Quantificational Modification:
The Semantics of Totality and Proportionality

by

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Thesis submitted for the degree

"DOCTOR OF PHILOSOPHY"

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University of London
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2009

بسم الله الرحمن الرحيم

Abstract

The thesis explores the syntactic and semantic dimensions of four linguistic elements that appear in Modern Greek arguably as quantifiers and modifiers, i.e., in the form of Quantificational Modifiers (QMods) *olos* `all, whole, overall` and its extension *olikos* `total`, *merikos* `some, a few, partial`, *ligos* `some, few, little, insignificant` and *polis* `many, great, considerable`. Such QMods are analyzed as `measure` quantifiers of scalar semantics that appear in a syntactic position common to adjectival modifiers. The thesis explores specific sets of reading and their interpretations. Such a phenomenon is common to Modern Greek, English, French and Arabic QMods and gives evidence to the universality of Quantificational Modification as a semantic subclass of Quantification.

Chapter 1 discusses Quantification as semantic interpretation along with the main questions this research intends to answer, while Chapter 2 reviews recent literature on Quantification within and across languages. Chapter 3 focuses on Modern Greek expressions of Quantification and extends chapter 2 into a further discussion about their various syntactic manifestations. Chapter 4 and 5 are extensions to chapters 2 and 3 as they discuss the semantics of specific QMods as `total` and `partial` quantifiers, which operate on homomorphic sets of degrees and amounts.

Chapter 6 discusses the broader issues in the thesis from a theoretical and typological perspective that establish Quantificational Modification as a universal and purely semantic subclass of Quantification. Our findings are summarized in chapter 7 followed by suggestions for expanding our investigation into other related areas.

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Acknowledgements

First, I would like to praise and thank my Lord, Allah Almighty for giving me the mental and physical strength to complete this study.

I would like to express my gratitude to Dr. Wynn Chao and Prof. Emmon Bach for their tolerant supervision and support.

I am also grateful to my supportive family, especially to my husband Dr. AlTahir Hafiz, who kept faith in me even when I had lost it, and to my four children Al-Harith, Muhammad-Ilyas, Nooruddin and Layla, who made me smile when I wanted to cry! Their patience, prayers and endurance have been a major source of my achievements in this study.

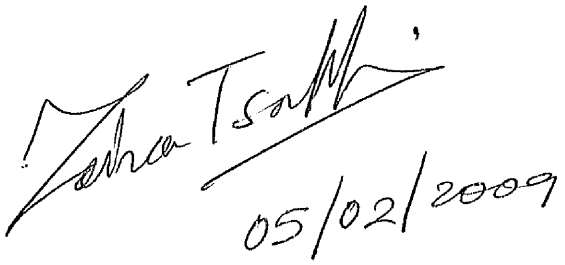
I would also like to thank my brother, Mike Tsouhlaris, for his constant advice on the Greek data used through out the thesis, Virginia Venus for our discussion on the French data and again, my husband and children for the help they offered with the Arabic data and their computer skills.

Many thanks go to my dear friends Rihana Malik, Mona Alwafi and Khadija Boukabash for their emotional support and friendship.

Finally, I should also thank all SOAS staff for making studying at SOAS an enjoyable experience.

Author's declaration

`No portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification of this, or any other University.



CHAPTER ONE

Introduction

Language is our human means for communication; what we communicate through language is meanings that appear in the way we put words together in order to talk about an idea, a concept, a notion or an entity. Natural languages have the ability to generalize about fundamental concepts like that of Quantification (cf. Bach et al, 1995). Aristotle's classical syllogism, below, is an example of showing how the human mind processes meaning:

Every man is a mortal
Socrates is a man

Therefore: Socrates is mortal

Concepts like Quantification are mentally processed similarly to show how an utterance is the result of the mental process of meaning x in relation to meaning y. The way we interpret words is important to our perception of concepts, ideas and the `world`. And it is in relation to our experience with the `world` that we understand meanings expressed verbally in utterances.

Questions about how Quantification is expressed have contributed in describing human language. Semantically, the power of language might describe notions like Quantification as a way of formalizing Truth, Falsity and their measures. In terms of Semantics and Language, quantificational expressions appear in Syntax in the form of a variety of syntactic categories which with the means and rules of Compositionality combine with other lexical elements and their interpretation aim in expressing the notion of Quantification in terms of Proportionality or Cardinality.

Quantification is a universal phenomenon used for the mental activity of `counting` and `measuring` that appear either in the form of numbers and numerals or as quantities that allow a collective, distributive or proportional reading such as English *all*, *every*, *few*, *many*, *much*, *more* and their counterparts in other natural languages. Cushing (1981) thinks that "...it would be surprising indeed to discover a linguistic community whose members had no interest in quantities and their comparison, even if this interest included only the proverbial one, two, many form of `counting`" (Cushing, 1981: ix).

Research has shown that Quantification is detected in most recorded human languages (with the possible exception of Pirahã, an Amazonian language)[1] in the restricted form of numerals or as abstract as ∀ and ∃ quantifiers. A few simple examples of quantified sentences in English, Modern Greek, Standard Arabic and French testify to the universality of Quantification.

(1) ***All*** *the students came* (English)
(2) ***Oli*** *i mathites irthan* (Modern Greek)
(3) ***Kul*** *al tulab ataw* (Standard Arabic)
(4) ***Tous*** *les etudiants sont venues* (French)

Such sentences, and perhaps many more of the identical meaning in other languages, have one common logical interpretation:

(5) $\forall x\,[st(x) \rightarrow c(x)]$

Logic[2] has successfully described the differences and similarities recorded in various natural languages by making generalisations of how the human mind works and how

[1] "It has been claimed that there are languages that have no quantification at all, a claim that has led to a widely publicized controversy: see Everett 2005 on Pirahã, critique in Nevins et al. 2007, and reply by Everett 2007" (Bach and Chao, 2008 [To appear])

[2] The structure of the formal language of logic "is made to resemble that of a real natural language" (Faltz, 1995: 272).

concepts and notions (e.g., Quantification) are perceived and expressed in a shared manner, explicitly encoded in logical reasoning. The logical representation in (5) is semantically equivalent to examples (1)-(4). What is conveyed in (5) is the identical semantic sense of the above examples from different languages, expressed with different syntactic constructions and vocabulary, which confirms that quantifiers are a semantically unified class.

The meaning, analysis and understanding of Quantification have puzzled the minds of philosophers, logicians, linguists and semanticists throughout the years. The outcome of such investigation sees quantifiers as "one of the very few expressive devices of language for which it is known how to break out of the circle of language and explain what a word means other than essentially in terms of other words' meanings." (Peters and Westerstahl, 2006: Preface vii). "It is possible to explain the meaning of quantifiers in mathematical and other non-linguistic terms. This foundation not only provides a satisfying clear account of the meaning of quantifiers themselves, but also lies behind the widespread use of quantifiers in analyzing the meaning of an extensive range of non-logical expressions, including tenses and temporal adverbs, modal verbs, conditionals, attitude verbs, and some noun phrases that may not be explicitly quantified" (ibid).

1.1 Quantification as semantic interpretation

"των λεγομένων τα μέν κατά συμπλοκήν λέγεται, τα δ' άνευ συμπλοκης΄
τά μέν ουν κατά συμπλοκήν οιον άνθρωπος τρέχει, άνθρωπος νικα΄ τά
δ' άνευ συμπλοκης οιον άνθρωπος, βους, τρέχει, νικα."[3]
(Aristotle, Categories: 1, a. 16)

[3] `It will be seen that the meaning and function of the single word can only be explained relatively to the complete proposition, which must be assumed as foreknown` (Translation by Bair and Robertson, 1872: 88 (footnote a)).

Aristotle was the founder of the logic of quantifiers, which have been expanded into a broad field of linguistic and philosophical research in our present time. In our above quotation Aristotle notes that the meaning and the function of a word can only be explained in relation to the complete proposition whose truth is judged through experience. This is the case with the way we mentally process meanings associated with all kinds of words including ***quantifiers***. And we bring our attention to quantifiers since quantifiers are the focus of this thesis, described not as linguistic elements but as semantic objects which classify as such because of the way they interpret, independent of their syntactic manifestations. `Interpretation` is the way we understand an entity, an idea or a concept; and it is the interpretation of quantificational entities that allow them such a classification. Grammatical categories like nouns, verbs, adjectives and adverbs are put together to form propositions; it is important that these propositions are evaluated as true or false in order for the sentence to be true or false. For instance, for an individual called *John* to be described as *tall* it is important that the height of *John* is above average for a proposition like *John is tall* to be evaluated as true; and it is our inner experience with the world that allows to judge *John* as *tall* when we compare him to other individuals like *Peter* and *Mary* who are not *as tall*, nor *taller than John*.

The same mental process occurs with quantifiers and the way our mind understands propositions that include them and require a `quantificational interpretation`. In semantic terms `quantificational interpretation` requires a model structure, a set of values to variables and an evaluation function in order to understand a quantifier: a semantic object interpreted in relation to sets of entities, so that for the proposition *every boy named John is tall* it is necessary that we generalize over the individual

entities that are boys in the universe and we pick the set of boys that are called *John*; then, all boys named *John* are evaluated as having a height above average that will allow them to be classified as *tall*. If at least one boy named *John* is found of a height not above average that would determine the values of our proposition as false and therefore, our claim: *every boy named John is tall* would be false. These are our standards used to evaluate the `quantificational` interpretation of certain elements examined in the thesis.

1.2 Research background and research questions

Quantification is not a new research area of the present. It has been the subject of philosophical and linguistic study since ancient times. The philosophers' contribution to the analysis of Quantification began with Aristotle "who initiated the logical study of the four quantifiers all, some, not, and not all" (Peters and Westerstahl, 2006: 21), and discussed the relational view of quantification. Aristotle saw quantifiers as expressions that "denote relations between sets of individuals" (Peters and Westerstahl, 2006: 30). His logical analysis of quantifiers influenced logicians who analyzed quantification over discrete individuals rather than over pluralities of them; linguists applied the logicians' semantic analysis of quantification to human language and expanded it by discussing other forms of quantificational expressions such as quantification over times and events.

The linguistic study of quantifiers began much later than Aristotle "and until recently focused mainly on the grammatical expression of quantification rather than its meaning" (Peters and Westerstahl, 2006: 1). Besides Aristotle, other important names in the development of the linguistic analysis of Quantification are those of Russell,

Frege, Mostowski, and Montague. "Russell explained the quantifiers in terms of a propositional function's being `always true`, `sometimes true`, etc., with a syntax using the notion of `real` (free) versus `apparent` (bound) variables" (Peters and Westerstahl, 2006: 37). "Frege was clear about the syntax as well as the semantics of quantifiers" (Peters and Westerstahl, 2006: 38) and distinguished "between names and ... their denotations, free and bound variables ... and the fact that quantifier symbols are not syncategorematic, but denote well-defined entities, quantifiers, i.e. second-order (second-level) relations" (Peters and Westerstahl, 2006: 40). Mostowski was concerned with the logical form of quantifiers and their semantic types, while the work of Montague "represents the first systematic attempt to apply the logician's methods of formal syntax and semantics to natural language" (Partee, 1976: 51). Montague treated English as a Formal Language which could be treated "within the logical tradition in syntax and semantics" (ibid); "work on NP's as Generalized Quantifiers ... began with Montague and was continued and elaborated by Barwise and Cooper (1981). In Montague's theory, phrases like `John`, `every man` and `he`, are all members of a single category, term-phrase or NP, and they are given a single type of interpretation as sets of properties" (Bach et al., 1995: 7). Initially logicians analyzed "the meaning of quantification over discrete individuals rather than over pluralities of them or parcels of non-discrete stuff" (Peters and Westerstahl, 2006: 1), while linguists concentrated "on quantification over domains denoted by individual count nouns such as *person* and *table*, rather than domains denoted by collective count nouns such as *crowd* and *suite* or by mass nouns such as *protoplasm* and *furniture*" (ibid).

Our investigation into quantificational expressions revolves around the following fundamental works in the treatment of Quantification: Barwise and Cooper (1981) who extended Montague's work, and Bach (1981) who discusses `eventology` in terms of subsets of `events` along with Bach's et al., (1995) typological work which "provides data on the syntactic and morphological expressions of quantificational notions in a range of natural languages" (Bach et al., 1995: 10). Such works will be looked at in more detail in Chapter 2.

The research questions this thesis will attempt to answer range over the semantics of Quantification and Modification, and how they both relate in the case of certain elements that appear in adjectival position but induce `quantificational` interpretation. Such cases appear in various natural languages. We compare data from English, French, Standard Arabic and Modern Greek. This research moves from the cross-categorial findings of various morpho-syntactic devices that take the same semantic interpretation, to cross-linguistic issues that address the interplay between ***Quantification*** and ***Modification*** in our analysis of ***QMods***. QMods are found to share similarities with adjectival (gradable) modifiers and quantifiers and were therefore, branded as QMods, i.e., ***Quantificational Modifiers***. Hence, ***Quantificational Modification*** is seen as another way of expressing Quantification, perhaps as universal as Quantification itself. Often QMods are polysemous; as a result of their polysemy they allow appearing in more than one syntactic position and are semantically ambiguous between two interpretations. QMods syntactically resemble adjectival modifiers in terms of linear order and morphological inflection and agreement – if the language allows inflection as in the case of Greek, Arabic, etc. - with the noun and definite article they combine to form an NP that induces

quantificational interpretation. Because of their interpretation and semantic analysis as operators over set relations they semantically pair with quantifiers. In addition they also resemble gradable adjectives in terms of scalarity and the comparison they allow between the proportional sets they operate on.

In our discussion of QMods we have used data from Modern Greek, Standard Arabic, English and French in order to provide evidence that will establish Quantificational Modification as a universal semantic subclass of Quantification. Our comparison between Greek, Arabic, English and French throughout the thesis intends to show that such languages can relate typologically but not geographically and the means of such relation is purely linguistic. Our modest typological assessment of Greek, Arabic, English and French QMods target to answer questions posed initially by Bach et al., (1995: 1) as the following:

- How do natural languages provide for quantificational expressions?
- How much of such structures and meanings is universal and to what extent do languages vary in their quantificational tool-boxes?
- Are differences among languages in the domain(s) of quantification systematically correlated with other differences?

With such a variety of morpho-syntactic manifestations ranging from determiners, modal verbs, affixes, adjectives, nouns and adverbs it is natural to ask `what constitutes really `quantificational interpretation` and `is there a possible mapping between morphology/syntax and semantic interpretation` and `if there is, then how is such a mapping realized in natural language`?

Quantification is an abstract notion; what happens on the ground of Quantification is really something like the relation between light and energy in the form of a torch as a

source of light. The energy would not be perceived if there was no actual physical appearance of light. This is exactly what happens with Quantification. Its actual semantic interpretation is exposed in the morpho-syntactic mechanisms it uses and such a mapping only shows in the logical representation of quantifiers. Montague used a λ-categorial language as the base for a logical analysis. The λ-calculus enforces compositional interpretation of different semantic notions such as Quantification. A quantificational treatment in a categorial language follows the syntactic rules which allow combining syntactic elements in a certain way so that quantificational expressions are formed that possess a unified semantic analysis represented in the logic. The machinery used is the Lexicon and the specific categories words belong to[4]. We examine QMods in terms of proportional set relations; the proportionality of these sets confirms that `proportion` is a "notional ingredient of many instances of quantification" (Partee, 1995: 561); it is evident from our discussion on QMods that we interpret proportion as `total` or `partial`.

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[4] Basic categories are *t* for truth-value (i.e. sentence) and *e* for entities (i.e. noun phrase). These categories combine following certain syntactic rules and yield quantificational expressions with the same semantic interpretation. This mapping between the syntax and the semantics of notions such as Quantification shows in the logical representation of each sentence. Montague's paper: `The proper treatment of Quantification in Ordinary English` deals with such mapping in English. Partee (1976) notes, "The two basic categories are *t*, the category of sentences (t for truth bearing), and *e*, the category of `entity-expressions`. The category *e* seems quite mysterious if one looks only at the syntax, since it turns out that no words or phrases of English are assigned to that category. But it along with the category *t*, is used in defining the remaining categories, and in the language of intensional logic into which the English expressions are translated, there *are* expressions of category *e*, and they are interpreted as denoting in a straightforward way" (Partee, 1976: 55-56). Partee (1976) explains how Montague's paper analyzes quantificational phrases such as *every man*, *the unicorn*, *a woman*, as term phrases along with *John* and *Mary*. "The way Montague manages a uniform treatment of *every man* and *John* is to interpret both as denoting sets of properties of individual concepts. The individual concept of John is the function which picks out John at each possible world and time. The constant *j* in the intensional logic is of category *e* and simply denotes the individual *John* (assuming we have fixed on a particular interpretation of the constants of the intensional logic" (Partee, 1976: 59-60).

We feel that in the case of various syntactic manifestations of quantifiers, Proportionality and Totality are related issues, determined by context; such issues will be the focus of this thesis discussed in the form of `total` and `partial` QMods.

1.3 Primary area of study: Quantificational Modification in Modern Greek

This thesis is an attempt to describe specific phenomena of Quantificational Modification in Modern Greek by examining the syntactic behaviour of certain Greek elements that allow quantificational interpretation in specific contexts. We are concerned with the more controversial quantificational expressions in Modern Greek, as they appear mainly in adjectival position.

Our focus is on Modern Greek QMods manifested in the form of adjectives and their counterparts in English, French and Arabic. Modern Greek QMods maintain strong morpho-syntactic bonds with their Classical Greek ancestors as shown in their adjectival syntactic manifestations, morphological inflection and agreement with other components in their host NP and their polysemous nature. This explains why such quantifiers have been branded `adjectival` even though they induce quantificational interpretation. QMods are viewed as `total` and `partial` quantifiers analyzed in terms of relations between proportional sets of degree and amount. They resemble `normal` modifiers in terms of linear order, restriction and morphology; QMods resemble `gradable` adjectives in terms of scalarity that appears either morphologically, lexically or semantically. Their adjectival properties are also confirmed by their ability to grammaticalize into adverbs and prefixes of the same root to which we will refer as ***QMod-advs*** and ***QMod-prefixes*** (cf. 1.3, 2.3 and 2.4).

Our analysis of QMods is an attempt to show the possible common semantics between D- and A- quantifiers in this special class of `adjectives` that induce `quantificational` interpretation. This shows up in their composition that necessarily includes a restriction and a scope.

1.4 Outline of dissertation

Chapter 2 deals with ***Quantification*** within and across languages; it reviews recent literature on Quantification and discusses the semantic properties that classify quantifiers in terms of `entities` and `events` as GQs in the sense of Barwise and Cooper (1981) and Bach (1981, 1986). Chapter 2 also discusses the syntactic manifestations of GQs and their further classification into D- and A- quantifiers in the sense of Bach et al., (1995). A special section of this chapter is devoted to certain Arabic quantificational modification expressions that share morpho-syntactic properties with adjectives. Therefore, chapter 2 sets the scene for the investigation of another class of quantifiers which adopt a modification form to syntactically manifest themselves but maintain a uniform semantic interpretation as expressions of Totality and Proportionality.

Chapter 3 extends chapter 2 and our discussion about Quantification in natural language and its various manifestations; it focuses on Modern Greek and discusses the diachronic relations of Modern Greek quantifiers and their relation to their Classical Greek ancestors. It compares Arabic, English and French `total` and `partial` quantifiers to the same Modern Greek QMods. Modern Greek QMods are peculiar in their ability to appear in different syntactic positions as the very same lexical element; such a peculiarity is attributed to their polysemous nature.

Chapter 4 and 5 are extensions to chapter 3 as they discuss `total` and `partial` quantifiers as expressions of ***Totality*** and ***Proportionality***. Chapter 4 offers a brief discussion of possible cases of Quantificational Modifiers in the light of three English elements: *entire*, *total* and *partial*; it also offers a primary semantic analysis of QMods, while chapter 5 discusses the semantics of Quantificational Modification in more detail and in the light of Modern Greek related data. Our typological discussion in 2.4 and 3.4 of chapters 2 and 3 and our semantic analysis of QMods in general offered in chapters 4 and 5 set the scene for our discussion in chapter 6.

Chapter 6 discusses the broader issues in the thesis from a theoretical and typological perspective that establish Quantificational Modification as a purely semantic subclass of Quantification as universal as Quantification itself. A special section in chapter 6 compares and evaluates Standard Arabic and Modern Greek QMods in order to claim the universality of Quantificational Modification.

Finally, chapter 7 concludes our findings and presents possible ways of expanding our investigation to other related areas.

CHAPTER TWO

Quantification within and across languages

2.0 Introduction

Quantification in natural language can be thought of as a means by which generalisations can be expressed[5]. The nature and characteristics of quantification has been the subject of enduring fascination and research; philosophers, logicians and linguists have investigated the logical, ontological and semantic properties of quantificational phenomena and their syntactic expressions.

The focus on the formal processes and manifestations of quantification across languages from the perspectives of typology and language universals is a more recent enterprise, and the results of one of the main research programs in this area are published in the volume *Quantification in Natural Languages* (1995) by Bach, Jelinek, Kratzer and Partee (eds.) (henceforth Bach et al (1995)), which in many ways serves as the departure point for the work in this dissertation. Following Bach et al., we consider two main aspects of research on Quantification:

> "a very old one, [concerning] the systematic import of syntactic categories, a question [which requires] a combination of theoretical work and cross-linguistic study. The other area, only recently under active investigation, concerns the structure and interpretation of expressions of quantification, including not only quantification expressed by NP's with determiners like `every` and `no` but also what Lewis (1975) called `adverbs of quantification` (`always`, `in most cases`, `usually`, etc), `floated` quantifiers, and quantifiers expressed by verbal affixes and auxiliaries" (Bach et al., 1995: 4-5).

We are interested in particular in the question of what may be the 'similarities and differences, within and across languages, in the structure and interpretation of

[5] Quantifiers are seen as devices for generating statements, so that in a sentence like *All babies cry* the quantifier *all* expresses a generalisation about certain individuals that are babies and have the property of crying. This implies that all individuals who are babies cry, with no exception.

quantification' (ibid.) in the domains of morphology, syntax and semantics. The papers in Bach et al.(1995) provide a rich basis for this research, where studies of the morphological and syntactic manifestations of quantificational semantics in a variety of natural languages (English, Hindi, Mayali, Mohawk, Navajo, and others) allow for on the one hand, a better understanding of the complex nature of the different things which the term *Quantification* is used to cover and, on the other hand, of the ways in which *Quantification* may be expressed in the syntax and morphosyntax of different languages.

The rest of this chapter presents aspects of Quantification within and across natural languages. Section 2.2 presents Bach's et al. syntactically-based classification of quantificational elements *(D-quantification and A-quantification)* first introduced in 1987. Subsection 2.1.1 discusses the semantic interpretation of quantifiers and the ontological nature of the elements which they are taken to quantify over, while subsection 2.1.2 briefly introduces the theory of Generalized Quantifiers. Section 2.3 concentrates on the typological aspects of quantification, their morphosyntactic and categorial realisations and the range of their lexical meanings and interpretations. In section 2.4, through a more detailed description of related phenomena in Standard Arabic, I argue that certain elements in adjectival positions induce quantificational interpretation in specific contexts. This leads to a discussion of one of the main issues I will address in this dissertation: the status of elements that semantically are interpreted as quantifiers, even though their syntactic status is arguably that of adjectival modifiers.

2.1 Quantification in Natural Language

Quantification is inextricably linked to Semantics, and it is in semantic terms that we identify a word or expression as a quantifier – where the interpretation involves, in some sense or another, the 'quantity' of some entity. In this semantic sense quantifiers cannot be consistently identified with a single syntactic category. Instead, as demonstrated by much previous research (see for example, Bach et al. 1995), they may be realised in a wide range of morpho-syntactic positions more typically associated with elements assigned to other syntactic categories – not only determiners, but also adverbs, adjectives, nouns, auxiliaries, modal verbs, affixes and possibly others not yet identified. Although some lexical elements such as ***every*** and ***always*** always seem to induce quantificational interpretations, there are many other cases, such as the English form ***one*** which as a pronominal N might be associated with a referential interpretation in sentences like *I like* [*the red* ***one***], but as a Determiner can receive a quantificational interpretation like [***One*** *man*] *came in.* In the latter case it is arguable that the quantificational interpretation, possibly associated with the syntactic environment in which one appears, leads us to consider ***one*** as a quantifier.

In the following two subsections we explore two aspects of quantificational semantics: (1) the nature of the elements that natural language quantifiers may quantify over, i.e. the ontological commitments that natural language semantics requires (cf. 2.1.1) and (2), the formal characterisation of natural language quantifiers under the *Theory of Generalised Quantifiers* (cf. 2.1.2).

2.1.1 The ontology of quantified elements

When we talk about *Ontology* we refer to the nature of things. The term derives from the Classical Greek word οντολογία [*ontologia*] which in its turn derives from όν [*on*] `being, creature'. Ontology, the study of the various aspects of 'existents', in this broadest sense has been linked to Quantification from its earliest days.

In *Metaphysics,* Aristotle examines the nature of *ousia* `matter, substance`, and its possible forms and manifestations. The Aristotelian o*usia* might be variously regarded as the 'essence,' 'form,' or 'matter' (in the sense of material substance) of the entity question, possibly describable in terms of the characteristics which distinguish it from other 'things'.[6] Aristotelian *atoma*, on the other hand, are distinct from other things on the basis of their indivisibility.[7] In defining natural language metaphysics for model-theoretic semantics (e.g., Bach (1986a, b)) one fundamental question to consider is whether a single universal ontology underlies the process of semantic interpretation in natural languages. In other words, do all languages use the same sorts of 'basic' entities when computing meaning? In this thesis I wish to explore the extent to which this may be the case in quantificational semantics.

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[6] For this reason, when Bach (1986a) talks about the `stuff` of apple or apple as a mass-term, he refers to what actually constitutes what we know as being `apple`. Thus, when we talk about an apple-pie we mean a pie made of apple where apple is a mass entity referring to the stuff, or the *ousia*, that relates to apple as the main ingredient in the pie. And *apple* is *apple* because our world has taught us to view it as such, that is a round, reddish, yellowish or even greenish fruit, of a particular shape, size and taste attributed only to apples, which comes only from what, is known as an apple tree. And it is the *ousia* – to use Aristotle's term- of apple that makes it an apple and make us differentiate between an apple and an orange, so that, we automatically realize why an orange is not an apple.

[7] Cohen, S. Marc, "Aristotle's Metaphysics", *The Stanford Encyclopedia of Philosophy* (Fall 2008 Edition), Edward N. Zalta (ed.), forthcoming
URL = <http://plato.stanford.edu/archives/fall2008/entries/aristotle-metaphysics/>.

What sorts of entities should be included in the domains of models for natural language interpretation? Aristotle's *atoma*, the indivisible primitives, may be thought of as the basic elements in the domain. In a typical 'basic' model these would be *individual entities*, the referents for nominal expressions such as proper names (such as the person named ***John*** or the English city known as ***London***). Aristotle's multifaceted notion of o*usia* - essence, form and material substance – finds its modern counterparts in the different sortal domains which classify the different sorts of entities in the model. In the nominal domain, the 'essence' interpretation of o*usia* may be related to *generics* and *natural kinds*, e.g., HORSES as in *Horses are widespread.* The counterparts to the notion of 'form' may be found in the entities sorted as *count* (e.g., TABLES) and *mass* (e.g., FURNITURE). 'Material substances' (e.g., WOOD) are often expressed as mass terms.

Davidson (1967, 1980) and Bach (1986a) were the first to argue that events should be included alongside individuals as entities in the semantic domain. The Aristotelian concepts of *energeia* `action`, `actuality` or `activity` and *kinesis* `motion` or `change` may be considered from this perspective, where *energia* is `actualized` as soon as an action begins, while *Kinesis* `change` has *arche* `beginning` and *telos* `end,` where *telos* is the outcome of *energeia* `action`. Similar notions are currently used in classifying different 'sorts' of events/eventualities - as states, activities and telic or atelic processes.

Quantification in natural language expresses generalisations over entities in the semantic domain. Although there is no generally accepted proposal on what would constitute a complete ontology for natural language metaphysics, it is arguable that it

would have to be sufficiently rich to express quantificational interpretations, and thus would have to include in its domain at least the distinct sorts of entities discussed above: kinds, count and mass entities, and events. The sortal distinctions outlined above are often reflected across its quantificational mechanisms and expressions in natural language. For example, quantification over individuals typically involves quantificational determiners such as *every*, *some*, *many* or *few*, while forms such as *much* or *little* can only quantify over mass terms.

Events can be similarly defined. Lewis (1975) argued that certain adverbs should be seen as quantifiers over `times` or 'cases,' since they relate to events that occur at certain `times`[8] or as quantifiers over `events` or `cases`[9]. Bach (1986b) argued that `events` and `things` should both be treated as ontological entities in the domain, on the basis that quantification/measuring applies to both domains. Thus, we may refer to the number of things or to `all things` in the same way we may refer to the number of events or to `all events` as in questions like *how many things are there in the room* and *how many events took place in the last hour.* Quantification over `events/eventualities` in the sense of Davidson (1967) and Bach (1986a) is typically expressed in the verbal domain via adverbial operators such as *always, usually,* and *occasionally*. Bach (1986a) considers "events to be analogous to the singular and

[8] An adverb like *always* would be a modifier that combines with a sentence Φ to make a sentence *Always* Φ that is true iff the modified sentence Φ is true at all times. *Sometimes* Φ, *Never* Φ, *Usually* Φ, *Often* Φ, and *Seldom* Φ are analyzed similarly and are found true iff Φ is true *at some times, none, most, many,* or *few* (cf. Lewis, 1975).
In his second attempt to define semantically adverbs of quantification Lewis (1975) analyzes them as quantifiers over `events` as he realizes that often such adverbs refer to abstract entities that can not be identified in time.

[9] A `case` corresponds to "each moment or stretch of time, or to each in some restricted class. But sometimes we have a case for each event of some sort; or for each continuing relationship between a man and his donkey [as in his example (10) *A man who owns a donkey always beats it now and then*] or for each quadratic equation [as in examples (11) *A quadratic equation never has more than two solutions* and (12) *A quadratic equation usually has two different solutions*]. In other words, Lewis considers `cases` to be the admissible assignments of values to variables such as the relationship between the man and his donkey or for each quadratic equation.

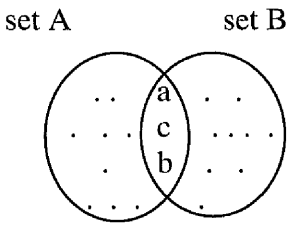
plural individuals, while bounded processes are analogous to the parting of matter that make up the "material extensions of those individuals" (Bach (1986a) reprinted in Portner and Partee, 2002: 327); "tenseless clauses of English are to be interpreted as denoting sets of eventualities" (ibid). In his `partitive puzzle` Bach (1986a) makes the parallelism between the verbal aspect and the nominal domain; "in both domains there are clear and ordinary examples of count items that don't follow these restrictions. These are words like *thing*, *event*, *happen*, and so on. Suppose it is true that something happened, then in the normal case there are smaller subevents that make up the big thing that happened that are also happenings. Similarly for things." (Bach (1986a) in Portner and Partee, 2002: 332). And for this reason questions like `How many things are there in the room` and `How many events took place in the last hour` are similar. Then, a sentence like *John always visits his mother on Sundays* analyzed in the sense of Bach (1981, 1986a) would imply that *always* operates over a set of events that include all the Sundays which refer to the times John visits his mother; in a similar way *all the students came to the party* would imply that *all* operates over the set of individuals (i.e., *the students*) who came to the party. This is in accordance with Bach's (1986a) view that events can also be counted in a way mass-terms can be counted; then, events can be analyzed similarly to entities as sets of sets. Then, other quantifiers like *many* in *many students came to the party* quantify over the number of students and quantifiers like *often* in *John often visits his mother* quantify over the number of times John visits his mother; therefore, it is evident that GQs quantifying over `things` or `events` share similar semantics and the way an entity expresses a property of entities is similar to the way a VP expresses properties of eventualities.

2.1.2 Generalized Quantifiers (GQ)

Our discussion of Generalized Quantifiers (GQ) starts with the work of Barwise and Cooper (1981) who develop Montague's (1973)[10] theory of Generalized Quantifiers where NPs such as *every student* are taken to denote a set of properties, in this case, the set of all the properties which contain the set of students as a subset. Thus in this view, "quantifiers correspond to Noun Phrases, not to Determiners" (Barwise and Cooper, 1981:162) and in a sentence like *most people came to the party*, "it is the NP `*most people*` that is the quantifier" (Barwise and Cooper, 1981:162) and not just the determiner *most*. Quantifiers then "denote families of sets" (Barwise and Cooper, 1981: 163) and "are used to assert that a set has some property" (ibid); "a quantifier may be seen as dividing up or partitioning the family of sets provided by the model. When combined with some sets it will produce the value `true` and when combined with others it will produce the value `false`. In order to capture the idea this formally, quantifiers are taken to denote the family of sets for which they yield the value `true`." (Barwise and Cooper, 1981: 164). For instance, in a sentence like *few students came to the party*, the GQ *few students* can be analyzed as the set which contains all the sets which contain few students as its members, and *few students came to the party* will be true just in case the intersection of the set of students (A) and the set of those who came to the party (B) contains few members as in the diagram below:

[10] Montague (1973) interprets the NP as denoting Generalized Quantifiers, (i.e. sets of sets) and uses logic in order to describe natural language. He defines categories for the lexicon which combine with rules to yield more complex categories; such combinations result to the formation of sentences. He treats noun phrases like *every man*, *unicorn*, *a woman*, etc. as term phrases like *John* and *Mary*. "The way Montague manages a uniform treatment of *every man* and *John* is to interpret both as denoting sets of properties of individual concepts. The individual concept of John is the function which picks out John at each possible world and time." (Partee, 1976: 59).

(1)



Quantifiers denote sets of sets in a given domain E of discourse. ***Conservativity*** is that semantic property of quantifiers that defines the smaller set of sets and appears in Barwise and Cooper's (1981) equivalences given below in (2):

(2) Many men run ↔ Many men are men who run
Few women sneeze ↔ Few women are women who sneeze
John loves Mary ↔ John is John and loves Mary

Barwise and Cooper (1981) propose that all natural language quantifiers are conservative. Quantifiers like those given in (2) "live on the set men, women and the singleton set containing John, respectively" (Barwise and Cooper, 1981: 179). The following (3a, 4a, 5a and 6a) are examples of English sentences whose predicate logic formula is given in (3b, 4b, 5b and 6b), while (3c, 4c, 5c and 6c) provides their Generalised Quantifier interpretation:

(3) a. *All students came*
b. $\forall x$ [student (x) $\rightarrow$ came (x)]
c. $[\![\text{All}(A,B)]\!] = 1$ iff $A \subseteq B$ A: the set of students
B: the set of those who came

(4) a. *Some students came*
b. $\exists x$ [students (x) $\wedge$ came (x)]
c. $[\![\text{Some}(A,B)]\!] = 1$ iff $A \cap B \neq \varnothing$

(5) a. *Few students came*
b. $\exists x$ [students (x) $\wedge$ came (x) $\wedge$ |students(x) $\cap$ came(x)| $\leq$ m]
c. $[\![\text{Few}(A,B)]\!] = 1$ iff $|A \cap B| \leq m/n\ |A|$ (a proportional reading)

(6) a. *Many students came*

b. $\exists x$ [students (x) $\wedge$ came (x) $\wedge$ |students(x) $\cap$ came(x)| $\geq$ m

c. [[Many (A,B)]] = 1 iff $|A \cap B| \geq m/n\ |A|$ (a proportional reading)[11]

GQs may denote Totality, often expressed in terms of ***Exhaustivity*** (cf. Kadmon and Landman (1993)), in the case of collective universal *all*, distributive universals *every* and *each* or polarity item *any* in specific syntactic environments. Exhaustivity is expressed in examples like ***all*** *the men*, ***each and every*** *man*, ***every single*** *boy* and *I don't have* ***any*** *money*, in a way that excludes any exceptions in the described situation. GQs may also denote ***Proportionality,*** often expressed in `partitive` constructions common to existential quantifiers *some*, *many*, (*a*) *few*, and the like. This can be found in constructions like ***some*** *men* and ***some of the*** *men*, ***many*** *places* and ***many of the*** *places*, etc., where the partitive preposition *of* is associated with the proportional reading of the NP.

Quantifiers may also be described in terms of their ***Monotonicity*** (Barwise and Cooper, 1981: 187)[12]. Quantificational expressions are divided according to their model semantics into ***monotone increasing*** (e.g. *a man, some man, some men, somebody, the man/men, these/those men, most men, many men, several men, either man, at least two men*), ***monotone decreasing*** (e.g. *no man/men, few men, neither man, nobody, none, nothing, at most two men*) and ***not monotone*** (e.g. *exactly two men, exactly half the men*)[13]. Barwise and Cooper (1981) define a quantifier Q as

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[11] *Many* and *few* can take either a proportional (as in *There are many male students in this class*, in which many depends on the number of students) or a cardinal (as in *Many students in this class are male*, in which many refers to the proportion of students in this class who are male) reading.

[12] We only refer to these examples of quantifiers since these are the cases we will investigate in this thesis in connection to our claim. As we will see in the coming chapter 4, QMods can often occupy a D- position and analyze as monotonic GQs. In their normal adj-position they are not monotonic but proportional.

[13] A quantifier like *a few* is not monotone when it means `some but not many`.

"monotone increasing (mon ↑) if X∈Q and X ⊆ Y ⊆ E implies Y∈Q (i.e. for any set X∈Q, Q also contains all the supersets of X.)" (Barwise and Cooper, 1981: 184). Similarly, a quantifier Q is monotone decreasing (mon ↓) "if X∈Q and X ⊆ Y ⊆ E implies Y∈Q (i.e. for any set X∈Q, Q also contains all the subsets of X.)" (Barwise and Cooper, 1981: 185). Barwise and Cooper (1981) further explain that a quantifier can be tested for monotonicity if we consider two verb phrases: VP_1 and VP_2 "such that the denotation of VP_1 is a subset of the denotation of VP_2 and then check whether either of the following seem logically valid:

If NP VP_1, *then* NP VP_2. (NP is mon ↑)

If NP VP_2, *then* NP VP_1. (NP is mon↓)" (Barwise and Cooper, 1981: 185).

Another further classification of Quantifiers is into ***positive strong*** (e.g. English *the 1, the 2, both, all, every, each, most*), ***negative strong*** (e.g. English *neither*) and ***weak*** (e.g. English *a, some, one, two, three, many, a few, few,* and *no*) - terms borrowed from Milsark (1977) who defines ***weak*** determiners as those which create noun-phrases which sound good after *there is* or *there are*. Usually positive strong determiners are monotone increasing while negative strong determiners are monotone decreasing. Weak determiners are sensitive to Milsark's (1977) `there-is` test and appear as in example *many men love Mary* that paraphrases as `there is many men who love Mary`. Strong determiners like *all* are not usually sensitive to such a test; for instance, *all men love Mary* can not be paraphrased as `there is all men who love Mary`.

2.2 Quantificational expression in natural languages

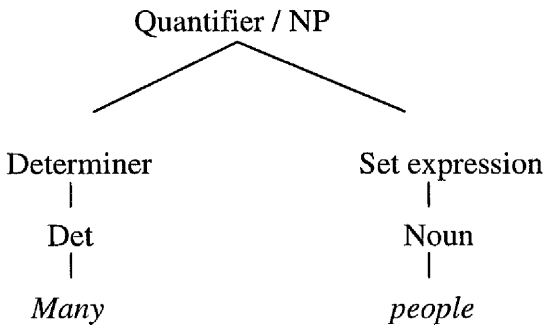
In 2.1 we discussed how ontological primitive elements: `things` and `events` appear in quantificational constructions in the nominal and verbal domain and adopt a unified semantic analysis as GQs.

