dropped.³

Degree relative with substance reading: indefinite version unavailable (Romanian):

- (3) [**(Cele) două mile cât se întinde drumu-l dintre*
the two miles how.much refl. stretches road-the between
MIT si Harvard] *sînt pline de hârtoape*
MIT and Harvard are full of potholes
'The 2 miles that the road stretches between MIT and Harvard are full of potholes'

Second, the definite and indefinite degree relatives are used under different circumstances. The definite version carries a presupposition of the claim introduced in the subject DP (e.g., that your bag weighs 9kg) and is thus used when that information is part of the common ground of the conversation. The indefinite version is used when that information is not in the common ground and thus not presupposed. Speakers report that its status is felt to be less prominent than that of the matrix assertion. I will refer to this status as a *background assertion* (Abbott 2000).

To show that this is indeed true, consider the results of the *Hey Wait a Minute! I had no idea that X!* test (von Stechow, 2004). A presupposition which is not in the common ground at the time of utterance can be challenged by 'Hey, wait a minute! I had no idea that X' (or other similar responses). In contrast, an assertion which is not in the common ground cannot be challenged in this way. This is shown in (4), from von Stechow (2004), for the existence presupposition of *the*:

The 'Hey, wait a minute' test (English):

- (4) A: The mathematician who proved Goldbach's Conjecture is a woman.
 \exists -presupposition: Somebody proved Goldbach's Conjecture.
 B: Hey, wait a minute. I had no idea that someone proved Goldbach's Conjecture.
 B': #Hey, wait a minute. I had no idea that that was a woman.

Applying the same test to both versions of (2), we learn that the response in (5)a, which disputes the claim in the matrix predicate, is infelicitous for both the definite and indefinite relatives, as expected, teaching us that the information in the matrix is not presupposed. The response in (5)b, which disputes the claim introduced in the subject DP,

³ I note that Donca Steriade (p.c.) does accept a substance reading of the indefinite version of (3). This fact remains to be verified by more speakers: Alex Grosu (p.c.) and his informants do not accept this possibility.

is infelicitous for the indefinite relative but is perfectly acceptable as a response to the definite relative. This teaches us that the claim in the relative clause is presupposed by the definite relative in (2)a, but not by the indefinite relative in (2)b.

*'Hey, wait a minute' test for the Romanian degree relatives in (2):*⁴

- (5) a. Hey wait a minute. I didn't know it won't prevent you from boarding the plane.
 b. Hey wait a minute. I didn't know it weighs 9 kg!

The following table summarizes the facts discussed in section 2.1:

<i>Degree relatives</i>	Claim in subject DP presupposed?	Claim in matrix presupposed?	Maximality interpretation?	Substance reading available?
Definite (2)a	Yes	No	Yes	Yes
Indefinite (2)b	No	No	Yes	No

2.2 Entity-Headed Relatives

Romanian has two relativizers, both *wh*-words, that introduce relative clauses whose head is a phrase of type <e,t>: *care* ('which') is the relativizer that is used in most contexts, and *cât* ('how much/many') is only used with phrases expressing quantity.⁵ Unlike in the case of relative clauses headed by phrases of type <d,t>, we are able to contrast the behavior of the two relativizers when the head of the relative is of type <e,t>. This yields two sentence-pairs of definite and indefinite entity-headed relatives in (6)-(7), which we can use to look for similarities and differences between the two constructions.

Definite and indefinite entity-headed relatives introduced by care (Romanian):

- (6) a. [Cei nouă cai pe care i-a cumpărat Ion] sunt din Arabia.
 the nine horses acc which Cl.Pl.M.Acc-has bought Ion are from Arabia
 'The nine horses that John bought are from Arabia.'
 b. [Nouă cai pe care i-a cumpărat Ion] sunt din Arabia.
 nine horses acc which Cl.Pl.M.Acc-has bought Ion are from Arabia
 'Nine horses that John bought are from Arabia.'

Definite and indefinite entity-headed relatives introduced by cât (Romanian):

- (7) a. [Cei nouă cai pe câți a cumpărat Ion] sunt din Arabia.
 the nine horses acc how.many.M.Pl has bought Ion are from Arabia
 'The nine horses that John bought are from Arabia.'
 b. [Nouă cai pe câți a cumpărat Ion] sunt din Arabia.
 nine horses acc how.many.M.Pl has bought Ion are from Arabia
 'Nine horses that John bought are from Arabia.'

⁴ Here and in several other points throughout the paper, I only give the English translations of the Romanian data which I test. The judgments I report, however, refer to the actual Romanian data.

⁵ There exists a third, archaic form, *ce* ('what'), which is irrelevant for the purposes of this paper.

Degree Relatives, Definiteness & Shifted Reference

We would like to know whether the entity-headed and degree-headed *cât*-relatives share any properties, namely, whether they share the same presupposed status of the claim in the subject DP and the same maximality interpretations, and how they differ from *care*-relatives. To test for presuppositions, we use the *Hey Wait a Minute!* test; to test whether the sentences convey a maximality interpretation, we use the continuation sentence in (8). We expect (8) to be felicitous whenever no maximality is conveyed: we thus expect it to be an infelicitous continuation of the definite sentences in (6)a and (7)a, and we are interested in its interaction with the two indefinite sentences in (6)b and (7)b.

Test for maximality effect in (6) and (7):

(8) The other horses John bought are from Libya.

The results show a difference between the presupposition vs. assertion status of the fact in the subject DP and in the maximality interpretation of the relative clauses. The relatives headed by *care* behave similarly to their English counterparts on both counts: it is infelicitous to continue the definite version with (8), but it is a natural continuation of the indefinite one. The relatives headed by *cât* pattern with the *cât*-headed relatives of the previous section, so that (8) is an infelicitous continuation of both sub-cases of (7).

The following table summarizes the facts discussed in section 2.2:

<i>Entity relatives</i>	Claim in subject DP presupposed?	Claim in matrix presupposed?	Maximality interpretation?
Definite- <i>care</i> (6)a	Yes	No	Yes
Indefinite- <i>care</i> (6)b	No	No	No
Definite- <i>cât</i> (7)a	Yes	No	Yes
Indefinite- <i>cât</i> (7)b	No	No	Yes

3. An Analysis

To account for the uniform behavior of indefinite *cât*-relatives, differentiating it from that of *care*-relatives, I propose that while *care* simply triggers abstraction over the relative clause which it introduces, *cât* **triggers both abstraction and maximalization over the relative clause it introduces**, and is thus in effect an overt maximalization operator.⁶ This means that maximality and existence are attributed to different elements in the relative clause: **the maximality interpretation of *cât*-relatives is independent of its definiteness**. In the following I give an analysis of *cât*-relatives based on this idea. The semantics of *care*-relative clauses is parallel to that of the corresponding English relatives.

⁶ See Rett (2006) for a similar idea and arguments in favor of analyzing *cât* and other *how-many* words in Balkan languages as involving maximalization. I note that although parallel *how-many* words exist in the lexicon of Bulgarian and Macedonian, the construction in question in this paper is only available in Romanian and is ungrammatical in the former two languages, just as it is in English.

The maximality operator *max* is a set modifier: it takes a set *S* and returns a singleton set *S'* whose member is the maximal element of *S*; it is undefined if there is more than one such element.⁷ Since *max* can take either sets of degrees, of type $\langle d, t \rangle$, or sets of entities, of type $\langle e, t \rangle$, we require two entries for *max*, as detailed in (9)a-b below (modeled after von Stechow 1984, Rullmann 1995, Heim 2001).⁸

The maximality operator as a set modifier (degree and entity versions):