GQs are manifested in natural languages with various syntactic devices. Partee, Bach and Kratzer's (1987) unpublished NSF proposal offers a discussion on `Cross-Linguistic Quantification` that led to the formation of Bach et al., (1995) and the classification of quantificational expressions into two main categories: the D- and A-quantifiers, where `D` refers to Determiner and `A` refers to Adverbs, Auxiliaries, Affixes, and Argument-structure Adjusters. Such a classification is based on the syntactic manifestations of quantifiers independent of their analysis as GQs, discussed already in 2.1.2. D- and A- quantification is the focus of the next two subsections 2.2.1 and 2.2.2. When quantifiers appear in a Determiner position they are referred to as D-quantifiers which at the syntactic level combine with a nominal expression to create a *quantifier* in the GQ sense, quantifying over count or mass entities. A-quantifiers appear in the form of Adverbials, Auxiliaries, Affixes and Argument-structure Adjusters and quantify over `events`.

2.2.1 D-quantification

In 2.1.2 we discussed how an NP such as *many people* is treated as a quantificational NP in the sense of Barwise and Cooper (1981), with the following syntactic structure:

(7)



In the Barwise and Cooper (1981) framework natural language quantifiers follow two fundamental universals: the ***NP-Quantifier Universal*** which states that "every natural language has syntactic constituents (called noun-phrases) whose semantic function is to express generalized quantifiers over the domain of discourse" (Barwise and Cooper, 1981:177) and the ***Determiner Universal*** which indicates that "every natural language contains basic expressions, (called determiners) whose semantic function is to assign to common count noun denotations (i.e. sets) A a quantifier that lives on A" (Barwise and Cooper, 1981: 179).

A typical language with examples of determiner-quantifiers is English. The term **D-quantifier** refers to those elements associated with the syntactic category of determiners, such as English *every*. For most linguists, *every* is "the prototypical, garden-variety quantifier" (Gil, 1995: 321), while to philosophers *all* as the default example of a quantifier[14]. Both English *all* and *every*, belong to the category of

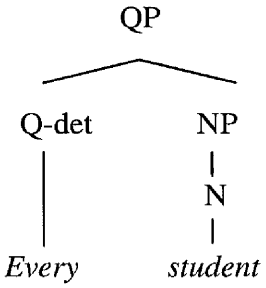
[14] Regarding our choice in the terminology we use to refer to such semantic elements Peters and Westerstahl (2006) clarify that there is no obvious difference between the terms ***quantifier*** and ***generalized quantifier***. They note, "Logicians call these objects `generalized` quantifiers, since they were originally generalizations of the universal and the existential quantifiers from first-order logic. But once the naturalness and the ubiquity of the concept is appreciated, it becomes natural to drop the qualification, and just call them *quantifiers*" (Peters and Westerstahl, 2006: 53).[14]
Barwise and Cooper (1981) believe that "noun phrases act, semantically, like the logician's generalized quantifiers" (Barwise and Cooper, 1981: 166); they emphasized that it is the NP which corresponds to the Generalized Quantifier and not the Determiner, which is a function that maps common noun denotations onto Generalized Quantifiers. The Generalized Quantifier takes a VP as its argument to build a proposition.

determiners. Others are *some, most, many, each, no*, etc. Throughout the history of studying Quantification, *all* has been seen as a default example of universal quantifiers and *some* as the default example of existential quantifiers.

Expressions formed by D- quantifiers and their associated nominal restrictions in both subject and object positions are equivalent to representations of Determiner Phrases (DPs) (sometimes also referred to here as NPs or QPs). "A quantificational expression in an argument position will be assumed to be headed by its quantificational determiner of category D. The whole expression will therefore be a Determiner Phrase (DP), whose complement is the NP with which it is in construction." (Higginbotham, 1995: 405). Quantificational expression in an argument position could be syntactically analyzed as [DP [D X] [NP Y]] (cf. Higginbotham (1995: 405, ex. 58)). Other English quantifiers can receive a similar analysis that is, as heads of DPs. Thus, *every* in `*every book*` can be analyzed as [DP [D every] [NP (book)]], *much* in `*much gold*` as [DP [D much] [NP (gold)]], *some* in `*some men*` as [DP[D some] [NP(men)]], *most* in `*most students*` as [DP [D most] [NP (students)]], and so forth. This has already been discussed in 2.1.2 in Barwise and Cooper's (1981) theory of Generalized Quantifiers.

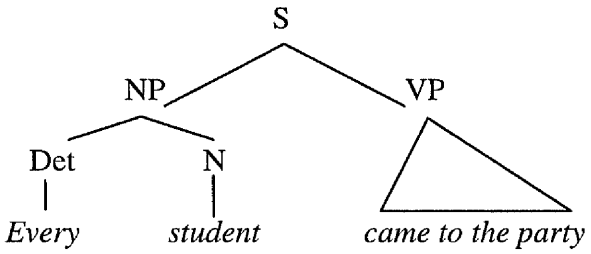
Semantically, a determiner is the head of a Quantifier Phrase (QP) as shown in (8):

(8)



Thus, a sentence like *every student came to the party* receives the following syntactic construction as in (9):

(9)



"Syntactically the roles of determiner, domain predicate, and predicate quantified can be distributed in many different ways. In case of nominal quantifiers of the form determiner (in a syntactic sense) plus noun, the determiner functions as a determiner in the semantic sense, the noun serves as the domain predicate, and the rest of the sentence – as long as it does not contain any higher operators – serves as the predicate quantified" (Loebner, 1986: 57). Examples of GQs in the form of NPs with a determiner operator are *two girls*, *most men*, *all men*, *much gold*. This description of syntactic construction of quantifiers reflects their semantic composition which appears in syntax as the combination of the quantifier in the form of a determiner or an adverb, its restriction and its scope.

2.2.2 A-quantification

A-quantification involves quantification over `events`. It is restricted to other non-determiner kinds of Quantification, and occurs in all natural languages, in one form or the other, with adverbs as the most common form of A-quantifiers, others be Auxiliaries, Affixes and Argument-structure Adjusters. A-quantification is not as homogeneous as D-quantification but common in all natural languages since it is manifested across natural languages not only in the form of adverbials such as English

always, usually, never, seldom, etc., but also in the form of invariant paticles, coverbs, preverbs, enclitics to the verb, or verbal prefixes (cf. Bach et al., (1995)).

An A(dverbial)-quantifier is a syntactic operator which can occur in different positions: "in the VP of the main clause, in sentence-initial position, or in the VP of the subordinate clause" (de Swart, 1993: 208), while A(ffix)-quantifiers are word-internal operators; they quantify over their stem and function at the morphological level[15]. "Syntactically, an A-quantifier forms a constituent from some projection of V [...], whereas a D-quantifier is, or forms a constituent with, a projection of N" (Bittner, 1995: 59). While D-quantifiers find their first and second argument internally in the NP, often adverbial A-quantifiers find their first argument in the verb, and the second one in the whole VP. The verb, "modified by an adverbial, specifying a quality of the event or the way in which the action is performed" (de Swart, 1993: 172); regarding the second argument, i.e. the VP, de Swart explains that a relation can be established "between the denotation of the verb and a subset of it, given by the modified VP. We may quantify over the relation denoted by the verb and vary over its arguments, or the other way round, etc." (de Swart, 1993: 174). Hence, in an example like *John always visits his mother*, *always* would be the quantifier, its restriction would be the verb *visits* and it will take scope over the event *e* of *John* visiting his mother, or over the times John visits his mother. And the event of the individual *John* visiting his mother when quantified by an adverbial like *always* would include all those subevents of the individual times that John visited his mother which accumulate into the main event of John **always** visiting his mother.

[15] We make a brief reference to A-quantifiers in the form of Adverbial and Affixes, since other forms of A-quantifiers such as Auxiliaries and Argument-structure Adjusters do not relate to the issues discussed in the thesis.

A-quantifiers do not include only A(dverbial)-quantifiers. Bach et al., (1995) offer a wide list of A-quantifiers that includes Affixes, Auxiliaries and Argument-structure adjusters. A-quantifiers in the form of Affixes function at the morphological level. Such a form of A-quantification exposes a more complex form of semantic information carried by morpho-syntactic elements at the level of NP or VP (cf. Bach et al., 1995). A(ffix)-quantifiers are often seen as the morphological alternatives to A(dverbial)-quantifiers as they often appear as nominal or verbal affixes that perform in the nominal or verbal domain respectively.

Some natural languages rich in A(ffix)-quantification are Mayali, Asurini Do Trocara and several Slavic languages. Mayali possesses certain verbal affixes that function as A-quantifiers. It has been argued by Evans (1995) that Mayali verbal affixes with quantificational interpretation take scope over the subject or subset of subjects; examples of such affixes are "*djarrk-* `all, altogether` which universally quantifies over semantic agents" (Evans, 1995: 217), "*bebbeh-*, a marker of distributive share, whose commonest reading is to distribute over all members of the agent set..." (ibid), and "*wernh-* and *who-* [which are concerned with the effectiveness and] in some cases the best translation is with an adverb like `properly` or `half-heartedly`, but in other cases the scope is over a NP" (ibid). Mayali A-quantifiers like *mirnde-*, *djangged-*, and *gaberrk-* mean `many`, and provide spatial information about their referents, taking absolutive scope over the subjects of intransitive verbs, and the objects of transitives. Evans believes that often many of Mayali A-quantifiers also have a corresponding D-quantifier.

Vieria (1995) mentions Asurini Do Trocará and certain cases of affixes that convey quantificational meanings; such are the nominal collective suffix *–toa*, which gives the equivalent of `all` and "whose use is narrowly restricted to kinship terms and to words referring to humans, such as `girl`, `boy`, etc." (Vieira, 1995: 715). Other examples she mentions are "the augmentative suffix *–oho* (`big`)" (ibid) which conveys the idea of `many/much` and can be suffixed to nouns and verbs; when attached to a noun it has scope over the noun; when attached to a verb it takes scope over the verb itself or over any argument of the verb. The following are a collection of examples of A(ffix)-quantifiers from Mayali, Asurini Do Trocará, Czech and Russian:

(10) Mayali (Evans, 1995: 218, ex. 43)

a. *Garri -**djarrk** -dulubom duruk*
we.plu-**together**-shootPP dog
`We all shot the dog(s)`

(Evans, 1995: 221, ex. 53)

b. *Gunj barri-**bebbe**-yame-ng*
kangaroo **3aP-DISTR**-spear-PP
`They each killed a kangaroo`

(11) Asurini Do Trocara (Vieira, 1995: 715, ex. 52, 53, 54, 55)

a. *kosoe-**toa** o-seʔenan*
woman-colective 3ag.-sing
`All the women sang`

b. *h-eys-**oho**-a sekwehe h-aro pane*
3poss.-family-many-nom 3pt.-wait-dep. in vain
`Many (of) his relatives, they waited (for) him, in vain`

c. *o-pam-tar-**oho** rimo ipira ore-rewiri*
3pt.-finish-fut-many modal fish lexcl-behind
`Many fishes will die behind us`

d. *Soowia o-saaʔa-**oho***
Soowia 3ag.-cry-much
`Soowia cried much`

(12) Czech (Filip, 2005b: 129, ex. 5b)

*Na.dělal*P *chyby*
ACM.do.PAST mistake.PL.ACC
`He made a lot of mistakes`

(13) Russian (Filip, 2005a: 244, ex. 16a)

Na daču *po-NA-exalo*P *p'janyx*
on weekend-cottage DIST-CM-go.PAST.3SG.NEUT drunk.PL.GEN
gostej
guest.PL.GEN
`There were many/ a lot of drunk guests who gradually arrived at the dacha`.

Our example of prefix quantifier in Czech mentioned by Filip (2005b) shows the accumulative *na-* in Slavic languages is "compatible with any expression of quantity or measure that `matches` its meaning of a relatively large measure or quantity: e.g., in Czech, weak adverbial quantifiers like *mnoho* `a lot of`, *hodne* `a lot of`, nominal quantifiers like *hromada* (fem. Sg. Nom) `a pile of, a heap of`" (Filip, 2005: 138); "*na-* [is also] being treated as an intersective modifier of nominal meanings (that is, a predicate of the intersection of sets). In this respect, the accumulative *na-*, and other verb-internal operators with uses that fall under lexical A-quantification in Slavic languages, behaves like weak indefinite quantifiers, such as *a lot (of)*, *some*, *several*, *five*, *many* (in its cardinal reading)" (Filip, 2005b: 139). Filip (2005a) describes the Russian variation of *na-* as a cumulative prefix while the distributive prefix *po-* "distributes the property expressed by the verb root (i.e., the property of going or arriving) to separate (subgroups of) individuals and to separate running times" (Filip, 2005a: 244, footnote 15).

Filip (2005a) also discusses a possible tripartite structure of Slavic verbal prefixes and notes that these prefixes are "operators that require a restrictor clause in the DRT-type tripartite structure, which is `filled in` by information from the context, and include

tense, modality, genericity and crucially perfective and imperative operators, which correspond to the categories of the grammatical aspect" (Filip, 2005a: 270). What we are concerned with is not Filip's compositional analysis of Slavic verbal prefixes but the fact that such A-quantifiers also have a tripartite structure which allows them to be analyzed as quantifiactional operators similar to D-quantifiers and A(dverbial)-quantifiers. After all, it is such tripartite structures of quantificational sentences that allow us to represent them in a compositional way and make the relation between syntax and semantics more apparent. The focus of the following section 1.3 will be on alternatives ways of expressing Quantification, their interpretation and categorial patterns common in a variety of natural languages.

2.3 Quantificational expression from a cross-linguistic perspective

According to Cushing (1981) even though quantifiers are a semantic category, they still occupy a syntactic category which differs from language to language; for this reason there is the possibility of having quantifiers in the position of articles (e.g. English *all*, *every*, *some*, *many* and *no*, or Swedish *varju* `every`, *(de) flesta* `most` and *ingen* `no`), of pronouns (e.g. English *somebody, anybody, someone* and *anyone*, Portuguese *algun* `someone` (cf. Haspelmath (1997)), and M. Greek *kapios-a-o* `someone` (cf. Holton, Mackridge and Philippaki-Warburton (1997)), in adverbial position (e.g. English *always*, *often* and *usually* or French *toujours* and *souvent* (cf. de Swart (1993)) but also in morphological constructions in the form of affixes (e.g. Mayali *djarrk-* `all acting together (at the same place and time`), Eskimo *–tigut* `-most` or Asurini Do Trocara *–toa* `-all`) (cf. Bach et al., (1995)). The possibility of classifying quantifiers into D- and A-quantifiers has already been discussed. Such a classification reflects the syntactic structure of quantifiers. However, quantificational

expressions could also be classified in terms of their semantics. Research has shown that quantifiers appear in a variety of syntactic positions as discussed in 2.2, which receive a unified semantic analysis and interpretation. The various syntactic manifestations of quantifiers ranging from determiners, adverbs and affixes to temporal prepositions (cf. Pratt and Francez (2001))[16] and their similar quantificational interpretation in various natural languages give evidence to the universality of Quantification and the syntactic devices used for the expression of such a semantic notion. This is the focus of the next subsections.

2.3.1 Morpho-syntactic alternatives and cross categorial patterns

English is one of the natural languages that manifest Quantification in the form of all three categories, i.e. determiners, adverbs and affixes. Primarily English is viewed as a natural language rich in D-quantifiers; however, A-quantifiers in the form of adverbials also occur in English (e.g. *always*, *usually*, *often*, etc.). During our investigation we also came across cases of English elements that could relate semantically to quantifiers but appear in adjectival position; such elements grammaticalize into adverbs, affixes and compound formations of the same interpretation. It is understood that such grammaticalized extensions are common to most adjectival modifiers. It appears that their grammaticalizations[17] are the result of the initial appearance of such elements in adjectival position.

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[16] Pratt and Francez (2001) discuss the function of temporal prepositions as temporal generalized quantifiers (tGQs) and explain how English temporal prepositions like *during* can "restrict domains of quantification arising elsewhere in a sentence" (Pratt and Francez, 2001: 187 (abstract)). Their discussion includes examples like *Mary kissed John* ***during*** *every meeting*.

[17] Grammaticalization is the process words undergo that gives rise to new grammatical categories (cf. Kiparsky (2008)).

English *all* occurs with full NPs as in *all the men, all my books, all that work* "as well as with common noun phrases, and also with expressions of a variety of other categories as in *all wet, all gone, all up, all over the country, all along the road, all clear, all night,* etc." (Partee, 1995: 583). Such a variety of positions could be "suggesting that *all* is not so much acting as a determiner as it is adding an `exhaustiveness` meaning to what is otherwise still the meaning of a bare plural" (ibid). Besides the positions of `all` there are other possibilities, such as the appearance of *all* in a partitive like *John talks to* ***all of us*** referring to a group as a `whole`. *All* also occurs as an adverbial in *I've seen it* ***all*** meaning `everything` and in *my car is* ***all*** *damaged* meaning *entirely* or *completely damaged.*

During this investigation into additional mechanisms of Quantification and their interpretation we came across compound formations with *all* as in *all-around, all-clear, all-inclusive, all-important, all-powerful* and *know-all* and words like ***alright*** and ***always***. Could this be the combination of *all* and the word *right* or *ways* combined to mean `everything is right` or `all the time` respectively? And how would we interpret such occurrences of *all*? Is *all* in such occurrences quantificational? And if it isn't, then what is the function of *all* in *alright* and *always*?

It is common knowledge that *all* relates semantically to *whole* and *whole* in its turn relates to `pure`, `full`, `total` and `complete` (cf. Haspelmath (1995)). *Whole* also appears in an affix constructions as in ***wholefoods*** meaning `pure` or *a* ***wholehearted*** *support* referring to a support that involves one's *whole heart* or *total devotion*, or in compounds like ***whole-life*** *insurance* and ***whole-tone*** *scale* referring to a life insurance policy and a musical scale consisting entirely of intervals of a tone,

respectively. It also appears as adverbial *wholly* meaning `completely`, `entirely`, `fully` or `totally` as in the following examples borrowed from the Oxford Advanced Learner's Dictionary (2003: 1478): *a* ***wholly*** *inappropriate behaviour*; *the government is not* ***wholly*** *to blame for the recession*; *the company is a* ***wholly****-owned subsidiary of a large multinational.* Such relations in meaning take us back to Haspelmath (1995) and his discussion of how `all` relates to `whole`, `total`, `complete`, `full` and `entire`. Our modest observation is that while *all* is treated mainly as a Determiner-quantifier, *whole*, *total*, *entire* and their like are adjectival in syntax and morphology but might semantically relate to `all` as expressions of Totality. Is it possible that quantifier *all* relates semantically to an adjective like *whole*, *entire* or *total*? *Whole* appears only in adjectival constructions contrary to *all* which appears in various positions except the adjectival. However, both *all* and *whole* appear in a prefix position (e.g. ***al****right* and ***whole****hearted*) or in compound formations (e.g. *know-****all***, ***all****-inclusive*, ***whole****-life* insurance), which is normally a grammaticalized position attributed to adjectives.

And what about noun phrases like *all the city* and *all the apple*? Do such examples relate by any means to noun phrases like *the whole/entire city* and *the whole/entire apple*. After all, constructions like *the* ***whole*** *city* or *the* ***whole*** *apple* refer to the entity as a mass term in a similar way *all* in ***all*** *the city* and ***all*** *the apple* refer to the singular mass entity of *city* or *apple*. And what about sentences like *this sweater is all wool* [18] where *all* refers to the sweater as a mass or `a unity` made entirely out of wool?

[18] Such an example was brought to my attention by my second supervisor Prof. Emmon Bach.

English *many* is similar to *whole* in the sense that they both refer to quantities and *many* even though a renowned D-quantifier it also has an adjectival side (cf. Hogg (1977)) made obvious in constructions like *the many* + N (e.g. ***the many*** *faces of a woman*; ***the many reasons*** *you gave me are not enough*; ***the many difficulties*** *we are faced with*). The same occurrences are detected in the case of *few* in adjectival constructions like *the few* + N, also discussed in Hogg (1977). Therefore, we can have *many* in positions like ***many*** *people*, ***many*** *of your suggestions* and ***many-sided*** or ***many-faced***[19]. Paraphrases of ***many****-sided* and ***many****-faced* can give evidence to the possibility of having quantifiers in a position common to adjectives; therefore, *many-sided* can be paraphrased as *the many sides* of an entity and *many-faced* as *the many faces* in an individual's personality. What we are targeting with such examples is to show that quantifiers in English do not always appear as our well-known D-quantifiers but also engage in positions not yet fully explored such as the adjectival. Such constructions could imply the adjectival side of quantifiers like English *many* which might compliment the main claim of this thesis. If the concept of `whole` and `total` relate to the meaning of quantifier *all* (cf. Haspelmath (1995)), then can we assume that adjectives like *whole* and *total* relate to quantifier *all*? Such a speculation could be extended to the assumption that on a similar ground adjectives like *partial* and certain interpretations of adjectives *little* and *great*, could semantically relate to quantifiers *some*, *few* and *many* respectively, since they all make reference to proportional amounts and since *partial*, *little* and *great* relate to adjectives like *whole* and *total* in terms of semantics and syntax.

[19] And what about meanings like *polygon* (lit., an object of many corners), *polygamy* (lit. the act of marrying many) and *polytheist* (lit., the worship of many Gods) where the meaning of `many` is expressed by borrowing its Greek counterpart *poly-*. Another interesting combination we came across is English *polyhedric* which corresponds to ***many****-faceted* in `plain` English.

What encourages such speculation is our initial understanding of the interpretations of sentences like ***all*** *the city was destroyed* meaning that *the* ***entire*** *city* or *the* ***whole*** *city was destroyed* which would imply *the* ***total*** *destruction inflicted on the city*; this last phrase refers to the **degree** of destruction rather than the amount of the destroyed mass *city*. Similarly, a sentence like *some part of the city was destroyed* would imply *the* ***partial*** *destruction of the city*; *a small part of the city was destroyed* would imply ***an insignificant*** or ***a `little`*** *destruction*, while *a large part of the city was destroyed* would imply *a* ***great*** or *a* ***considerable*** *destruction of the city*. The same adjectives could paraphrase into adverbials like *the city was* ***totally/ partially*** *destroyed*; *the city was destroyed* ***a little***; *the city was destroyed* ***a great deal***.

We have already given examples of how English quantifier *many* appears in adjectival position in our paraphrases of *many-sided* as *the many sides* of an entity. Hogg (1977) discusses the adjectival side of English *many* and *few* which appear in the same adjectival position we find adjectives like *great* – meaning a *considerable* amount or degree- and *little* –meaning an *insignificant* amount or degree- that induce a similar quantificational interpretation. Often attributive adjectival constructions can also be expressed adverbially, or lexicalised in the formation of compound words like those we discussed above; for instance, *a* ***good dancer*** *dances* ***well***, and *a good child* is a ***well-behaved*** child or *a* ***good-mannered*** or ***good-natured*** *child*. Such constructions are typical to adjectives, but our data show that forms like *many*, often treated as quantifiers, can also appear in similar constructions. Conversely constructions that involve adjectives like *whole* in *the whole city* receive an interpretation equivalent to quantificational *all* in *all the city*. Is there a semantic relation between adjectival constructions and quantifiers in terms of interpretation? If *all the city* is interpreted as

the whole city, then there could be a possible semantic relation between quantifier *all* and adjective *whole*. And if quantifier *all* relates to adjectives *whole*, *entire* and *total* then could quantifiers *some*, *few* and *many* also relate semantically to adjectives *partial*, *little* and *great*? Such speculations direct our attention to a possible connection that could be made between such adjectival constructions and semantic ***Quantification***. This thesis explores primarily the possible quantificational interpretation of such constructions that involve a quantificational element in adjectival position. The same elements also appear in other positions common to adjectives like prefixes and compound formations; such cases, however, are left open to further investigation. The correspondences discussed for the English cases above can also be found cross-linguistically. French displays a very similar pattern to English. French *tout* is also one of those quantifiers that appear in various syntactic positions, like English *all*. Consider the following examples from the Collins Robert Concise French Dictionary (2003: 537); *tout* appears in typical D-quantifier in *il a tout le temps qu'il lui faut* `he has all the time he needs` and in *tout le voyage* `the whole trip`, conveying exhaustivity. *Tout* also appears as a pronoun in *tout va bien* `everything is fine` or as an adverbial *il est tout étonné* `he is very surprised`, *c'est tout naturel* `it's quite natural` or *il est tout près* `he is very near`. French *tout* can also appear in the form of a prefix as in *toutefois* `however` or as a compound as in *tout-petit* `toddler`.

Similarly French existential *quelque* is used as an expression of Proportionality in sentences like *il habite à quelque distance* `he lives some distance from here`, *il ne peut rester que quelques instances* `he can only stay for a few moments`, *les quelques enfants qui étaient venus* `the few children who had come`, or as a prefix in

quelquefois `sometimes` that combines with the noun *fois* `time`. In addition, an English phrase like *the total destruction* would correspond to the French *la destruction totale* and similarly *the partial destruction* to *la destruction partielle.* Since such English determiners and phrases have French equivalents and receive a similar interpretation, can we then, assume that English *all* and *some* as well as English *total* and *partial* relate semantically to French *tout* and *quelque*, *total* and *partiel* and can belong to the same class of quantifiers, i.e. the D-quantifiers and QMods respectively? Such initial speculations allow us to expect the universality of such adjectival constructions that induce quantificational interpretation. If English and French share similar constructions of quantifiers, is it possible that other natural languages make use of the same morpho-syntactic patterns in order to express Quantification? Our limited English and French data show that both languages adopt similar mechanisms to express universality and existentiality. The interpretations of such mechanisms revolves around the concepts of `all`, `whole`, `entire`, `total`, `full` or `complete` in the case of expressions of Totality, while the interpretation of expressions of Proportionality revolves around the concepts of `many, `much`, `few`, `little` meaning `insignificant, of a small amount/degree`, `partial`, `great` meaning `considerable, of a large amount/ degree`, `very`, ` a lot` and ` a bit`. Are these expressions semantically quantificational? And how can they be classified if they are not? The next two subsections 2.3.2 and 2.3.3 target such a discussion and the clarification of the interpretation attributed to certain elements that classify as quantifiers or as degree modifiers.

2.3.2 Varieties of polysemy and systematic ambiguities

Subsection 2.3.1 discussed how quantificational expressions can choose a variety of alternatives for their morpho-syntactic manifestation maintaining the same semantic interpretation. This subsection 2.3.2 concentrates on the interpretation of quantificational manifestations and their often polysemous nature that attributes to the same element either a quantificational interpretation or a degree modification interpretation. Polysemy[20] allows also quantificational elements to be interpreted either in terms of amounts or degrees.

Languages differ in the syntactic mechanisms they employ in order to express Quantification. However, it seems that they follow certain patterns in the way they express certain concepts. In 2.3.1 we discuss how `all` relates to `whole` semantically even though syntactically they both belong to different categories and follow a different syntax. This is not a unique feature of English. Haspelmath (1995) mentions several cases of languages that allow an ambiguous reading in expressions of universal quantifiers; for instance, Latin *totus* means `whole`, while French *tout* means `all`; Portuguese *todo* means `all` in its plural use but `whole` in its singular form. Classical Greek *holos* means `whole` in both its singular and plural form but its M. Greek derivate *olos* means `whole` in its singular use but `all` in its plural form. Other varieties allow an ambiguous reading between `whole` and `complete, intact, sound` or `undamaged`. This is the case with German *heil* `undamaged`, Old High

[20] ***Polysemy*** according to Ravin and Leacock (2000) is defined as "the multiplicity of word meanings" (Ravin and Leacock, 2000: 5); they also comment about polysemous adjectives such as *good* that appear "to acquire different meanings depending on the head they modify. Thus, *a good knife* is a knife that cuts well, but a good memento is an object that adequately reminds. We explain this seeming polysemy in decompositional terms – the semantics of the head is a composition of several semantic components; only one of these components is affected by the modifier. This issue of the polysemy of modifiers continues to challenge linguists" (ibid).

German *heil* `sound, well, uninjured`, Old Church Slavonic *cělŭ* `well, sound, unharmed` and Russian *celyj* `whole, sound, uninjured`. A similar ambiguous reading occurs between the meanings of `whole`, `complete`, `full` and `entire`; Haspelmath (1995) notes, "Other concrete meanings that give rise to `whole` are `untouched` (Latin integer `intact, whole`, but only `whole` in Portuguese *inteiro*, French *entire*, English *entire*) and `filled` (English *complete*, Latin *completes*, from *complete* `fill`; Hungarian *teljes* `complete, whole` from *tel(ik)* `be full`)" (Haspelmath, 1995: 368).

We have detected such ambiguities in English; for instance, English *all* often allows multiple interpretations as in examples like *He ate **all** the apple* which really means that he ate **the entire** or **the whole** apple; examples like *He told me **all** the story of how it happened* would really mean that he narrated the whole story of how things happened. In English one could say *the **whole*** or *the **entire** city was destroyed* which would mean that *there was **total** destruction in the city*. And an expression like ***in all*** means ***in total*** while English sentence *he is **all** surprises* would mean that *he is **full** of surprises*. But are all these meanings quantificational even though they all refer to the `whole`? Bach et al (1995) hint to such a distinction in their examples (14) and (15) mentioned below:

(14) *This sweater is **all** white*

(15) ***All** the flour is spoiled*

Such examples are not any different from our example ***All** the students came to the party*, apart from referring to "domains for quantification of some sort" (Bach et al., 1995: 4) which "link to notions of wholes, totalities, portions of masses" (ibid), while in our example ***All** the students came to the party*, *all* refers to "domains of individuals" (ibid). However, is *all* in a sentence like *this sweater is **all** white* (cf.

Bach et al, 1995) as quantificational as *all* in our example ***all*** *the students came to the party*? Similar speculations arise as we think of cases like Partee's (1995) examples *all-clear*, *all night*, *all gone*, etc. And what about *all* in *alright* and *whole* in *wholefoods*? Are all these cases of quantification and if they are how can they be semantically described?

All is polysemous in its interpretation as `all` when it refers to count entities or as `whole` when it refers to singular mass entities. For this reason, in an informal utterance like ***all*** *the city was destroyed* we would mean that *the* ***whole*** or *the* ***entire*** *city was destroyed*; the same sentence would mean that *there was* ***total*** *destruction in the city* or *the city was* ***totally*** *destroyed*; all these utterances would imply the same idea expressed in a different manner involving *all* or *whole* and *entire* but also adjective *total* and its adverbial counterpart *totally*.

Similarly a French speaker could use similar expressions referring to `all` and `whole` interchangeably; thus, French speakers can refer to *the* ***whole*** *road* as ***toute*** *la route*, or to ***whole*** *villages* as *des villages* ***entiers***; *the whole world* would be *le monde* ***entier***; ***whole****-wheat bread* would translate in French as *pain* ***complet***, while English ***whole****foods* would correspond to French *aliments* ***complets***; *wholly* as in *I'm not* ***wholly*** *conviced* would translate as *totalement* in *Je ne suis pas* ***totalement*** *convaincu* and *entirely* in *It's* ***entirely*** *up to you* would translate as *Ça dépend* ***totalement*** *à toi.* In these translations we detect similarities in meanings between `all`, `whole`, `entire` and `total`. Such cases justify Haspelmath (1995) who believes that `whole` relates to `complete`, `intact`, `sound`, `undamaged`, `uninjured` or even `filled` and `be full`.

Sapir (1930) discusses some of these `meanings` as ***totalizers***[21] referring to ***Totality*** as the `unity` of a mass entity, and examines them in terms of `whole-part` relations. However, such analysis is not in accordance with our analysis of such elements in the sense of Barwise and Cooper (1981)[22] and Bach (1981) and for this reason, we do not wish to explore it any further.

Similar to the above cases of ambiguous readings of the `whole` mentioned by Haspelmath (1995) are also other cases of ambiguous readings of the meanings of the `part`. If we accept that English quantifier *all* relates to *whole* which appears in adjectival position then, perhaps *whole* is semantically similar to *partial*, and to *little* and *great* in a certain context, since all four refer to quantities in terms of amounts or degrees. We already discussed *all* as being ambiguous between two meanings: `all` and `whole`. *Partial* usually refers to an unspecified quantity or degree in the way quantifier *some* in *some men* refers to an unspecified number as discussed in 2.1; for instance, in a phrase like *the partial destruction of London*, *partial* would mean that some degree of destruction was inflicted on London that resulted in some part of London being destroyed. This would mean that if the city of London consists of 100 houses and 20 or 40 of them were destroyed one could say that ***a few*** *houses were destroyed* referring to *the* ***partial*** *destruction of the city of London*; similarly, *the* ***great*** *destruction of the city of London* would implyallow us to think that *London was inflicted with a considerable destruction* or that *London was* ***much*** or ***very much*** *destroyed* or even *destroyed* ***a lot*** or ***a great deal***. Similarly, if ***some*** *part of a building was demolished* then one can talk about *the* ***partial*** *demolition of that building*. A big

[21] ***Totalizers*** in the sense of Sapir (1930) are totalized terms of quality.
[22] In chapter 3 and 4 we analyze such elements as proportional intersective sets of mass entities which correspond to Barwise and Cooper's (1981) monotone intersective sets of count entities. The elements under investigation are sensitive to Milsark's test that allows them to be identified more like elements of Proportionality that rather than Sapir's `totalizers`.

or a small part of the building has it been demolished would imply *a considerable* or *an insignificant demolition of the building*.

Other examples like English *a **partial** success* and French *un success **partiel*** might be a semantic similarity in the way we interpret English ***partial*** and French ***partiel*** in specific context. This directs our attention to the polysemy of other quantificational cases in the following examples where English `much` in *there was much destruction* which refers to ***a great** destruction* which is *a considerable amount of destruction* or ***a great deal** of destruction*. For the same reason of a multiple meaning the English would say *It doesn't matter **much*** meaning *It's not a **big** deal* or ***much** to my amazement* referring to *a **great** amazement*, for which a French speaker would say *ça n'a pas **grande** importance* and *à ma **grande** stupefaction*. This would allow us to think that French *grand* relates semantically to English *great* and both refer to a great degree or a large quantity which consequently would be a considerable quantity. Doetjes (2007) believes that such ambiguities are not accidental since they are repeated in several natural languages[23], and we feel that languages choose to adopt such ways of expressing Quantification because all such expressions whether in the form of generalized quantifiers or modifiers, really involve 'measuring', and target Totality and Proportionality readings associated with Quantification or Modification. The difference between the two relays in their semantic analysis and interpretation. In previous subsections of 2.3., we mentioned various ways of expressing the concept of `the whole` and `the part` including elements like English *whole*, *entire*, *total* and *partial* and their French counterparts. An interesting observation follows from the above facts: such elements usually appear in adjectival constructions. The following

[23] Doetjes (2007, handout) reports that Italian and Moroccan Arabic use the same word to mean `many`, `much`, and `very`.

section 2.4 will focus on similar cases in Arabic, a Semitic language, targeting to show that geographically unrelated natural languages can typologically relate and such cases of quantificational elements could be universal.

2.4 Quantificational Modification in Standard Arabic

In this section we wish to extend the investigation to Arabic, a Semitic language, and argue that Totality and Proportionality can also be expressed in Arabic using two fundamental systems: the syntactic D- and A- classification and the semantic classification of ***Quantificational Modification*** explored in the thesis. Section 2.4 discusses superficially D- and A- quantification in Arabic and shows that Arabic, even though a Semitic language, shares similarities with English and French in the way it expresses Quantification with the use of particular adjectives that would allow us to consider the universality of such a semantic subclass of quantifiers. `Traditional` Arabic quantifiers are either `nominal` determiners (e.g., nouns كل [*kul*] `all`,الجميع [*jami:'u*] `all, everyone`, كثير [*kaṯi:r*] `many, much`,قليل [*qali:l*] `some, little`, بعض [*b'ad*] `some`, عديد [*a'di:d*] `many, numerous` or adverbs (e.g., كلياً *kulli:yan*] `totally`[24]) which can be classified as D- and A- quantifiers depending on their syntactic position in the sentence.

Arabic is similar to another Semitic language, Hebrew[25], and share similarities in the syntax and interpretation of quantifiers. It uses nominal determiners كل [*kul*] and جميع [*jami:'u*] both meaning `*all*` in D-position to express Totality and they both relate to

[24] Arabicكلياً [kulli:yan] `*totally*` that derives from the nominal quantifier كل [kul] `*all*` and the adverbial suffix –ياً [-i:yan] is the only Arabic adverb of quantification used as an alternative way to express Totality (cf. Badawi, Carter and Gully, 2004).

[25] Haspelmath (1995) discusses Hebrew *kol* `whole, all` which means `every` when used with an indefinite singular noun and notes that the Arabic shares the same structure. Therefore, *kol* combines with a definite noun to mean `all` as in ***kol*** *ha-sfarim* `**all** the books` and with an indefinite noun to mean `every` as in ***kol*** *sefer* `**every** book` (cf. Haspelmath, 1995: 379, ex. 29 and 30).

Hebrew *kol* `all, whole`, English *all* and French *tout* `all, entire`. The syntax of Arabic `all` and `whole` is given in the following examples (i.e. (16 – 18) :

(16) كل /جميع الأولاد
kulu/jami:'u *al awalad*
all NOM the+boys NOM.pl. MASC
`All the boys`

كل [*kul*] combined with a singular noun interprets as `every` while جميع [*jami:'u*] combined with a singular noun interprets as `entire` as demonstrated below:

(17) كل ولد
kulu *walad*
all NOM. sg boy NOM. sg. MASC
`Every boy`

(18) جميع ماله
jami:'u *ma:li-hi*
all NOM. sg wealth-his GEN. sg
`His entire wealth`

Such examples allow us to speculate that Arabic also allows a semantic relation between the concepts of `all` and `whole, entire`.

The existential quantifiers بعض [*b'ad*] `some` and عديد [*a'di:d*] meaning `many, numerous` are considered by Badawi, Carter and Gully (2004) as nominal determiners (cf. B.C.G., 2004: 228) similar in syntax to universal كل [*kul*] `all` as they combine with a definite DP, and are found in both partitive and non partitive constructions (cf. Hallman (2005: 3, ex. (59)):

(19) بعض الكتب
b`adu *l-kutub-i*
someNOM the-books NOM. pl. MASC
`Some of the books`

(20) العديد من الأعداء
al-a'di :du *min-a l-'a'da'i*
the-many from- the-members
`Many members`

(21) العديد من الإنجازات
al- a'di:du *min-al-'injazati*
the-many from-the-accomplishments
`Many of the accomplishments`

Another similarity between Arabic and English is in the usage of the adjectival side of quantifiers that mean `many` and `few`. Arabic كثير [kaṯi:r] `*many, much*` appears in a D-position as in (22) and (23) but also in an adjectival position as in (24):

(22) الكثير من العلومات
al-kaṯi:ru min *a l-ma'lumati*
the-many **from** the-information
`A great deal/ a lot of information`

(23) كثيرٌ من السيدات
kaṯi:run min *-a l-sayyidati*
many **from** the-women
`Many women`

(24) كتب كثيرة
kutubun ***kaṯi:ratun***
books **many**
`Many books`

Badawi, Carter and Gully (2004) refer to quantifiers that occupy a D-position as nominal determiners; in the case such a quantifier appears in a adjectival position they note that "a formally indef. noun becomes def. enough to function as a topic (cf. 4.1) if it is further qualified, usually adjectivally or by a rel. clause, e.g. كتب كثيرة [*kutubun kaṯi:ratun*] `many books`. The status of such noun phrases is termed `specification` (taĥŝīŝ) rather than `definiteness` in the Arab grammatical tradition" (Badawi, Carter and Gully, 2004: 95). Arabic employs the preposition *bi* `in` attached to the nouns أجمع [*ajma'i*] `lit. the whole of` or to جميع [*jami:'u*] `lit. all of` and اسر [*asri*] `the total of`. It is a compound pronominal suffix placed at the end of the NP that expresses Exhaustive Totality as shown in examples (25) and (26) which all interpret as `Mankind in its entirety` and refer to `all mankind`:

(25) الناس بأجمعهم
an-nāsu ***bi-ajmaihim***
the people **in their-entirety**

(26) الناس بجميعهم
an-nāsu ***bi-jami:'him***
the people **in their-entirety**

Badawi, Carter and Gully (2004) also mention the preposition *bi* `in, with` in a different construction in which can be either definite or indefinite and gives an adverbial phrase when combined with a verbal or a noun as demonstrated in their examples: ***bi**-l-tahdidi* `exactly`, itself`, ***bi**-l-kamili* `completely`, ***bi**-darajatin kabiratin* `to a larger degree` (cf. Badawi, Carter, and Gully, 2004: 170) as well as examples like the following (cf. Badawi, Carter and Gully, 2004: 232):

(27) كلماث دالة على الأمر بأكمله
kalimātu dallatun 'alā l-'amri ***bi-'akmalihi***
`Words denoting the matter **in its entirety**`

What we are concerned with in examples (25-27) is not the analysis of such quantificational elements but the fact that Arabic also permits the affixation of certain elements in compounds which might induce a quantificational interpretation. The fact that Arabic allows such formations of compounds that refer to Totality takes us towards the same direction with English and French compounds and affixes of Totality as discussed in 2.3.