- (9) a. $[[\text{max}]]_{\langle\langle d, t \rangle, \langle d, t \rangle\rangle} = \lambda f_{\langle d, t \rangle}. \exists! 1d \in f [f(d)=1 \ \& \ \forall d' \in f [d' < d]] .$
 $\lambda d \in f. [f(d)=1 \ \& \ \forall d' \in f [d' < d]]$
- b. $[[\text{max}]]_{\langle\langle e, t \rangle, \langle e, t \rangle\rangle} = \lambda f_{\langle e, t \rangle}. \exists! 1x \in f [f(x)=1 \ \& \ \forall y \in f [|y| < |x|]] .$
 $\lambda x \in f. [f(x)=1 \ \& \ \forall y \in f [|y| < |x|]]$

Max operates after abstraction and before the head of the relative is introduced. Note that we will make different predictions if we assume a matching analysis of relative clauses, as in (10)a, compared to a raising analysis of relative clauses, as in (10)b (Bhatt 2002, Hulsey and Sauerland 2006).

Matching vs. raising analyses of relative clauses:

- (10) a. (The) $[[_{MP} 9kg_i] [_{CP} \text{max} \langle 9kg_i \rangle \lambda [_{IP} \text{your luggage weighs } t_i]]]$ (where $i=j$)
 b. (The) $[_{CP} 9kg_i \text{max} \lambda [_{IP} \text{your luggage weighs } t_i]]$

In case your luggage weighs e.g. 10kg, the indefinite *cât*-sentence in (2)b above can't be true. Under a matching analysis, I assume that the unpronounced copy of the head is intersected with the denotation of the relative clause before maximalization. Assuming for simplicity that weight is counted in 1kg-increments, the result of the intersection will be a set containing ten 9kg-weighing members. Since this set does not have one maximal member, *max* will fail to apply and we expect the sentence to have an undefined truth value because of presupposition failure.

⁷ The requirement that every non-empty set have a unique maximal member is trivially met in all the cases I discuss in this paper. Presupposition failure in these simple cases – in which there is no interaction with secondary operators, and which all involve predicates that are order on a scale that is totally ordered – can thus only be caused by an inappropriate use of the definite article. My semantics does, however, predict that in some more complicated context *max* can cause presupposition failure. I must leave the testing of this prediction for future research.

⁸ An alternative analysis of entity-headed *cât*-relatives is to view the head as a number phrase and give it a denotation as in (i) below. Some difficulties arise, but if such an analysis turns out to be correct, then the lexical entry of *max* in (9)a suffices. Otherwise we require the additional entry in (9)b.

- (i) *max* (λn . John bought n-many horses)

I note that a NumP analysis might be able to capture some speakers' intuition that *care*-relatives focus on entities, while *cât*-relatives focus on cardinalities (though there is no difference in the truth conditions of parallel sentences with the two relativizers). I have not been able to sufficiently clarify the significance of this intuition and I thus do not attempt to incorporate it into my analysis.

Degree Relatives, Definiteness & Shifted Reference

Under a raising analysis, when the head is first intersected with the denotation of the relative clause after maximalization, we expect the sentence to simply be false. In order for my analysis to correctly predict that presuppositions (and hence presupposition failure) can only arise in the definite case, it must assume a raising structure. Otherwise it will predict that presupposition failure can arise in the indefinite case as well and have difficulties explaining the presupposition facts surveyed in the previous section.

To proceed with the analysis, I make the simplest assumptions regarding the denotations of degrees, namely that they represent points on a scale:⁹

The denotations of degree-denoting items in example (2):

$$(11) \quad \llbracket \text{weigh} \rrbracket = \lambda d. \lambda x. \text{WEIGH}(x) \geq d$$

$$(12) \quad \llbracket \text{that your luggage weighs} \rrbracket = \max[\lambda d. \text{WEIGH}(\text{your luggage}) \geq d]$$

$$(13) \quad \llbracket 9\text{kg} \rrbracket = \lambda d. d = 9\text{kg}$$

At the CP level we combine two singleton sets using Predicate Modification, as in (14). Logically, the resulting set may contain at most one member. Given this, *the use (or avoidance) of the definite article straightforwardly predicts the presupposition facts discussed in the previous section*. If we use the definite article, then we require that the intersection is not empty, but rather that there exists a member in that set, resulting in the desired presupposition. If we do not use the definite article we make no such assumption, and no presupposition arises. In the indefinite case, the information in the set in (14) ends up having the status of a background assertion.

Derivation of CP: intersecting two singleton sets using PM:

$$(14) \quad [_{\langle d, t \rangle} [_{\langle d, t \rangle} \lambda d. d = 9\text{kg}] \cap [_{\langle d, t \rangle} \max[\lambda d. \text{WEIGH}(\text{your luggage}) \geq d]]]$$

⁹ Alex Grosu (p.c.) raises the following example as a potential problem for a *max*-based analysis. Sentence (i) means that the weight of each woman will prevent that woman from becoming a ballerina, not that the weight of the heaviest woman will prevent all of the women from becoming ballerinas (note that there is also an implausible collective reading of this sentence):

- (i) Cele peste 100 kg cât cantaresc femeile astea le vor împiedica (pe toate)
The over 100 kg how.much weigh women these Cl will prevent acc. all
sa devina balerine.
to become ballerinas
'The more than 100 kg that these women weigh will prevent (all of them) from becoming ballerinas.'

This example, however, is only a problem for analyses which use a denotation of *weigh* that relates individuals to points on a scale: in that case, *max* will fail to apply if the women have different weights and the result will be an incorrect prediction of presupposition failure. By contrast, if *weigh* relates individuals to degree-intervals then *max* will pick the weight of the *lightest* woman and apply the matrix predicate to it. This will yield the correct truth conditions: if the lightest woman can't be a ballerina because of her weight, heavier women won't be able to become ballerinas for the same reason as well.

At the DP level, a degree-compatible version of the definite article as in (15) thus optionally applies to the result of (14), returning the degree d which is the member of the set in (14). The matrix predicate takes d as its argument, returning a truth value. We end up with the amount reading of the definite *cât*-relative clause.

$A \langle \langle d, t \rangle, d \rangle$ lexical entry for the definite article:

(15) $\llbracket \text{the} \rrbracket_{\langle \langle d, t \rangle, d \rangle} = \lambda f_{\langle d, t \rangle} : \text{there is exactly one contextually salient } d: f(d)=1 .$
the unique d in the context such that $f(d)=1$

If the definite article does not apply, we require some operation which will allow us to refer to the member of the set $\langle d, t \rangle$ denoted by CP. That degree will combine with the matrix predicate, returning a truth value. I propose to use *existential closure*, which will make available the degree such that it equals 9kg and is the weight of your luggage, as needed. This will give us an amount reading for the indefinite *cât*-relative. I note that using the *iota* operation, which in effect amounts to assuming a covert definite article in the indefinite relative, yields bad results. Since *iota* has the same lexical entry as the definite article, we would be in essence analyzing the indefinite relative as elliptical version of the definite relative. This will cause us to lose our explanation of why indefinite relatives do not carry the same presuppositions as their definite counterparts. Existential closure raises no such problem and is therefore the preferred solution.

4. Substance Readings and Shifted Reference

In section 3 I gave an analysis of the amount readings of the definite and indefinite *cât*-relatives. The analysis, however, does not straightforwardly extend to substance readings of definite degree relatives such as example (3), the English gloss of which is repeated in (16) below. Recall that a substance reading is impossible with the indefinite degree relative but is allowed with the definite relative.

Degree relative with a substance reading (English gloss of (3)):

(16) The 2 miles that the road stretches between MIT and Harvard are full of potholes.