بأكمله [*bi-'akmalihi*] `in its entirety` in example (27) relates etymologically to adjective كامل [*kāmil*] `complete`. Such a relation confirms Haspelmath (1995) who notes that meanings like `complete`, `whole`, `entire` and `total` are semantically related. In their example [*qad takūnu l-mar'atu*] **kāmilata** l-'unūṯati كاملة الأنوثة قد تكون المرأة `[a woman may well be] **completely** feminine`" (B.,C., &G., 2004:112), Badawi, Carter and Gully (2004) mention the case of expressing the sense of

`completeness` with the adjectiveكاملة [*kāmilata*] `complete` used predicatively and agreeing in case, gender and indefiniteness with the head noun.

Arabic expresses meanings of `the whole` and `the part` also with other adjectives besides كثير [*kaṯi:r*] `many, much` which has an `adjectival` side like English *many*. Arabic syntactic alternatives used to express `the whole` and `the part` are adjectives كامل [*kāmil*] `complete`, الجزء *ju'zzi'* `partial`, قليل [*qali:l*] `little degree, small quantity` and كثير [*kaṯi:r*] `great degree, a large quantity`. Hence, an Arab speaker could talk about التضمير المدينة الكامل [attadmi:r al madina alkāmil] `*the entire destruction of the city*` where Arabic *kāmil* translates as `entire` or `total` and is semantically equivalent to English *total* or French *total*; Arabic also uses *ju'zzi'* to mean `partial` as in التضميرالجزء للمدينة [attadmi:r al ju'zzi' lil madinah] `*the partial destruction of the city*` in a similar way English uses *partial* and French uses *partiel*.

Arabic كلي [kulli:] `*total*` resembles semantically كامل [kāmil] `*total, complete*`, which derives from the `nominal` quantifier كل [kul] `*all*`; the Arabic equivalents of English *great* and *little* are asكبير [kabi:r] `*big*` and عظيم [a'zi:m] `*great*`, أقل ['aqal] `*smallest*` and أكثر [akṯar] `*great*`, *biggest*` as their superlatives. Such are also the superlatives of adjectives قليل [qali:l] `*little, a bit*` andكثير [kaṯi:r] `*much, a lot, great*`. It appears that *qali:l* and *kaṯi:r* are ambiguous between two readings: `small quantity` or `little degree` and `big quantity` or `great degree`. Such an ambiguity has been detected also in the way English and French induce a similar polysemous interpretation for equivalent elements.

Arabic also uses adjectives *basi:t* `insignificant` and *qali:l* `little` to talk about الضمار البسيط للمدينة [adamir al bassi:t lil madinah] `*the insignificant* (lit. *little*) *destruction of the city*` and *kati:r* `*much, great*` to talk about الضمارالكثيرللمدينة [adami:r al kati:r lil madinah] `*the considerable* (lit. *great*) *destruction of the city*`. Hence, an Arab speaker would talk about الزيادة الكلية رواتب [azzi:ada al kuli:ya] `*the whole raise of the salaries*` or لزيادة الكاملة رواتب [azzi:ada alkāmila rawātib] `*the total raise of the salaries*` where *kuli:ya* `whole` and *kāmil* `*complete*` interchange semantically. الزيادة الجزئية [azzi:ada al ju'zzi:a] refers to `*the partial raise of the salaries*`, while a choice of adjectives meaning `unimportant`, `weak` or `small` is allowed in expressing القليلة / الصغيرة / الضعيفة / الزيادةالبسيطة [azzi:ada al basi:tah/ al dai:fah/ al saġirah/ al qali:lah] `*the small raise of the salaries*` in which *small* means `weak`, `insignificant` or `small`; الهائلة / الكبيرة / العظيمة الزيادة [azzi:ada al azi:mah/ al kabi:rah/ al hā'ilah] would refer to `*the great raise of the salaries*` and would allow a choice in expressing *great* with the equivalent adjectives meaning either `great`, `big` or `huge`. Similarities in the way English, French and Arabic express Quantification provide evidence that geographically unrelated languages may yet display typologically similar patterns. Such similarities in syntax, meaning and interpretation and testify that Quantification, reconceived as 'measuring', can be grammatically expressed not only with the fundamental D- and A- quantificational forms, but also with elements appearing in adjectival position such as the QMods. The affix constructions and the formation of compounds with these elements further attest to the adjectival nature of these quantifiers and spark hopes for investigating Quantification through the spectacles of Modification. This is the very theme of this thesis. Could Quantificational Modification be seen as a semantic subclass of Quantification? And if it isn't then, how could we explain variations like the following English noun

phrases which seem to induce quantificational readings: *the **whole** apple*, *the **entire** population*, *the **overall** situation*, *the **total** destruction of the city* which could be paraphrased as *the city was **totally** destroyed*; *the **partial** demolition of the tower* paraphrased as *the tower was **partially** demolished* or even *the partial destruction of the city*. Such English phrases correspond to similar French and Arabic expressions that convey the same meanings. Chapters 4 and 5 will discuss how quantificational are such phrases in terms of context and interpretation.

2.5 Conclusions

Similarities in English, Arabic and –to a certain degree- French data fortified us with the intuition that such cases are expressions of Quantificational Modification that express Quantification in terms of Totality and Proportionality.

Chapter 2 offers an initial discussion of English, French and Arabic QMods allowing us to speculate that Quantificational Modification might be a universal semantic class of Quantification. Our data share similarities in syntax and interpretation. The meanings of English adjectives *total*, *whole*, *entire*, *partial*, *little* and *great* are summarized as follows by the Oxford Concise English Dictionary (2002): *total* is something "comprising the whole number, amount" (Concise Oxford English Dictionary, 2002: 1514) or "complete; absolute" (ibid); *entire* is something "with no part left out; whole" (Concise Oxford English Dictionary, 2002: 475) or "without qualification; absolute" (ibid). *Whole* can mean `complete` or `entire`, "emphasizing a large extent or number" (Concise Oxford English Dictionary, 2002: 1633), while *partial* means "existing only in part; incomplete." (Concise Oxford English Dictionary, 2002: 1039). *Little* refers to something "small in size, amount, or degree"

(Concise Oxford English Dictionary, 2002: 829), while *great* refers to "an extent, amount, or intensity considerably above average" (Concise Oxford English Dictionary, 2002: 622). Such definitions also show how ambiguous certain elements can be in terms of interpretation referring to degree or amount. Our data in English, French and Arabic seem to match. The languages we investigated even though they are not geographically related they share many typological similarities in the way they express `total` and `partial` quantifiers; such data give evidence that these quantifiers appear in similar cross- categorial patterns across natural languages which are often polysemous and systematically ambiguous. Because of the interpretation they receive they could classify as quantificational expressions of Totality and Proportionality. Their classification as QMods is in addition to the previous D- and A- classification of quantifiers offered by Bach et al., (1995).

The following chapter 3 offers an account of how Quantification is normally expressed in Modern Greek and the relation between certain Modern Greek quantifiers and their Classical Greek roots. It also briefly mentions Quantificational Modification as a possible way of expressing Quantification in Modern Greek, in terms of Totality and Proportionality.

CHAPTER THREE

Quantification in Modern Greek

3.0 Introduction

The study of Quantification started with the Greek philosopher Aristotle "who initiated the logical study of the four quantifiers *all, some, not* and *not all*" (Peters and Westerstahl, 2006: 21). However, Classical and Modern Greek quantifiers include a wide range of other elements that receive the same quantificational interpretation but vary in their syntactic manifestations. A wide list of quantificational expressions in Modern Greek includes several syntactic devices ranging from the indefinites *kanena- / tipote* `some; no`, the partitives *meriko-* `some, several` and *ligo-* `some, few`, the indeclinable *kathe* `each, every`, the declinable *kathenas* (MASC), *kathemja* (FEM), *kathena* (NTR) `each (one), every(one)`, *polis* `much, many`, *olo-* `all`, *alo-* `other`, *arketo-* `enough`; the stem of Classical Greek quantifier *pas* `everyone` as *pand-* (feminine: *pasa-*) meaning `all, every, whole`, the phrase *ke ta dio* meaning `both`, and numerals in their cardinal and ordinal form (cf. Joseph and Philippaki-Warburton, 1987). Quantificational interpretations could also be argued for prepositions like distributive *kata* `along, throughout, all over` (cf. Haspelmath, 1995) and partitive and distributive *apo* `of, from`, adverbs like *panta* `always`, *sinithos* `usually` and *sihna* `often`, the modal *bori* `it's possible, can`[26] and the pronoun *kapios-kapia-kapio* `someone`.

As we have seen in the previous chapter, quantificational readings could also be argued for `total` and `partial adjectives` (cf. Joseph and Philippaki-Warburton (1987) and Holton, Mackridge and Philippaki-Warburton (1997)) such as *polis* `much, a lot

[26] *Bori* `it is possible, can` is analyzed as a universal quantifier over possible worlds (cf. Giannakidou, 2000: 251).

[of]; too much` (pl. `many; too many`); comparative *perisoteros* `more`[27]; *arketos* `quite a lot [of]`; *kambosos* `quite a lot [of]`; *mbolikos* `plenty [of]`; *ligos* `[a] little` (pl. [a] `few`); comparative *ligoteros* `less` (plural `fewer`); *ligostos* `little` (pl. `few`); *elahistos* `very little` (pl. `very few`); *o ipolipos* `the rest [of]` and *merikos* `some` normally used in its plural form as *meriki* (cf. Holton, Mackridge, and Philippaki-Warburton, 1997: 314) and their neuter singular forms which may also function as adverbs: *poli* `very; much` (comparative *perisotero* `more`); *ligo* `a little` (comparative *ligotero* `less`); *toso* `so`; *oso* `as much as`, etc. (cf. H.M.&P.-W., 1997: 316). Additional forms include *olos* `all, whole` and *olokliros* `whole` (cf. Holton, Mackridge and Philippaki-Warburton, 1997: 314) and those quantifiers that seem to be adjectival or adverbial but are also emphatic; these are *tosos* `so much` (pl. `so many`); *osos* `as much as` (pl. `as many as`); *poso* `how much` (interrogative); *telios* `completely`; *arketa* `quite [a lot]`; *shedon* `almost`; *tulahiston* `at least`; *pano kato* `approximately`; *peripou* `approximately, more or less`; *katholou* `[not] at all`; *mallon* `rather`; *eksisou* `equally`; *para* (intensifying an adverb as in *para poli*: `very much; too much`); *pio* `more` (used in front of an adjective or an adverb to form a comparative), *akoma* `more` and *kathara* `purely` (cf. Holton, Mackridge and Philippaki-Warburton, 1997: 354-5)[28]. Such a wide variety of quantificational manifestations conforms to the general view advocated in Chapter 2, that quantifiers "constitute a single semantic category, but languages differ widely in their syntactic

[27] Holton, Mackridge and Philippaki-Warburton (1997: 355) note that Modern Greek does not distinguish between the meanings of `much/ many` and `too much/ many`.

[28] They specify two cases in which either "an adverb of quantity modifying an adjective conveys the degree of the quality denoted by the adjective" (Holton, Mackridge and Philippaki-Warburton, 1997: 359) or "an adverb may modify an adverb... in much the same way as it may modify an adjective" (Holton, Mackridge and Philippaki-Warburton, 1997: 360); examples of such cases are: *poli kala* `very well`, *para poli kala* `very well`, *pio kala* `better`, *poli kalitera* `much better`, *kapos kalitera* `somewhat better`, *ligo kalitera* `a bit better`, and *tris fores kalitera* `three times better`.

and morphological treatment of individual members of that category" (Cushing, 1981: 5).

Our focus in this thesis is on those quantifiers that can also appear in adjectival constructions, inflect like adjectives and agree in number, case and gender with their host noun. Such quantifiers also grammaticalize into adverbial and prefix extensions similar to adjectives in respect of their semantic quantificational analysis. Their ability to grammaticalize into adverbials and prefixes confirms their adjectival status, since it is usually common for adjectival modifiers to extend to grammaticalized adverbials and prefixes; for instance, an adjective like *kalos* `good` grammaticalizes into adverbial *kala* `good, well` and prefix *kalo-* as in ***kalo**-magiremenos* `well-cooked`.

We divide these `adjectival` quantifiers into two groups depending on their relation to `the whole` or to `the part`. The thesis explores certain syntactic manifestations and the interpretation of `total` quantifiers όλος [*olos*] `all, whole`, ολόκληρος [*olokliros*] `whole` and ολικός [*olikos*] `entire, total, overall` and of `partial` quantifiers μερικός [*merikos*] `some, a few`, πολύς [*polis*] `*many*` and λίγος [*ligos*] `some, few`; such a distinction reflects the analysis of such quantifiers in terms of proportional set relations, discussed in more detail in chapter 5; such sets are defined in terms of proportional amounts and degrees. `Total` are those that refer to the `whole`, while `partial` are those which refer to a relative `part` of the `whole`.

Section 3.1 explores the adjectival features of these quantifiers, which have been argued to be the historical remnants of their Classical Greek roots. Section 3.2 will concentrate on the syntactic manifestations of such quantifiers and their interpretation.

Section 3.3 concentrates on the variety of morpho-syntactic alternatives such quantifiers use to manifest themselves and discusses their categorial patterns and their polysemous and often ambiguous interpretation. Section 3.4 focuses on the adjectival occurrences of such Modern Greek elements. There we argue that these are expressions of Quantificational Modification, and that they pattern in the same way as the similar data from English, French and Arabic discussed earlier in sections 2.3 and 2.4.

The following section, 3.1 begins with a general discussion of the different forms of Modern Greek quantifiers and their linguistic transition from their Classical Greek forms to the present; the adjectival features of the four Modern Greek quantifiers discussed are their remaining bonds with their Classical Greek ancestors in terms of etymology and morpho-syntax.

3.1 Quantifiers in Classical and Modern Greek

The evolution of Modern Greek quantifiers from their Classical counterparts is not only interesting but it also explains why certain Modern Greek quantificational expressions are labelled `adjectival`. Modern Greek quantifiers either derive from their Classical Greek roots[29] (e.g. *pas* `everyone, all, whole` and *holos* `all, whole`) or are purely Modern Greek variants (e.g. *apo* `from, of`, *mbolikos* `enough, too much`, etc.). Classical Greek quantifiers that relate to their Modern Greek variants are *holos* `all` and *pas* `all, everyone`. Modern Greek *olos* `all` is derived from its Classical Greek ancestor *holos* `whole` which along with Sanscrit *sarva-* is derived from the

[29] We are not claiming that the Modern Greek elements we examine are of a direct descent of specific forms at a specific period of time but we are making a loose association with their Classical Greek roots without specifying the exact period; we are aware that Modern Greek is associated with Koine dialect but a detailed discussion of the exact derivational roots of such elements would not compliment the thesis in any way.

meaning `sound, well`[30]. The linguistic transition from Classical Greek *holos* `all, whole` to Modern Greek *olos* `all, whole`[31] is summarized in examples (1a-d) (cf. Haspelmath, 1995: 365, ex. (3a, b) and (4 a, b)):

(1)

Classical Greek	⇒	**Modern Greek**
a. ***holen*** *ten hemeran* **whole+** the+ day ACC. sg. FEM `The whole day, all day`		c. ***oli*** *ti mera* **whole+** the+ day NOM. sg. FEM `The whole day, all day`
b. ***holous*** *oikous* **whole+** houses NOM. pl. MASC `Whole families (not `all families`)`		d. ***ola*** *ta spitia* **all+** the+ houses NOM. pl. NTR `All the houses`

The difference between the two is in their syntax and interpretation; in Classical Greek *holos* precedes a [+def] singular NP to mean `all` or `whole` but a [-def] plural NP to refer to an entity as `a whole`; its Modern Greek version *olos* combines with a [+def] NP to mean either `all` or `whole`; *olos* interprets as `all` when it combines with a count definite plural noun (e.g. *ta spitia* `the houses`) but it refers to an entity as `a whole` when it combines with a singular mass noun (e.g. *ti mera* `the day`). Such constructions resemble the constructions of Arabic nominal determiners كل [*kul*] and جميع [*jami:'u*] both meaning `*all*`, discussed briefly in 2.4 of chapter 2.

Classical Greek *pas* `whole, all` demonstrates a similar transition; it expresses the meaning of `every` and follows the same syntax like *holos* in Classical Greek (cf. Haspelmath, 1995: 379, ex. (29a-b)) as demonstrated in (2):

(2) a. ***pántes*** *hoi hodoi*
all + the + roads NOM. pl. FEM
`All the roads`

[30] In this manner *olos* is similar to English *whole* which relates etymologically to Old English *hal* which is derived from the Germanic *heil* meaning `undamaged`.
[31] Classical Greek *holos* meaning `solid, complete`, and it is similar to Latin *sollus* (cf. Babiniotis, 2002).

b. ***pasa*** *hodós*
all+ road NOM. sg. FEM
`Every road`

Pas is stronger in meaning than *holos* `all, whole` and has remained in use in Modern Greek either in fixed phrases (e.g. *kata pasan pithanotita* `in all likelihood` (cf. Joseph and Philippaki-Warburton, 1987: 209)) or to mean `everybody, everything`. Both *pas* `everyone` and *olos* `all` combine in a phrase like *oli ke pandes* (cf. Babiniotis, 2002: 1352) to convey the exhaustive meaning of `all with no exception`.

Goodwin discusses the syntax and interpretation of such expressions which resemble their Modern Greek counterparts in terms of morpho-syntax and interpretation. Expressions of the `whole` such as *pas* and *simpas* `all` and *olos* `whole` are usually used in the predicative as in Goodwin's (1924) examples: *pandes i andres* and *i andres pandes* meaning `all the men`; *oli i polis* and *i polis oli* meaning `all the city`. Such lexical elements can also be used in the attributive preceded by the article as in *i pasa sikelia* to mean `the whole Sicily` or *to olon genos* to refer to `the entire race`. Goodwin (1924) notes that the distinction "was probably no greater than that between *all the city* and *the whole city* in English" (Goodwin, 1924: 212). It is evident in these constructions that Classical Greek quantifiers *holos* and *pas* follow the construction of `normal` adjectives in Classical Greek in attributive as in *o dikaios anir* `the just man` (cf. Smyth, 1920: 256), and appear in the adjectival position. Perhaps, we could dare say that the adjectival position was the original syntactic manifestation of such quantifiers. The same applies to other quantifiers like Modern Greek *polis* `many` and *ligos* `few`. *Polis* `many, much` and *oligos* `few` are also sensitive to such discussions; Smyth (1920) in his grammar of Classical Greek does not differentiate between Classical Greek adjectives and `adjectival` quantifiers like *holos*, *polis* and

oligos because of their morpho-syntactic similarities as described in the following examples: *o dikaios* `the just man`, *i athinei* `the Athenians`, *i polli* `the many`[32], *i oligi* `the oligarchical party`, *i kali* `the beautiful woman`, etc. (cf. Smyth, 1920: 273). The adjectival use of *polis* shows in examples like *polli i panourgi* used in the predicative to mean `many are the evil doers` or constructions like *tis gis i polli* (cf. Smyth, 1920: 273) meaning `a large part of the earth`, which are common constructions also with Classical Greek *holos* `all`; another similar construction is in Smyth's example *touton anekragon os oligas (pligas) pesin* `they shouted that he had dealt him few (blows)` (cf. Smyth, 1920: 274) where the noun *pligas* `blows` can be made redundant and *oligas* –the root of Modern Greek quantifier *ligos* `few`- is used in adjectival construction to mean *few*.

Another interesting Classical Greek construction- borrowed from Smyth (1920: 273)- is the following which explains the derivation of Modern Greek *merikos* `some, a few`: *tis Salaminos ta polla* `the greater part of Salamis` that resembles the construction in *tis poleos to timomenon* `the dignity of the state`. In the first construction *ta polla* `the many` refer to the part as it is evident from the translation. This is why such an adjective in Classical Greek modified the noun *meros* `part` or *meris* `part` which was made understood in the construction and it is the root of Modern Greek quantifier *merikos* `some, a few`. Other constructions where this structure is more apparent are *tis gis i polli* `a large part of Earth`, where the feminine

[32] Such a syntactic construction has been maintained in the syntax of *ligos* and *polis* which can also occur in nominalized forms as *i ligi* `the few` and *i poli* `the many`, meaning `the minority` and `the majority` respectably. Such constructions are common in other non quantificational adjectives such as *psilos* `tall`, *eksipnos* `intelligent`, *plousios* `rich`, etc. which follow the same syntax -combine with the definite article while the head noun that is context dependent is implied- and can interpreted as subsective (i.e. defining sets). Thus, while *i ligi* `the few` and *i polli* `the many` define the minority and the majority of a context dependent noun (entity), *i plusii* `the rich`, i psili `the tall` and i eksipni `the intelligent` also define a subset of those who are identified as `the rich`, `the tall` and `the intelligent`. The difference between the two classes is in proportionality and scalarity, which are responsible for labelling only *i ligi* `the few` and *i poli* `the many` as quantificational.

of πολύς `many` agrees with the understood noun *meris* meaning `part` and *ton polemion to poli* (cf. Goodwin, 1924: 231) meaning `the greater part of the army` where *to poli* `the greater` agrees with *meros* `part` made redundant. Goodwin (1924) notes several usages of *merikos*, *polis* and *ligos* in Classical Greek. Ολίγος, the root for *ligos*, seems to refer to a `small part/ quantity` and be used in a similar way to *polis*.

Merikos is an interesting case since it does not derive from a Classical quantifier but from the word *meros* meaning `part` and in Classical Greek was attached to Classical Greek *tis* `some` to refer to an unspecified quantity or to *polis* `a great quantity` or *oligos* `a small quantity` and was agreeing with the adjective. Modern Greek *ligos-i-o* derives from Classical *oligos-i-o* `some, few, little`, while *merikos-i-o* `some, a few, little` comes from the noun *meros* `part`[33]; this explains the dual interpretation of *merikos* as `some, a few` and `partial` as it will be discussed in more detail in chapter 5. Regarding their morphology and inflection such quantifiers relate to adjectives. For instance, Greek *pas* `all` is treated morphologically as a third- and first-declension adjective, declined like the first aorist active participles *pedeusas* `having instructed` (cf. Cushing, 1981), while Classical Greek πολύς [*polis*] `many, much` is "declined similarly to μέγας, `great`, and ηδύς, `sweet`. Both μέγας and πολύς are second- and first-declension adjectives with the exception of the nominative, the accusative, and the vocative singular masculine and neuter, which are of third declension. The plural,

[33] The difference between the two shows in their Greek spelling and stress: the adjective is spelled as μερικός-ή-ό [pronounced *merikos-i-o*] `some, a few, little, partial`, while the adverb is spelled as μερικως [pronounced *merikos*] `partially, partly`[33]. In spoken Greek it is mainly from the structure of the sentence that Greek speakers understand whether it is the first or the second case used, while in written Greek it is through its syntax and orthography that speakers of Modern Greek distinguish between the two.

[...], is entirely regular as a first- and second- declension adjective like magnus, `great`" (Cushing, 1981: 6). Πολύς [*polis*] `many, much`, has entered the grounds of Modern Greek Quantification maintaining its `adjectival` morpho-syntax as we will see in more detail in 3.2. Cushing (1981) informs us that such a quantifier is treated as a regular adjective in both Latin and Classical Greek regarding the morpho-syntactic properties of such quantifiers. Thus, the morpho-syntactic similarities in the structure of Modern Greek quantifiers and their Classical ancestors which explain why linguists like Cushing (1981), Holton, Mackridge and Philippaki-Warburton (1997), Joseph and Philippaki-Warburton (1987) insist in describing certain Modern Greek quantifiers as `adjectival`. The next sections give the analysis of certain Greek D- and A-quantifiers in the sense of Giannakidou (2004) and Dimitrakopoulou (1994) whose semantic analysis of certain Greek quantifiers might give us clues for the semantic analysis of the `adjectival` quantifiers we discuss in chapters 4 and 5.

3.1.1 Syntax and Semantics of Modern Greek D-quantifiers

In chapter 2 we discussed the possibility of dividing quantificational expressions in Natural Language into two main classes: the D- and A-quantifiers (cf. Bach et al., (1995)). D-quantifiers are those quantifiers that appear in determiner position such as universal *(o) kathe* `every, each` and existential *i perissoteri* `most` discussed by Giannakidou (2004) as Q-det heads of a QP. *(O) kathe fititis* and *i perisoteri (i) fitites* seem to appear in a similar syntactic position with the `adjectival` quantifiers under investigation. *(O) kathe* can not be described as an `adjectival` quantifier; however, *i perisoteri* is the comparative/ superlative form of *polis* `many, much` and has already been included in our list of quantifiers in the introduction of this present chapter 3.

(O) kathe is a combination of the article *o* `the` and the indeclinable particle-like *kathe* meaning `every, each` and "involves embedding of the quantifier `every` under the definite article" (Giannakidou, 2004:116); it is "further incompatible with a definite" (ibid) and with collective predicates; such incapability results in ungrammaticalities like those in (3) and (4) (cf. Giannakidou, 2004: 116, ex.16 - 117, ex. 19a, b):

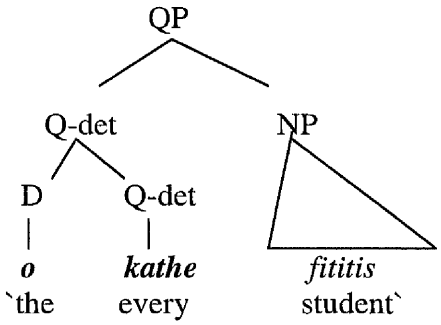
(3) ***o kathe o** *fititis*
***the+ each+ the+** student NOM. sg. MASC
*`each the student`

(4) a. ****to kathe pedi** *sigentrothike.*
***the+ each+ child** NOM. sg. NTR gathered 3rd sg. Past
`*Each child gathered`

b. ***ola ta pedia** *sigentrothikan*
all+ the+ children NOM. pl. NTR gathered 3rd sg. Past
`All the children gathered`

Semantically "the result of D QP is a strong distributive quantifier, which like English *each*, but unlike *all* and *oli*" (Giannakidou, 2004: 117). *(O) kathe* is analyzed as a "complex determiner" (Giannakidou, 2004: 121) where the Det *o* `the` is incorporated in Q-det *o kathe* which is the head of QP as described in diagram (5) and (6) below (cf. Giannakidou, 2004: 121, diagram 32 and representation 33); *o kathe* is a Q-det, part of a QP with an embedded definite article as described in (5), while (6) gives its semantic representation:

(5)



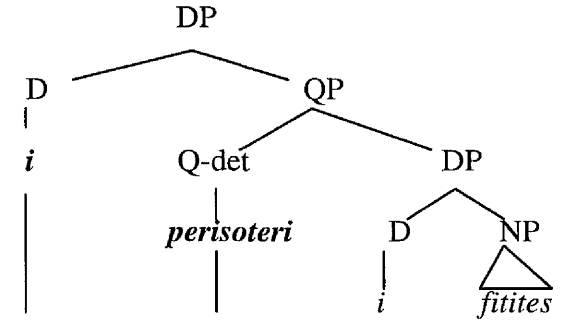
(6) a. [QP o D + kathe Q-DET [NP fititis N]]
b. *o kathe fititis* = [kathe (C)] (student) `each student`
c. [[o kathe]] = λC λP λQ {x: C(x) = 1 & P(x) =1} ⊆ {x: Q(x) =1} `each`

Giannakidou (2004) further explains that in the case of *o kathe*, the definite D *o* `the` provides the domain restriction and yields a new determiner *o kathe* which contains the additional variable C (i.e. *fititis* `student`) and is contextually restricted.

Modern Greek *i perisoteri* (lit. the.pl `more`) meaning `most` is another Q-det discussed in Giannakidou (2004) which "exhibits the D QP order while at the same time optionally allowing a definite argument: *i perisoteri fitites*. This option, which is admittedly more marked that the canonical version without the embedded definite, suggests the following structure" (Giannakidou, 2004: 122) given in (7) and (8) (cf. Giannakidou, 2004: 122, diagram (37) and its syntactic analysis (38)):

(7) [DP *i* D [QP *perisoteri* Q-det [DP *i* D [NP *fitites* N]]]]

(8)



`Most students`

I perisoteri i fitites is not a DP constituent like *o kathe*; it allows the definite reduplication which is common in Greek (e.g. *o kalos o fititis*, lit. `the good the student`); *i perisoteri* `most`, is a weak quantifier described as a Q-det, head of a QP embedded in a DP and often appears as a covert partitive[34] as in *i perisoteri fitites*

[34] "QPs are contextually restricted" (Giannakidou, 2004: 119) which have a covert partitive structure where the covert preposition is a type shifter; thus, "D performs domain restriction on the nominal, and

`most students`; in this description *i perisoteri* differs from the strong determiner *o kathe* which does not allow partitive constructions. *I perisoteri* can also be part of an overt partitive like *i perisoteri apo tous fitites* contrary to *o kathe* as demonstrated in our examples (9) and (10) below. *I perisoteri* `most`, contrary to *o kathe* `every`, is "a DP constituent" (Giannakidou, 2004: 122) and is also involved in an overt partitive construction as in *i perisoteri apo tous fitites* `most of the students`, which involves a construction with the preposition *apo* `of` (cf. Giannakidou, 2004: 113); *(o) kathe* cannot occur in such a construction as shown in (9 a, b) and (10 a, b):

(9) a. ***i*** ***perisoteri*** *fitites*
the+ most+ students NOM. pl. MASC
`Most students`

b. ***i*** ***perisoteri*** ***apo*** *tous fitites*
the+ most NOM. pl. MASC **of+** the+ students GEN. pl. MASC
`Most of the students`

(10) a. ***(o)*** ***kathe*** *fititis*
(the)+ every+ student NOM. sg. MASC
`Every student`

b. ****(o)*** ***kathe*** ***apo*** *tous fitites*
***(the)+ every** NOM. sg. MASC **of+** the+ students GEN. pl. MASC
`*Every of the students`

Giannakidou (2004) briefly discusses *olos* `all` which requires the definite article in its syntactic construction as in (12) below (cf. Giannakidou, 2004: 115, ex. 13a):

(11) *oli i fitites* `all the students`; **oli fitites* `all students`

Olos is also incompatible with partitive constructions as shown in (13) (cf. Giannakidou, 2004: 122, ex. 36):

(12) **oli apo tous fitites* `all (of) the students`

... the DP subsequently undergoes predicate shift [which] enables the classical GQ analysis" (Giannakidou, 2004: 120).

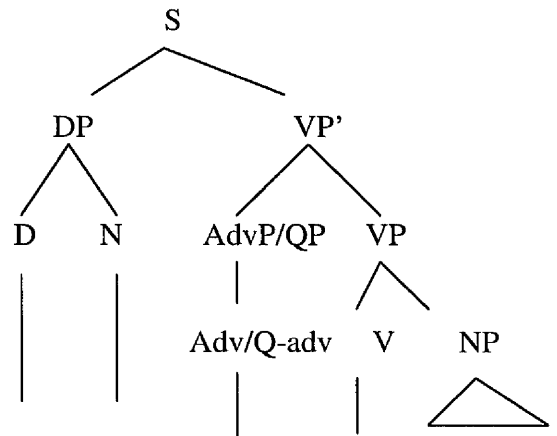
Giannakidou follows Brisson (1997) in not taking *oli* as a Q-det. In chapter 4 we suggest that *olos* is in the same position occupied by Greek demonstratives; such a position also requires the obligatory presence of the article found in the *olos* construction.

3.1.2 Syntax and Semantics of Modern Greek A-quantifiers

A-quantification has been briefly discussed in chapter 2 and in the sense of Bach et al., (1995). Such a form of quantification is restricted to other non-determiner kinds of quantification, and occurs in all natural languages. In chapter 2 we discussed cases of A-quantification in natural languages while in 3.1.1., we mentioned a variety of Greek adverbials of quantity. In 3.1.2 we present the analysis of some Modern Greek A(dverbial)-quantifiers such as *panta* `always`, *sinithos* `usually` and *sihna* `often`, in the sense of Dimitrakopoulou (1994). Dimitrakopoulou (1994) views such A-quantifiers as aspectual quantifiers of quantification, while other linguists like Holton, Mackridge and Philippaki-Warburton (1997) treat such adverbs as adverbs of time.

The following diagram (13) intends to show the syntax-semantics interface in Greek A(dverbial)-quantifiers and show that adverbs like *panta* `always`, *sinithos* `often` and *sihna* `usually` syntactically appear in a preverbal position as Adverbs, heads of an Adverbial Phrase, while semantically they are Q-adv, heads of a QP:

(13)



o yiannis ***panta*** *vlepi ti mitera tou* `John always sees his mother`

o yiannis ***sihna***[35] *vlepi ti mitera tou* `John often sees his mother`

o yiannis ***sinithos*** *vlepi ti mitera tou* `John usually sees his mother`

Such examples of Greek A-quantifiers take scope over the entire VP as mentioned already in the relevant discussion of A-quantifiers in 2.1 of chapter 2.

In terms of their semantic analysis such adverbials are operators over sets of `times` in the sense of Bach (1981, 1986). The semantics of such adverbials resembles the semantics of D-quantifiers since they both refer to sets of sets, a semantic feature unique to quantifiers; for instance, the universal English A-quantifier *always* is similar to D-quantifier *all* and its Greek equivalent *panta* can be analyzed similarly as referring to `all the times` at which a proposition holds true; A-quantifiers like *often* are similar to D-quantifier *some* as they do not specify the number of times at which the proposition they modify holds true; they refer to sets of `times` or `eventualities` or "properties of moments – that is instants- of time" (Bach 1986b: 588). Bach (1986b) following Link (1983) notes that the domain of ordinary individuals includes a special set of atoms, "quantities of matter" (Bach, 1986b: 589). Bach (1986b) notes that in the domain of `eventualities` along the lines of proportion "events are linked to

[35] *Sihna* `often` in preverbal is case of focus, but we do not intend to discuss any semantic peculiarities of such adverbs.

`quantities of process` in much the same way that things are linked to quantities of matter in Link's construction" (ibid). Therefore, Adverbials like *sihna* `often`, *sinithos* `usually` and *panta* `always` refer to sets of `times` or - to be more precise - to sets of `eventualities` that operate in the temporal domain, as we have already discussed in 2.1.1., and 2.2.2 of chapter 2.

Dimitrakopoulou (1994) describes English adverb *always* as "a universal quantifier, as it includes all the times at which a proposition holds true. Adverbs such as *often* sometimes belong to the class of existential quantifiers, as they do not specify the number of times at which the proposition they modify holds true. Thus, if x is times, y the verb argument and e the event variable introduced by the verb [...]" (Dimitrakopoulou, 1994: 57-58). The analyses in (14) and (15) correspond to Dimitrakopoulou's (17a) and (20a)):

(14) a. *John **always** runs.*
b. $\forall$x (run (John, e at x)) paraphrased as `for all x, it is the case that y runs at x`

(15) a. *John **often** runs.*
b. $\exists$x (run (John, e at x)) paraphrased as `there exists an indefinite number of times such that y runs at x`

Dimitrakopoulou (1994) believes that D- and A-quantifiers are semantically related and explains that these adverbs can be divided into `strong` and `weak` quantifiers.

"A strong quantifier, such as the universal quantifier *all*, is uniquely referring, in the sense that it denotes the whole of a universal or a contextually given set. On the other hand, weak quantifiers, such as the existential *some* do not help the speaker/hearer define the referent in the set introduced by them. Along these lines, *always* is a universal quantifier, as it includes all the times at which a proposition holds true. Adverbs such as *often*, *sometimes* belong to the class of existential quantifiers, as they do not specify the number of times at which the proposition they modify holds true." (Dimitrakopoulou, 1994: 57).

Modern Greek A-quantifiers *panta* `always`and *sihna* `often` appear in a variety of syntactic positions, i.e. preverbal, post verbal and sentence final position. We do not intend to concentrate on all possible positions such adverbial quantifiers can occupy. What we are concerned with is the function of such quantifiers in a preverbal position and their quantificational interpretation. *Panta* `always` is an adverbial quantifier which asserts the truth value of the proposition as in example (16) (cf. Dimitrakopoulou (1994: 61), ex. (6)):

(16) *o yianis* ***panta*** *vlepi tin mitera*
the+ John NOM. sg. MASC **always** sees 3rd sg. Pres. the+ mother ACC. sg. FEM
tou (ala den tis tilefoni)
his GEN. sg. MASC (but not her-calls 3rd sg. MASC)
`John always sees his mother (but does not call her)`

In this preverbal position "the whole verb phrase seems to be included in the scope of the adverb and the sentence reads as `what John does at all times is seeing his mother`" (ibid) [36].

Existential *sinithos* `usually` "denotes the habituality of the event and in this respect differs from the aspectual adverbs whose role is to contribute to the truth value of just one proposition." (Dimitrakopoulou, 1994: 62). Semantically, it resembles sentence adverbs which "function as predicates, the arguments of which are the event and the sentence." (ibid). Example (17) summarizes the syntax of *sinithos* `usually` in a preverbal position, (cf. Dimitrakopoulou, 1994: 62, ex. 9):

(17) *o yianis* ***sinithos*** *vlepi ti mitera*
the+ John NOM. sg. MASC **usually** sees 3rd sg. Pres. the+ mother ACC. sg. FEM
tou
his GEN. sg. MASC
`John usually sees his mother`

[36] The notion of `times` relates the verbal domain of A-quantifiers to the nominal domain.

Semantically, such a sentence contains two propositions: "`this is a habit of John` is analyzed into `it is a habit of John to do something`" (ibid).

Sihna `often` is another existential Adverbial-quantifier discussed by Dimitrakopoulou (1994); *sihna* `often` is paraphrased as `there is an indefinite number of times at which the proposition p holds true` and it "has scope over the DP object following it or over the whole verb phrase" (Dimitrakopoulou, 1994: 63) as demonstrated in the following example (18), (cf. ibid, ex.14):

(18) *o yiannis* ***sihna*** *vlepi tin mitera*
the+ John NOM. sg. MASC **often** sees 3rd sg. Pres the+ mother ACC. sg. FEM
tou (ala den tis tilefoni/ ala ohi tous filous tou)
his GEN. sg. MASC (but not her-calls-3rd m sg/but not the friends-his)
`John often sees his mother (but does not call her/ but not his friends)`

Dimitrakopoulou's analysis shows that A-quantifiers are also available in Modern Greek. We do not discuss Modern Greek A- quantifiers any further. Our discussion in 3.1.3 was only meant to show different aspects of A-quantification in Modern Greek without offering a detailed syntactic or semantic analysis and emphasize the similarities between D- and A- quantifiers.