In such examples, the referent of the subject DP seems to be an individual – the actual road between MIT and Harvard – not an abstract amount of 2 miles. However, the analysis in section 3 can only predict a reading of (16) in which 2 miles (which is the distance between MIT and Harvard) are full of potholes, not the actual road. We need a way of picking an entity-denoting referent for the subject of the definite degree relative. Moreover, we must pick the exact entity which is the road between MIT and Harvard: example (16) cannot be true if the road between MIT and Harvard stretches 2 miles and there are 2 miles which are full of potholes, but not the ones between MIT and Harvard.

This problem is reminiscent of the problem of substance readings of *amount relatives*. The literature attributes to amount relatives different properties, but their

Degree Relatives, Definiteness & Shifted Reference

unifying characteristic is that they are entity-headed relative clauses which involve abstraction over degrees. The examples in (17) exemplify the amount/substance ambiguity in amount relatives: (17)a has a prominent substance interpretation, while (17)b has a more plausible amount interpretation.

Amount relatives with both an amount reading and a substance reading (English)

- (17) a. Marv put everything he could in his pocket. (Carlson 1977)
b. It will take us the rest of our lives to drink the champagne that they spilled that evening. (Heim 1987)

Authors have analyzed substance readings of amount relatives in various ways. Grosu and Landman (1998, hence G&L) employ a sophisticated notion of degrees as triples consisting of the cardinality of a plural individual, a sortal restriction on that individual, and the plural individual itself. The amount relative in (18)a thus has the denotation in (18)b. The degree serves as a sort of storage device: a special function allows access to the individual itself at any point in the derivation, as needed, yielding a substance reading.

The denotation of an amount relative based on the idea that degrees are ordered triples:

- (18) a. books [_{CP} there were *d-many* books on the table]
b. $\{ \langle |x|, \text{books}, x \rangle : \text{books}(x) \ \& \ \text{on the table}(x) \}$

To avoid making non-standard assumptions about degrees, von Stechow (1999) suggests that the substance reading is derived by multiply interpreting a covert *d-many-X* phrase which originates inside the relative clause and moves to Spec,CP.¹⁰ The amount reading is the result of interpreting the moving phrase both in its base position and in its target position, as in (19)a, while the substance reading is the result of interpreting the moved phrase only in its target position, as in (19)b.

A movement-based derivation of the amount and substance readings of amount relatives:

- (19) a. $\lambda x. \text{books}(x) \ \& \ |x| = \max (\lambda n. n \text{ many (books)(on the table)})$
b. $\lambda x. \text{books}(x) \ \& \ |x| = \max (\lambda n. n \text{ many (of } x \text{)(on the table)})$

Analyzing the same Romanian degree relatives which appear in this paper, Grosu (2009) suggests radically different analyses of the amount and substance readings: the amount readings are derived using standard restrictive semantics of relative clauses which do not include maximalization. Maximality is derived from the fact that a bag naturally has a unique maximal weight. The substance reading is to be handled via the novel notion of *restricted degrees*, an expansion of Landman's (1989) restricted individuals. Though the semantics of this proposal is not fully worked out, the idea is that the semantics of the relative clause itself is identical in all cases. At the CP level, a feature on C can cause

¹⁰ This assumption is shared by many authors, including Carlson 1977, Heim 1987, G&L 1998.

both the relative clause and its head to be lifted to the type of intensional generalized quantifiers over degrees. *Being the weight of your luggage* becomes a property of 9kg, yielding a substance-like interpretation. The licensing feature on C is presumably not available in the case of indefinite degree relatives.

None of these strategies yield across-the-board good results for the Romanian relatives. Using a G&L-like degree storage mechanism, we expect substance readings to be available both in the definite and the indefinite relatives, not just in the definite ones. We are furthermore forced to use the more complicated, and otherwise unneeded, notion of a degree as an ordered triple, which complicates the semantics of many other items in the language. A movement analysis is impossible for the Romanian degree relatives because there is no place in the analysis for a covert *d-many-X* phrase. Interpreting the moved degree phrase itself (e.g. *2 miles*) both in its base position and in its target position will not yield a substance reading, since *2 miles* does not denote an entity but rather is of type $\langle d,t \rangle$. The idea of restricted degrees, besides being stipulative on several counts and otherwise unmotivated, does not have a hope of giving a unified analysis of all *cât*-relatives, degree and entity headed, nor explaining their shared property of a maximality interpretation.

An attempt to relate the availability of a substance reading directly to the presence of the definite article will provide an obvious explanation of why substance readings are only possible in definite relatives. An appropriate meaning of *the* in this case will be of type $\langle \langle d,t \rangle, e \rangle$: *the* will be that function which takes the singleton set whose member is the maximal degree in the CP and returns the entity which measures that degree. Since it is impossible to formally access the information inside the CP by the time we get to the DP level, we have to rely on the context to retrieve that necessary entity.

A $\langle \langle d,t \rangle, e \rangle$ lexical entry for the definite article:

- (20) $\llbracket \text{the} \rrbracket_{\langle \langle d,t \rangle, e \rangle} = \lambda f_{\langle d,t \rangle} : \text{there is exactly one contextually salient } d: f(d)=1 .$
the unique x in the context such that: x measures d

A lexical entry for *the* along the lines of (20) runs into two kinds of difficulties. First, it predicts more-than-minimally different derivations for the seemingly very similar substance and quantity readings of the definite relative: the quantity reading uses the information in the relative clause in an intersective, semantic manner. The substance reading uses that same information in a contextual, pragmatic manner. More seriously, a theory which relies on context salience runs into trouble whenever more than one object is made salient in the context. For example, consider the following: *during the triathlon we biked two miles, swam two miles, and ran two miles. The two miles we swam were particularly tiring.* It seems that more than one two-mile stretch is made salient here, but a sentence that refers e.g. to *the two miles we swam* is perfectly acceptable and does not lead to the presupposition failure a context-dependent analysis such as (20) would expect.

Degree Relatives, Definiteness & Shifted Reference

Though it is perhaps possible to argue that a more fine-grained notion of salience that will be able to pick the correct referent in contexts like the one above, I would like to argue that the substance reading is only one member of a family of shifted references allowed by sentences similar to (16) (= (22) below). It is of import that such cases are only available to definite constructions. It is well known in the literature that definites give some leeway to the interpretation of referring expressions. For example, a waiter at a restaurant can felicitously utter (21), referring to the customer who ordered the ham sandwich, not to the sandwich itself (based on Nunberg 1977).

Shifted reference with a definite article:

(21) The ham sandwich wants his money back.

Expressions based on measure phrases such as *two miles* can in many cases refer to actual entities which measure certain degrees, yielding a substance reading. It is interesting to note that in such cases, the measure phrases must be modified in some way (Irene Heim, p.c.). The modification can be in the form of a relative clause, a classifier, a demonstrative, etc. A bare unmodified measure phrase, however, is odd, as suggested by (25)¹¹. This suggests that the referent in these sentences is contextually chosen and must be somehow identifiable within the sentence:

Substance readings of measure phrases must be modified in some way:

(22) The 2 miles that the road stretches between MIT and Harvard are full of potholes.

(23) Those 2 miles are full of potholes.

(24) The first mile is the hardest to run.

(25) The 5th year of graduate school is the busiest.

(26) #The 2 miles are full of potholes.

Alongside the possibility of referring to the actual object measured by a measure phrase, it seems that it is also possible to refer to things other than entities (David Pesetsky, p.c.). For example, while (22) refers to the actual path between MIT and Harvard, the very similar (27) seems to refer to the surface below the path we flew, in all directions. Example (28) could either refer to the process of losing weight or to someone's figure at the end of the process (it is, of course, also possible to construct a similar example that refers to the actual weight that was lost). Example (29) seems to naturally refer to the duration of the ride home. What's more, notice that a very natural reading of the baseline sentence used throughout this paper – *the 9kg that your luggage weighs won't prevent you from boarding the plane* – is that it is the *fact* that your luggage weighs 9kg that won't prevent you from boarding the plane, not the *amount* 9kg.