3.2 Totality and Proportionality in Modern Greek Quantification

In 3.1 we briefly discussed the morpho-syntax and `adjectival` features of certain Modern Greek quantifiers which originate in their Classical Greek ancestors. Such features control the syntax of such quantificational elements as they appear in positions common to modifiers such as adjectives, adverbs and prefixes, as they appear in the same lexical form. Their relation to `the part` and `the whole` allows them to interpret as expressions of Totality and Proportionality, independent of the category they belong to. Expressions of Totality and Proportionality in Modern Greek

appear not only in form of adjectives but also in the forms of such adverbials and prefixes that derive from their adjectival roots. In 3.1.2 we discussed how D-quantifiers relate to A-quantifiers in terms of semantics and we expect that the quantificational elements that appear in adjectival position analyze semantically in a similar way with their adverbial and prefix variants. Section 3.2 offers a brief discussion of such elements and concentrates more on their adjectival manifestations.

This section focuses on the quantificational elements όλος [*olos*] (MASC), όλη [*oli*] (FEM), όλο [*olo*] (NTR)`all, whole, entire`, ολόκληρος[*olokliros*] (MASC), ολόκληρη [*olokliri*] (FEM), ολόκληρο [*olokliro*] (NTR) `whole, entire, all, complete`, πολύς [*polis*] (MASC), πολλή [*polli*] (FEM), πολύ [*poli*] (NTR) `many, much`, λίγος [*ligos*] (MASC), λίγη [*ligi*] (FEM), λίγο [*ligo*] (NTR) `some, a few, little` and μερικός [*merikos*] (MASC), μερική [*meriki*] (FEM), μερικό [*meriko*] (NTR) `some, few, a little` which occupy a variety of syntactic positions (i.e., determiner, adverbial, prefix or adjectival position). Holton, Mackridge and Philippaki-Warburton (1997) classify Greek quantifiers into two categories: the first that contains *olos* `all, whole` and *olokliros* `whole, entire` in various syntactic positions and the second which contains the rest; we focus on *olos* `all, whole`, *olokliros* `whole, entire`, *polis* `many, much`, *ligos* `some, few`, and *merikos* `some, a few` which "may be used with or without a noun, inflect like adjectives, and agree in gender, number and case with the relevant noun or with the item they denote" (H., M. & P.-W., 1997: 316).

Besides Holton, Mackridge and Philippaki-Warburton (1997) there are other linguists who also classify such Greek quantificational elements as `adjectival`; for instance, Cushing (1981) believes that "there is nothing in the treatment of the plurality or

universal quantifiers in Latin or Greek that distinguishes them specifically as quantifiers, rather than ordinary adjectives" (Cushing, 1981: 7) and Joseph and Philipaki-Warburton (1987: 121) note that quantifiers pattern with the adjectives as they follow the strictly the rich, inflectional morphology of Greek declinable adjectives, agreeing in number, gender and case with their restriction[37]. This thesis intends to investigate the multiple syntactic manifestations of such elements which syntactically pair with modifiers and their semantic interpretation that is responsible for classifying them as quantificational expressions of Totality and Proportionality. The following subsection 3.2.1 discusses the syntactic varieties of *olos*, while subsection 3.2.2 focuses on the syntactic varieties of *merikos*, *polis* and *ligos* and their interpretations according to their position in the sentence.

3.2.1 Totality: *Olos* and its variants

Holton, Mackridge and Philippaki-Warburton (1997) identify a variety of syntactic manifestations of *olos* `all, entire, whole, overall`, that involve its placement in a position typical to Greek demonstratives, pronouns and adverbs. In a demonstrative's position *olos* translates as `all`, in a pronoun's position as `all, everybody, everything` while in adverbial position it means `always`.

"The quantifier όλος `whole; all` (in singular or plural) and ολόκληρος `whole` (especially in the singular) regularly stand outside the article + noun complex" (H., M., & P.-W., 1997: 314) and this position identifies them with demonstratives as in our examples (19 a, b, c) and (20 a-c) (cf. H.,M.,& P.-W., 1997: 314, ex.1, 2 and 3):

[37] Exempted from any inflectional agreement are quantifiers like the indeclinable *kathe* `each, every` and the quantificational phrase *ke i dio* (lit. and the two) meaning `both`.

(19) a. ***olos*** *o kosmos*
all+the+world NOM. sg. MASC
`All the world; everybody` (cf. ***autos*** *o kosmos* `this world`)

b. ***oles*** *i ginekes*
all+the+women NOM. pl. FEM
`All [the] women` (cf. ***autes*** *i ginekes* `these women`)

c. ***olokliro*** *to spiti*
whole+ the+ house NOMsgNTR
`The whole house` (cf. ***auto*** *to spiti* `this house`)

These quantifiers also float like demonstrative *autos* `this`:

(20) a. *o kosmos* ***olos*** (cf. *o kosmos* ***autos***)
the+ world+ **all** NOM. sg. MASC

b. *i ginekes* ***oles*** (cf. *i ginekes* ***autes***)
the+women+**all** NOM. sg. FEM

c. *to spiti* ***olokliro*** (cf. *to spiti* ***auto***)
the+house+**whole** NOM. sg. NTR

Olos can function as a pronoun as in (21) (cf. H., M. & P.-W., 1997: 315, ex. 12):

(21) *ta vlepis ta radiofona?*
them ACC. pl. NTR see 2nd sg. Pres the+ radios ACC. pl. NTR?
ola [38] *ine skarta*
all NOM. pl. NTR are 3rd pl. Pres useless ACC. pl. NTR
`Do you see the radios? They're all useless`

But *olos* can also function as an adverb, the result of the grammaticalization of its neuter singular form *olo* meaning `all [wholly], all the time` as demonstrated in (22), mentioned in Babiniotis (2002: 1247):

(22) ***olo*** *ke milouse*
all-adv. and talking 3rd sg. Past
`He was always talking`

Besides these three syntactic positions, *olos* can also appear in a position typical to adjectives as in the following examples (23) and (24) (cf. H., M. & P.-W., 1997: 315, ex. 17 and 18). "In formal usage the singular of the quantifier *olos*, meaning `whole`

[38] The sentence should be ***ta radiofona*** *ola* ***(ta radiofona)*** *ine skarta* `the radios all (the radios) are useless` but *ta radiofona* `the radios` is made redundant allowing *ola* `all` to function as a pronoun.

and accompanying an abstract noun, may behave like a normal adjective with respect to word order"[39] (H., M. & P.-W., 1997: 315).

(23) *i* ***oli*** *katastasi*
the+ **whole**+ situation NOM. sg. FEM
`The whole situation`

(24) *i* ***oli*** *auti* *i* *katastasi*
the+ **whole**+ this+ the+ situation NOM. sg. FEM
`This whole situation`

Olos is often described as "somewhat adjectival" (Joseph and Philippaki-Warburton, 1987: 54) and resembles Classical *holos* as discussed in 3.1 (cf. examples 2 a-d); it "can accompany only a definite noun phrase and unlike adjectives, it precedes rather than follows the article ... Furthermore, unlike adjectives, it "floats", i.e. can be positioned quite far from its head noun" (ibid). In its syntax, *olos* `all` combines with a [+def] DP and floats in the sentence in a similar way to English *all* as shown below in (25 a-d) that originate in Joseph and Philippaki-Warburton (1987: 54, ex. (74a-d)):

(25) a. ***olos*** *o* *kafes* *hithike* *epano* *mu*
all+the+coffee-NOMsg.MASC spilt 3rdsgPast on me GEN
`The whole coffee was spilt on me`

b. *o kafes* ***olos*** *hithike epano mu*
c. *o kafes hithike* ***olos*** *epano mu*
d. *o kafes hithike epano mu* ***olos***

The following diagram summarizes the syntactic positions a floater *olos* can acquire:

(26) a. [**olos**] o kafes olos hithike olos epano mu olos

(b) o kafes **olos** hithike epano mu

(c) o kafes hithike **olos** epano mu

(d) o kafes hithike epano mu **olos**

[39] It is also important to remind ourselves that "quantifiers and demonstratives are often considered modifiers in Classical and Modern Greek, so they are on a par with adjectives" (Matthieu and Sitaridou (2004: 16).

Its ability to float does not classify *olos* `all, whole` - and to a certain extent its extension *olokliros* `whole, entire`- as a `true` quantifier (cf. Matthewson, 2001: 163) which implies that *olos* could be more than a `traditional` quantifier. Matthewson's (2001) remark enhances our analysis of such quantifiers as Quantificational Modifiers (QMods) that often appear in a D-position and can then analyze as D-quantifiers, as explained in 5.2.2 of chapter 5. Its placement in an adjectival (e.g. *i* ***oli*** *katastasi* `the overall/entire situation`), demonstrative (e.g. ***oli*** *i andres* `all the men`), adverbial (e.g. ***olo*** *kaugadizoun* `they always fighting`), and a prefix position –discussed in more detail in 3.4- (e.g. ***olo****-kardos* `wholehearted`) allow speculations that perhaps *olos* relates to modifiers since all these syntactic positions are attributed to elements with Modification properties, with the exception of *olos* in a pronoun position (e.g. ***oli*** *irthan* `all came`). Such a variety of syntactic manifestations is not unique to Greek *olos* but it has been detected also in the case of English *all*. This allow us to contemplate Partee's (1995) speculations that the quantifier *all* is not always acting as a determiner but could also be grouped along with *only* as a cross-categorial modifier when examined in specific syntactic environments. Could this be the case with Modern Greek *olos*? A more detailed analysis in chapter 5 will attempt to answer such questions.

In 2.3 of chapter 2 we discussed Haspelmath's (1995) view that `all` relates to `whole`, `entire`, `total`, `complete` and `full`; these concepts manifest themselves in English in adjectival position contrary to `all`. Modern Greek also allows similar manifestations of such concepts. In addition to Modern Greek *olos* in adjectival position we will also discuss in chapter 4 *olikos* `entire, overall, total`. *Olikos* relates

etymologically and semantically to *olos* `entire, whole, overall` and grammaticalizes into adverbial *olikos*[40] `totally` as discussed later in 3.4 of this chapter.

3.2.2 Proportionality: *merikos, polis* and *ligos*

Another set of quantificational elements are μερικός [*merikos*] (MASC), μερική [*meriki*] (FEM), μερικό [*meriko*] (NTR) `some, several, few, little, partial`, λίγος [*ligos*] (MASC), λίγη [*ligi*] (FEM), λίγο [*ligo*] (NTR) `a few, a little, a bit, little` and πολύς [*polis*] (MASC), πολλή [*polli*] (FEM), πολύ [*poli*] (NTR) `many, much, a lot, a great deal, great`, which also engage in various syntactic positions similar to those of *olos* discussed in 3.2.1. Regarding their syntactic ordering, Alexiadou (2003) notes that "quantificational adjectives and adverbs appear higher than non-quantificational ones" (Alexiadou, 2003: 12). The following examples show the syntactic order of *ligos* and *polis* placed before any other adjectives and the ungrammaticalities that result from any other ordering; the same is the case with English examples like *the many red houses*, *the few trivial reasons*, etc.:

(27) a. *ta* ***polla*** *kokina spitia*
the+ **many**+ red + houses NOM. pl. NTR
`The many red houses`

b. **ta* *kokina* ***polla*** *spitia*
*the+ red+ **many**+ houses NOM. pl. NTR

c. *i* ***ligi*** *midamini logi*
the+ **few**+ trivial+ reasons NOM. pl. MASC
`The few trivial reasons`

d. **i* *midamini* ***ligi*** *logi*
*the+ trivial+ **few**+ reasons NOM. pl. MASC

[40] There might not be a difference in the transliteration of adjectival and adverbial *olikos*; such difference is obvious in their original spelling in Modern Greek, where the adjectival *olikos* is spelled with –ός and its adverbial variation with –ώς as it is common of Modern Greek adverbs.

Merikos-i-o `some, a few` is a plural partitive inflected as an adjective, used with count nouns as a partitive or as a "nonpartitive quantifier" (Joseph and Philippaki-Warburton, 1987: 136).

(28) ***merika*** *apo ta pedia*
some NOMplNTR of the+ children ACC. pl. NTR
`Some of the children`

(29) ***merika*** *pedia*
some+ children NOM. pl. NTR
`Some children`[41]

Joseph and Philippaki-Warburton's (1987) discussion of the patitive constructions of *merikos* reflects the analysis of all weak quantifiers which license the partitive case which can occur overtly as in Greek example (28) or covertly as in (29)[42] above. Such constructions in Modern Greek regarding not only *merikos* but also *ligos* and *polis*, follow similar structures from Classical Greek which uses the Genitive case in order to express partitivity[43]. Such a construction in Classical Greek is referred to as the Partitive Genitive[44] as in example *tis salaminos*[45] *ta polla* `the greatest part of Salamis (cf. Smyth, 1920: 273), which we briefly discuss in 2.2.2 of chapter 2. Structures similar to *olos* are ungrammatical in the case of *merikos*, *polis* and *ligos* since the latter do not combine with a definite DP as shown in (30a, b):

(30) a. ***merika/ liga/ polla*** *ta pedia*
***few/ a few/ many+** the+ children NOM. pl. NTR

b. ***ola*** *ta pedia*
all+ the+ children NOM. pl. NTR

[41] Examples (29) and (30) originate in Joseph and Philippaki-Warburton's (1987) examples (57) and (58a).
[42] Thomas (2003) discusses the partitive case and its relation to weak quantifiers and notes that the weak quantifiers lincense Partitive case (cf. Thomas, 2003) which also result in the use of the Partitive with overt weak quantifiers.
[43] Partitivity is expressed with the Partitive Genitive which in grammar is "a genitive used to indicate a whole divided into or regarded in parts, expressed in English by of as in most of us" (Concise Oxford English Dictionary, 2002: 1040).
[44] Goodwin (1924) and Smyth (1920) discuss the Classical Greek Partitive Genitive in more detail.
[45] Partitive Genitive is τής Σαλαμίνος `of Salamis` as shown in its English translation.

Both M. Greek *polis* (MASC), *polli* (FEM), *poli* (NTR) `many, much` and *ligos* (MASC), *ligi* (FEM), *ligo* (NTR) `few`, relate semantically and syntactically to M. Greek *merikos* (MASC), *meriki* (FEM), *meriko* (NTR) `some, several`. Joseph and Philippaki-Warburton (1987) describe *polis* as a declinable quantifier, "fully adjectival in all respects" (Joseph and Philippaki-Warburton, 1987; 55) and discuss its ability to float like *olos* and *olokliros* (cf. subsection 3.2.1). Syntactically, *polis* occurs prenominally, with or without a definite article; it can also be placed after the head noun as demonstrated below in (31 a-c) borrowed from Joseph and Philippaki-Warburton's (1987: 55) examples (77-79):

(31) a. ***polla*** *pedia* *den* *agapun* *to*
many + children NOM. pl. NTR not NEG love 3rd pl. Pres the+
sholio
school- ACC. sg. NTR
`Many children do not love school`

b. ***ta*** ***polla*** *pedja* *den* *agapun*
the+many+children NOM. pl. NTR not NEG love 3rd pl. Pres
to sholio
the+school ACC. sg. NTR
`Most (lit. "the many") children do not love school`

c. *pedja* ***polla*** *den* *agapun* *to*
children+ **many** NOM. pl. NTR not NEG love 3rd pl. Pres the+
sholio
school ACC. sg. NTR
`Many children do not love school`

Joseph and Philippaki-Warburton (1987) make an interesting observation, when they mention that *polis* has no other fully acceptable movement and only occasionally can "appear at the end of the sentence when its head noun phrase occurs at the beginning" (ibid); their examples (80a-b) and (81a-b) are given below as (32a-b) and (33a-b):

(32) a.?? *pedja* *den* *agapun*
children NOM. pl. NTR not NEG love-3rd pl. Pres
to sholio ***polla***
the+school ACC. sg. NTR **many** NOM. pl. NTR

b. **pedja* *den* *agapun* ***polla***
*children NOM. pl. NTR not NEG love 3rd pl. Pres **many** NOM. pl. NTR
to sholio
the+school ACC. sg. NTR

(33) a. **ta pedja* *den* *agapun*
*the+children NOM. pl. NTR not NEG love 3rd pl. Pres
to sholio ***(ta) polla***
the+school ACC. sg. NTR **(the)many** NOM. pl. NTR

b. **ta pedja* *den* *agapun*
*the+children NOM. pl. NTR not NEG love 3rd pl. Pres
(ta) polla *to sholio*
(the)many NOM. pl. NTR the+school ACC. sg. NTR

Joseph and Philippaki-Warburton (1987) comment on such syntactic variation, "Similar movement restrictions apply also to true adjectives, which do not readily "float" to positions in the sentence other than adjacent to the head noun. Because of the many common features, morphological as well as distributional, such as exhibiting comparative and superlative degree forms, e.g. *perisotero-* `more` corresponding to *pol-*, items in this last group of declinables may be classified syntactically with the adjectives and only semantically with the quantifiers" (Joseph and Philippaki-Warburton, 1987: 55).

Normally, the syntax of *merikos-i-o*, *ligos-i-o*, and *polis-i-i* allows them to appear before a noun and in complementary distribution with the Greek definite article as shown in the following example (34 a-d):

(34) a. ***i*** *andres* `the men`
b. ***meriki*** *andres* `some/a few men`
c. ***ligi*** *andres* `few men`
d. ***polli*** *andres* `many men`

The above is not the only construction of such quantifiers; Greek *merikos*, *ligos* and *polis* also engage in constructions common to Greek adjectives where they are preceded by the definite article and followed by the noun; they all agree in case,

number and gender. This thesis will take under consideration the fact that *merikos*, *ligos* and *polis* appear in a syntactic position common to adjectives, which reflects their label `adjectival determiners` used by Giannakidou and Merchant (1997). These features are demonstrated in our examples (35), (36) and (37) below:

(35) ***i*** ***meriki*** *sighisis* *tou* *plithous*
the+ partial+ confusion NOM. sg. FEM of-the+ crowd GEN. sg. NTR
itan *anapofekti*
was 3rd sg. Past inevitable ACC. sg. FEM
`The partial confusion of the crowd was inevitable`

(36) ***i*** ***ligi*** *doulia* *de* *ferni* *polla*
the+ little+ work NOM. sg. FEM not NEG bring 3rd sg. Pres a-lot-of+
lefta
money ACC. pl. NTR
`The little amount of work does not bring a lot of money`

(37) ***i*** ***polli*** *tebelia* *vlapti*
the+ much+ laziness NOM. sg. FEM harms 3rd sg. Pres
`A lot of laziness is bad`[46]

Such constructions are typical of adjectives and will be discussed in detail in chapter 5. They also grammaticalize into adverbials and prefixes which confirms their adjectival nature and will be discussed in more detail in 3.3. Subsection 3.3 sets the scene for the investigation into the semantics of such quantificational elements and their analysis as expressions of Totality and Proportionality.

3.3 Quantificational expression in Modern Greek

Quantification is expressed in Modern Greek with a variety of quantifiers as we have already seen in our discussion in sections 3.1 and 3.2. Several of the issues discussed in 2.3 of chapter 2 reoccur in Modern Greek with the use of certain quantificational

[46] Such cases are similar to example (27) mentioned in 2.2.1., involving *olos* `all, whole`:
(27) ***i oli*** *katastasi* **[the+ whole+** situation NOMsgFEM] `The whole/overall situation`

elements whose morphology and inflection along with some of their syntactic constructions are similar to English and French adjectives discussed in 2.3, and their Arabic counterparts discussed in 2.4 of chapter 2. In this section we will examine in more detail the distribution and interpretation of Modern Greek *olos* and its extension *olokliros* and *olikos* as well as on *merikos*, *polis* and *ligos* briefly discussed in 3.2.

Section 2.5 of chapter 2 mentions the definitions for English adjectives *entire*, *total*, *partial*, *little* and *great* which match the definitions of the equivalent Modern Greek quantifiers discussed in this chapter. According to Babiniotis (2002: 1249) όλος [*olos*] (MASC), όλη [*oli*] (FEM), and όλο [*olo*] (NTR) `whole, all` translates as the one who exists in its entirety, totality or total quantity, without missing part of it, while ολόκληρος [*olokliros*] (MASC), ολόκληρη [*olokliri*] (FEM), and ολόκληρο [*olokliro*] (NTR) `entire, whole` is a combination of όλο- + κλήρος [*olos* + *kliros*] `all + part` and refers to something that has all its parts and therefore it is complete; ολικός [*olikos*] (MASC), ολική [*oliki*] (FEM), and ολικό [*oliko*] (NTR) `total, entire, utter, complete` is that which is related to the whole and includes the totality of something and not part of it[47] (cf. Babiniotis, 2002: 1246). These can receive a wider classification as expressions of Totality, while the rest can be viewed as expressions of Proportionality (i.e., *merikos*, *ligos* and *polis*). Μερικός [*merikos*] (MASC), μερική [*meriki*] (FEM), and μερικό [*meriko*] (NTR) `some, several, a few, little` is mainly used in its plural form (cf. H., M.& P.-W. (1997)) and it etymologically refers to μέρος `part`; it translates as something that defines an entity that is of a small number and cannot be defined in a specific way (cf. Babiniotis (2002: 1074)). *Polis* refers to something that exists in big

[47] We deliberately limit our discussion to the above mentioned adjectives and we are aware that these are not the only quantificational adjectives. Others include *arketos* `quite a lot [of]`, *kambosos* `quite a lot [of]`, *mbolikos* `plenty [of]`, *ligos* `[a] little` (pl. [a] `few`), *ligostos* `little`, *elahistos* `very little`, *tosos* `so much`, *osos* `as much as` (cf. Holton, Mackridge, Philippaki-Warburton (1997)).

quantity and is described as an adjective of genders (i.e. πολύς [*polis*] (MASC), πολλή [*polli*] (FEM), and πολύ [*poli*] (NTR) `many, much` (cf. Babiniotis, 2002: 1448); λίγος [*ligos*] (MASC), λίγη [*ligi*] (FEM), and λίγο [*ligo*] (NTR) `some, few, little` is another element with adjectival syntactic properties which means that which exists in a small quantity (cf. Babiniotis (2002: 1010) (cf. examples of *polis* and *ligos* in 3.2.2). The following is an attempt to summarize important data in our discussion of Greek QMods, concentrating more on sentences like those in (38a), (38e), (39a) and (39b):

(38) a. ***oli*** *i* *fitites* *irthan*
all+ the+ students NOM. sg. MASC came 3rd pl. Past
sto *parti*
to-the+ party ACC. sg. NTR
`All the students came to the party`

b. ***olokliri*** *i* *polis* *kaike*
whole+ the+ city NOM. sg. FEM was-burned 3rd pl. Past
`The entire city was burned`

c. ***oli*** *i* *ipothesi* *mirizi* *psema*
all+ the+ situation NOM. sg. FEM smells 3rd pl. Pres lie NOM. sg. NTR
`The entire situation involves lies`

d. ***i*** ***oli*** *ipothesi* *mirizi* *psema*
the+ whole+ situation NOM. sg. FEM smells 3rd pl. Pres lie NOM. sg. NTR
`The overall/ entire situation involves lies`

e. ***i*** ***oliki*** *katastrofi* *tis*
the+ total+ destruction NOM. sg. FEM of-the+
polis *itan* *anapofekti*
city GEN. sg. FEM was 3rd pl. Past inevitable ACC. sg. FEM
`The total destruction of the city was inevitable`

(39) a. ***meriki/ ligi/ polli*** *fitites* *irthan*
a few/few/many+students NOM. pl. MASC came 3rd pl. Past
sto *parti*
to-the+ party ACC. sg. NTR
`A few/ few/ many students came to the party`

b. ***i*** ***meriki*** *katatsrofi* *tis*
the+ partial+ destruction NOM. sg. FEM of-the+
polis *itan* *anapofekti*
city GEN. sg. FEM was 3rd pl. Past inevitable ACC. sg. FEM
`The partial destruction of the city was inevitable`

c. ***i*** ***polli/ ligi*** *doulia* *de* *ferni*
the+ `**great/little**`+ work NOM. sg. FEM not NEG bring 3rd sg.
eutihia
happiness ACC. pl. FEM
`The great/little amount of work does not bring a lot of money`

The following section deals with various morpho-syntactic manifestations of such quantificational expressions, their semantic interpretation and polysemous nature. The same section also investigates the cross-categorial manifestations of these elements.

3.3.1 Morpho-syntactic alternatives and cross-categorial patterns

In 2.3.1 we already discussed possibilities of expressing the concept of `the whole` and `the part` in natural languages using a variety of morpho-syntactic alternatives which can be interpreted in a unified manner as expressions of Totality and Proportionality. In this section we will see that the same is possible in Modern Greek with elements like *olos*, *olokliros*, *olikos*, *merikos*, *ligos* and *polis* which occur in a variety of constructions similar to our English data presented in 2.3.1.

The morpho-syntactic alternatives we discuss in 3.3.1 are the grammaticalized forms of expressions of Totality and Proportionality which derive from the neuter form of these expressions. They occur in a grammaticalized form as adverbials or as nominal and verbal prefixes – perhaps, similar to the A(ffix)-quantifiers discussed in 2.2 of chapter 2- that combine with a stem noun, adjective, adverb or verb and result in the formation of a new lexical item. As quantificational adverbials they follow the syntax of normal adverbs; both prefixes and adverbials derive from their adjectival root. Such prefixes include ολο- [*olo-*] which grammaticalizes from *olos-i-o* `all, whole, overall, all the time`, πολυ- [*poli-*] from *polis-i-i* `many, great` and λιγο- [*ligo-*] from *ligos-i-o* `some, few, little`. They all function at the morphological level and denote

meanings similar to those of their roots; *olo-* denotes what is `whole`, `total` or `complete`, *ligo-* denotes a small quantity or degree and *poli-* refers to a big quantity or a great degree. Examples of such morpho-lexical alternatives are the following:

(40) *i* ***olo-****klirosis* *tou anthropou*
the+ **completion** NOM. sg. FEM the+human GEN. sg. MASC
`The completion of man`

(41) *to* ***olo-****hriso dahtilidi* *itan* *akrivo*
the+ **all**-gold+ ring NOM. sg. NTR was 3rd sg. Past expensive ACC. sg. NTR
`The pure-gold ring was expensive`

(42) ***olo-****psihos* *o* *giannis* *poulise*
wholehearted+the+John NOM. sg. MASC sold 3rd sg. Past
ta *panda*
the+ everything ACC. pl. NTR
`John wholehearted sold everything`

(43) *o* ***poli-****vasanismenos andras*
the+ **much**-afflicted+ man NOM. sg. MASC
`The much-afflicted man`

(44) *to* ***poli-****tragoudismeno tragoudi*
the+ **much**-sang+ song NOM. sg. NTR
`The much-sung song`

(45) *o* ***ligo-****logos* *ine* *panda*
the+ **few**-words NOM. sg. MASC is 3rd sg. Pres always ADV
kerdismenos
winner NOM. sg. MASC
`The man-of –few-words is always a winner`

An additional lexical alternative used to express Totality and Proportionality is in the form of adverbials which also derive from the neuter form of *olikos*, *merikos*, *ligos* and *polis*; such adverbials also follow the syntax of non quantificational adverbs, i.e. they mainly occur at the end of the sentence and combine with a verb which they

syntactically modify. Thus, ολικά [olika] or ολικως [*olikos*] `*totally*`[48] derives from the adjective ολικός-ή-ό [*olikos-i-o*] `total, entire, complete, overall`; it also refers to `the whole` and takes as its antonym μερικως [*merikos*] `partially` which refers to `part of the whole`. The adverbial λίγο [*ligo*] `*a little, a bit*` refers to a small quantity, and derives from the neuter λίγο [*ligo*] of λίγος [*ligos*] `few, little`; similarly, the adverbial πολύ [*poli*] `*a lot, a great deal, much, greatly, highly, widely, deeply*` denotes quantity in high degree and derives from the neuter πολύ [*poli*] of πολύς [*polis*] `*many, much*`. The following examples illustrate the syntax of the grammaticalized adverbials[49]:

(46) *i* *polis* *katastrafike* ***olikos/ olika***
the+ city NOM. sg. FEM was-destroyed 3rd sg. Past **totally** ADV
`The city was destroyed totally`

(47) *i* *polis* *katastrafike* ***merikos***
the+ city NOM. sg. FEM was-destroyed 3rd sg. Past **partially** ADV
`The city was partially destroyed`

(48) *i* *polis* *katastrafike* ***poli***
the+ city NOM. sg. FEM was-destroyed 3rd sg. Past **a great deal/** a lot ADV
`The city was destroyed a great deal`

(49) *i* *polis* *katastrafike* ***ligo***
the+ city NOM. sg. FEM was-destroyed 3rd sg. Past **a little** ADV
`The city was destroyed a little`

It appears that the morpho-syntactic varieties such elements produce with the means of grammaticalization[50] resemble the D- and A- quantifiers already discussed in

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[48] Another form of the adverb ολικως [*olikos*] `*totally*` is ολικά [*olika*] which corresponds to the identical form of the neuter of the adjective *olikos* `total`. There is no semantic difference between the two, except in that ολικως [olikos] `*totally*` is more formal than ολικά `*totally*`.

[49] We can also use adverbials *elahista* `in a minimal degree` and *megista* `in a maximal degree` in a similar way we could use their adjectival counterparts. However, we will not discuss such alternatives.

[50] Grammaticalization is - in the sense of Meillet (1912) a fourth type of linguistic change- a property that "gives rise to new grammatical categories" (Kiparsky (to appear in Dianne Jonas (ed)). Meillet (1912) suggested that "grammaticalization is due to the loss and renewal of expressiveness of speech

chapter 2; the differences between the two is that the former are all products of the same elements that initially occur as syntactic modifiers with semantic quantificational properties, while the latter bear the typical ending for adverbs that distinguishes them from their adjectival roots; such fundamental features force us to view them as a unique case of quantifiers that relate to adjectives in terms of their morpho-syntax.

Our brief discussion in 3.3.1 shows that the morpho-syntactic alternatives Modern Greek uses to express Totality and Proportionality are similar to those used in English and French discussed in 2.3.1 of chapter 2. Modern Greek allows similar occurrences but it is peculiar in a sense that it uses the same lexical item in all occurrences (whether in determiner or adjectival position), while English makes use of different lexical items that semantically relate to their Modern Greek counterparts. Such Modern Greek elements are obviously polysemous in meaning and it is with the means of polysemy that are licensed to appear in such a variety of syntactic structures.

The concept of Totality is expressed in Modern Greek with `total` quantifier *olos* which appears in a demonstrative's position when combined with a count plural noun (e.g. *oli i fitites* `all the students`) or with a mass singular noun (e.g. *oli i polis* `all the city`) and interprets as `all`, `whole` or `entire`; in adjectival constructions (e.g. *i oli katastasi* `the entire/ overall situation`; *i oli sighisis* `the total confusion`) Greek *oli* interprets as `entire`, `overall` or `total`[51]. As a nominal or vebal prefix *olo-* combines with a stem noun, adjective or adverb and interprets in a similar way as `all-`, `whole-

forms in the use of language, reasoning that, since this is a constant factor in the ordinary use of language, the changes it triggers must have an intrinsic direction" (ibid).

[51] The semantic transition from *olos* and *olokliros* to *olikos* allows *olikos* to be identified as semantically similar to English *total* and French *total*.

`, `complete-` and `pure-` as in examples (41-43); all such meanings are described as expressions of `the whole` (cf. Haspelmath (1995)). Their English and French [52] adjectival counterparts also engage in similar syntactic constructions but because of not being polysemous they appear as different adjectives not related etymologically to determiners *all* and *tout*. However, they are semantically related; for instance, in English examples like *all the city* can be paraphrased as *the entire city*; both noun phrases refer to *city* as a mass entity.

Similarly, the concept of Proportionality is expressed in Modern Greek with `partial` quantifiers *merikos*, *ligos* and *polis*. *Merikos* is a `partial` quantifier which also appears in all categorical patterns and shares similarities with other similar elements in English and French. When in D-position it combines with count plural entities and means `some, a few` (e.g. *meriki fitites* `some students`), while in adjectival position it is placed between the definite article and a mass singular noun to interpret as `partial` (e.g. *i meriki sighisi* `the partial confusion`); therefore, Greek *merikos* relates semantically to English *partial*, French *partiel* discussed in 2.3 and Arabic *ju'zzi'* already discussed in 2.4 of chapter 2. In its adverbial form, i.e., *merikos*[53] follows the syntax of normal adverbs and interprets as `partially` or `partly`. *Polis* and *ligos* also appear in D- position in similar constructions to *merikos* as well as in adjectival and adverbial position and as grammaticalized verbal or nominal prefixes. As determiners

[52] A syntactic difference between French and English/Greek in their adjectival structures is that in French the adjective is often placed after the noun as in the case of *un succès partiel* `a partial success` mentioned in 1.3.4 of chapter 1. This is the same construction French *entier* follows which confirms its adjectival properties.

[53] *Merikos* `partial` does not grammaticalize into a prefix; however, a prefix like *miso-* is often borrowed to express the meanings of something `being incomplete` or being achieved `halfway` as in *i polis* ***miso****-katastrafike* `the city was partly destroyed` or as in *to* ***miso****-teliomeno/* ***miso****-diavasmeno vivlio* `the half-finished/ partly-read book`. The verbal and nominal prefix *miso-* originates from adjective *misos-i-o* meaning `half` and it usually combines with a stem participle to mean either `half(way)` or `incomplete`.

they combine with a [-def] NP and translate as `many` and `few` (e.g. *polli fitites* `many students`; *ligi fitites* `few students`), while in adjectival position they translate as English *little* and *great/ much* respectively[54] when they refer to the amount/degree of a state (e.g. *i polli fasaria* `(lit.) the much noise`; *i ligi fasaria* `the little noise`). Often, *polis* and *ligos* are synonyms of Modern Greek adjectives *megalos* `big, large` and *mikros* `small` when reference is made to the amount or degree of an achievement as in *i megali katastrofi pou egine stin poli* `the great destruction inflicted on the city` and *i mikri katatstrofi pou egine stin poli* `the little destruction inflicted on the city`, where both adjectives refer to the large or small quantity of the city destroyed. This reflects a similar interpretation of English examples like *a large/ small part of the city was destroyed* which will be mentioned later in chapter 4, and the ungrammaticalities of English constructions like * *the little/ great destruction inflicted on the city.*

In their verbal or nominal prefixed forms *poli-* and *ligo-* they combine with a stem noun, adjective, adverb or verb and bear similar interpretations. As quantificational adverbials they appear after the VP as it is common for Greek adverbials or before an adverb or an adjective as degree modifiers. All the above mentioned elements are detected in similar categories and morpho-syntactic positions as it is expected of a unified class of quantifiers. The semantic analysis of such elements as `total` and `partial` quantifiers will be the focus of chapter 4, while the next subsection 3.3.2 will discuss their polysemous nature.

[54] Their interpretation is similar to English *great* and *little* and French *grand* and *petit*, already discussed in 1.3 of chapter 1.

3.3.2 Varieties of polysemy and systematic ambiguities

Often expressions of Totality and Proportionality are polysemous[55]. Subsection 3.3.2 intends to clarify different readings attributed to such expressions. Their polysemous nature often allows such expressions to be interpreted either as quantificational or as degree modifiers. This present thesis is concerned mainly with the quantificational interpretation of such expressions and will not discuss their cases as degree modifiers. Normally, the interpretation of expressions of Totality relates to `the whole` and ranges between the meanings of `all`, `whole`, `entire`, `total`, `complete` and to a certain extent `full`[56], while expressions of Proportionality include meanings that denote `the part` like `partly` and `incomplete` for *merikos* and its adverbial extensions, or `little`, `a little` and `small` for *ligos* and its extensions and `big/large`, `great` or `much` for *polis* and its extensions.

In 2.3.2 we became familiar with such cases in English, French and Arabic which correspond to similar polysemous cases in Modern Greek. Often *olos* in its adjectival form combines with a singular noun to mean `whole, entire, overall` (e.g. *i oli katastasi* `the overall situation`, *i oli istoria* `the whole story`); in a demonstrative's position it combines with a plural noun to mean `all` (e.g. *oli i mathites irthan* `all the students came`); as a prefix, *olo-* is also used to denote an entity or an event as a `whole` (e.g. *olo-psihos* `wholehearted, hearty`, *olo-kardos* `whole-hearted`, *olo-selidos* `full-paged`, *olo-fotos* `full of light, illuminated`, *olo-skotinos* `full of

[55] For instance, *polis* can be semantically ambiguous between the meanings of `much` (e.g. *egine **poli** thorivos* `much noise was made` and `very` (e.g. *etane **poli** krio* `it was very cold`). Other similar ambiguous cases include the semantic ambiguities in the following sentences: 1) *i oliki katastrofi tis polis* in which *oliki* can interpret as `total` if it refers to the amount of the destroyed city or as `absolute` if it refers to the degree of destruction inflicted on the city; 2) the different interpretation of *oli* as `entire, whole` in ***oli** i polis katastrafikeike* `the entire city was destroyed` and *oli* as `all` in ***oli** i andres irthan* `all the men came`.

[56] We do not discuss the interpretation of such elements as `complete` or `full` in the thesis, but we mainly concentrate on the meanings of `all`, `whole`, `entire` and `total`.

darkness, pitch dark`, *olo-metaksos* `pure-silk`, *olo-malos* `pure wool` and *olo-hrisos* `pure gold`, *olo-nihtia* `all-night-long, vigil`, *olo-imeros* `lasting one-day, day-long`) or to intensify the essence of something (e.g. *olo-aspros* `snow white`, *olo-katharos* `clean, spotless`, *olo-faneros* evident, obvious, clear, complete[ly] clear`, *olo-monahos* `all alone, all by oneself`). Stavropoulos (1988: 621) interprets *olo-* as `all, very` in *olo-mauros* `quite black` and *olo-katharos* `very clean`, semantic variations that can be attributed to its polysemous nature. However, are all these interpretations quantificational? Or is it that *olos* often functions as a degree modifier to show that a property has been accomplished to its exhaustive degree? Partee (1995) makes a similar suggestion when puzzled with the numerous syntactic manifestations of English *all*, she suggest that "*all* is not so much acting as a determiner as it is adding an `exhaustiveness` meaning to what is otherwise the meaning of a bare plural" (Partee, 1995: 583) as in her examples *all clear*, *all night*, *all gone*, etc. *Olo-kliros* `entire` is a good example of the quantificational properties of prefix *olo-* which refers to totality or the entirety of *–kliros* `the part`. A sentence like *efage* ***olo****kliro to peponi* `he ate the whole melon` would mean that someone ate all the parts of the melon, that is the entire melon. This example is similar to a sentence like ***oli*** *i polis katastrafike* `the entire city was destroyed` which can be paraphrased as ***olo****kliri i polis katastrafike* `the entire city was destroyed` referring to every part of the city, that is everything that constitutes the city that was destroyed. Perhaps in combinations like ***olo****-katharos* `spotless`, ***olo****-faneros* `all clear`, ***olo-****monahos* `all alone` where *olo-* interprets as `completely`, it functions more like a degree modifier rather than a quantifier. Such cases are not of our concern.

Merikos is similar to *olos* regarding its polysemous nature whether it appears in the form of an adjective or a prefix. It refers to `an unspecified part` of `the whole`. When it appears in D-position and combines with a plural noun it interprets as `some` (e.g. *meriki mathites irthan* `some students came`) but when combined with a singular noun in adjectival construction it interprets as `partial` (e.g. *i meriki katastrofi tis polis* `the partial destruction of the city`) referring to an unspecified amount or degree of something accomplished. Such a polysemous nature appears also in the case of its adverbial extension μερικως [*merikos*] `partially` which also refers to `part of the whole` without identifying the exact quantity and therefore, it interprets as `partially`. Its synonym is εν μέρει [*en meri*] `partly`and it is the antonym of ολικως [*olikos*] `totally`. *Olikos/ olika* `totally` relates to the `whole` or to the total of something, and derives from *olikos* `entire, total, complete`, a semantic extension of *olos* `all, whole, entire`. Its synonym is πλήρως [*pliros*] `completely, fully` and ολοκληρωτικά [*oloklirotika*] `totally, completely, absolutely, utterly, wholly`, which seem to appear mainly in the interpretation of prefix *olo-* as a degree modifier (e.g. *olo-mauros* `quite black`, *olo-skotinos* `completely dark, pitch-dark` and *olo-katharos* `very clean, extremely clean`).