¹¹ This may simply be a familiarity effect of the definite article. To the best of my understanding, however, examples like (26) are harder to accept, even with supporting context, than examples (22)-(25).

*Non-amount but not-quite-substance readings in English*¹²:

- (27) The 60 miles we flew were full of birch trees
- (28) The 10 pounds she lost are glorious
- (29) The 5 miles I drove home after dropping him off at the airport were melancholy

I conclude that measure-phrase headed degree relatives such as the Romanian relative that was the main focus of this paper and the English examples given in (27)-(29) above can involve a range of references – to entities, degrees, paths, processes, facts, durations, achievements, etc. – distinguishable from the “ordinary” amount reading of the degree relatives. Whether these referents should be derived in the semantics or left to be picked by pragmatics, I leave for future research.

5. A Puzzle: English Maximalizing Relatives vs. Romanian *Cât*-Relatives

An open question is why English maximalizing relatives do not have an “indefinite” variant with semantics parallel to that of the Romanian indefinite *cât*-relative. Recall that Maximize Presupposition (Heim 1991) blocks the use of the indefinite determiner when the maximalization and existence requirements associated with the definite determiner are satisfied. This is how the ungrammaticality of sentences like (30) is normally explained.

A sentence that does not satisfy Maximize Presupposition:

- (30) a. #A sun is shining
- b. The sun is shining

Following the argumentation in this paper, it is clear why it is possible to use an indefinite in constructions such as the Romanian degree relatives: the maximality conveyed by the relative clause is introduced by the relativizer *cât* and is independent of existence. The property in the relative clause (e.g., that the luggage weighs 9kg) is thus free to be either asserted or presupposed in the context, compatible with the use of an indefinite or definite article, respectively.

Given this, and given that English amount relatives are standardly analyzed as containing a maximalization (or exhaustification) operation at the relative clause level (Carlson 1977, Heim 1987, G&L 1998, von Stechow 1999, Butler 2001, McNally 2006, Herdan 2009), it is puzzling that such relatives do not have an indefinite variant parallel to that of Romanian. Since maximality can come from a different source than existence, we would expect both a definite version, in which existence is part of the common ground, and an indefinite version, in which existence is asserted. However, an intended indefinite reading of (31) which asserts that there were exactly five books on the table and I took them with me is unavailable.

¹² The corresponding Romanian *cât*-relative versions of these examples allow a comparable array of references, including references to durations, processes, achievements, paths, surfaces – though they require more supporting context than the English sentences seem to need.

An English amount relative: why is a Romanian-like indefinite reading unavailable?

(31) #I took with me five books that there were on the table.

Intended meaning: ‘there were exactly five books on the table and I took them with me.’

A salient difference between the Romanian relatives and the English relatives is that in Romanian, maximalization is overtly introduced via the relativizer *cât*. On the other hand, the maximalization operation in English is covert. Given that the distribution of determiners compatible with English amount relatives is restricted to those determiners which preserve maximality into the quantification, such as *every*, *all*, and *the*, a possible argument could be that maximalization is not introduced covertly into the relative clause at all, but rather stems solely from the determiner. I leave this option open at this point.

6. Conclusion

I have argued that interpreting the Romanian relativizer *cât* as encoding maximalization over the relative clause it introduces correctly predicts the presupposition facts of the definite and indefinite degree relatives discussed in this paper. I showed that these relatives pattern with other *cât*-relatives and differ from *care*-relatives in their presuppositions and maximality interpretation, and that my analysis predicts these differences. Similarly to Rett (2006), the meaning I assigned *cât* is that of a set-modifier, which takes a set and returns a singleton set containing as its member the single maximal member of the previous set, if such a member exists.

I showed that, similarly to English measure-phrase headed relatives, the Romanian relatives allow a wide range of denotations – not only entities but also such notions as process, duration, and fact. I argued that existing analyses of substance readings in amount relatives cannot be straightforwardly applied to the Romanian degree relatives to derive their substance readings, and that a theory that attempts to pick the correct entity referent out of the context is also problematic. I leave open the question of whether the derivation of the different denotations available to the English and Romanian relatives should be a semantic or a pragmatic one.

References

- Abbott, Barbara. 2000. Presuppositions as nonassertions. *Journal of Pragmatics* 32. 1419-1437.
- Bhatt, Rajesh. 2002. The raising analysis of relative clauses: evidence from adjectival modification. *Natural Language Semantics* 10. 43-90.
- Butler, Alastair. 2001. Degree relatives are ordinary relatives. In B. Jackson, R. Hastings and Z. Zvolenszky (eds.), *Proceedings of SALT XI*, 76-94. Cornell University, CLC Publications.

Hadas Kotek

- Carlson, Greg. 1977. Amount relatives. *Language* 53. 520-542.
- Cornilescu, Alexandra. 1993. Notes on the structure of the Romanian DP and the assignment of the genitive case. in *University of Venice Working Papers in Linguistics* 2. 107-133.
- von Fintel, Kai. 1999. *Amount relatives and the meaning of chains*. ms, MIT. Handout of a talk given at the University of Edinburgh.
- von Fintel, Kai. 2004. Would you believe it? The king of France is back! Presuppositions and truth-value intuitions. In M. Reimer and A. Bezuidenhout (eds.), *Descriptions and Beyond*, 315-341. Oxford: Oxford University Press.
- Grosu, Alexander, and Fred Landman. 1998. Strange relatives of the third kind. *Natural Language Semantics* 6. 125-170.
- Grosu, Alexander. 2009. Two kinds of degree-denoting relatives: Hebrew versus Romanian. *Brill's Annual of Afroasiatic Languages and Linguistics* 1. 176-203.
- Heim, Irene. 1987. Where does the definiteness restriction apply? Evidence from the definiteness of variables. *The representation of (in)definiteness*, edited by E. Reuland and A. ter Meulen. Cambridge, Mass.: The MIT Press.
- Heim, Irene. 1991. Artikel und Definitheit. In A. von Stechow and D. Wunderlich (eds). *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, 487-535, Berlin: de Gruyter.
- Heim, Irene. 2001. Degree operators and scope. *Audiatur Vox Sapientiae: A Festschrift for Arnim von Stechow*, ed. Fery and Sternefeld. Akademie Verlag.
- Herdan, Simona. 2008. A superlative theory of amount relatives. *Proceedings of WCCFL 26*, University of California, Berkeley, CA
- Hulsey, Sarah and Uli Sauerland. 2006. Sorting out relative clauses. *Natural Language Semantics* 14. 111-137.
- Landman, Fred. 1989. Groups II. *Linguistics and Philosophy* 12. 723-744.
- McNally, Louise. 2008. DP-internal only, amount relatives, and relatives out of existential sentences. *Linguistic Inquiry* 39. 161-169.
- Nunberg, Geoffrey. 1977. *The Pragmatics of Reference*. Unpublished Ph.D. dissertation, CUNY Graduate Center.
- Rett, Jessica. 2006. How many maximizes in the Balkan Sprachbund. In M. Gibson and J. Howell (eds.), *Proceedings of SALT XVI*, 190-207. Ithaca, NY: CLC Publications.
- Rullmann, Hotze. 1995. *Maximality in the semantics of wh-constructions*. Ph.D. diss, UMass Amherst
- von Stechow, Arnim. 1984. Comparing semantic theories of comparison. *Journal of Semantics* 3. 1-77.

MIT Linguistics Department
77 Massachusetts Avenue
Bldg. 32-D808
Cambridge, MA 02139 USA

hkotek@mit.edu