Polis refers to `a big/ large part` of `the whole`; when in D-position it combines with a plural noun to mean `many` (e.g. *polli*[57] *mathites irthan* `many students came`) but when combined with a singular noun in an adjectival construction it means `great` (e.g. *i polli sighisi tou plithous* `the great confusion of the crowd`); in its nominalized form as *i polli* interprets as `the majority` or `the many` (e.g. *i polli protimoun ti*

[57] The transliteration of πολύς [polis] `many, much` might vary through out the thesis since we allow it to reflect its original orthographic spelling in Modern Greek. Therefore it might be written either with one or a double l.

thalassa `the majority prefers the sea`), while its prefix *poli-* denotes either big quantity, *endasi* `tension` or *ektasi* `expansion` (e.g. ***poli**-anthropos* `populous, crowded`, ***poli**-pleuros* `many-sided`, ***poli**-vasanismenos* `much-afflicted`, ***poli**-teknos* `having many children`); it intensifies the stem (e.g. *poli-asholos* `very busy`, *poli-milo* `talk too much`, *poli-logos* `talkative`) or it shows frequency (***poli**-tragoudismenos* `much-sang`, ***poli**-diavasmenos* `much-read`) (cf. Babiniotis, 2002: 1443). Such examples show the possibility of *polis* receiving a quantificational reading - which is the focus of this thesis - or a degree modification reading not only in its prefix form but also in its adverbial manifestation which we will ignore. Its adverbial form denotes quantity in high degree and derives from the neuter πολύ [poli] of πολύς [polis] `*many, much*`. It splits between two meanings: as `a lot` or `much` when it refers to a large amount or quantity (e.g. *efaga poli* `I ate a lot`), or as `a great deal` when it refers to degree (e.g. *i polis katastrafike poli* `the city was destroyed a great deal`), or `very` when it intensifies (e.g. *efaga poli ligo* `I ate very little`, *ine poli sofos* `he is very wise`, *ine poli noris* `it is very early`, *ine poli enohlimenos* `he is very annoyed`).

Ligos and its extensions as expressions of Proportionality refer to `a small quantity` or `a little degree`. When in D-position it combines with a plural noun to mean `some, few` (e.g. *ligi mathites irthan* `Few students came`) but when combined with a singular noun in an adjectival construction it means `little` and refers to degree or `small` when it refers to amount or quantity (e.g. *i ligi eutihia* `(lit.) the little happiness`; *to ligo pososto* `the small percentage`). Its prefix form *ligo-* also denotes small quantity literary and metaphorically (e.g. ***ligo**-fagos* `poor/small eater`, ***ligo**-logos* `of few words`, ***ligo**-militos* `reserved, withdrawn, of few words` ***ligo**-zoos* `of

little/short life`) (cf. Babiniotis (2002: 1010). In its adverbial form it interprets either as `a little` (i.e. a small quantity) when it refers to degree, amount or quantity (e.g. *efaga ligo* `I ate a little`), or `a bit` (e.g. *efaga ligo poli* `I ate a bit too much`, ine *ligo enohlimenos* `he is a bit annoyed`)[58]. In these two different interpretations it resembles Modern Greek *polis*. The same ambiguities were detected in English *great* (when it means `considerable`) and *little* (when it means `insignificant`) interpreted as *big* and *small* – referring to a large or a small quantity.

Merikos in a determiner and adjectival form it refers to an unspecified proportion which can be defined in relation to its clausal restriction and its implied interpretation as a small or a big quantity or degree. In a determiner's position *merikos* `some` could refer to a small or a big number of individuals and mean `some`; in an adjectival position it refers to a small amount of a mass entity or great degree or extent a property is exercised on a mass entity. In 2.3 and 2.4 we discussed how English, French and Arabic syntactically manifest Quantificational Modification and how they allow systematic ambiguities in the interpretation of such manifestations. We also mentioned in the relevant section of chapter 2 how natural language allows ambiguous readings in expressions of universal quantifiers (cf. Haspelmath 1995) and how languages like Italian, Moroccan Arabic and French translate *many*, *much*, and *very* by the same word (cf. Doetjes, 2007: handout). Modern Greek also allows similar ambiguities in a systematic way. Greek *olos* is often used to refer to the `whole` of a mass singular entity or to a countable plural entity; we already mentioned a sentence like *oli i fitites irthan sto parti* `all the students came to the party` in which *olos* refers to the exhaustive number of students who came to the party and means

[58] *Poli* and *ligo* are are not only polysemous but also homonymous since their meaning varies according to their syntactic position and they are pronounced and spelled the same.

`all`, while in *oli i polis kaike* `the entire city was burnt` *olos* refers to what constitutes the city as a mass entity - or in the sense of Bach (1986), the stuff that constitutes what appears to be a city and means `whole, entire`. In *i oli katastasi* `the entire/ overall situation`, it interprets as `overall` which is close to the meaning of `total`. Modern Greek like Italian, Moroccan Arabic and French "does not normally distinguish between `much/many` and `too much/many`" (Holton, Mackridge and Philippaki-Warburton, 1997: 315), and uses the neuter forms of polysemous *ligos-i-o* `some, few, little` and *polis-i-i* `many, much, great` as quantificational adverbials *poli* `much` and *ligo* `a little ` placed after the VP or as degree adverbial modifiers being interpreted as `very` and `a bit` respectively, placed before an adverbial or an adjectival modifier. The following section 3.4 clarifies such varieties of Modern Greek candidates of Quantificational Modification, and presents certain cases of QMods discussed in chapter 5.

3.4 Quantificational Modification in Modern Greek

The polysemous nature of quantifiers like *olos*, *merikos*, *ligos* and *polis* discussed in 3.3 allows such lexical items to appear in a variety of constructions. In this section we concentrate on constructions common to adjectives (i.e. def. article + adj + N), in which such quantifiers are found. Such class of quantifiers derive from Classical Greek `adjectival` quantifiers discussed in 3.1 and maintain their syntactic modification properties while semantically induce a quantificational interpretation. We refer to such a class as ***Quantificational Modifiers*** which can be divided into two main groups: the first consists of *olos* and its like which we label as ***`total` quantifiers*** or ***expressions of Totality***, while the second group consists of quantifiers *merikos*, *ligos* and *polis* to which we refer as ***`partial` quantifiers*** or ***expressions of***

Proportionality. Both groups extend to grammaticalized adverbials and prefixes as it is common of most adjectives in M. Greek and share the same etymological roots. The thesis does not offer a thorough analysis of all cases of Quantificational Modifiers (i.e. QMod-adjs, QMod-advs and QMod-prefixes) but concentrates on the adjectival occurrences of QMods. However, because of semantic similarities they are expected to induce the same quantificational interpretation. The quantificational manifestations described in section 3.3 involve a variety of syntactic constructions, using systematically certain categorical devices, which often have ambiguous interpretations. What we are concerned with are mainly adjectival constructions of such elements which relate semantically to their determiner, adverbial, and prefixed constructions. Their polysemous nature allows them to take several meanings ranging from `all`, `whole`, `entire`, `overall`, `total`, `complete` or `full`, common to all expressions of Totality common not only in Greek but also in other natural languages (cf. Haspelamth (1995)); the polysemous nature of expressions of Proportionality is responsible for attributing them meanings that vary between `some`, `few`, `many`, `partial`, `little`, `great`, etc. Quantificational Modification is seen as a subclass of Quantification examined in terms of Totality and Proportionality. This classification resulted from two factors: we first took into consideration the views of Cushing (1981)[59], Joseph and Philippaki-Warburton (1987), Alexiadou (2003) and Babiniotis (2002) that such quantifiers are `adjectival` which provided us with the intuition to analyze such elements considering both their adjectival position in terms of Syntax and the quantificational interpretation they induce in terms of Semantics and for this

[59] Cushing (1981) believes that quantifiers in Greek are mainly adjectives, and can only be classified as quantificational expressions because of their semantics;Joseph and Philippaki-Warburton (1987) name such elements are `Quantifiers Modifiers` and Alexiadou (2003b) discusses the syntactic position of what she calls as `quantificational` adjectives and adverbs as they appear before the non quantificational; Babiniotis (2002) treats all those quantifiers as adjectives when he discusses their etymology, syntax and morphology.

we refer to them as QMods. From our brief investigation into the roots of the quantifiers we explore in the thesis, it appears that `adjectival` is mainly a grammatical status that rules the syntax and morphology of such quantifiers and allows them to appear in syntactic constructions common to adjectives. This was the second factor that contributed to our speculations that such elements should be refer to as Quantificational Modifiers. In the Greek grammar such quantifiers are known as ποσοτικά επίθετα [posotika epitheta] `adjectives of quantity`[60]. The name *posotika* is derived from *posotita* which is the Greek for `quantity`, which is derived from Greek *poso* `amount` and also relates etymologically to interrogative *poso* meaning `*how much/ how many*`. Our analysis will reflect this name and will only deal with such elements as count and mass entities that involve amounts and degree in their semantics.

3.5 Conclusions

Chapter 3 extends our discussion about Quantification in natural language and shows how it is manifested in Modern Greek, not only in the form of D- and A- quantifiers but also with other elements that appear in adjectival position but semantically induce a quantificational interpretation as they refer to sets of relations, a semantic property attributed to quantifiers. We refer to such `total` and `partial` quantifiers as QMods, agents of Quantificational Modification: another subclass of Quantification. Modern Greek data were compared to previous data from English, French and Arabic discussed in chapter 2.

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[60] Adjectives with quantificational properties differ from pronouns with similar semantic properties in their syntactic constructions. Perhaps, this is an apparent reason that Greek differentiates between ποσοτικά επίθετα [posotika epitheta] `adjectives of quantity` and ποσοτικές αντωνυμίες [posotikes antonimies] `pronouns of quantity` (e.g. *kapios* (MASC), *kapia* (FEM), *kapio* (NTR) `someone`).

Section 3.1 gave a brief discussion about the diachronic relations between Modern Greek quantifiers and their Classical Greek ancestors while section 3.2 discussed certain quantificational elements as they appear in various morpho-syntactic manifestations whose interpretation allows them to classify as expressions of Totality and Proportionality. Because of their semantics we refer to such elements as `total` and `partial` quantifiers instead of the `universal` and `existential` terms we used in chapter 2 when we discussed quantifiers in general. Chapters 4 and 5 deal with such expressions of Totality and Proportionality in more detail and analyze their semantics in relation to their syntax and interpretation, concentrating on data mainly from English (cf. chapter 4) and Modern Greek (cf. chapter 5).

An initial discussion of such data in chapters 2 and 3 allows us to speculate that these linguistic variations are clearly related from a diachronic perspective. In 2.3 and 3.3 certain quantificational elements are found to be cross-linguistically polysemous and systematically ambiguous between two readings as they appear in similar syntactic environments. Such findings pose two initial questions: (1) whether there is a common semantics or universal model structure underlying the interpretation of these elements in their cross-categorial manifestations, and (2) how cross-linguistically universal are the relations between the quantifiers/modifiers of syntactic categories and their semantic interpretation? And if both cases are instances of semantic universals differentially realised in the morphology and syntax of different languages, then, are there any typological patterns that relate to questions (1) or (2)? (cf. Bach and Chao, 2008 to appear). An initial proposal we will explore in the next chapters is that the common semantics linking quantifiers and modifiers involve the notions of totality and proportionality. In the case of quantifiers, this is defined over the sets of

entities which form the denotation of the Generalised Quantifier. In the case of quantificational modifiers, this is defined over the (total or partial) degree to which the modified element is involved (e.g., *the entire city*).

Chapters 4 and 5 discuss the semantics of Quantificational Modification in detail using data mainly from English and Modern Greek. Chapter 4 discusses the main semantic properties that pair Quantificational Modifiers with quantifiers and their syntactic similarities to adjectives relaying mainly on English data, while chapter 5 concentrates more on the way Modern Greek demonstrates Quantificational Modification, giving a more detailed semantic analysis of Quantificational Modifiers as they appear in adjectival position.

CHAPTER FOUR

Quantificational Modification in Natural Language

4.0 Introduction

In the previous chapters we have established that semantic quantification is manifested in natural languages through a variety of morphological and syntactic forms: determiners, adverbs, modals, prepositions or affixes. We have also examined the recurrent claim that many elements traditionally treated as quantifiers display characteristics and distribution typical of adjectives, and that these ***Quantificational Modifiers*** (***QMods***) often express notions of totality, partiality and proportionality. These notions can also be expressed by adjectival means, as *entire*, *total* and *partial* in English and their French and Arabic counterparts (cf. sections 2.3 and 2.4) illustrate. Similar cases were explored in Modern Greek in sections 3.3 and 3.4. I have proposed that these elements – adjectival in form and quantificational in meaning – should be thought of as ***Quantificational Modifiers***, and that Quantificational Modification constitutes a cross-linguistic means of expressing Totality and Proportionality. Chapter 4 develops this claim in the light of analyses of **gradable adjectives**, adjectives whose semantics involves what has variously been termed **measure** (Siegel (1980)), **scales** (Doetjes (1997)) or **degrees** (Kennedy 1999a)).

4.1 Adjectival Modification

This section explores ***Adjectival Modification*** and the syntactic and semantic properties of `normal` and `gradable` modifiers in order to establish a possible relation between natural language adjectival modifiers and ***QMods***. ***Modification*** is a process found in both the nominal and the verbal domain, in which a modifier is optionally attached to a nominal or a verbal phrase giving them certain attributes. The

syntactic realisation of modifiers varies; in the nominal domain they appear usually as adjectives, while in the verbal domain they are mainly adverbs. Other forms of modifiers include sentential or propositional modifiers (e.g. *obviously* in *obviously, he didn't do it*), degree modifiers that modify modifiers (e.g. *very* in *the very tall man*), etc.

Regarding the semantic and syntactic similarities between adjectives and adverbs, Parsons (1980) discusses and suggests that adjectives and adverbs stand for functions that map properties to properties. For instance, the adjective *brown* in *Fido is a* ***brown*** *dog* "stands for a function which maps the property of being a dog to the property of being a brown dog" (Parsons, 1980: 37); and the adverb *slowly* in *Carlos runs* ***slowly*** "stands for a function which maps the property of running to the property of running slowly" (ibid).

Nominal modifiers such as adjectives can be classified in terms of three notions: Quality, Quantity and Location (cf. Rijkhoff, 2002). Qualifying modifiers relate to the qualitative properties of the referent of the NP and resemble adjective *rich* in the NP *the* ***rich*** *man*; such qualifying modifiers in their plural form (i.e. *the rich*) can refer to a collective set of entities. Quantifying modifiers "pertain to quantitative properties of the referent of the NP" (Rijkhoff, 2002: 173) and are often identified with numerals placed in adjectival position as cardinal *three* in *the* ***three*** *men* and ordinal *first* in *the* ***first*** *price* and *every* ***first*** *prize*. Localizing modifiers "relate to locative properties of the referent of the matrix NP" (ibid) and vary between demonstrative pronouns (e.g. ***this*** *book*), relative clauses (e.g. *the book* ***you want so much***), possessive modifiers (*John's book*) and locative modifiers (e.g. *the book* ***on the table***). Rijkhoff's notion of

Quantity relates to the possible quantificational interpretations of modifiers like numerals that can be placed in a position common to determiners like *three* in ***three*** *men* or in a position common to adjectives (i.e. between the definite article and the noun) like *three* in *these* ***three*** *men* or *the* ***three*** *men*, or *these three* (with the adjective made redundant). As we have seen the D-quantifiers *many* and *few* may appear in constructions such as *the many/few* N (e.g. ***the many boys*** *that came to the party*, ***the few reasons*** *you gave me*, ***the few cities*** *left intact*, etc.), and in these cases we have argued that they are QMods.[61]

Such observations allow us to speculate on the nature of a possible semantic connection between gradable adjectives, Rijkoff's notion of Quantity Modification and Quantification proper. The previous chapters have shown that numerals and QMods frequently display systematic polysemous behaviour across languages, as shown in the following examples:

(1) a. **Three** boys left early
b. **Many** boys left early

(2) a. **The three** boys left early
b. **The many** boys who came early, left early

(3) a. **The three** boys who came early, left early
b. **The red** books were lost

In the first of examples (1a, b) *three* and *many* may be argued to function as determiners in the DP, while in the second set of examples (2a, b) the numeral *three* in (2a) and the Q-determiner *many* in (2b) are placed between the determiner *the* and the noun, consistent with the distribution of uncontroversial adjectival modifiers like *red* in (3b). What interpretation do these elements have in structures such as those in

[61] Constructions like *the many/the few* with no N are similar to *the rich* mentioned previously referring to the proportional amount of a group as `the majority` or `the minority`.

(2)? Do quantifiers like *many* lose their quantificational properties when they appear in adjectival position and function as modifiers, or do they maintain aspects of their quantificational semantics? In order to answer these questions this chapter will explore whether it is possible to envisage a treatment of the semantics of QModifiers such as *many* and *three* that extends to adjectives such as *whole*, *total* and *partial* in English and their polysemous French and Arabic counterparts of section 2.3.

4.1.1 `Normal` adjectives

The ***Adjective*** has been described by Siegel (1979) "as a word that modifies a noun of some sort and appears either in the predicate or next to the noun as part of the noun phrase" (Siegel, 1979: 224). For example, the adjective *red* appears in the predicative position[62] in *the house is **red*** and in the attributive position next to the noun in *the **red** house*. We are here mainly concerned with adjectives in syntactically attributive positions.

The syntactic positions in which adjectives are realised correlate with their semantic interpretation. As Siegel notes, absolute adjectives such as *chief*, *main*, *principal*, *utter*, *mere*, *veteran*, *former*, *ultimate* and *actual* appear only in attributive positions (*a **mere** gesture*, **This gesture is **mere***), while relative adjectives such as *unused*, *nearby*, *sick*, *parallel*, *drunk*, *nude*, *fat*, *short*, *tall*, *four-legged*, *mutual*, *angry* and *aged* can appear in both attributive and predicative positions (*a **mutual** friend, The*

[62] Kamp (1975) notes that predicative adjectives are originally attributive and discusses the meaning of *clever* as "a function which maps the meanings of noun phrases onto other such meanings; e.g. the meaning of *clever* is a function which maps the meaning of *man* into that of *clever man*, that of *poodle* onto that of *clever poodle*, etc. Often predicative uses of adjectives are explained as elliptic attributive uses. Thus, *This dog is clever* is analyzed as *This dog is a clever dog* – or as *This dog is a clever animal*, or perhaps as *This dog is a clever being*" (Kamp, 1975: 123).

feeling is ***mutual***). A third class, `dual` adjectives such as *beautiful* in *beautiful dancer*, *old* in *old friend*; *true* in *true lover*, *bad* as in *bad violinist* are semantically ambiguous between two interpretations[63] and are not immediately relevant to our discussion of QMods.

It appears that adjectives are not always of a uniform semantics. Siegel (1980), following Kamp (1975) and earlier terminology distinguishes between *intersective* and *non-intersective* adjectives. If the noun *table* may be said to denote the set of tables, and an intersective adjective such as *round* may be argued to denote the set of round things, then the phrase *round table* may be interpreted as denoting the set intersection of both sets, i.e., set of things which are both round and are tables. The denotation of a non-intersective adjective, on the other hand, cannot be defined in the same way. Thus a *mere offering* is not found in the intersection of the set of offerings and the set of 'mere' things, and a *false friend* is presumably not to be found in the set of friends.

Siegel suggests that the semantic properties of adjectives determine the syntactic configurations in which they occur. Thus "all these adjectives that appear exclusively prenominally ... are exclusively non-intersective in their semantics, while those few that appear exclusively predicatively ... are exclusively intersective" (Siegel, 1980: 53-54). "Generally, an adjective in the prenominal position has a non-restrictive

[63] Semantic ambiguity "reflects the double syntactic role of the adjective that the semantic information is gleaned from syntactic structure" (Siegel, 1980: 9). Semantically *beautiful* in *Marya is a beautiful dancer* can refer to how beautifully Marya dances or to her physical appearance; in the first case *beautiful* is relative, restrictive, non intersective and relates to event modification implying that it refers to a dancer who dances beautifully but in the second case *beautiful* is absolute, restricting, intersective and refers to a dancer who is physically beautiful.

reading [non-intersective] and one in post-nominal position has a restrictive reading [intersective]" (Siegel, 1980: 123).

Partee (2007), following Kamp and Partee's (1995) proposals, further distinguishes two subclasses in the non-intersective adjectives appearing in prenominal position (*`normal` adjectives* in Partee's terminology): *subsective* adjectives, (e.g., ***good*** in *a good father* refers to an individual who is a father and has the property of being GOOD AS A FATHER), and `modal` adjectives such as ***fake*** in *fake gun*, which is presumably not a real gun, even if it resembles one in appearance. This latter class is also referred to as *privative adjectives* (cf. Partee, 2007: 157).

Adjectives have been classified as in (4) below according to Scott (2002). Such a classification shows the link between the semantics of adjectives and the syntactic configurations in which they occur. Scott's (2002) proposed hierarchy determining the structure of modifiers in nominal phrases. Scott follows the cartographic approach of Cinque (1999) which relates temporal, aspectual and modal heads to their adverbial counterparts. In extending this approach to the nominal domain, Scott proposes that the more or less rigid ordering of adjectival modifiers observed in many languages can be characterised in terms of the following universal (non-exhaustive) template:

(4) DETERMINER > ORDINAL NUMBER > CARDINAL NUMBER >
SUBJECTIVE COMMENT > EVIDENTIAL/EVALUATIVE > SIZE >
LENGTH > HEIGHT > SPEED >?DEPTH > WIDTH >
WEIGHT > TEMPERATURE >?WETNESS >
AGE > SHAPE > COLOUR > NATIONALITY ? ORIGIN >
MATERIAL > COMPOUND ELEMENT > NP

It can be seen that Scott's (2002) hierarchy is not to be understood as an ordering of lexical adjectives as such, but rather as a ranking of the characteristics which determine the adjective's interpretation. Although Scott demonstrates that the

hierarchy in (4) has syntactic consequences, it is not purely syntactic in nature. Rather, in common with Siegel (1979, 1980) and Partee (2007) (among many others), it classifies adjectives on the basis of the semantic interpretation available to them in particular syntactic configurations, and does so on the basis of an extremely fine-grained semantics.

It can be seen, for example, that privative and subsective adjectives such as *good* and *large* are associated with SUBJECTIVE COMMENT, EVIDENTIAL/EVALUATIVE and SIZE readings, and are expected to precede adjectives in the lower categories such as *red* (colour), *round* (shape) and *wooden* (material) (e.g., a *beautiful large red wooden table*, not **a wooden red large beautiful table*).

Lexical adjectives can of course have multiple interpretations, and Scott's hierarchy predicts that different orderings will constrain the readings that may be available. Thus, *a beautiful tragic dancer* is a 'tragic dancer' (COMPOUND ELEMENT) whatever kind of dancer that may be who is considered beautiful (EVIDENTIAL/EVALUATIVE) either as a dancer or as an individual. In contrast, *a tragic beautiful dancer* is a beautiful dancer (EVIDENTIAL/EVALUATIVE) who has met with what we consider to be tragic circumstances (SUBJECTIVE COMMENT).[64] Partee (2007) also discusses the semantics of gradable adjectives such as *tall* to which we devote the next sections. Section 4.1.2 discusses the semantics of *tall* while section 4.2 explores how `gradable` adjectives like *tall* relate semantically to QMods.

[64] The variant orderings *a beautiful, tragic dancer* and *a tragic, beautiful dancer* involve either appositives or covert coordination, and so allow for a wider range of contextually induced readings not constrained by Scott's hierarchy.

4.1.2 `Gradable` adjectives

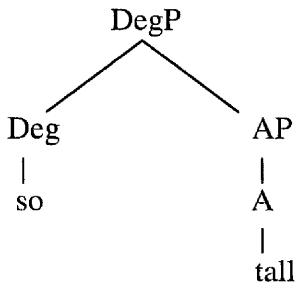
This subsection examines the semantics of adjectives such as ***tall***, where individuals who are 'tall' can be ordered in terms of their height. This class of adjectives corresponds to the **measure adjectives**[65] in Siegel (1981), **scalar adjectives** in Doetjes (1997) and **gradable adjectives** in Kennedy (1999a). We will adopt Kennedy's term `gradable adjectives` to refer to modifiers like *tall*. "Semantically, gradable adjectives can be informally defined as predicative expressions whose domains can be partially ordered according to some property that permits grading." (Kennedy 1999a: xiii). Such a semantic property is named ***Gradability***, specific to degree modifiers. In the case of our earlier example *tall*, its domain can be ordered according to HEIGHT, the domain of the adjective *heavy* can be ordered on a scale of WEIGHT, and so on. In contrast, non-gradable adjectives such as *unique*, *polygonal*, *dead* and *previous* do not have domains which are naturally associated with an intrinsic scale part of their core meaning.

Adjectives like *tall*, whose core meaning is gradable, are also distributionally distinct from non-gradable adjectives. Thus *tall* may occur in comparative or superlative constructions (e.g., *taller than*, *tallest*, *too tall*) and can be combined with Degree-heads (DegP) *how*, *so*, or *as* (e.g. *how tall*, *so tall*, *as tall as*, etc.), while an adjective such as *previous* cannot (**more previous than,** too previous, *as previous as*). Doetjes (1997) syntactically analyzes constructions such as *how tall* as Degree Phrases (DegP), where the Deg-head (i.e., *how*, *so*, *as*) and the AP are two separate constituents. In the case of comparatives such as *tall+er*, the adjective *tall* is raised

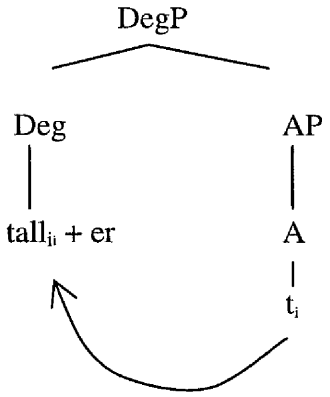
[65] "[M]easure readings emerge in postnominal (and predicate) position, but not in pronominal position" (Siegel, 1980: 125) and can be paraphrased as `large for a man`, `tall for a person`" (Siegel, 1980: 126).

from the AP to incorporate into a suffixal Deg-head. Diagrams (5) and (6) refer to two different gradable constructions; diagram (5) demonstrates the structure of *so tall*, (cf. Doetjes, 1997: 96, diagram 8 (a)), while diagram (6) illustrates the comparative *tall* + *er*, where *tall* moves to associate with the bound affix *-er* (cf. Doetjes, 1997: 96, diagram 8(b)):

(5)



(6)

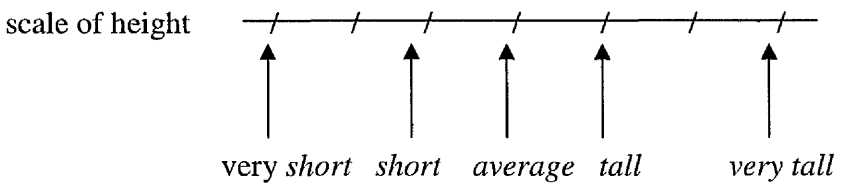


`Gradable` adjectives like *tall* are "expressions that denote relations between objects and abstract measures or *degrees*" (Kennedy, 1999a: 3). `Gradable` are such adjectives that "semantically must permit `grading` as in the case of *tall* whose domain can be ordered according to a measure of height" (Kennedy, 1999: 3) and can be interpreted as points on a scale[66]. Other adjectives with gradable semantics are *young, old, thin, fat*, etc. `Non gradable` or `non scalar` are those adjectives which do

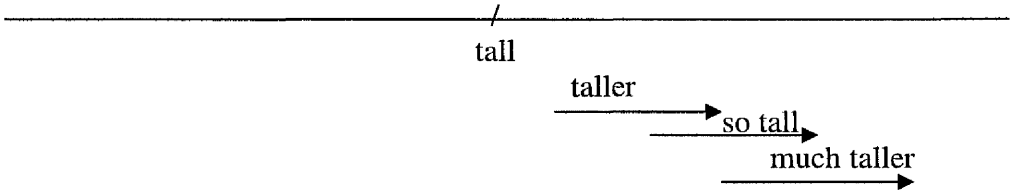
[66] Such an interpretation goes back to Cresswell (1976) who suggests that when we make comparisons we have in mind points on a scale.

not permit `grading`, e.g., *former, alleged, imaginative, exceptional* and *red*[67]. We refer to *tall* as our default example of `gradable` adjectives whose degrees of grading we define in diagrams (7) and (8) below:

(7) **gradable** *tall*



(8) **gradable** *taller*, and *so tall, much taller*



Tall is also described as a `scalar` adjective since it can be associated with points on a scale of height, as demonstrated in diagrams (7) and (8). Adjectives like *tall* and *long* form a comparative with a degree morpheme *more* or *–er*, but they can also occur with other degree modifiers such as *quite*, *very* and *fairly* in complex syntactic degree constructions. `Gradable` adjectives are analyzed as two-place relations between degrees and individuals or as measure functions – functions from objects to degrees. These measure functions apply to abstract representations,[68] `degrees` as another sort of entities into the ontology (cf. Kennedy (1999b)).

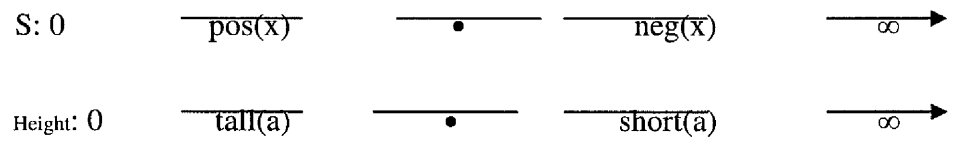
[67] *Red* can only become gradable by imposing on it a syntactic rather than a lexical scale as in *very red, extremely red, fire red*, etc.

[68] Kennedy (1999b) notes that such abstract representations can be construed as a set of objects totally ordered along some dimension (such as height, width or density) where each object represents a measure, or degree, of `φ-ness`.

A gradable adjective is of the form `*x is φ*` which would mean that the degree to which *x is φ* is compared to some other degree *ds* on a scale associated with φ (i.e., the property attributed to the adjective, e.g. *tall*) that identifies a standard for φ[69]. `Gradable` and `non gradable` adjectives differ in another respect; "non-gradable adjectives like `hexagonal` and `Croatian` always denote functions that return a value in {0,1} when applied to objects in their domains, but gradable adjectives like `dense`, `bright`, and `shallow` can denote functions that return 0, 1 or no value at all when applied to objects in their domains" (Kennedy, 1999b: 3).

Regarding the evaluation of the truth values of *tall*, an entity described as *tall* would be context dependent as "`x is φ' in a context c`" Kennedy (1999b: 4) and the property φ of the adjective is evaluated on a scale of height where **pos** stands for positive extension and **neg** for negative extension and refer to the maximum and minimum points on the scale, where "MAX(posS(x)) = MIN (neg(x))" (Kennedy, 2001: 53), as it is understood from diagram (9) below:

(9)



The vagueness and context-dependency of *tall* appears in the evaluation of its truth values; the domain of *tall* is partially ordered according to some dimension.

"A gradable adjective φ in a context c can then be analyzed as a function that induces a tripartite partitioning of its (ordered) domain into: (i) a positive extension (*posc(φ)*), which contains objects above some point in the ordering (objects that are definitely φ in c), (ii) a negative extension (*negc(φ)*), which contains objects below some point the ordering (objects that are definitely not φ in c), and (iii) an `extension gap` (*gapc(φ)*), which contains objects that fall within an indeterminate middle, i.e., objects for which

[69] Kennedy (1999b) notes that in order to decide whether `x is φ` is true (where φ is a gradable adjective) it is necessary to consider its truth values according to the factors external to the adjective such as the meaning of x and features of the context utterance. In order to consider it as true it is necessary to determine the criteria that x `counts as` φ in a specific context.

it is unclear whether they are or are not φ in c (cf. Sapir's (1944) `zone of indifference`). The net effect of these assumptions is that the truth conditions of a sentence of the form `*x is* $\varphi$` in a context c" can be illustrated for the adjective *tall* as follows (Kennedy, 1999b: 3 figure 2a-c) [70].

(10) a. $\|\varphi(x)\|^c = 1$ iff x is in the positive extension of φ at c

b. $\|\varphi(x)\|^c = 0$ iff x is in the negative extension of φ at c,

c. $\|\varphi(x)\|^c$ is undefined otherwise.

In (10) *tall* is a property of x in a specific context if and only if x has the property φ at this context. Similarly if x does not have φ in a specific context then x has a negative extent of the property *tall*, which would be its negative extension *short* at that specific context. If the truth value is not defined then x can be classified neither as *tall* nor as *short*.

"The partitioning of the domain into positive and negative extension and extension gap is context-dependent, determined by the choice of comparison class. Roughly speaking, a comparison class is a subset of the domain of discourse that is determined to be somehow relevant in the context of utterance, and it is this subset that is supplied as the domain of the function denoted by the adjective" (Kennedy, 1999: 4). For example, in Kennedy's example *Erik is tall*, it is necessary to limit the height domain in order to evaluate the height of Erik[71]. Thus, the individual denoted by Erik should be restricted to a comparison with the standard human height, and "then a comparison class consisting of humans is used as the basis for the partitioning of the domain of *tall*, and the truth or falsity of depends only on the position of Erik in this smaller set" (ibid).

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[70] Kennedy (1999a) argues that "propositions in which the main predicate is headed by a gradable adjective φ have three primary semantic constituents: a *reference value*, which denotes the degree to which the subject is φ, a *standard value*, which corresponds to another degree or to a proposition, and a *degree relation*, which is introduced by the a degree morpheme which defines a relation between the reference value and the standard value" (Kennedy, 1999a: xvii-xviii).

[71] Therefore, Erik is compared only to humans and not to mountains, redwoods or skyscrapers.

As it results from the above theoretical descriptions, gradable adjectives are analyzed as degree modifiers which operate in the nominal domain and maintain their modification properties in their interpretation. Their occurrence in degree comparisons is important in 4.2 in order to set the scene for our discussion of QMods such as *entire*, *total* and *partial*. Such a class of adjectives are syntactic modifiers similar to gradable *tall* but induce a quantificational interpretation which semantically relates them to quantifiers.

4.2 The semantics of Quantificational Modification

The focus of 4.2 is to define the notion of ***Quantificational Modification*** and describe its semantics manifested in the form of certain adjectival occurrences which induce quantificational interpretation. Quantification has been already identified as the semantic operation that allows certain semantic objects (i.e. quantifiers) to operate over set relations, while modification, in semantic terms, is a process that allows modifiers (whether adjectival or adverbial) to affect the meaning of the noun or the verb they modify (e.g. *the* ***red*** *book* vs. *the book*; *the man ran* vs. *the man ran* ***slowly***). ***Quantificational Modification***, on the other hand, is a semantic operation that allows certain syntactic modifiers that appear in the attributive to function semantically as quantifiers over mereological set relations. A default example of Quantificational Modification would be a sentence like *the total destruction inflicted on the city was inevitable* in which QMod *total* quantifies over the mereological sets of `destruction` and `city`. Such a semantic operation is similar to the Quantification manifested in a sentence like *all the men came* in which the quanticational element *all* operates over the set of `people who are men` and the set of `men who came`. It is interesting that in the absence of quantifiers *all* and *total*, sentences like *the men came* and *the*

destruction of the city was inevitable would not be able to receive a quantificational interpretation as it would be natural with sentences like ***all*** *the men came* and *the* ***total*** *destruction inflicted on the city was inevitable* with the presence of quantifiers *all* and *total*.

Quantificational Modification is seen as a purely semantic class of Quantification and because of allowing quantification over mereological set entities, it differs semantically from Predicative Modification discussed in Heim and Kratzer (1998). In cases of Predicative Modification APs like `small elephant` in *Jumbo is a small elephant* receive truth conditions which assert that "Jumbo is an elephant" (Heim and Kratzer, 1998:69) - that is, `Jumbo is a large animal`) and "Jumbo's size is below the average elephant size" (ibid). Cases of Quantificational Modification as in *the total/ partial destruction inflicted on the city of London was inevitable* would allow a similar interpretation of the `amount` of the city of *London* being destroyed and the `degree` of *destruction inflicted on London* as of a certain (i.e. *total* or *partial*) degree, with the difference that in our example, QMods *total* and *partial* would semantically function as quantifiers over the mereological sets of `city` and `destruction` indicating the amount of `city` being destroyed, while in Heim and Kratzer's example *Jumbo is a small elephant* the syntactic modifier *small* preserves its modification properties also in its semantics and functions as a semantic `adjuster` of the meaning of the noun it modifies. `Proportional` QMods such as *entire*, *total* and *partial* operate over sets of (mereologically defined) amounts of the entity or event modified and not as functions on properties like the adjectives *red* and *small*.

Quantification, discussed in chapter 1, ranges over individuals (e.g. D-quantifiers) and `eventualities` (e.g. A-quantifiers), while ***Quantificational Modification*** ranges over mereological sets of mass entities and could be viewed as a purely semantic subclass of Quantification, further examined in terms of ***Totality*** and ***Proportionality*** as discussed in 4.2.1. Subsection 4.2.1 investigates, in particular, the semantics of QMods as they appear in the form of English adjectives *entire*, *total* and *partial* and their semantic relation to quantifiers. Our discussion then extends to cases like English *many* and *few*, which can appear in adjectival position as in *the many* N and *the few* N, but can also be realised as D-quantifiers. We argue that they can pair with QMods since they share similar syntactic constructions and semantic interpretation.

4.2.1 QMods

In 4.1 we referred to Partee's (2007) semantic classification of adjectives into intersective, subsective and nonsubsective, with the privative described as an extreme case of the nonsubsective adjectives (cf. Partee, 2007: 153). In 4.1 we also mentioned Scott's (2002) syntactic hierarchy of adjectives classified in terms of **size**, **length**, **height**, **speed**, **width**, and **weight**. Such adjectives allow `measuring`. However, Scott's hierarchy does not include adjectives like *entire*, *total* and *partial*; these elements also appear between the definite article and the noun as it is expected of adjectival modifiers but they seem to relate semantically more to **quantity** and **degree** rather than to size, length, weight, speed or any other `measure` device. Would this initial classification be sufficient to make such `adjectives` semantically equivalent to quantifiers? In this section we will investigate the semantic properties that allow QMods like *entire*, *total* and *partial* to be semantically identified with quantifiers, even though they syntactically remain modifiers and share similarities with adjectives

in terms of Syntax. Their name: ***Quantificational Modifiers –QMods*** for short- reflects the syntax-semantics interaction in their analysis.

QMods are analyzed as `measure` quantifiers of scalar semantics that appear in a syntactic position common to adjectival modifiers; semantically function as `total` and `partial` quantifiers which operate on proportional, homomorphic sets of degrees and amounts. The way to capture the relation between the degree and amount sets is by a homomorphism, i.e. the semantic `mapping` between the two mereological sets of `city` and `destruction`. Our discussion in this section is about the semantics of specific English QMods (i.e. *entire*, *total* and *partial*) as they appear in the following examples 11(a-c):

(11) a. ***The entire/ whole*** [72]*city was destroyed*
b. ***The partial destruction*** *of the city*[73] was inevitable
c. ***The total destruction*** inflicted on the city was inevitable[74]

Examples (11a-c) imply that there is a city x that suffered some amount of destruction y, whether *total* or *partial*. In (11a) [*the entire city was destroyed*] *city* is seen as a singular mass entity taken as a unity (cf. Sapir, 1930)[75], which refers to all of that makes a city according to our human experience. In (11b) [*the partial destruction inflicted on the city*] and (11c) [*the total destruction inflicted on the city was*

[72] We can also have examples like ***the whole collection*** *included all kinds of dresses* or ***a whole range*** *of issues* in which whole means `a large number` or `all`.
[73] Other examples include: ***the partial paralysis*** made him confined to bed; ***the partial division*** of the property was made to avoid disagreement; ***a partial division*** resulted in total disagreement.
[74] Other examples of ***total*** are: ***the total cost*** of our summer holiday exceeded our means; ***the total number*** of children participating was 100; ***the total measuring*** of the room exceeds 20 meters; ***the total confidence*** of all candidates is needed for the success of the company; ***a total stranger*** has no place in my home; in such examples the meaning of total varies between `the whole` or `something complete`, or `full`.
[75] Sapir (1930) discusses the entities *table* and *chair* as individual objects, as functional units i.e. parts of a set of furniture or as the `whole` table or the `whole` chair as a unity. His discussion can be applied to *city* as a unity, including all that would make a city. Such a perception would depend on the human experience of what a city consists of.

inevitable] indicate the amount of the city destroyed; the meaning of both (11a) and (11c) is the same referring to a city being entirely or totally destroyed.

A comparison between a sentence *the destruction of the city was inevitable* and examples (11b and c) would reveal the quantificational identity of (11b and c); in *the destruction of the city was inevitable* the deverbal noun *destruction* implies telicity but it does not allow a homomorphism that forces a specific amount of the *city* to be inflicted with an equal degree of *destruction* as it occurs in sentences (11b and c) which are under the influence of QMods *total* and *partial.* It appears, then, that the homomorphism is the result of using the QMod, and this homomorphic relation between the mereological sets of `city` and `destruction` allows the quantificational interpretation of sentences (11b, c) but not of a sentence like *the destruction of the city was inevitable.* Both sets of examples imply that there is a `city` x that was inflicted with `destruction` y. Therefore, they imply that there is a relation R between two sets of `destruction` x and `city` y which also allows the relation R' between y and x. This implies that if a certain degree of destruction x was inflicted on a city y then it would result that also a city y was inflicted a certain degree of destruction x. The same homomorphism exists in example (11a) [*the entire/ whole city was destroyed*] between the mass nominal *city* and the event of *destruction* presented in the semantics of the telic verb *destroy.* The role of the QMod *entire/ whole* is to operate on both arguments in order to indicate that *the entire city,* that is the city as a `whole`, *was* (*entirely*) *destroyed.* A sentence like *I read the entire book* would not allow a homomorphic relation between *book* and *read* since there is no deverbal noun involved. As we progress in our discussion of the semantics of such examples (i.e.

examples (11b) and (c)) we are bound to discuss in more detail this homomorphic relation between such mereological sets and the role of the QMod.

QMods *total* and *partial* operate on mass terms like `city` and `destruction` in *the total/partial destruction of the city was inevitable*. Such are, therefore, the QMod's arguments which are both analyzed in a mereological sense. *City* is not a set entity but a mereological entity x which is composed of parts that are available as individual units regardless of their interaction with other parts of x. For instance, if we consider a city like *London* which has been divided into 6 tube zones, we would expect that *London* is a unified city which can be divided mereologically into 6 individual parts which can be inflicted with destruction either as individual parts or as a whole. For this when destruction is inflicted on London, it would be expected that certain parts of London would be affected but not others, unless the destruction is *total*. The QMod would indicate the amount of the destroyed city of London or the degree of destruction inflicted on London, so that if we are talking about a ***total*** *destruction inflicted on the city of London* then it would be expected that all the individual parts of London are destroyed which would imply that London as a unified city (as a `whole`) has been destroyed. Following this thinking, examples like *the* ***total*** *destruction inflicted on the city of London* and *the* ***entire*** *city of London was destroyed* would be semantically identical. Then, examples like *the partial destruction inflicted on the city of London* analyzed in a mereological sense would allow us to think that some tube zones of London were destroyed but not others; for instance, it would be possible that zone 1 and 2 were destroyed but not zones 3, 4, 5 and 6. Similarly it could be possible that zones 1, 3, 4 and 6 were destroyed but not 2 and 5.

A noun like *city* can receive a similar analysis of the noun *apple* discussed in Bach (1986). Both *city* and *apple* can take a cumulative reference when used in their singular form as mass nouns. This would imply that if `parts of city` are added to `parts of city` they would give `city` as a mass in the same way if `portions of apple` are added to `portions of apple` would still give `apple`. Therefore, both entities `city` and `apple` could be analyzed as mass entities.

If we take an apple and cut it into 6 parts – as we divided the city of London into 6 tube zones- then we end up with 6 `portions` of apple. If we say that *Mary ate **some** apple* we would imply that Mary ate `parts` or `part` of the apple; if *Mary ate an apple* we would expect Mary to have eaten all the `parts` of the apple, therefore *the entire apple* or the apple as a `whole`. `The destruction of the city`, therefore, resembles `the eating of the apple` when such mass entities are discussed in terms of mereology (cf. Bach, 1986).

Destruction is a deverbal noun, associated with the durative, telic predicate *destroy.* Because of its semantic relation to its root verb, *destruction* can analyze as an `event` nominal mass. In terms of an `event` analysis *destruction* is a `process`. This is evident in sentences like *the **total** destruction of the city occurred after 4 hours* which shows that the `process` of destruction was completed; when we talk about *the **partial** destruction of the city* we refer to the `process` of destruction that has not been completed. In this kind of analysis it is the QMod *total* or *partial* that indicates the degree of completion of this process. Then, deverbal nouns like *destruction* would represent an event that encodes a homomorphism between a `process` and its effect on its incremental theme. *Destruction* as an event nominal mass tends to associate

interpretation to its incremental theme *city*. Such a relation allows both *destruction* and *city* to function as the QMod's arguments.

In order to account for the examples in (11) I will first consider the relation between the parts of the event (in the case, the process of destruction) and the scale of change (i.e., the degree of destruction). This approach follows Krifka (1992, 1998) and Dowty (1991) who have argued that the progress of an event to its telic conclusion is homomorphically related to the quantity of the incremental theme. Informally put, for the sentences in (11) `the more destruction there has been, the less city remains`. At its telic conclusion, the destruction process comes to an end when there is no more city left.

Beavers argues in (2004) and other works that telic predicates may enter into multiple homomorphic relations. In particular, following Hay et al. (1999) and Kennedy and Levin (2007), telic predicates may enter into a homomorphic relation with the **scale of change** of a participant of the event. This can be illustrated in (14) below (Beaver (2004), example (2)), where the mapping (14b) illustrates a coextensive homomorphism between the event progression and the cleanliness scale:

(14) a. *John wiped the table clean.*

b. Wiping event: $e = e' \oplus \ldots \oplus e''$ (event termination)

Cleanliness scale: $p = p' \oplus \ldots \oplus p''$ (completely clean)

Example (15), below, illustrates the event to scale mapping between the process of destruction and the degree to which the city has been destroyed.

(15) a. Destruction event: $e = e' \oplus \ldots \oplus e''$ (process: beginning, middle, end)

Destruction scale: $d = d' \oplus \ldots \oplus d''$ (points from d to d'')

Cleanliness is a scale of properties that appears in sets of *p* in Beaver's (2004) mentioned above as (14), while we have described *destruction* as a scale of degrees that appear internally linearly ordered as *d*, in (15) above; the arrows in (15) refer to the semantic mapping between the sets of events (i.e. *e* made of *e'*, *e''*, etc.) and the degree points (i.e. *d* made of *d'*, *d''*, etc.).

In examples (11a-c) the role of the QMod as a `measure` quantifier is to operate over the homomorphic, mereological sets of `city` and `destruction` in order to indicate how much amount of the city has been inflicted with the equivalent degree of destruction that would make this city entirely/ totally or partially destroyed. This would imply that the scales of the QMod would be exercised on the scales of destruction and its incremental theme participant (i.e. city) so that they yield a quantificational NP like *the total/ partial destruction inflicted on the city*. QMods can also be defined on a measuring scale the same way deverbal nouns (e.g. *destruction*) form a scale as shown in (15). Therefore, ***scalarity*** appears to be the semantic property that allows scalar expressions to form a scale or a point on a scale (cf. Oxford Concise Dictionary of Linguistics (1997) and appears in the semantics of QMods as it appears in the semantics of `gradable` adjectives – discussed previously in 4.1.2.- making both QMods and `gradable` adjectives `**scalar**`.

We already mentioned that QMods induce a quantificational interpretation in environments like those in examples 11 (a-c) because they involve set relations in a mereological sense; therefore, QMods *entire*, *total* and *partial* resemble D-quantifiers *all* and *some*, which also involve set relations in their semantics. Such D-quantifiers are semantic operators over sets and answer questions like `how many` and `how

much`. This is precisely where QMods may be said to resemble quantifiers. The role of the `proportional` QMods such as *entire*, *total* and *partial* is to operate over sets of (mereologically defined) amounts of the entity or event modified and not as functions on properties like the adjectives *red* and *small*, discussed in 4.2. Compare the following examples of D-quantifiers *all* and *some* and QMods *entire*, *total* and *partial* and their interpretations:

(16) a. ***All*** *students came* ↔ All students are students who came
b. ***Some*** *students came* ↔ Some students are students who came

(17) a. *The* ***entire*** *city was destroyed* ↔
Every city-part was a city-part that was destroyed.

b. ***Total*** *destruction was inflicted on the city* ↔
Every part of the destruction process was a process inflicted on the city

c. ***Partial*** *destruction was inflicted on the city* ↔
Some parts of the destruction process were processes inflicted on the city

The event to scale homomorphism guarantees the equivalence between (17a) and (17b) - as each part of the destruction process proceeds, its corresponding city-part is destroyed. (17c) is treated in a similar fashion, and the sense of Proportionality is expressed as quantification on the mereological domain of the eventuality (in Bach's sense) corresponding to the deverbal predicate *destruction*. Previously, in section 3.5., we suggested that QMods involve `proportions` in their semantics, with the totality interpretation as the (exhaustive) limiting case. This is evident in examples (17 a-c). In (17 a-b) QMods *entire* and *total* are viewed as expressions of `entirety` or `totality`, while in 17c QMod *partial* expresses ` unspecified quantity ` and refers to a `part` of `the whole`. *Partial* is an expression of Proportionality; other similar proportional readings are found in (18) below:

(18) a. A **large/considerable part** of the city was destroyed
b. A **small/insignificant**[76] **part** of the city was destroyed.
c. (Only) **a fraction** of the city was destroyed

In (18) the partitive constructions ***part of, fraction of*** explicity indicate the proportion of the city destroyed, and the event to scale homomorphism guarantees that the amount of 'destroying' is commensurate with the amount of damage. Thus, the homomorphism that gives us the correlation between events and scales turns out then to give us both gradability and ***Proportionality*** (with ***Totality*** as the exhaustive limiting case) at the same time.

Let us go back, now, to our mereological discussion of `apple` and `city` as mass entities in order to explain how the semantic concepts of Totality and Proportionality are perceived. Both concepts are directly related to the semantics of Quantificational Modification. We have already talked about a city like London being divided into 6 tube zones and an apple being cut into 6 slices. Every tube zone of London is taken as an individual part of London which is equally important to compose the city of London as a unified city; similarly, every `portion` or `part` of the apple is equally important in order to make the `whole` apple. If all the zones make what we know as the city of London and all the portions of apple make a whole apple then in these terms we are allowed to interpret ***Totality*** as the exhaustive limiting case of ***Proportionality***; for this we interpret `proportion` as `total` that refers to the whole or `partial` that refers to a relative part of the whole. On this ground we could rename Totality as ***Absolute Proportionality*** and Proportionality as ***Relative Proportionality***. Other forms that resemble QMods are the adjectival forms ***(the) many*** and ***(the) few*** (examples (1) and (2) in section 4.1.), repeated below as (19) and (20):

[76] Such an interpretation reminds us of our Arabic data in 1.4 of chapter 1 and its Arabic adjectival equivalent *bassi:t* `insignificant` as an alternative to mean *qali:l* `little`.

(19) a. **Three** boys left early
b. **Many** boys who came early, left early

(20) a. **The three** boys left early
b. **The many** boys who came early, left early

Three and *many* induce a natural partition on the domain of their modified noun *boys*. Unlike adjectives such as *entire*, this partition is not mereological, but operates over entities, individual boys. When the QMods are as in (18), we end up with the standard Generalized Quantifier reading for (a) and (b). But in (19), the Determiner *the* enforces the requirement that the partition is exhaustive over the (contextually restricted) domain of boys. This is the sense in which QMods such as *(the) many N* and *(the) entire N* can be said to involve quantificational semantics. They both involve quantification, whether over individuals or events, or over parts in mereological domains. The Exhaustivity requirement, inherently imposed in the case of *entire*, externally imposed when the determiner *the* is present, guarantees both Totality and uniqueness of reference. Such forms, along with the semantics of other QMods will be discussed in chapter 5, starting with a brief discussion on Greek modification that shows that Greek QMods share syntactic but also morphological similarities with adjectival modifiers but semantically pair with quantifiers in the same way English QMods *entire*, *total* and *partial*, discussed in 4.2.1. In addition, attention will be given to certain peculiariries of Modern Greek QMods discussed in 5.2 of the following chapter 5.

CHAPTER FIVE

Quantificational Modification and Modern Greek

5.0 Introduction

Chapter 4 discussed cases of Quantificational Modification in English and provided a basic semantic analysis based on certain semantic properties QMods share with quantifiers and gradable adjectives. QMods like *entire*, *total* and *partial* were analyzed as quantifiers that operate over mereological sets of `degree` and `amount`. In addition, QMods were found to share syntactic and morphological similarities with adjectival modifiers. Such similarities direct our discussion in 5.1 to an initial investigation into the way Modification is expressed in Modern Greek while section 5.2 provides a detailed semantic analysis of Greek Quantificational Modifiers *olos* `all, whole, overall`, *olikos* `entire, overall, total`, *merikos* `partial`, *ligos* `small amount/degree` and *polis* `large amount/ great degree` in the same adjectival constructions but with different semantic composition, as discussed in 5.2.1 and 5.2.2. Section 5.3 discusses Proportionality as a semantic principle specific to QMods.

5.1 Modification in Modern Greek

Modification has already been discussed in 4.1 of chapter 4 as the syntactic construction in which a modifier is attached to a noun or a verb and attributes them certain properties. Semantically modifiers - either in the form of adjectives or adverbs- stand for functions that map properties to properties. Adjectival Modification in Modern Greek – which is the focus of 5.1 – is not very different from modification in English since also in Greek "[t]he prime function of an adjective is to modify a noun, to which it attributes a certain quality [...]. An adjective normally modifies a noun in one of two ways: attributively or predicatively" (Holton, Mackridge and

Philippaki-Warburton, 1997: 285-6). "In attributive use an adjective modifies a noun within the same noun phrase [...]" (H., M.& P.-W., 1997: 286), while "[i]n predicative use an adjective appears as a subject predicate, in which case it modifies and agrees with the subject (...), or an object predicate, in which case it modifies and agrees with the direct object (...)" (ibid). "In Greek, all adjectives always precede the noun ... Hence Greek contrasts with languages such as Italian where the head-noun precedes the adjective" (Alexiadou and Anagnostopoulou, 2000: 189).

Modern Greek adjectives differ from their English counterparts in terms of morphology, as they inflect for number, gender and case and agree with the noun they modify. Normally "determiners in Greek DPs precede adjectives and adjectives precede nouns. All three categories overtly agree in gender, number and case." (Alexiadou and Wilder, 1998: 303). "Most (but not all) adjectives have separate forms for masculine, feminine and neuter genders. Some adjectives are indeclinable and have only one form" (Holton, Mackridge and Philippaki-Warburton, 1997: 73). Normally adjectives in Modern Greek are classified into different types depending on their morphology[77], and allow case, number and gender affixation as shown in the following examples (1a-c):

(1) a. ***o*** *psil**os*** *andr**as***
the+ tall+ man NOM. sg. MASC
`The tall man`

b. ***i*** *psil**i*** *gine**ka***
the+ tall+ woman NOM. sg. FEM
`The tall woman`

c. ***ena*** *psil**o*** *agor**i***
a + tall+ boy NOM. sg. NTR
`The tall boy`

[77] In Modern Greek adjectives are also classified according to their stem ending (cf. Holton, Mackridge and Philippakki-Warburton (1997)), but we will ignore such a classification since it serves no purpose in this current research.

Adjectives like *kokinos-i-o* `red`, *oreos-a-o* `handsome`, *mikros-i-o* `small`, *zestos-i-o* `warm`, *krios-a-o* `cold`, etc. are described as `normal/ underived`, while adjectives like *vamenos-i-o* `painted`, *kamomenos-i-o* `made`, *pagomenos-i-o* `made cold`, *pesmenos-i-o* `fallen`, etc., are originally passive perfect participles that function as adjectives in both the attributive and the predicative. Such adjectives are called `deverbal` or `derived` for obvious reasons. Partee (2007) in her discussion of English adjectives reports a similar classification of adjectives into `normal` (i.e. `underived`) and `modal` (i.e. `derived`)[78]. Modern Greek adjectives can also be classified into `normal/ underived`, `gradable` and `derived/ deverbal` which usually have the same syntax and semantics like their English counterparts.

The most acceptable syntactic construction of M. Greek adjectives is to be placed between the determiner and the noun they modify as demonstrated in example 2 (a-b) below, (cf. Alexiadou and Wilder, 1998: 303, ex. (1a, b)):

(2) a. *to* ***megalo*** ***kokkino*** *vivlio*
the+ **big+** **red+** book NOM. sg. NTR
`The red big book`

b. * *to* *vivlio* ***kokkino*** ***megalo***
*the+ book+ **red+** **big** NOM. sg. MASC
`*The book red big`

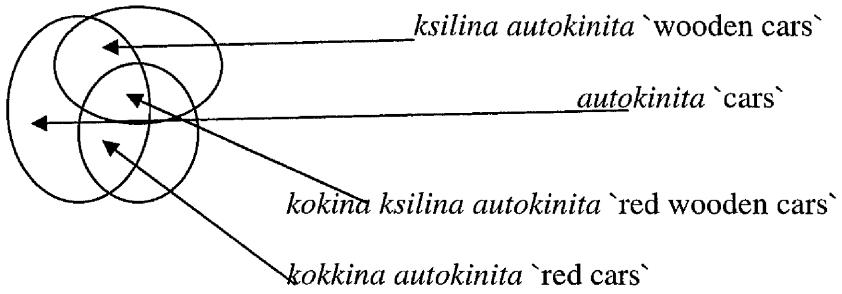
Alexiadou's (2003: 12) gives the hierarchical order of Greek adjectives in her diagram (33) presented below as (3):

(3) numeral > subjective comment > size > age > shape > colour > nationality/ origin > material

[78] It appears that a variety of terminology has been used to refer to adjectives that are not `underived` in the sense of Alexiadou and Anagnostopoulou (2007); Partee (2007) refers to them as `modal` while Kennedy and McNally (1999) refer to them as `deverbal`. Traditional grammars refer to such adjectives as `verbal`. We will adopt Partee's (2007) term `modal`, when we need to refer to adjectives which are originally derived from verbs (i.e. participles).

Such ordering is in agreement with Scott's (2002) hierarchy of adjectival ordering mentioned in chapter 3. Based on (3) it would be grammatical, therefore, to say in Modern Greek *omorfa mikra kokkina agglika ksilina autokinita* when we talk about `beautiful small red English wooden cars`[79]. In terms of semantics, then, an adjectival phrase like *ta kokkina ksilina autokinita* `the red wooden cars` could be represented as the intersection of the relevant adjectives as described below:

(4)



Semantically, Modern Greek adjectives denote "a property, quality or characteristic belonging to or associated with a specific noun or noun phrase" (H., M. & P.-W., 1997: 73) whether they classify as `normal/underived` adjectives or `deverbal/derived`. Modern Greek adjectives will be discussed on the basis of `normal` and `gradable` adjectives, a classification initially laid out in 3.1 in our discussion of English adjectives in the sense of Siegel (1980) and Kennedy (1999). Based on our discussion in 4.1.1., adjectives in Modern Greek also follow a similar semantic classification like their English counterparts (cf. Partee (2007:152) and classify into intersective, non intersective but subsective, non subsective and privative and plain non subsective adjectives, as it would expected of natural languges that bear similarities in the syntactic linear order of APs. Adjectival constructions like *to*

[79] A different adjectival ordering could be possible but with semantic differences such as cases of focus, emphasis, etc. Other reasons that allow variations in syntactic positions relate to the choice of article (i.e., definite or indefinite). However, such cases are not of our concern.

pseutiko autokinito `the fake car` would not result in the same kind of intersection as in *kokkina aglika ksilina autokinita* `red English wooden cars`. Other non intersective adjectives in M. Greek are *ipotithemenos* `alleged` as in *o ipotithemenos dolofonos* `the alleged murderer` and *proin* `former` as in *o proin prothipurgos* `the former prime minister` (cf. Alexiadou (2003).

English subsective adjectives such as *skilful*, also have Modern Greek equivalents such as *epideksios* `skilful` as in *enas epideksios hirourgos* `a skilful surgeon` who is *enas hirourgos* `a surgeon`; in terms of sets, *a skilful surgeon* is a subset of the set of surgeons. Adjectives which are not a subset of a set are classified as non subsective such as *fantastikos-i-o* `imaginary`, *pithanos-i-o* `possible`, *ipotithemenos-i-o* `alleged`, etc. Such adjectives would refer to either no entailments or would entail the negation of the property given by the noun (cf. Partee (2007: 151). Hence, the syntax and semantics of M. Greek adjectives in general are not any different from the syntax and semantics of English adjectives. Then, our discussion of Greek gradable *psilos* `tall` should follow Partee's (2007) discussion of English *tall* and we shall adopt the same analysis based on Kennedy (1999) presented in 4.2.1.

The following section 5.2 discusses the semantic properties of a special class of Modern Greek `adjectives` that induce `quantificational` interpretation and therefore, pair semantically with quantifiers; such `adjectives` syntactically occur in a position common only to adjectives sharing syntactic similarities with such modifiers. In addition, they also share a particular semantic property (i.e. scalarity) with gradable adjectives which is important for their quantificational analysis.

5.2 Quantificational Modification demonstrated in Modern Greek

Section 4.2 briefly discussed cases of English QMods; this present section 5.2 discusses similar cases of ***Quantificational Modification*** in Modern Greek in the form of όλος [*olos*] (MASC), όλη [*oli*] (FEM), όλο [*olo*] (NTR) `*whole, all*` which refers to an entity who exists in its entirety, totality or total quantity, without missing part of it; ολόκληρος [*olokliros*] (MASC), ολόκληρη [*olokliri*] (FEM), ολόκληρο [*olokliro*] (NTR) `*entire, whole*` which is a combination of όλο- + κλήρος [*olos + kliros*] `*all + part*` (cf. 3.3 of chapter 3) and refers to an entity that has all its parts and therefore it is complete; ολικός [*olikos*] (MASC), ολική [*oliki*] (FEM), ολικό [*oliko*] (NTR) `*total, entire, overall*` relates to the whole and includes the totality of something and not part of it[80]; πολύς [*polis*] (MASC), πολλή [*polli*] (FEM), πολύ [*poli*] (NTR) `*considerable, of a large amount, great*` refers to that portion which exists in a big quantity, or to something that happens in a small degree; λίγος [*ligos*] (MASC), λίγη [*ligi*] (FEM), λίγο [*ligo*] (NTR) `*insignificant, of a small amount, little*` denotes that portion which exists in a small quantity or something that occurs in a great intensity or degree; μερικός [*merikos*] (MASC), μερική [*meriki*] (FEM), μερικό [*meriko*] (NTR) `*partial*` refers to μέρος [*meros*] `*part*` of an entity that is of an unspecific amount (cf. Babiniotis, 2002).

Modern Greek Quantificational Modifiers are known among speakers of Modern Greek as **ποσοτικά επίθετα** [*posotika epitheta*] `quantitative adjectives` or `adjectives

[80] We deliberately limit our discussion to the above mentioned adjectives and we are aware that these are not the only quantificational adjectives. Others include *arketos* `quite a lot [of]`, *kambosos* `quite a lot [of]`, *mbolikos* `plenty [of]`, *ligos* `[a] little` (pl. [a] `few`), *ligostos* `little`, *elahistos* `very little`, *tosos* `so much`, *osos* `as much as` (cf. Holton, Mackridge, Philippaki-Warburton (1997)). Such quantificational adjectives can also be named as adjectival quantifiers depending on their syntactic position; for instance, we deal with **QMod-adjs** in the case of *i oli (i) katastasi* `the entire situation`, or with **QMod-adjs** as in *i oliki katastrofi tis polis* `the total/entire destruction of the city` but we deal with **D-quantifiers** in syntactic constructions of the form *oli i andres irthan* `all the men came` and *meriki andres irthan* `some men came`.

of quantity`[81] (cf. chapter 3); their Greek name has given us the intuition to base our analysis on a special feature that appears in the semantics of such `adjectives`, that of degree and/or amount. The Quantificational Modifiers we explore in 5.2 are not various forms of quantificational expressions but the very same lexical element that appears in different syntactic constructions while maintaining a unified semantic interpretation.

5.2.1 Modern Greek QMods

In chapter 4.2.1 we identified English adjectives *entire*, *total* and *partial* as cases of ***Quantificational Modification***, which resemble quantifiers in the sense that they operate on mereological homomorphic set relations of amount and degree. Similar is the analysis given in this present subsection to M. Greek QMods *olikos* and *merikos* which resemble their English counterparts in terms of syntax and semantic analysis but bear certain differences in terms of morphology.

Modern Greek QMods follow the inflection of the definite article they combine with and their host noun as it is common with Modern Greek adjectival modifiers. Greek QMods *olikos* `total` and *merikos* `partial` are the main cases of Quantificational Modification discussed in 5.2.1 in specific syntactic environments given in the examples below:

[81] Quantificational elements in adjectival position differ from those that function as pronouns in their syntactic constructions. Perhaps, this is an apparent reason that Greek differentiates between **ποσοτικά επίθετα** [posotika epitheta] `adjectives of quantity` and **ποσοτικές αντωνυμίες** [posotikes antonimies] `pronouns of quantity` (e.g. *kapios* (MASC), *kapia* (FEM), *kapio* (NTR) `someone`).

(5) a. *i* ***oliki*** *katastrofi* *pou egine*
the+ **total+** destruction NOM. sg. FEM that- happened 3rd sg. Past
stin poli tou Londinou itan
to- the+city NOM. sg. FEM of+the+London GEN. sg. NTR was 3rd sg. Past
anapofekti
inevitable NOM. sg. FEM
`The total destruction inflicted on the city of London was inevitable`

b. *i* ***meriki*** *katastrofi* *pou egine*
the+ **partial+** destruction NOM. sg. FEM that- happened 3rd sg. Past
stin poli tou Londinou itan
to-the+city NOM. sg. FEM of+the+London GEN. sg. NTR was 3rd sg. Past
anapofekti
inevitable NOM. sg. FEM
`The partial destruction inflicted on the city was inevitable`

Semantically *olikos* and *merikos* as in (5a, b) follow the main analysis of English *total* and *partial* discussed in 4.2.1 as `quantificational` operators over mereological set relations, combining with a complex event nominal and its incremental theme participant as they appear in a noun phrase like *i oliki/ meriki katastrofi tis polis* `the total/ partial destruction of the city`.

Grimshaw (1994) argues that such nominals (e.g. Greek *katastrofi* and English *destruction*) have a-structure that reflects their internal aspectual analysis. She notes that such complex event nominals have syntactic arguments and an event structure similar to those of verbs. For this reason we refer to such nouns as `event nominals`, which have a lexico-semantic representation that includes the participants involved in the activities or states described by the verb, and project their arguments syntactically (i.e. in the form of possessive *of* +*N* in English (e.g. *of the city*) or the genitive case of the noun in Modern Greek (e.g. *tis polis* `of the city`)) and semantically (i.e. in the form of the incremental theme participant).

Modern Greek deverbal noun *katastrofi* like its English counterpart *destruction* is an event nominal mass that allows the homomorphic relation between the parts of the event (in the case, the process of destruction) and the scale of change (i.e., the degree of destruction) (cf. discussion on Beavers (2004) in subsection 4.2.1). The change of scale could also be predicted from the etymology of deverbal noun *katastrofi* morphologically composed of *kata-*[82], a prefix that shows downward movement, and the noun *strofi* `turn` - from the verb *strefo* `to overturn` - which literary means the turn or the change to a downward direction. Therefore, *i katastrofi tis polis* `the destruction of the city` would imply the change of the state of the *polis* `city` from its initial state of `not being destroyed` to another state: that of being destroyed[83]. QMods *olikos* `total` and *merikos* `partial` operate on *katastrofi* `destruction` and show the exact extent of destruction inflicted on the city. Therefore, *katastrofi* like *destruction* tends to associate interpretation to its incremental theme *polis* `city` (cf. Krifka (1992, 1998) and Dowty (1991)). Modern Greek noun *polis* `city` analyzes as a mereological entity x which is composed of `parts` that are available as individual units. Such proportional sets then, are identified in relation to each other so that *oliki* `total` is the *katastrofi* `destruction` necessarily exercised on *oli i poli* `the entire city`, while *meriki* `partial` is the *katastrofi* `destruction` exercised on an unspecified *meros tis polis* `part of the city`. This would mean that the QMod must be exercised on every degree of `destruction` that corresponds to an equal amount of `city` destroyed as shown in the diagram below:

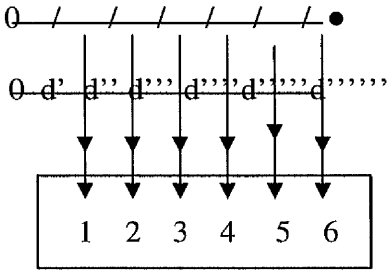
[82] *kata-* is a preposition that grammaticalizes into a prefix to denote degree of upward movement as in ***kata****-vtropiazo* `to completely put into shame` or of downward movement as in ***kata****-vasi* `going down`. The grammaticalization of such a preposition is also discussed by Haspelmath (1995).

[83] Babiniotis (2002: 863) gives the etymology of *katastrofi* as the cause of complete damage or decay or corruption, which agrees with our etymological analysis of Greek *katastrofi*.

(6) QMod: *olikos* `total`

Degree of `destruction`:

London tube zones:

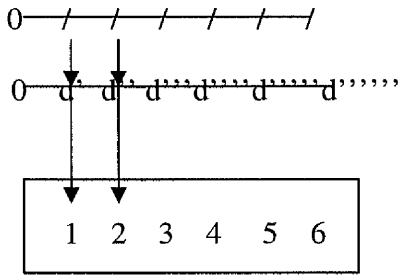


If we consider a city like London divided into tube zones as in (6) then, the QMod *olikos* `total` would correspond to the representation in (6) where *olikos* is identified with the end point (i.e. (•)) on the scale of `destruction` and is exercised on the scale of degree of *katastrofi* `destruction` and the London tube zones. There should be a correspondence between the degrees of *katastrofi* `destruction` and London's 6 tube zones so that the subsets overlap allowing a noun phrase like *i oliki katatsrofi tis polis tou Londinou* `the total destruction of the city of London` to be evaluated as true. Similarly, in the case of QMod *merikos* `partial` in *i meriki katatsrofi tis polis tou Londinou* `the partial destruction of the city of London`, it would be necessary to have some degree of *katastrofi* `destruction` exercised on some of London's tube zones as discussed in 4.2.1. Then, the QMod *merikos* `partial` would be exercised on the proportional mereological sets of *katastrofi* `destruction` and *polis tou Londinou* `the city of London` (divided into tube zones) in order for the noun phrase *i meriki katatsrofi tou Londinou* `the partial destruction of London` to be true. This is demonstrated in the following diagram (7a, b):

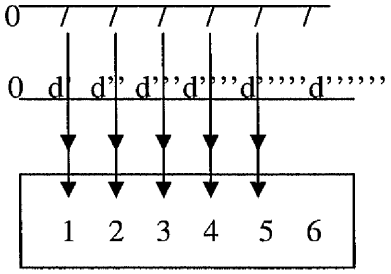
(7) a. QMod: *merikos* `partial`

Degree of `destruction`:

London tube zones:



b. QMod: *merikos* `partial`



The way to capture the relation between degrees and amounts is by a homomorphism between the two mereological sets of *katatsofi* `destruction` and the city of London. Diagrams (6) and (7) are similar in describing this homomorphic relation. Both *olikos* and *merikos* are scalar: *olikos* in (6) as a `total` quantifier is identified with the end point on the scale and operates over the total of degree of destruction exercised on all London's zones, while *merikos* in (7a, b) as a `partial` quantifier is identified with intervals on the scale and operates on `proportional parts` of the mereological sets of *katatstrofi* `destruction` and its incremental theme *polis tou Londinou* `the city of London`.

In (7) the degree of destruction inflicted on the amount of the destroyed city of London are unspecified and therefore, context dependent. If the NP *i meriki katatsrofi tou Londinou* is part of a sentence like *i meriki katatsrofi tou Londinoun perase aparatiriti* `the partial destruction of London remained unnoticed`, such an NP would imply diagram (7a), that is London's tube zone 1 and 2 being inflicted with the equivalent degrees of destruction. If the same NP is part of a sentence like *i meriki katatsrofi tou Londinou prokalese paniko* `the partial destruction of London cause panic` then the interpretation would imply diagram (7b) in which 5 or less out of the 6 tube zones of London are inflicted with an equal degree of destruction. Diagram (7) describes multiple homomorphisms that allow mereological entities like *katastrofi*

and *polis* - that involve `parts` of the `whole` - to relate in terms of inclusion. In both diagrams (6) and (7a, b), only the relevant parts of the mereological sets that are quantified overlap or are inclusive in order to allow the homomorphic `mapping` between the degree of destruction and the amount of city destroyed. Then, the QMod operates on these homomorphic mereological sets so that the degree of destruction inflicted on the amount of the city destroyed is *oliki* `total` or *meriki* `partial`. If there is no QMod involved, then, there wouldn't be a quantificational interpretation for such sentences following the discussion of *total* and *partial* in 4.2.1.

Greek QMods *olikos* and *merikos*, as well as their English counterparts discussed in 4.2.1, might be formalized using the measure of change function as discussed in Kennedy and Levin (2007). *Merikos* and *olikos*, therefore, like English *partial* and *total*, can be seen as a measure of change function which takes a mereological object x (i.e. *polis* `city`) and an event e (i.e. *katastrofi tis polis* `destruction of the city`) and returns the degree – say (50%<d<80%) in the case of *merikos* `partial` or (d =100%) in the case of *olikos* `total` - that represents the amount that x changes in the property measured by m (*katastrofi* `destruction`) as a result of participating in e. In order to capture the measure of change of the degree the process of *destruction* is exercised on its incremental theme participant *city* we have relayed on Kennedy and Levin's (2007) formalism of gradable adjectives in sentences like *the table is* [*wider than the carpet*]. They believe that "the adjectival core of a degree achievement is a special kind of difference function: one that measures the amount that an object changes along a scalar dimension as a result of participating in an event" (Kenendy and Levin, 2007: 18). They further explain this with their representation (25) "which defines for any measure function m from objects and times to degrees on a scale S a new MEASURE

OF CHANGE function m_{Δ}. (Here *init* and *fin* return the initial and final temporal intervals of an event)" (ibid). Kennedy and Levin's (2007) representation (25) of the measure of change is captured as follows:

(8) *Measure of change*

For any measure function m, $m_{\Delta} = \lambda x \lambda e.\, m^{\uparrow}_{m(x)(init(e))}(x)\,(fin(e))$

Kennedy and Levin add that "a measure of change function takes an object x and an event e and returns the degree that represents the amount x changes in the property measured by m as a result of participating in e. It does this by mapping its individual argument x onto a derived scale whose minimal element is the degree to which x measures m at the initiation of e. The output is a degree that represents the positive difference between the degree to which x measures m at the beginning of e and the degree to which it measures m at the end of e; if there is no positive difference, it returns zero" (Kennedy and Levin, 2007: 18-19).

Kennedy and Levin's (2007) formalisation of gradable adjectives in comparative constructions like *wider than* and similar scalarity properties QMods share with gradable adjectives show that perhaps a measure of change could be used for a more precise semantic description of QMods. QMods also enforce a semantic change of measure in the mapping between scales of the degree of the complex event nominal (i.e. *katatsrofi* `destruction`) and its incremental theme participant (i.e. *polis* `city`). The degree measure change in the case of QMods can be described as follows:

(9) a. ***olikos*** `total`: $m_{\Delta} = \lambda x \lambda e.\, m^{\uparrow}_{m(x)(init(e))}(x)\,(fin(e))$

b. ***merikos*** `partial`:

$m_{\Delta} = \lambda x \lambda e.\, m^{c\uparrow}_{m(x)(init(e))}(x)$ (e' before mid (e) or e' before fin(e))

The thesis does not provide the complete formalism of examples of Quantificational Modification given in (5a, b) in 5.2. The complete formalisation of such examples should be considered as the next step in of extending this research on Quantificational Modification.

Other Modern Greek complex event nominals, besides *katastrofi* `destruction`, are *katedafisi* `demolition` as in *i katedafisi tou ktiriou* `the demolition of the building` and *auksisis* `raise` as in *i auksisi ton misthon* `the raise of the salaries`. Such arguments allow QMods *olikos* and *merikos* to operate on proportional sets of amount and degree that increase or decrease in relation to each other.

Additional QMods *olos*, *polis* and *ligos* (cf. 3.2.1 and 3.2.2 of chapter 3) combine with different type arguments and appear in both adj- and D- position. They interpreted as QMods as in examples (5a, b) in 5.2.1 or as GQs (cf. following subsection 5.2.3) analyzed as D-quantifiers; such an analysis reflects our discussion in 2.1.2 about GQs as they appear syntactically in the form of D-quantifiers. The following subsection 5.2.2 superficially discusses such additional cases of QMods which require more attention and further investigation.

5.2.2 Additional types of Modern Greek QMods

Olikos and *merikos* are not the only Modern Greek QMods in adj-position. In chapter 3 we briefly discussed *olos*, *merikos*, *polis* and *ligos* as expressions of Totality and Proportionality along with other additional QMods such as *arketos* `quite a lot [of]`, *kambosos* `quite a lot [of]`, *mbolikos* `plenty [of]`, *ligostos* `little` (pl. `few`), *elahistos* `very little` (pl. `very few`) and *o ipolipos* `the rest [of]` among others. This

present subsection 5.2.2 will focus on QMods *olos*, *olokliros*, *ligos* and *polis* with the intention to show that these are different cases of QMods classified according to their a-structure in the sense of Grimshaw (1994).

Contrary to their English counterparts, Modern Greek QMods are often polysemous and can therefore combine with a different argument even though they appear as exactly the same lexical item[84] as demonstrated in examples (10-18) below:

(10) a. *i* ***oli/ meriki/ polli*** *sighisi*
the+ **entire (total)/ partial/ great**+ confusion NOM. sg. FEM
`The total/ partial/ little/ great confusion`

b. * *i* ***oliki/ligi*** *sighisi*
* the+ **total/little**+ confusion NOM. sg. FEM

(11) a. *i* ***ligi/ polli*** *doulia/ kourasi*
the+ **little/ much** work/ tiredness NOM. sg. FEM
`The little/ great deal of work/ tiredness`

b. **i* ***oliki/ meriki*** *doulia/ kourasi*
*the+ **total/ partial**+ work/ tiredness NOM. sg. FEM

(12) a. *i* ***oli/ polli/ ligi*** *fasaria*
the+ **entire/ much/ little**+ noise NOM. sg. FEM
`The entire/ great/ little noise`

b. * *i* ***meriki*** *fasaria*
*the+ **partial**+ noise NOM. sg. FEM

(13) a. *i* ***polli/ ligi*** *zarari* */ alati*
the+ **little/ much**+ sugar NOM. sg. FEM / salt NOM. sg. NTR
`The large/ small quantity of sugar/ salt`

b. * *i* ***oliki/ oli/ meriki*** *zahari* */ alati*
* the+ **total/ entire/ partial**+ sugar NOM. sg. FEM / salt NOM. sg. FEM

(14) a. *to* ***poli/ ligo*** *fai/ poto*
the+ **much/ little**+ eating/ drinking NOM. sg. NTR
`The large/ small quantity of eating/ drinking`

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[84] We have already seen the case of *olos* which interprets as `entire` (e.g. *i* ***oli*** *ipothesi* `the entire affair`) and `overall` (e.g. *i* ***oli*** *katastasi* `the overall situation`) - or even as `all` (e.g. ***oli*** *i andres* `all the men`). The interpretations of Greek *olos* correspond to individual English QMods: *entire* and *overall* as in *the* ***entire*** *city* and *the* ***overall*** *situation.*

b. * *to* ***oliko/ olo/ meriko*** *fai/ poto*
*the+ **total/ entire/ partial**+ eating/ drinking NOM. sg. NTR

(15) a. *i* ***oli*** *katastasi/ ipothesi/ diadikasia*
the+ **entire**+ situation/ affair/ procedure NOM. sg. FEM
`The entire/overall situation/ affair/procedure`
b. * *i* ***meriki/ polli/ ligi*** *katastasi/ ipothesi/ diadikasia*
*the **partial/ much/ little** situation/ affair/ procedure

(16) a. *i* ***ligi/ polli***
the+ **few/ many** NOM. pl. MASC
`The minority/ majority`

b. * *i* ***oli/ meriki***
* the **all/ some** NOM. pl. MASC

(17) a. ***oli*** *i* *fitites*
all+ the+ students NOM. pl. MASC
`All the students`

b. * *i* ***oli*** *fitites*
* the **all** students NOM. pl. MASC

(18) a. ***meriki/ ligi/ polli*** *fitites*
some/ many/ few+ students NOM. pl. MASC
`Some/ many/ few students`

b. * *i* ***meriki/ ligi/ polli*** *fitites*
* the **some/ few/ many** students NOM. pl. MASC.

In 4.2.1 and 5.2.1 we have already discussed how English *total* and *partial* and Greek *olikos* and *merikos* operate on mereological sets denoted by the event nominal and its incremental theme participant. Grimshaw (1994) mentions two classes of event nominals: those that denote complex events since they have an associated event structure and also an argument structure (cf. discussion of QMods in 4.2.1 and 5.2.1) and those that denote simple events and the result nominals which have no argument structure.

Our examples (10-18) reflect Grimshaw's discussion of simple event nominals. Such QMods quantify over mereological sets of mass nouns that denote events in the form

of achievements, activities or states (cf. Dowty (1991) and Bach (1981)) or even mass nouns that simply denote `quantity` in the sense of Bach (1986) and are not expected to operate over mereological sets of degree and amount as in the case of *olikos* and *merikos* discussed in 5.2.1. For instance, *doulia* `work` in example (11) is an event nominal that expresses activity similar to English *work* (cf. Pustejovsky (1998)). Such a noun combines with QMods *ligos* and *polis* to show only the amount of *doulia* `work` but not with *olikos* `total` and *merikos* `partial`. Other similar nominals are *kourasi* `tiredness` (a result nominal), *ipnos* `sleep` and *paegnidi* `playing`. Nouns like *fasaria* `noise `in example (11) are also event nominals which denote an action and combine well with QMods *ligos* and *polis* but again not with *olikos* and *merikos*. The same is observed with mass nouns like *fai* `eating` and *poto* `drinking` (cf. example (13)) and with mass nouns like *zahari* `sugar` and *alati* `salt` as in example (12) which also combine well only with QMods *ligos* and *polis* since they allow measuring in sets of `amounts`.

Example (15) encourages the analysis of such QMods in terms of mereological sets of `amounts`. In (15) the same QMods combine with the definite article to give a nominalized form of these quantifiers that refer to the majority of people, described as a large/ big quantity of people (i.e. *i polli* `the many`) and the minority of people, described as a small quantity of people (i.e. *i ligi* `the few`). The nouns in examples (10-15) also accept such QMods because they also refer to the `amount` of an activity like *sleep* (i.e. Greek *ipnos*), *eating* (i.e. Greek *fai*), *drinking* (i.e. Greek *poto*), *noise* (i.e. Greek *fasaria*) or of a mass entity like *sugar* (i.e. Greek *zahari*) and *salt* (i.e. Greek *alati*).

Peculiar is the case of nouns like *katastasi* `situation` and *ipothesi* `affair` that accept only QMod *olos*, while an event nominal like *sighisis* `confusion` (cf. example (8a,b)) would accept QMods *olos*, *merikos* and perhaps *polis* but not *olikos* and *ligos*. Our initial understanding would be that since nouns like *katastasi* `situation` and *ipothesi* `affair` can not be divided into `parts` in the mereological sense reject `partial` QMods such as *merikos*, *ligos* and *polis*. On the other hand, *sighisis* `confusion` as an event nominal can be divided in a mereological sense into `parts` that correspond into `amounts` of confusion or to the `whole`, i.e. the state of confusion. This modest explanation is based on our initial discussion of interpreting `proportion` as `total`/ `whole` and `partial`; additional expressions of `large` and `small` `proportions` correspond to QMods *ligos* and *polis* and could be added to our list of cases expressing Proportionality. It is expected that our general analysis of QMods in terms of `proportional` set relations could be applied to these additional cases of QMods. However, such cases require a slightly different treatment than the cases of QMods *olikos* `total` and *merikos* `partial` discussed in 5.2.1 since they only involve `amounts` in their semantics.

In 5.2.1 we only discussed examples like *i oliki/ meriki katastrofi tis polis* `the total/ partial destruction of the city`. QMods *polis* and *ligos* would result in ungrammaticalities if combined with complex event nominals like *katastrofi* `destruction`, *katedafisi* `demolition` and *auksisis* `raise` as demonstrated in the following examples:

(19) a. * *i* ***polli*** *katastrofi* *pou* *egine*
* the+ **great+** destruction NOM. sg. FEM that- happened 3rd sg. Past
stin *poli* *itan* *anapofekti*
to- the+city NOM. sg. FEM was 3rd sg. Past + inevitable NOM. sg. FEM

(20) a. * *i* ***ligi*** *katastrofi* *pou* *egine*
* the+ **little**+ destruction NOM. sg. FEM that- happened 3rd sg. Past
stin *poli* *itan* *anapofekti*
to- the+city NOM. sg. FEM was 3rd sg. Past + inevitable NOM. sg. FEM

Such ungrammaticalities arise because of the ability of QMods *polis* and *ligos* to quantify only over sets of amounts. However, complex event nominals like *katastrofi* `destruction` can combine well with adjectives *megalos* `large, big` and *mikros* `small` to convey the meanings of a `large` and a `small` quantity as in the examples below:

(21) *i* ***megali*** *katastrofi* *pou* *egine*
the+ **large**+ destruction NOM. sg. FEM that- happened 3rd sg. Past
stin *poli* *itan* *anapofekti*
to- the+city NOM. sg. FEM was 3rd sg. Past + inevitable NOM. sg. FEM
`The great/considerable destruction inflicted on the city`

(22) *i* ***mikri*** *katastrofi* *pou* *egine*
the+ **small**+ destruction NOM. sg. FEM that- happened 3rd sg. Past
stin *poli* *itan* *anapofekti*
to- the+city NOM. sg. FEM was 3rd sg. Past + inevitable NOM. sg. FEM
`The insignificant destruction inflicted on the city`

The semantic analysis of such examples would reflect our discussion in 4.2.1 and example (21) would refer to a **large/considerable part** of the city being destroyed while (22) would refer to a **small/insignificant part** of the city being destroyed. Such cases along with examples (10-18) would imply that adjectives like *megalos* `large, big` and *mikros* `small` might also be QMods. However, further investigation into their syntactic constructions and their interpretation would be needed for their establishment as cases of Quantificational Modification in specific syntactic environments.

In 4.2.1 we mentioned that English QMods *total* and *partial* and consequently Greek *olikos* and *merikos* are scalar since they can be identified with a point or with an interval on the measuring scale of `degree`. QMods *polis* and *ligos* are not only scalar

but also gradable. They are scalar because they can be identified as intervals on a measuring scale of `quantity` as shown below:

(23) a. QMod *polis*: 0 / / / / / / / / ∞
q' q'' q''' q'''' q'''''

b. QMod *ligos*: 0 / / / / / ∞
q' q''

In diagram (23a) QMod *polis* is symbolized as intervals from q' to q````` on a scale of `quantity`, while QMod *ligos* is symbolized as intervals from q' to q'' on a scale of `quantity` as in diagram (23b).

QMods *polis* and *ligos* are also gradable like *tall* (cf. 4.2.1) and its Greek counterpart *psilos* (cf. 5.1) since they form a morpho-lexical scale as in *para polli* `very many`, *perissoteri* `more` or *i perissoteri* `most` and *poli ligi* `very few` or *ligoteri* `less than`. They also form a scale in a periphrastic way as in *pio polli* `more` and *pio ligi* `less`. Their scalarity/ gradability allow them to engage in constructions of **comparison** in which other QMods are <u>not</u> licensed to appear (e.g. *olikos* and *merikos*). Such constructions are demonstrated in the following examples:

(24) a. *o Yiannis ine* ***psiloteros*** *apo*
the+ John NOM. sg. MASC is 3rd sg. Pres **taller** COMP than
ton Petro
the+Peter ACC. sg. MASC
`John is taller than Peter`

b. ***o psiloteros*** *andras pou genithike*
the+ tallest man NOM. sg. MASC who was-born 3rd sg. Past
ine o Petros
is 3rd sg. Pres the+Peter NOM. sg. MASC
`The tallest man ever born was Peter`

(25) a. ***i perisoteri*** *andres kapnizoun*
the+ more+ men NOM. pl. MASC smoke 3rd pl. Pres
`Most men smoke`

b. ***i*** ***perisoteri*** *apo tous andres* *kapnizoun*
the+ more NOM. pl. MASC than the+men NOM. pl. ACC smoke 3rd pl. Pres
`Most of the men smoke`

(26) a. ***perisoteri*** *andres* *para ginekes* *irthan*
most+ men NOM. pl. MASC than women NOM. pl. FEM came 3rd pl. Past
`More men than women came`

b. ***ligoteri*** *apo 10 andres* *irthan*
less than 10 men NOM. pl. MASC came 3rd pl. Past
`Less than 10 men came`

In (24-26) QMods are engaged in similar constructions of comparison like those of gradable adjectives as they appear in their comparative and the superlative form. The difference between the two is in that QMods maintain their set relations, while gradable adjectives refer to properties attributed to the individual, even though both engage in comparison[85].

Perisoteri and *ligoteri* are the superlatives/comparatives of quantifiers *polis* and *ligos* already mentioned in our list in chapter 3. Giannakidou (2004) has offered an analysis of *perisoteri* in *i perisoteri* (*i*) *fitites* `most students` as the Q-det head of a QP embedded in a DP. In *i perisoteri* (*i*) *fitites* the definite reduplication could be redundant so that its compliment is the expected NP (cf. Giannakidou, 2004: 122). From a morphological perspective, *i perisoteri* is the superlative of *polis* already discussed in chapter 3 as a Modern Greek quantifier that appears in a variety of

[85] **Comparison** is a special feature of **gradable adjectives** which also exists in the semantics of **QMods**. However, comparison would be possible to further consider comparison as a special feature of quantifiers which appears not in their syntax or semantics but as a mental process that takes place when we need to identify the set relations between sets, so that in a sentence like *many students came to the party* it is evident that the set *the people who came to the party* and the set of *students* intersect to give a third set of *students who came to the party* who were desribed as ***many*** after having compared mentally the first and the second set and allowed the process of comparison to take place so that the third set is desribed as ***many*** *students came to the party*. Therefore, I believe that the **Comparison** is the mental process that allows us to distinguish between the set of students and the set of students who came to the party and decide that the students who came to the party are **MANY**.

syntactic positions. In that sense *polis* and *perisoteri* are adjectival[86]; their common adjectival syntax does not prevent them in appearing as Q-dets and therefore in D-position. However, Giannakidou (2004) does not mention anything concerning the adjectival position of *perisoteri* and its semantic interpretation, which needs to be further, investigated for providing a complete semantic account of such cases of Quantificational Modification.

Another semantic peculiarity of such QMods is that their neuter form grammaticalizes into an adverbial that functions either as an A-quantifier (cf. example (27a, b) or as a degree modifier[87] (cf. examples (28) and (29a, b)), because of being polysemous.

(27) a. *efaga* ***poli***
ate 3rd sg. Past **a-lot** A-q
`I ate a lot`

b. *efaga* ***ligo***
ate 3rd sg. Past **a-little** A-q
`I ate a little`

(28) *i* ***poli*** *megali* *katastrofi*
the NOM. sg. FEM + **very** ADV big+ destruction NOM. sg. FEM
pou *egine* *stin* *poli*
that- happened 3rd sg. Past to- the+city NOM. sg. FEM was
sinevi *hthes*
happened 3rd sg. Past yesterday ADV
`The greatest destruction inflicted on the city happened yestarday`

(29) a. *efaga* ***ligo*** *poli*
ate 1st sg. Past **a bit** degree adv a lot A-q
`I ate a bit too much`

b. *ine* ***ligo*** *kourastikos*
is 3rd sg Past **a bit** degree adv tiring NOM. sg. MASC
`He is a bit tiring`

---

[86] Hogg (1977) notes that one of the properties that gives quantifiers *many* and *few* their adjectival side is the ability to form superlative and comparative. This is the case with their Modern Greek counterparts.

[87] The degree adverbial πολύ `very` and the QMod πολλή `much, of great amount` differ in spelling which is not obvious in their transliterated forms.

Such possibilities are not analyzed in detail since they do not directly relate to the QMods in adj- nor in D- position. We do not intend to lengthen such discussions, but we do encourage further research to the split semantics of Modern Greek adverbials *poli* `much, a lot, very` and *ligo* `a little, a bit` which might accept the analysis Kennedy and McNally (1999) offer for English *very* and other degree modifiers, or analyze as A-quantifiers, depending on their syntactic position. The following section 5.2.3 discusses cases of Greek QMods in D-position.

5.2.3 Modern Greek QMods in D-position

Often the semantic interpretation of QMods depends on their syntactic position which depends on whether they combine or not with a definite determiner and on where they are placed. If placed between the determiner and the noun they are in adj-position and function as QMods. If they appear without the determiner then they, themselves, function as D-quantifiers[88]. The following table summarizes the possible syntactic constructions of QMods and their interpretation.

(30)

	before[+/-def]det & interpretation	**after[+def]det & interpretation**
Expressions of Totality	***oli***+ [+def]D + mass/count N means `**all**`or `**entire**`/`**whole**`	[+def]D +***oli*** +mass N means `**entire**` or `**overall**` [+def]D+ ***oliki***+ mass N means `**total**`
Expressions of Propotionality	***meriki/ligi/poli***+[-def]mass/countN means `**a few/ few/ many**`	[+def]D+***meriki/ligi/poli***+mass N means `**partial**`/`**small**` / `**big**` amount/ degree

[88] *Olos* `all` is an exception which can still be analyzed as a D-quantifier as it will be demonstrated in this subsection, even though it precedes a definite determiner.

Modern Greek *olos* is a QMod that appears in either adjectival construction and interprets as `entire, whole, overall` as in (31b) or in a demonstrative's position as a D-quantifier which interprets as `all, entire, whole` as in (31a) below:

(31) a. ***oli*** *i* *polis* *katastrafike*
entire+ the+city NOM. sg. FEM was-destroyed 3rd sg. Past
`The entire/ whole city was destroyed`

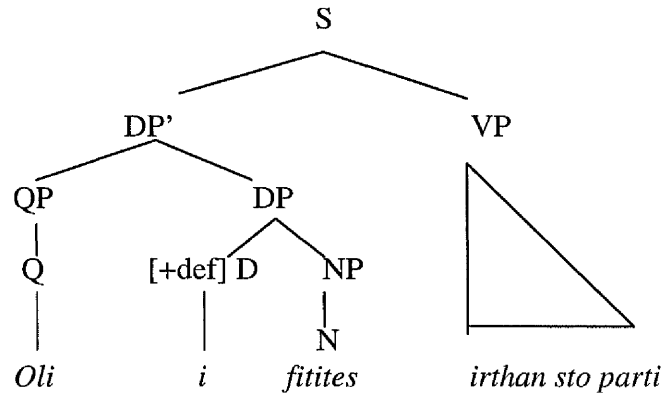
b. *i* ***oli*** *katastasi* *ine kourastiki*
the+ **entire+** situation NOM. sg. FEM is-tiring 3rd sg. Pres
`The entire situation is tiring`

Olos in both examples (31a and b) combines with mass entities contrary to *olos* in *oli i fitites irthan* `all the students came` (cf. example (17a) in 5.2.2) which combines with a count entity and interprets as `all`. We analyze *olos* `all, entire` as follows: *olos* in a D-position shares syntactic similarities with Modern Greek demonstratives. In such a position *olos* functions semantically as a universal, collective quantifier (i.e., a Q head in a QP) over sets of count entities as in (32b) below, or over a mass entity as in (31a), while syntactically it functions as a complex Determiner placed in a demonstrative's position as in example (32b) analyzed in diagram (33):

(32) a. ***auti*** *i* *fitites* *irthan*
these+ the+ students NOM. pl. MASC came 3rd pl. Past
sto *party*
to Prep the+ parti ACC. sg. NTR
`These students came to the party`

b. ***oli*** *i* *fitites* *irthan*
all+ the+ students NOM. pl. MASC came 3rd pl. Past
sto *parti*
to Prep+ the+ parti ACC. sg. NTR
`All the students came to the party`

(33)



`All the students came to the party`

Olos in (31a) and (32b) has received the semantic analysis of a D-quantifier over sets of individuals in the sense of Barwise and Cooper (1981). This analysis also agrees with Giannakidou and Merchant (1997) who note that "weak `determiners` occur within the NP projection, while strong determiners occur outside it" (Giannakidou and Merchant, 1997: 147). *Olos* is a strong determiner and strong determiners are expected to be "true quantifiers" (Giannakidou and Merchant, 1997: 144)[89].

Our analysis of *olos* is also in support of Mathieu and Sitaridou (2004) who note that "quantifiers and demonstratives are often considered modifiers in Classical and Modern Greek, so they are pair with adjectives" (Mathieu and Sitaridou, 2004: 16). Other linguists who also mention such cases are Holton, Mackridge and Philippaki-Warburton (1997) who note that *olos-i-o* `all` can appear in a syntactic position similar to the demonstrative *autos-i-o* `this`. In addition Haspelmath (1995) – following Greenberg (1978) - notes that determiners originate from adjectives which explains why it is common to find indefinite articles originating from numeral adjectives as the French *un* (MASC), *une* (FEM) `one, a` and the Modern Greek *enas* (MASC), *mia* (FEM), *ena* (NTR) `one, a`. Thus, *olos* in *oli i fitites irthan sto parti* `all the

[89] However, there is the contradictory view that `true` quantifiers do not float (cf. Giannakidou and Merchant, 1997: 4 and Matthewson, 2001: 163). English *all* (cf. Brisson 1997) and Greek *olos* (cf. Giannakidou 2004) are both floaters; this feature could imply that are not `true` quantifiers, a view that we do not discuss in detail in this thesis.

students came to the party` could be analyzed as a D-quantifier over count entities and the same analysis can be given to *olos* when combined with a mass singular entity as in *oli i polis katastrafike* `the entire city was destroyed` or *olo to milo halase* `all the apple went bad` in which the singular form of the nouns *polis* `city` and *milo* `apple` refers to the mass-term *city* and *apple*. In such a syntactic construction *olos* interprets as `whole, entire` and not `all`, and *polis* `city` and *milo* `apple` would be mereological and not count entities like *fitites* `students`. In this case *olos* relates to Greek *olokliros-i-o* whose meaning corresponds `whole, full, entire, all, solid`[90]. Thus, *olos* `all` and its extension *olokliros* `whole, entire` denote collective totality and follow the same syntax as D-quantifiers when placed in a demonstrative's position; a syntactic difference between the two is that *olokliros* `whole, entire` does not appear in adjectival position as it is common for *olos* `entire, whole, overall`. We expect similar semantic and syntactic similarities between *olos* and other QMods which contain *olos* in their morphological composition (e.g. ***olo**melis* `complete`, ***olo**kliromenos* `complete, finished`, etc.). Such cases could be an interesting extension of the thesis, not haven received enough attention because of lack of space and time.

Examples like *oli i polis katastrafike* `the entire city was destroyed` would formalize as in (34) below:

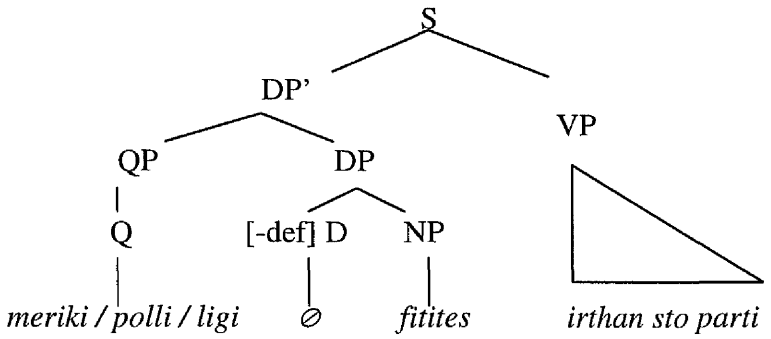
(34) $\forall$x (x is *polis* `city`) $\wedge$ *polis* `city` x was destroyed

[90] Section 2.3 of chapter 2 briefly discussed how *olokliros-i-o* is derived from *olos-i-o* `all` and refers to the `mass` of an entity; it is a combination of the quantificational element *olos* in its prefixed form *olo-* and *-kliros* `member, part` meaning `the one who has all its parts or members` and therefore it is whole, complete (cf. Babiniotis, 2002: 1248). Because it refers to the mass of an entity it is usually combined with a singular mass-term.

Olos in a sentence like *oli i fitites irthan* `all the students came` would imply the union of the set of people who are students and the students who came and would formalize similarly to English *all* discussed in 2.1.2 of chapter 2.

Similar to the case of *olos* is the case of Modern Greek `partial` quantifiers *merikos*, *polis* and *ligos* when they appear in D-position and can receive a representation similar to those also presented in 2.1.2 of chapter 2, regarding existential English D-quantifiers *some*, *few* and *many*. We have briefly talked about such Greek elements appearing in D-position in chapter 3, which are named `adjectival determiners` by Giannakidou and Merchant (1997). Such weak `adjectival` determiners (i.e., *meriki*, *ligi* and *polli*) appear before a noun and in complementary distribution with the Greek definite article *i* `the`. In their syntax they combine with a [-def] D contrary to *oli* `all` which precedes the definite article *i* `the` and being in complementary distribution with the definite article in Modern Greek as mentioned already in 3.2.2. In this syntactic position they could analyze as determiners-quantifiers as shown below:

(35)



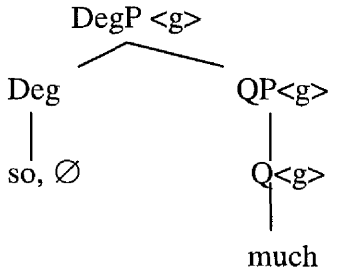
`Some/ many/ few students came to the party`

In the above diagram *merikos*, *ligos* and *polis* analyze as D-quantifiers that quantify over count entities and interpret as `some, a few`, `few` and `many` respectively; syntactically they function as determiners. On the contrary, QMods in adj-position are syntactic adjuncts to the noun they combine with, but semantically are analyzed as `quantifiers` over mereological sets of degree and amount. The following diagrams

(37) and (38) attempt to describe the syntax-semantics interface in the analysis of Quantificational Modifiers and are based on Doetjes' (1997: 96-7) diagram (8 a, b) and (14) mentioned in 4.1.2.

Doetjes discusses Degree Quantifiers (DQ) like *so little*, *as little*, *very little*, *so much* and *too much* and analyzes them as DegP similar to a DegP of a gradable adjective like *so tall* and *taller*. Doetjes (1997) further explains that "Adjectival DQs which combine with Deg-heads can be seen as a special type of scalar adjectives, containing a g-position" (Doetjes, 1997: 97) which can often be empty; therefore, the Deg-head of a DQ can be either overt or covert as in her diagram (14) mentioned below:

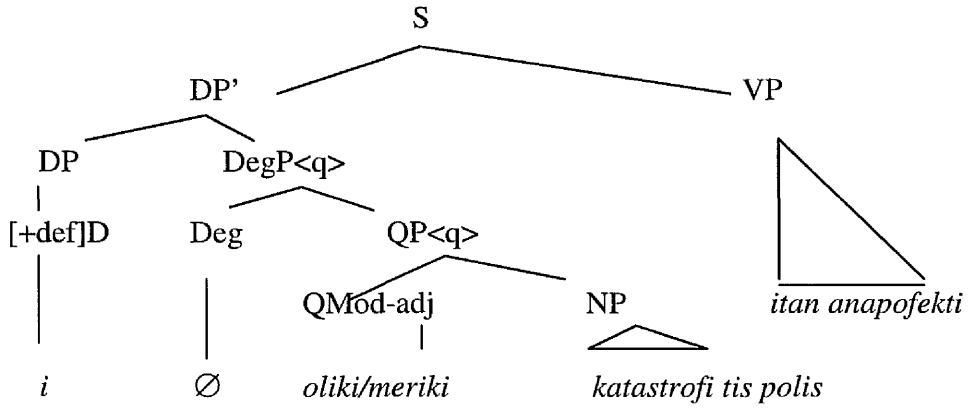
(36)



Doetjes further notes that "the thematic grid of nouns contains a *q*-position"[91] (Doetjes, 1997: 55); nouns can also be marked for a *g*-position that refers to degree. A *g*-position corresponds to a grade while a *q*-position corresponds to a quantity. This is the case with our semantic analysis of QMods quantifying over mereological sets of degree and amount denoted by a complex event nominal like *katatstofi* `destruction` and its incremental theme participant *polis* `city`. Bearing this in mind the following diagrams is our attempt to show the syntax-semantics interface in the case of QMods *olikos* `total` and *merikos* `partial`.

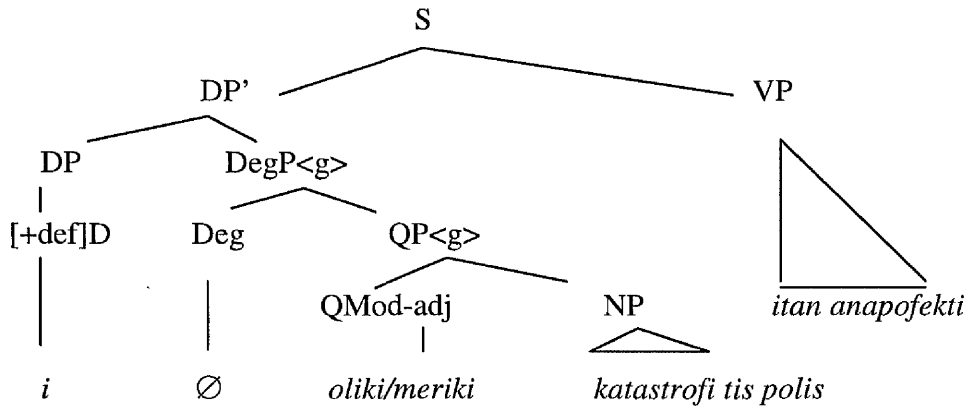
[91] Doetjes (1997) explains that "the *q*-position in a VP is an expression of the reference properties of the event, and not of, for instance, the subject. They ran a lot does not imply that there were many people who ran, but that there was a lot of running taking place" (Doetjes, 1997: 141).

(37) *i oliki/ meriki katastrofi tis polis tou Londinou itan anapofekti*
`The total/ partial destruction of the city of London was inevitable`



`The total/partial destruction of the city was inevitable`

(38)



`The absolute/some degree of destruction inflicted on the city was inevitable`

Diagrams (37) and (38) are based on Doetjes (1997) who discusses degree quantifiers (i.e. DQs) marked for amount <*q*> or degrees <*g*>. Modern Greek QMods are also marked for amount and degree. This marking appears semantically in the interpretation of noun phrases like *i oliki / meriki katatstrofi tis polis* `the total/ partial destruction of the city` and reflects our analysis of QMods as `measure` quantifiers over an event nominal and its incremental theme participant. In the above diagrams Degree occupies an empty position because of being only a semantic abstract object[92]. The QMod –in this case a QMod-adj - is analyzed as the head of a QP marked for

[92] Degrees do not appear syntactically since they are an abstract notion (cf. Kennedy, 1999).

degree <*g*> (cf. diagram (38)) or amount <*q*> (cf. diagram (37)) that combines with an NP. Then, the DegP combines with a DP and both (i.e. the DegP and the DP) are part of a higher DP' that is quantificational in terms of `interpretation`. When the QMod is marked for amount as in (37) it interprets as `total` or `partial`; when the QMod is marked for degree as in (38) it interpretes as `absolute` or `some/ a certain degree`. Could then, QMods be described as complex Determiner-quantifiers similar to Giannakidou's (2004) analysis of *i perisoteri* `most` as in *i perisoteri (i) fitites* `most students`? Or are they a peculiar kind of A-quantifiers (i.e. Argument-structure Adjusters) which because of their scalar modification properties are lincensed to appear in D-position? Afterall, such QMods even though they appear as part of a DP they can also paraphrase as A-quantifiers so that *i* ***oliki*** *katatstrofi tis polis* `the total destruction of the city` would imply that *i polis katastrafike* ***olikos*** `the city was totally destroyed` and *i* ***meriki*** *katatstrofi tis polis* `the partial destruction of the city` would imply that *i polis katastrafike* ***merikos*** `the city was partially destroyed`. This speculation would allow us to see QMods as a special class of syntactic `adjectives` that induce quantificational interpretation and possess a possible common semantics between D- and A- quantifiers.

Diagrams (37) and (38) are not syntactic diagrams or purely semantic representations. They demonstrate a syntax semantically motivated with the intention to reflect the syntax-semantics interaction in the formation of such quantificational noun phrases where the QMod is placed not only between the definite article and the noun but also preceeds any other non quantificational adjectives that could be placed before the noun so that noun phrases like *i oliki anagaia katastrofi tis polis* `the total necessary destruction of the city` are grammatical, while noun phrases like **i anagaia oliki*

katastrofi tis polis `the necessary total destruction of the city` are not, because of the wrong ordering of the QMod.

Such constructions of Quantificational Modification also resemble constructions with numerals like *tris* `three` in *i tris psili andres* `the three tall men` which would be ungrammatical if allow the numeral *tris* `three` to be placed before the noun *andres* `men` as in **i psili tris andres* `*the tall three men`. The adjectival side of numerals appears to be similar to the adjectival QMods in terms of syntax and interpretation and allows us to speculate that numerals could be sensitive to a Quantificational Modification analysis. The following section 5.3 focuses on Proportionality, an important semantic property of QMods.

5.3 Proportionality

QMods in adj-position have been analyzed as `measure` operators that quantify over mereological sets of degree and amount denoted in the QMods' arguments: an event nominal and its incremental theme participant. Therefore, a QMod is a function that takes mereological objects as its arguments and quantifies over `parts` of them or the `whole` of them. On the contrary, when specific QMods appear in D-position they are considered as functions that take entities as their arguments and quantify over them. The mereological sets QMods in adj-position quantify over are `proportional` sets of degree and amount; therefore, ***Proportionality*** is an important semantic property that is derived from the homomorphism which correlates the progression of a durative event as in our discussion of English *destruction* (cf. 4.2.1) and Greek *katastrofi* (cf. 5.2.1) to the scale of change of its participant. Quantificational Modifiers quantify

over mereological sets that are ***proportional*** which implies that they obey the principle of ***Proportionality*** summarized below:

(39) **The Principle of Proportionality**:
The homomorphic relation between two mereological sets allows them to increase and decrease at the same rate.

(40) **Proportional sets**[93]**:**
Such are two mereological sets that can increase or decrease at the same rate so that they maintain the same homomorphic relationship between them.

Proportional are not only mereological sets quantified by `partial` QMods but also mereological sets quantified by `total` QMods. This implies that NPs like *i oliki katatstrofi tis polis tou Londinou* `the total destruction of the city of London` would necessarily need the homomorphic relation between the sets of *katatsrofi* `destruction` and *polis* `city` as `whole` mereological entities, while an NP like *i meriki katatstrofi tis polis tou Londinou* `the partial destruction of the city of London` shows the homomorphic relation between proportional `parts` of the mereological sets of *katatsrofi* and *polis*. Both sets would be proportional and would imply that there is a `city` x that was inflicted with `destruction` so that if a certain degree of destruction x was inflicted on part of city y then it would result that also part of city y was inflicted a certain degree of destruction x (i.e. *i meriki katatsrofi tis polis tou Londinou* `the partial destruction of the city of London`). The proportional relation between *katatsrofi* and *polis* could be analyzed in a similar way in the case of *i oliki katatsrofi tis polis tou Londinou* `the total destruction of the city of London`, so that if there is absolute destruction it is necessary that the entire city of London has been destroyed and vice versa. This reflects our discussion in 4.2.1 where we have interpreted `proportion` as `total` when it refers to the `whole` and `partial` when it refers to a

[93] This definition is based on the way COLLINS COBUILD DICTIONARY (2003) defines proportional amounts: "if one amount is proportional to another, the two amounts increase and decrease at the same rate so that there is always the same relationship between them" (COLLINS COBUILD DICTIONARY, 2003: 1147).

relative `part` of the `whole`. ***Totality*** is viewed, therefore, as the exhaustive limiting case of ***Proportionality*** and can be further labelled as ***Absolute Proportionality***, while ***Proportionality*** could be renamed as ***Relative Proportionality***. Such labels reflect the relation of the `part` to the `whole` in our discussion of Quantificational Modifiers.

5.4 Concluding Remarks

This chapter has discussed the syntax and semantics of `total` quantifiers: *olos* (MASC), *oli* (FEM), *olo* (NTR)`all` and *olikos* (MASC), *oliki* (FEM), *oliko* (NTR) `total, entire, overall` and `partial` quantifiers: *merikos* (MASC), *meriki* (FEM), *meriko* (NTR) `some, a few, partial`, *polis* (MASC), *polli* (FEM), *poli* (NTR) `many, considerable, of large amount/great degree`, *ligos* (MASC), *ligi* (FEM), *ligo* (NTR) `some, few, little, insignificant, of a small amount/degree`; the semantic interpretation of such QMods is connected to their syntactic constructions either in a determiner's (cf. 5.2.3) or in adjectival position (cf. 5.2.1 and 5.2.2).

Quantificational Modification was described as a semantic operation that allows certain class of `adjectives` to quantify over mereological set entities of amount and degree. A QMod was therefore described as a `measure` quantifier that quantifies over proportional sets that appear either as `parts` of mereological entities or as the `whole` of such entities. Our analysis pays equal respect to the syntax and the semantics of such elements. Syntactically they pair with adjectival modifiers, while semantically they induce quantificational interpretation. In general, `total` quantifiers are ***exhaustive*** expressions of Totality while `partial` quantifiers are ***partitive*** expressions of Proportionality which can be further classified into expressions of ***Absolute*** and ***Relative Proportionality***. The following chapter 6 is concerned with the

broader issues discussed in the thesis from a theoretical and a typological perspective as it examines Quantificational Modification within natural language and across languages; quantificational variation is therefore examined within natural language along with the interaction between syntax and semantics in certain constructions which induce quantificational interpretation (i.e., QMods); chapter 6 also attempts to answer questions about the universality of such structures and their interpretation. Syntactic and semantic similarities in our proposed data confess to the universality of Quantificational Modification.

CHAPTER SIX

Theoretical and typological considerations

6.0 Introduction

Chapter 6 is concerned with the broader issues discussed in the thesis from a theoretical and a typological perspective as it examines quantification within natural language and across languages. Our discussion reflects Partee's (1995) encouragement for more research on quantificational expressions in natural languages for the benefit of linguistic/semantic typology in order "to provide a broad basis for typological generalizations and implicational universals" (Partee, 1995: 547) and in order "to begin to do justice to the variety of different means that are used by languages of diverse type to express quantificational ideas." (Bach et al., 1995: 1).

Section 6.1 examines quantificational variation within natural language and discusses the interaction between syntax and semantics in adjectival constructions which induce quantificational interpretation. This section focuses on the semantic composition and interpretation of QMods which allow them to pair with quantifiers independent of their syntactic environment. Section 6.2 attempts to answer questions about the universality of such structures and their interpretation. Syntactic and semantic similarities in our proposed data confess to the universality of Quantificational Modification. Our focus is on Modern Greek QMods compared to English, French and Arabic similar data of Quantificational Modification with the intention to contribute to a typological assessment of such a class of quantifiers proving that Quantificational Modification constitutes a cross-linguistic means of expressing Quantification in terms of Totality and Proportionality.

6.1 Theoretical considerations

Quantifiers appear in a variety of syntactic positions but `qualify` as quantifiers because of the `quantificational` interpretation they induce. Quantifiers have been divided into two classes: the D- and A-quantifiers in the sense of Bach et al., (1995), a classification which reflects more their syntactic manifestations. Chapters 2 and 3 discussed cases of English quantifiers *all*, *some*, *many* and *few* and their Modern Greek counterparts analyzed as D-quantifiers along with cases of A- quantifiers as they appear in the syntactic position of adverbs, modals or even affixes. Independent of such a variety of morpho-syntactic manifestations, all such linguistic elements induce a `quantificational` interpretation that licenses them to classify as Quantifiers. In the theory of Generalised Quantifiers, this interpretation is expressed in terms of relations between sets.

During our investigation we came across a class of `adjectives` that also induce `quantificational` interpretation in certain syntactic environment and analyze as quantifiers in respect to the set relations they define. Such elements we named *Quantificational* Modifiers *(QMods)*, a label that considers the syntax-semantics interaction. Section 6.1 is concerned with the syntactic manifestations of QMods, their `quantificational` interpretation and semantic composition.

6.1.1 Syntactic `tools` and interpretation

Quantifiers are purely semantic objects which in order to manifest themselves, use certain syntactic positions that allow them to combine with other meaningful lexical items and form quantificational phrases. These syntactic positions are the syntactic

`tools` quantifiers need in order to manifest themselves. In investigating Quantificational Modification expressions we have also seen that natural languages like English and Modern Greek also use a certain class of `adjectives` to syntactically manifest Quantificational Modification, a semantic subclass of Quantification. Such `adjectives` have been described semantically as `total` and `partial` QMods (cf. subsections 4.2.1, 5.2.1 and 6.2.2 of the relevant chapters); such classification directly depends on the syntactic position QMods occupy, that is mainly the **adjectival position** (e.g. Greek *i meriki katatstrofi tis polis* `the partial destruction of the city`, *i polli zahari* `the big amount of sugar`; English *the partial destruction of the city, the many students*, etc.). However, QMods also appear in **determiner's position** (e.g. Greek *polli/ meriki fitities irthan* `many/ a few students came`, English *many/ a few students came*)[94] as discussed in 5.2.3. The thesis, therefore, considers these as the two main positions in which the very same lexical elements because of being polysemous appear as D-quantifiers following a structure summarized as **D-Q + N** (e.g. English *few* and *many* in *few/ many students came* and Modern Greek *meriki, ligi* and *polli* in *meriki/ ligi/ polli fitites irthan* `some/ few/ many students came`) or QMods following a structure summarized as **Def. Art + QMod + N** (e.g. English *total* and *partial* in *the total/partial destruction inflicted on the city* and *many* in *the many students who came* or Modern Greek *oli, oliki, meriki, ligi* and *polli* in *oli* in *i oli katastasi* `the overall situation`; *i oliki/ meriki katatstrofi pou egine stin poli* `the total/ partial destruction inflicted on the city`; *i ligi/ polli doulia* `the small/ great amount of work`; etc.). The position of such elements before or after the [+/-def] NP determines their interpretation and classification into D-quantifiers or QMods. The construction

[94] Modern Greek QMods because of being polysemous they appear as the same lexical item but with a variety of meanings as in the case of *merikos* which in adjectival position means `partial` but in determiner's position it means `some, a few`.

of D-quantifiers requires the element to be placed before the [+/-] def NP and combine with a count/mass entity to yield a quantificational noun phrase. In order to classify as QMods such elements should appear between the definite article and their host N in order to yield a quantificational NP[95].

The meanings QMods acquire, then, vary according to their syntactic position. When in a determiner's position `total` quantifiers interpret as `all` or `whole`, while `partial` quantifiers interpret as `some/ a few`, `few` and `many`. In adjectival position `total` quantifiers interpret as `whole`, `entire`, `complete`, `overall` or `total` and `partial` quantifiers interpret as `partial`, `of little degree/ of small amount` and `of great degree/ of big amount`. In both positions such elements maintain a unified semantic analysis, analyzed in terms of relations between sets defined in terms of proportion of inclusion or overlap (cf. 4.2 and 5.2 of the relevant chapters). In subsection 5.2.3 we have summarized the possible nominal syntactic positions QMods use to manifest themselves that allow them certain interpretations; for instance Greek *olos* in D-position means `all` (e.g. *oli i fitites* `all the students`) but in adj-position it means `whole`, `entire`, `overall` (e.g. *i oli katatstasi* `the entire/ whole/ overall situation`); similarly *merikos* in D-position would mean `some, a few` (e.g. *meriki fitites* `some/ a few students`) but in adj-position would mean `partial` (e.g. *i meriki katatstrofi tis polis* `the partial destruction of the city`); *polis* in D-position means `many, much, a lot` (e.g. *polli fitites* `many students; *polli zahari* `much sugar`; *polli doulia* `a lot of work`) but in adj-position it means `a large amount of something` (e.g. *i polli doulia* `the great amount of work`; *i polli zahari* `the large quantity of sugar`);

[95] QMods also appear as QMod-adv and QMod-pref in adv- and prefix-position respectively as briefly discussed in chapters 1 and 2. In these additional positions QMods are also expected to induce a `quantificational` interpretation similar to that of A-quantifiers (in the form of quantificational adverbials and prefixes), sharing similar meanings with QMod-adj, and be able to classify as `total` and `partial` QMods.

ligos in D-position means `few, a little bit of` (e.g. *ligi fitites* `few students`; *ligo gala* `a little bit of milk`) but in adj-position it means `a small quantity of something` (e.g. *i ligi sighisis* `the small amount of confusion`; *to ligo alati* `the small amount of salt`).

The variety of meanings QMods acquire depending on their syntactic position does not interfere with their quantificational interpretation. Therefore, QMods whether in D- or adj- position maintain the same semantic analysis as operators over set relations whether such sets are mereological or not. QMods in Quantificational Modification constructions have a similar function to that of quantifiers over mass entities in D-position, since them both `indicate` amount or quantity. The function of QMods is to `indicate` proportional sets of amount/degree of the mereological entities they quantify over, while quantifiers in D-position like *many* in *many men* and *much* in *much milk* indicate `part` of the count entity or a proportion of the mass entity as *much* in *much milk*. Therefore, QMods are `measure` quantifiers that quantify over mereological sets of `proportional` parts of mass entities that appear in the form of complex event or simple event nominals like *destruction* and *work* or in the form of mass terms like *milk*, *sugar* and *salt*. The semantic composition of QMods is the focus of the following subsection 6.1.2.

6.1.2 Semantic composition

QMods respect the Principle of ***Compositionality***, a semantic principle that words follow when they combine to form sentences so that "the meaning of the whole is a function of the meanings of the parts and of the way they are syntactically combined" (Partee, 2007: 146). And this is exactly how meanings relate in general, and how words and utterances are understood. Compositionality explains how the meanings of

complex expressions relate, compose and appear as `submeanings` of a more complex expression. For instance, a word like the proper name *John* would not mean much besides referring to the individual called *John*, if it is said out of context, as a single utterance. However, if *John* is put in a sentence like *John loves Mary*, then the meaning of *John* would imply the individual who has the property of being called *John* who also has the property of `loving another individual` called *Mary*. In this manner, words like *John*, *loves* and *Mary* relate through meaning and are used in connection to each other in order to convey a more complex meaning i.e. *John loves Mary*. Semantically ||John|| and ||Mary|| are members of sets; while ||to love|| is a function that assigns truth values to such members so that ||John loves Mary|| is true. In terms of syntax, *John* is an NP that combines with the VP *loves Mary* to form the sentence *John loves Mary*. This is precisely what happens with quantifiers; if a determiner like *most* is said in isolation it would not mean much but when put in a noun phrase like *most people* then *most* would function as an operator over the entity *people* and would pick a set that denotes a `large quantity` of people; if the noun phrase *most people* would be said in connection with the VP *voted for Carter* to give a sentence like *Most people voted for Carter* (cf. Barwise and Cooper, 1981: 160, ex. (3b)), then it would further mean that in the domain of people, there is a large quantity of people (i.e. *most people*) who have the property of `voting for Carter`. *Most people* then would be a GQ in the sense of Barwise and Cooper (1981).

A QMod is responsible for inducing the quantificational interpretation in phrases like *the total destruction of the city*, *the partial confusion of the crowd*, etc. Even though the whole NP is quantificational, its parts are not connected in the way *many* and *men* or *most* and *people* are connected to form a GQ. In the case of Quantificational

Modification, the semantic function of words that combine with QMods is similar to the function of elements like *John*, *to love* and *Mary* in the sentence *John loves Mary* analyze syntactically as an NP (i.e. [John]) which combines with a VP (i.e. [loves Mary]) to form a sentence; this sentence semantically implies that an individual entity (i.e. ||John||) engages in the event of |||loving Mary||. *John* in semantic terms is a GQ in the sense of Barwise and Cooper (1981), a member of the set that denotes the family of sets that contain ||John||; therefore, ||John|| denotes the individual named *John*. Similarly, a QMod like *total* or *partial* syntactically is an adjectival modifier that combines with a deverbal noun and a possessive; such `adjectives`, however, semantically correspond to QMods (i.e. degree operators) that combine with a complex event nominal and its incremental theme participant which semantically denote the mereological sets the QMod quantifies over. In this respect noun phrases like *most people*, *many men* and *the total destruction of the city* follow the principle of Compositionality which "requires a notion of part-whole structure that is based on syntactic structure" (Partee, 2007: 146).

In the case of *most people*, *most* chooses an entity like *people*; a QMod like *total* or *partial* would not combine well with an entity like *people*. Such a combination would lead to ungrammaticalities like **total people* or **partial people*. This is because the semantics of QMods allow them to combine only with such nouns that allow the relation between proportional sets of `amount` and `degree` over which QMods operate. Because of following the Principle of Compositionality, QMods must be semantically compatible with their host noun. For this reason Greek *olikos* and English *total* combine respectively with nouns like *katatstrofi* and *destruction* or *katedafisi* and *demolition* but not with *katastasi* and *situation* or *zahari* and *sugar*.

Thus, QMods operate over mass entities that may define proportions of `amount` or `degree` that are either exhaustive as in the case of *olos* in *i oli katastasi* `the entire/ overall situation` and *olikos* in *i oliki katastrofi tis polis* `the total destruction of the city` or partitive proportions as in the case of *merikos* in *i meriki katastrofi tis polis* which relates *meriko* `some` amount of the city to be inflicted with *meriko* `some` degree of destruction, and the cases of *polis* and *ligos* which operate over sets of `amount` and need to combine syntactically and semantically with nouns that allow `amount` set relations like *zahari* `sugar`, *doulia* `work`, etc. (cf. subsection 5.2.3). Under these conditions, ***Exhaustivity*** relates to ***Totality*** and ***Partitivity*** to ***Proportionality***. Both concepts of Totality and Proportionality are expressions of `proportional` amounts. Totality refers to the `whole` as a `unity`, while Partitivity refers to `some part` of the `whole`. Because Totality has been viwed as the limiting case of Proportionality we refer to both as ***Absolute*** and ***Relative Proportionality***.

QMods resemble both D- and A-quantifiers and are viewed as a purely semantic subclass of quantification that reflects the possible common semantics between D- and A- quantification. In a sentence like *the **entire** city was destroyed*, *entire* functions as a QMod which takes *city* as its restriction and scope over [x *was destroyed*]. In a similar manner, a D-quantifier like *all* in *all the students came* takes *the students* as its restriction and scope over [x *came*]. In this manner QMods resemble D-quantifiers. In a sentence like *the total destruction (inflicted on the city) was inevitable* QMod *total* takes *destruction of the city* as its restriction and scope over the VP; the NP *the total destruction of the city* can also be paraphrased as *The city was totally destroyed*, where the A-quantifier *totally* modifies ('restricts') the destruction event. In this sense, QMods also resemble Lewis's (1975) A-quantifiers.

From the above discussion it follows that QMods are `quantificational` in nature:

- Their semantics defines the relations that must hold between the set domain of their restriction and the sets defined by their scope;
- These relations, discussed under the terms **Totality** and **Proportionality** are preserved across the different syntactic environments in which QMod forms appear (D- positions, modifiers and as A-quantification);
- The different semantic readings in the resulting constructions are attributable to compositionality:
    - D-position QMods involve restrictor sets whose members are individuals (*many students*),
    - QMods in modifier positions operate over restrictor sets whose members are subparts of the mereological domain (*the many students, the entire city*) and
    - QMods in A-quantification positions involve events in their interpretation (*The city was totally/ largely destroyed*).
- The semantic correspondences in the readings across these positions can be captured by means of homomorphic relations between events and participants and events and scale of change, which account for, among other things, the relationship between degrees and proportionality. (cf. subsection 4.1.2)

The following section 6.2 focuses on manifestations of ***Quantificational Modification*** across languages such as English, French, Arabic and Modern Greek in order to show that QMods are a semantic class of quantifiers common to a variety of natural languages.

6.2 Typological considerations

Often, typology sets can determine the fundamental syntactic patterns used in language responsible for expressing abstract notions such as Quantification. Therefore, certain typological considerations are needed to be made regarding our Quantificational Modification data in order to establish the universality of Quantificational Modification as a semantic class of Quantification.

This section 6.2 follows our discussion in 6.1 which summarized the syntactic patterns of QMods and their unified semantics as expressions of Absolute and Relative Proportionality. Section 6.2 discusses Quantificational Modification across languages; a preliminary discussion showed that Modern Greek QMods correspond to similar QMods in English (cf. 4.2.1) which not only engage in similar syntactic constructions but also receive a similar interpretation. Such syntactic patterns have also been detected in Arabic (cf. 2.4) and French (cf. 2.3) even though they were not semantically analyzed in as much detail as their Greek (cf. 5.2) and English counterparts (cf. 4.2.1). Data from these four languages engage in similar syntactic constructions of Modification and acquire similar meanings and quantificational interpretation, allowing us to speculate that Quantificational Modification could be a universal notion rather than a semantic peculiarity of Modern Greek quantifiers.

6.2.1 Language variation and cross linguistic manifestations

Subsection 6.2.1 extends our discussion as it compares Greek and English cases of QMods to similar cases in Arabic and French showing that QMods use the same syntactic patterns to manifest themselves in all four languages, proving the

universality of Quantificational Modification. Table (1a-d) summarizes the syntactic manifestations of QMods in Greek, French, Arabic and English, as discussed throughout the thesis:

(1) a. D-Qs

Universal	Existential	
Greek: **oli** i andres	**meriki/ ligi / polli**	andres
French: **tous** les hommes	**quelques/ peu d'/ beaucoup d'**	hommes
Arabic: **kul** al rijāl	**b'ad / qalilun min / kaṯi:run min**	al rijāl
English: **all** the men	**some/ few / many**	men

b. Universal D-Qs ⇨ `total` QMods

Greek: **oli** i istoria	⇨	i **oli** istoria
French: **toute** l' histoire	⇨	l'histoire **complète**
Arabic: **kul** al qissah	⇨	al qissat ul **kāmilah**
English: **all** the story	⇨	the **whole** story

c. Existential D-Qs ⇨ `partial` QMods:

Greek: **meros** tis istorias	⇨	**megalo/mikro** meros tis istorias
French: une **partie** de l'histoire	⇨	une **grande/petite** partie de l'histoire
Arabic: **j'uzz'** min al qissah	⇨	j'uzz'un **kabirun/ sagirun** min al qissah
English: **part** of the story	⇨	a **big/ small** part of the story

d.

`total` QMods	`partial` QMods
Greek: i **oliki** katatsrofi	i **meriki** katastrofi
French: la destruction **totale**	la destruction **partielle**
Arabic: al tadmi:r al **kuli:/** al **kāmil**	al tadmi:r al **j'uzz'i :**
English: the **total** destruction	the **partial** destruction

In table (1a-d) data from Modern Greek, Arabic, English and French show that ***Quantificational Modification*** is expressed similarly in these four natural languages with respect to the syntactic devices they use and the meanings they acquire. Table

(1a) shows that Greek, French, Arabic and English use determiners-quantifiers – universal or existential - to express the Cardinality of an entity. Universal D-quantifiers proceed a [+def] DP while existential D-quantifiers proceed a [-def] DP or partitive constructions. Existential D-quantifiers engage in either overt (i.e. French and Arabic data) or covert partitives (i.e. Greek and English data).

In table (1b) QMods share the same meanings when in D- or adj-position depending on their syntactic composition: Greek *olos*, French *toute*, Arabic *kul* and English *all* in D-position combine with the definite article and a noun to mean `all` and express Cardinality. In order to express Quantificational Modification all four languages use `adjectives` that refer to the `whole`, placed between the article and their host noun; in this manner all data in (1b) express Totality using the meanings of `all`, `complete` and `whole/entire` as discussed in Haspelmath (1995). In addition, existential D-quantifiers have their corresponding `partial` QMods - that syntactically appear in the form of `adjectives`- and engage in partitive constructions referring to a `large` or a `small` quantity. Constructions in (1c) express Proportionality (i.e. relation of `parts` of the `whole`).

In (1a) the universal D-quantifiers are placed before the [+def] DP while the existential D-quantifiers are placed before a [-def] DP. In (1b, c) both `total` and `partial` QMods are placed in a typical adj-position of modifiers that refer to the `whole`, or to `some` degree, to a `big` or a `small` quantity; Greek `partial` QMods *polis* and *ligos* and Arabic *kaṯi:r* and *qali:l* are replaced by Greek *megalos* and *mikros* and Arabic *kabir* and *sagir* as in (1c); their English and French correspondents are adjectival *large*, *small* and *grand* and *petit* respectively. This kind of alternative

construction agrees with our discussion of Classical Greek data and the ability of Classical Greek `adjectives` like *polis* to appear in front of a noun like *meros* `part` (cf. *ton polemion to poli* (cf. Goodwin, 1924: 231) discussed in 3.1, meaning `the greater part of the army` where *to poli* `the greater` agrees with *meros* `part` made redundant). In 5.2.2 we offered a similar discussion in the case of Modern Greek *polis* and *ligos* which are synonymous (cf. Babiniotis (2002)) with adjectival *megalos* and *mikros* in `partial` QMod constructions that involve degrees and amounts. In table (1b, c) it appears that the same is also allowed in English, Arabic and French making such construction a generalization. This allows us to think that if languages like Greek, French, Arabic and English share similarities in the way they express Quantificational Modification as in table (1a-d), it might be possible that they also share similar semantic analysis that would make Quantificational Modification a universal semantic subclass of Quantification.

Based on table (1d) we can conclude that all four natural languages follow a basic syntactic pattern of expressing Quantificational Modification, summarized as **Def. Art. + QMod + N** for `total` and `partial` QMods; such is the syntactic pattern common also to adjectival modifiers in the attributive. QMods also engage in partitive constructions in order to express Proportionality.

The above typological comparison would allow us to speculate that such `adjectives` in Greek, English, Arabic and French would not be common modifiers but QMods since they are expected to also induce the same `quantificational` interpretation as discussed in 5.2.1 and 4.2.1. However, for such a conclusion, a more extensive investigation would be needed into the Arabic and French data in order to establish

such `adjectives` as `total` and `partial` QMods, i.e. `quantificational` expressions of Totality and Proportionality.

6.2.2 Cross linguistic manifestations and their interpretation

Table (1a-d) in 6.2.1 forces an important observation regarding `total` and `partial` quantifiers. If we remind ourselves of the definitions we have given to such elements in chapter 2 and 3, it will be more evident that Arabic *kāmil*, French *total*, Greek *olikos* and English *total* appear as `total` QMods that express ***Totality*** since they refer to the `whole` of an entity and their interpretation ranges from meanings like `total` (e.g. English and Greek data) and `complete` (e.g. Arabic data) to `overall` (e.g. Greek and English data). On the other hand, Arabic *j'uzz'i*, French *partiel*, Greek *merikos* and English *partial* appear as `partial` QMods that express ***Proportionality*** as they all engage in similar ***partitive*** constructions and refer to `proportions/ parts` of the `whole`.

Modern Greek is more peculiar in that it uses the same lexical item (i.e. *merikos* `partial`) to denote unspecified quantity in expressions of Relative Proportionality in both D- and adj-position or its grammaticalized adverbial and prefixed forms (cf. chapter 3), while in order to express Absolute Proportionality it uses a variety of lexical items such as *olos*, *olokliros* and *olikos* discussed through out the thesis along with additional elements such as *oloklirotikos* `total, complete, absolute, utter, whole, thorough [-going] `[96], *oloklиromenos* `complete`[97] and *olomelis* `complete` not

[96] Such elements also appear to relate to QMods because of their adjectival structure and their interpretation; ***oloklirotikos*** appears in examples like *oloklirotikos polemos* `total war`, *oloklirotikos horismos* `complete separation`, *oloklirotiki embistosini* `absolute/ complete/ utter condfidence`, *oloklirotiki katastrofi* `utter/ total/ complete destruction` which translates as `wholly` in its adverbial form as in *ligi anthropi ine oloklirotika kaki* `few people are wholly bad`.

discussed in the thesis. Such expressions of Absolute Proportionality (cf. 4.2.1) relate semantically and etymologically since they are morphologically include `total` QMod *olos* as a prefix, (cf. examples (41 – 43) [*olo-klirosis* `completion`, *olo-hriso* `all gold` and *olo-psihos* `whole hearted`] in 3.3.1 of chapter 3). I believe that because *olos* is part of the morphological composition of such QMods, *olos* relates semantically not only to *olokliros* `entire, whole` and *olikos* `entire, total, overall` but also to other potential `total` quantifiers such as *oloklirotikos* `total, absolute`, *olomelis* `complete` and *oloklиromenos* `complete, finished`. I believe that the stem and the ending of such QMods relate semantically to their prefix *olo-* and such a relation is vital for their interpretation as `complete`, `absolute`, `total`, etc.; as we have previously discussed (cf. chapter 3) and in the light of Haspelmath (1995) all these meanings are semantically related and since such extended Greek QMods include *olo-* in their morphological composition it appears that *olos* contains all these meanings in its semantics. Perhaps for this the main interpretations of *olos* revolve around the meanings of `all`, `entire`, `whole`, `total` and `overall`. This observation reflects Partee's (1995) discussion about the syntactic varieties of English *all* and its interpretations. Partee admits that often English *all* is adjectival and that its differences in languages and in Syntax perhaps mean that "all is a basic concept or not" (Partee, 1995; 582)[98]. Considering the peculiarities of English *all* she is tempted

[97] ***Oloklиromenos*** is a participle semantically similar to Arabic *kāmil* `total, complete` discussed in 1.4 of chapter 1.

[98] Partee (1995) comments on the various interpretations of English *all*:
"I still find cross-linguistic variations of *all* difficult to understand and classify. On one hand, Gil has argued that the meaning expressed by English *all* is more basic than that expressed by *every*, but, perhaps as a reflection of its very basicness, *all* isn't necessarily a determiner. Some of the varied cross-categorial behaviour of *all*-like words or morphemes in different languages may be due to different historical sources (see Haspelmath, this volume) relating *all* to any of *complete(ly)*, *whole*, *finish*, and other possibilities" (Partee, 1995: 582).
Partee believes *all* to be "heterogeneous" (ibid) and points out that there are "major differences in the behaviour of close cognate words for *all* between German and English and between Italian and Spanish" (ibid). She observes that "*all* does not always seem to pattern as an `essentially quantificational` quantifier should" (ibid) and that "it shows up as a predicate much more readily than

not to classify it as a determiner, "but rather to group it more nearly with *only* as a cross-categorial modifier that can combine with expressions of various categories to form new expressions of various categories" (Partee, 1995: 583). Is there any relation between our analysis of Greek *olos* as QMod and English *all*? Such a point needs further clarification not possible to be accomplished in this limited thesis.

Similar to Greek *olos* is Arabic *kāmil* which depending on its host noun it can semantically accomodate many of the meanings of Totality discussed by Haspelmath (1995) as demonstrated in examples (2a-e) below:

(2) a. attadmi:r al **kāmil** (complex event nominal)
the+destruction + the+ **total** NOM. sg. MASC
`The total destruction`

b. al kāsah al **kāmilah** (mass entity)
the+ glass + the+ **full** NOM. sg. FEM
`The full glass`

c. al tufāha al **kāmilah** (mass entity)
the+ apple+ the+ **whole** NOM. sg. FEM
`The whole apple`

d. al shifā al **kāmil** (simple event nominal)
the+ recovery+ the+ **complete** NOM. sg. MASC
`The complete recovery`

e. al hālah al **kāmilah** (simple event nominal)
the+situation+ the+ **whole**
`The entire/whole/overall situation`

In examples (2a-e) the Arabic `adjective` *kāmil* combines with a variety of nouns to imply a variety of meanings that relate to Totality as discussed in Haspelmath (1995) who looks at the etymological roots of expressions of the `whole` and discusses how `all` relates to `whole` and `entire` or even to `complete` and `full` as it also appears in (2a-e). The interpretation and semantic analysis of *kāmil* then would depend on its

expressions glossable as *every*, and sometimes seems adjectival rather than determiner-like when in construction with a noun" (ibid).

host noun which varies between being a complex event nominal or a simple event in the sense of Grimshaw (1994) or a mass entity as discussed in Bach (1986) (cf. examples (2a-e) mentioned above).

In our limited discussion of such Arabic data we have observed that the Arabic language also expresses Totality using similar means: that is an `adjective` like *kāmil* which appears as a potential Arabic QMod because of the meanings it acquires in examples (2a-e). In addition, Arabic *kāmil* seems to as polysemous as Greek *olos* whose interpretations reflect Haspelmath's (1995) observation about the diachronic sources of the meaning of `all` and how it manifests itself in natural languages. Arabic *kāmil* bears semantic similarities to Greek *olos*, and if it allows a similar semantic analysis as that of Greek *olos* and its extensions then Arabic *kāmil* should be officially established as a QMod. In addition, Greek and Arabic `total` QMods bear similarities regarding Haspelmath's (1995) following observation, "As meaning changes from abstract to concrete in the grammatical domain are very rare or non-existent, we do not expect to find cases where `(plural) all` is extended to be used with single objects and to mean `whole` (let alone `complete`, `intact`, `sound`, etc.), and in fact I know of no such cases" (Haspelmath, 1995: 366). I believe that such cases are the `total` quantifiers *olos* (cf. examples like *oli i polis* `all the city` or *i oli katastasi* `the entire/ overall situation` in which the same plural *oli* as in *oli i andres* `all the men` changes into singular but maintains the same meaning of the `whole`) and *kāmil* (cf. example (3c) below, which appears to replace D-quantifier *kul* `all` in (3a-b) in order to mean `whole`):

(3) a. **kul** al m'dun
all D-Q the+ cities NOM. pl. FEM
`All the cities`

b. **kul** al medinah
all D-Q the+ city NOM. sg. FEM
`All the city`

c. al medinah al **kāmilah**
the+ city+ the+ **whole**
`The entire/ whole city`

What we are concerned with is that the few languages we investigated use QMods in a similar way to express Quantificational Modification, making the possibility of dealing with a more universal phenomenon even more evident. All the cases of QMods, recorded in examples through out the thesis, are described as adjectives in the Grammar of M. Greek, French, Arabic and English. Is it a coincidence or an intentional use of such lexical items? Can a certain class of adjectives be interpreted as quantifiers? Our semantic analysis of such elements as quantifiers over related proportional sets of amount and degree independent of their adjectival syntactic status provides evidence to the fact that languages "differ widely in what is put into their grammars" (Bach, 2005: 167) and in that quantifiers as semantic objects could be classified as such independently of their grammatical categories and their syntactic manifestations; hence, it is the grammar and often the morpho-syntax of natural languages that force a particular classification which is not always in accordance with other factors, e.g., the semantics of these elements in the case of QMods. For instance, Modern Greek *olos*, *olikos*, *merikos*, *polis* and *ligos* grammatically are classified as `adjectives` but such a classification does not correspond to their semantic function. The evidence for this is that even though they appear in adjectival position, their semantics is unified and does not allow any changes in their `quantificational` interpretation; hence, it is in terms of their semantics that they pair with quantifiers as expressions of Absolute and Relative Proportionality as discussed in chapter 5. Our investigation into the quantificational expressions in Modern Greek and the support

we received from French, Arabic and English data are in agreement with Bach (2005) who believes that "[t]ypological studies must take that into consideration" (ibid).

6.3 Evaluating Greek and Arabic Quantificational Modification

A comparison between certain Greek and Arabic data initially included in table (1) in 6.2.1 and examples of Arabic QMods in examples (2a-e) and (3c) in 6.2.2 show how Arabic and Modern Greek use the same mechanisms to express the concepts of Totality and Proportionality. Examples from Arabic and Greek data initially discussed in sections 2.4 and 3.4., show that Quantificational Modification phenomena are expressed similarly in both languages, independent of their geographical background. For instance, `total` quantifiers *olos* and *kul* appear as D-quantifiers and transform into QMods in (cf. 1b) meaning `whole`. The semantic interchange in the meanings of `total` and `whole` occurs in Arabic as it occurs in Greek (discussion in 6.2.2); it appears that Arabic uses *kāmil* `whole, entire, full, complete, total` in order to express the concept of Totality in a similar way Greek uses *olos*. Both *kāmil* and *olos* because of being polysemous are allowed to combine with different types of nouns in order to express the notion of Totality or Absolute Proportionality - as we have further described it. In addition, Arabic `total` QMod *kuli:* relates semantically and etymologically to D-quantifier *kul* `all` and adverbial *kulli:yan* `totally`; all three seem to derive from D-quantifier *kul* `all` in a similar way Modern Greek *olos* `al, whole, overall` is the root of *olokliros* `whole, entire`, *olikos* `total, overall`, *olika* `totally` and other `total` quantifiers like *oloklirotikos-i-o* `complete, total`, *oloklиromenos-i-o* `complete` and *olomelis* `complete` where it is preserved in its prefix form. Perhaps such similarities could be attributed to the rich morphology and derivational system of both languages, which we do not intend to discuss any further.

What we are concerned with is that all three Arabic variants of *kul* and the Greek variants of *olos* express Totality either referring to the unity of an entity as the `whole` or as the `total`, while Arabic *kāmil* is as polysemous as Greek *olos* and both engage in the same adjectival constructions and are expected to induce a similar `quantificational` interpretation. Further research into the semantics of Arabic *kāmil* and Greek *olos* would be needed to establish them as expressions of Totality. Furthermore, examples of `partial QMods in table (1a-d) show how both languages express the concept of Proportionality in a similar manner. Arabic uses QMod *j'uzzi'* `partial` in adjectival construction while Greek uses QMod *meriki* also to mean `partial`; similarly, Greek *megalos* `big, large` and *mikros* `small` correspond to Arabic *kabi:r* `big, large` and *sagir* `small` and are used to mean a `large` and a `small` quantity or `part` of a mass term. Such semantic and syntactic similarities shared by Greek and Arabic QMods are also detected in similar English and French examples discussed in 2.3 of chapter 2 and summarized in table (1a-d) in 6.2.1.

Similarities in the syntactic manifestations and their interpretation hint to the possibility of giving a similar semantic analysis to all the data presented in table (1a-d). The cross-linguistic manifestations of `total` and `partial` QMods discussed in 6.1 and their cross categorical manifestations and their interpretation enable us to argue that Quantificational Modification is a semantic subclass of Quantification in natural language that accepts `quantificational` semantics to be associated with Modification forms from a syntactic perspective. However, a more detailed investigation is needed in order to establish Arabic and French data in table (1a-d) as cases of QMods.

CHAPTER SEVEN

Conclusions

The goal of the thesis was to examine the Semantics of ***Totality*** and ***Proportionality*** through analyzing certain linguistic elements as `measure` quantifiers. The thesis explored the syntactic and semantic dimensions of such elements that appear arguably as quantifiers and modifiers and was concerned with questions that range over the semantics of Quantification and Modification and how they both relate in the case of ***Quantificational Modifiers***.

A general discussion of Quantification as semantic interpretation was initially offered in the Introduction of the thesis, since it is in terms of `interpretation` that QMods were analyzed as `measure quantifiers` of scalar semantics. Quantification was examined within and across languages pointing out at the similarities and differences in the structure and interpretation of quantifiers in the domains of morphology, syntax and semantics. Our discussion in chapter 2 gave a broad picture of what makes certain linguistic elements `quantifiers`, independent of their morpho-syntactic manifestations showing that "languages do not differ in their semantics (universal semantic claim), they share the same ontological commitments and metaphysical presuppositions, but may `package` them in different ways in their grammars" (Filip, 2007: 29, Lecture 4) as it appears in the case of D-and A-quantifiers and QMods. The same chapter also discussed the syntactic manifestations of GQs as D- and A- quantifiers and prepared the ground for our discussion on Quantificational Modification (cf. 2.3 and 2.4) based on data from English, French and Arabic; in these languages certain adjectival modifiers acquire `meanings` that relate to `amount` and `quantity`. Similar cases of

Modern Greek QMods were discussed in chapter 3 which also made references to the diachronic relations of such elements with their Classical roots hinting that perhaps Quantificational Modification is an `old`, alternative way of expressing Quantification in the Greek language. The semantics of QMods were investigated in detail in chapters 4 and 5 with data mainly from English (cf. 4.2) and Modern Greek (cf 5.2). Sections discussing English and Greek Modification (i.e. 4.1 and 5.1) were intended to show how QMods relate to syntactic modifiers (i.e. gradable adjectives) in terms of syntax, scalarity and comparison, while the semantic analysis in 4.2 and 5.2 targeted their analysis as `total` and `partial` operators on proportional, homomorphic sets of mereological entities that denote degree and amount. The way to capture the degree and amount set relations in such constructions was by multiple homomorphisms between mereological objects that involve sets of `parts`.

In order to explain the quantificational properties of QMods it was necessary to consider the relation between the parts of an event like the process of *destruction* and the scale of change (i.e. the degree of *destruction*) on its incremental theme participant (i.e. *city*). QMods were found to quantify over these proportionally related sets of mereological entities (cf. 4.2).

What made such cases of Quantificational Modification interesting was the importance of the presence of the QMod in the phrase; in case of its absence phrases like *the destruction of the city* could not have received a `quantificational` interpretation. Chapter 5 extended chapter 4 mainly discussing similar cases of Modern Greek QMods *olikos* `total` and *merikos* `partial` but also offerring other possible cases of QMods which involved simple event nominals or mass entities.

Little discussion was offered on such cases which require further investigation for providing a complete discussion of Quantificational Modification in Modern Greek. Cases discussed in 4.2 and 5.2 were an attempt to show the possible common semantics between D- and A- quantifiers (cf. 2.2, 3.1 and 3.2) in this special class of `adjectives` which induce `quantificational` interpretation.

Quantificational Modification was examined from both a semantic and a typological perspective which showed that Quantificational Modification is not particular to Modern Greek. Additional data from English, Arabic and French (c.f. chapter 6 and 2.3 and 2.4 of chapter 2) were used in support of our claim that Quantificational Modification is a universal semantic subclass of Quantification and indirectly answered questions mentioned initially in the introduction about the way natural languages provide for quantificational expressions; about how much of such structures and meanings is universal and about how languages vary in the way they use certain syntactic tools for the expression of the notion of Quantification. Chapter 6, therefore, discussed the syntactic device – that is the adjectival position- QMods use to manifest themselves (cf. 6.1.1) and their classification as `quantifiers` in terms of their semantic composition and interpretation (cf. 6.2.2) in similar data from English, French, Arabic and Greek (cf. table (1) in 6.2.1) which allowed speculations that the similarities in syntax and interpretation QMods share, make them a unified semantic class (cf. 6.2.2).

Very little discussion was carried out concerning similarities in the Greek and Arabic data (cf. 6.3) but seemed sufficient in providing a starting point for the analysis of similar Quantificational Modification phenomena in the Arabic language. However, a

more detailed investigation would be needed in order to establish Arabic data in examples (1-3) in 6.2 as cases of Quantificational Modification. Arabic *kāmil* as it appears in examples (2) and (3) of 6.2.2 and its multiple interpretations similar to those of polysemous Greek *olos* in examples in 3.3.2 and 5.2.2 (i.e. `all, entire, whole, overall, total`) encourage speculations that *kāmil* could be semantically similar to *olos*. The semantics of Arabic *kāmil* would require further development in order to establish it as a QMod.

Besides a more detailed examination of the Greek cases stated in 5.2.2, other areas for further research and development would include the formalisation of the main Quantificational Modification data discussed in 4.2.1 and 5.2.1; such a formalisation could follow Kennedy and Levin (2007) as biefly discussed in 5.2.1 and should be considered as a first step for the further development of this thesis. In addition, a more detailed semantic analysis would be needed along with the formalisation of the grammaticalized forms of QMod-adjs as they appear in the form of ***QMod-adverbs*** and ***QMod-prefixes*** briefly discussed in 3.3. Additional cases of QMod-adjs would include *elahistos* `minimal, minimum, slightest`, *ligostos* `very little`, *arketos* `quite a lot [of]`, *kambosos* `quite a lot [of]`, *mbolikos* `plenty [of]` and *ipolipos* `the rest [of]`, as listed in the introductory section of chapter 3 which seem to involve ***Scalarity*** but also ***Intensification*** and ***Quantification*** in their semantics; the combination of such properties would make a challenging way of expanding this research.

Other additional cases that need further clarification and also involve ***Intensification*** and ***Quantification*** are the meanings and interpretation of Modern Greek *polis* and

ligos often as ambiguous as their English, French and Arabic counterparts (cf. discussion about Arabic data in Doetjes, handout (2007)).

Numerals were briefly discussed in 4.2.1 as they also appear in positions common to adjectives (e.g. *the three men*) or in D-position (e.g. *three men*). Would it be possible that numerals are also sensitive to a Quantificational Modification analysis? Further investigation would be needed for such a claim.

A big part of our discussion of QMods was devoted to Modern Greek *olos* `all, whole, entire, overall` which also appears morphologically in its prefix form in other similar `quantificational` elements like ***olo****kliros* `whole, entire`, ***oli****kos* `total, entire, overall`, ***olo****klirotikos* `total, absolute`, ***olo****kliromenos* `complete` and ***olo****melis* `complete` (cf. chapter 3); the morphological occurrence of *olos* (i.e. *olo-*) in such elements could be connected to their semantic analysis as Quantificational Modifiers and their `quantificational` interpretation. A detailed analysis of the semantics of QMod-prefix *olo-* along with the role of the stem and ending in such quantifiers, could open up routes to more interesting and complex cases of Quantificational Modification and the discussion of how concepts like `all`, `whole`, `total`, `full`, `absolute` and `complete` relate semantically.

Our discussion on etymological issues related to the semantic analysis of Greek `total` and `partial` QMods shows that etymology in Greek quantifiers could often provide the key to their semantic analysis and logical representation not only of QMods but also of other cases of Greek quantifiers such as the pronoun *kapios-a-o* `someone` and the negative polarity item *kanenas-a-a* `no one`.

Our discussion in chapter 3 includes the Classical Greek preposition *kata* `along, through out, all over` (cf. Haspelmath 1995) which can expand to the discussion of Modern Greek preposition *apo* `from, of` of distributive and partitive properties (cf. Tsouhlaris in preparation). Similar to Greek prepositions *kata* and *apo* is the Arabic preposition *bi-* used as a prefix in quantificational expressions like *bi-ajmaihim*, *bi-jamihim* and *bi-asrihim* meaning `in their-entirety`, *bi-'asrihā `a whole`*, *bi-l-tahdidi* `exactly`, *bi-l-kamili* `completely`, *bi-darajatin kabiratin* `to a larger degree`. Its analysis along with Greek preposition *apo* `of, from` could be another interesting topic in researching expressions of Quantification, opening a different route to the investigation of quantifiers and their semantic analysis.

Besides our development of the semantic analysis of Arabic *kāmil* additional Arabic data discussed in chapters 2 and 6 can expand our discussion of Quantificational Modification from meanings like كل [*kul*] `all` to `measures` like طوال عمري [*ṭiwāl u'mri*] `(lit.) the length of my age`; such a noun phrase means طوال حياتي [*ṭiwāl hayati*] `the length of my life`, another variation to the more standard كلّ عمري / حياتي [*kulli u'mri /hayati*] `all my life` as shown in the following examples:

(1) طِوال عمري
ṭiwāl *omri*
the-length NOM. sg. MASC of-my-years GEN. pl. MASC
`All my life`

(2) طِوال حياتي
ṭiwāl *hayati*
the-length NOM. sg. MASC of-my-life GEN. sg. FEM
`All my life`

(3) كلّ عمري / حياتي
kul *omri / hayati*
all NOM my-years /my-lifeGENsgFEM
`All my life`

In such examples طِوال `*length*` is used to mean `*all*` and refers to the actual length of one's life, which evidently refers to one's **entire life**. Is this another case of Quantificational Modification? And would it be possible to claim that كلّ [*kul*] `all, entire, whole` and طِوال [*ṭiwāl*] `length` are both `quantificational` since they both refer to the `whole` of someone's life? Such cases require further research in order to be fully understood.

Further research into the above additional cases would allow us to examine Quantification not only through the means of `counting` but also through the means of `measuring`. The analyses of both of these concepts compose the Semantics of Quantification.

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Appendices

Appendix I

The abbreviations used through out the thesis are as follows:

nom	nominative
acc	accusative
gen	genitive
sg	singular
pl	plural
MASC	masculine gender
FEM	feminine gender
NTR	neuter gender
Pres	present
Past	past
adj	adjective
adv	adverb
def. art.	definite article
D	determiner
DP	determiner phrase
N	noun
NP	noun phrase
V	verb
VP	verb phrase
S	sentence
3^{rd}	third person
*	ungrammatical
?	semantically odd
QMods	Quantificational Modifiers
QMod-adj	Quantificational Modifiers in adjectival form
QMod-adv	Quantificational Modifiers in adverbial form
QMod-prefix	Quantificational Modifiers in prefix form
D-position	Determiner's position
adj-position	adjectival position
D-quantifier	Determiner-quantifier
A-quantifier	A(dverb)/A(uxiliaries)/ A(ffixal)/A(rgument-structure Adjuster)-quantifier
B., G. & C. (2004)	Badawi, Gully and Carter (2004)
H., M. & P.-W. (1997)	Holton, Mackridge and Philippaki-Warburton (1997)
M. Greek	Modern Greek
[ ]	boundaries of a syntactic constituent as in [NP]

Appendix II

The international system of transliteration is used through out the thesis:

Greek	Roman
α	a
β	v
γ	g
δ	d
ε	e
ζ	z
η	i
θ	th
ι	i
κ	k
λ	l
μ	m
ν	n
ξ	ks
ο	o
π	p
ρ	r
ς	s final
σ	s
τ	t
υ	i
φ	f
χ	h
ψ	ps
ω	o

Arabic	Roman
أ	a or ā
ء	ʾ
ب	b
ت ة	t
ث	h
ج	ṯ
ح	ǧ
خ	h
د	h
ذ	d
ر	ḏ
ز	r
س	z
ش	s
ص	š
ض	s
ط	d
ظ	ṭ
ع	z
غ	ʿ
ف	ġ
ق	f
ك	q
ل	k
م	l
ن	m
ه	n
و	h
ي	w
	i: