

Argument Structure in Hellenistic Greek

Micheal W. Palmer

An updated presentation of ideas first
presented in *Forum* in 1999.

Table of Contents

Introduction	1
Subcategorization of Verbs	1
Argument Structure	3
Some Terms Borrowed from Logic	4
A Brief Introduction to Semantic Roles	4
Moving Beyond Transitivity	5
Diversity of Syntactic Realizations of Arguments	5
Adjuncts	9
Predicates Other Than Verbs	10
Canonical Realization of Semantic Roles	11
Semantic Roles and Passivization	13
Semantic Roles and the Copula	14
Conclusion: Production of Language Acquisition Tools	14
Notes	16
Glossary	20
Bibliography	21

Introduction¹

In Linguistics, the term **argument** refers primarily to the noun phrases directly related to a verb, such as *Sarah* and *bicycle*, in the sentence

1. Sarah rides a bicycle.

Sarah and *bicycle* are “arguments of” the **predicate**, *rides*. As we will see below, though, not all predicates are verbs, and the relation “argument of” has broader implications than simply identifying the subjects and objects of individual verbs.²

Recent developments in computer software and standards are making possible the development of tools that can significantly expand our ability to analyze argument structure in ancient texts. The development of several high-quality open-source treebanks in XML now allows analysis of argument structure to be done with standard XML tools that can efficiently query and transform those treebanks. While past work on the argument structure of both Hellenistic and Classical Greek was hindered by the lack of relevant syntactic information in lexica and other reference tools, we now have the opportunity to accelerate the development of those tools by encoding argument structure relations in electronic versions of the texts on which those tools are based.

Subcategorization of Verbs

The common traditional approach to argument structure has been to categorize verbs in terms of transitivity. An *intransitive* verb is one that has a subject, but no objects. A *transitive* one has a subject and one object. A *ditransitive* verb has a subject and two objects. The traditional Greek grammars all discuss these categories, but their discussions of transitivity do not cover arguments of nouns. Take for example the following Noun Phrase (NP) from Colossians 2:5:³

2. τῆς εἰς Χριστὸν πίστεως ὑμῶν
 the in Christ faith your_{gen.pl.}
 the to Christ faithfulness your_{gen.pl.}
 your faith in Christ
 your faithfulness to Christ

Here both εἰς Χριστὸν and ὑμῶν function as arguments of πίστεως. Our discussion of the argument structure of Greek predicates must be flexible enough to cover not only verbs, but nouns that, like πίστις, assign or permit arguments.

The range of possible constructions in which a given predicate may occur is restricted directly by the meaning of that predicate. The meaning of any particular grammatical construction is restricted, determined, or licensed by the particular semantic properties of the predicate around which that construction is built, that is, by the *argument structure* of that predicate. The reason some verbs may not appear in ditransitive constructions, for example, is to be found in the semantic properties of those verbs. Of course, this is not a radical proposal, and linguists working with a wide variety of linguistic theories accept some form of it.⁴

A great many transitive verbs may also appear in intransitive constructions in ancient Greek.

3. δώσει αὐτῷ κύριος ὁ θεὸς τὸν θρόνον Δαυὶδ τοῦ πατρὸς αὐτοῦ (Luke 1:32)
will.give him lord God the throne of.David the father of.him
The Lord God will give him the throne of his father David
4. ἐδίδου καρπὸν (Mark 4:8)
it.gave fruit
it produced fruit
5. δωρεὰν δότε (Matthew 10:8)
freely give
give freely

In both 3 and 4 an object NP is clearly stated for δοῦναι, διδόναι (δώσει, *will give*).⁵ That same verb appears with no object in 5. The absence of an object seems to follow naturally from the *sense* of the verb here. It does not refer to a specific act of giving, but to the general practice of giving. The absence of an object then, signals a difference in meaning. Compare 6 and 7 below with the verb ζητήσαι, ζητεῖν

6. ἐζήτουν δὲ πλουσίους ἄνδρας (Chariton, *Callirhoe*, 1.11.4)
they.sought but rich men
But they sought rich men
But they were looking for rich men
7. ζητεῖτε καὶ εὕρησете (Matthew 7:7)
you.seek and you.will.find
Seek and you will find

An object NP is included in 6, but no object is stated in 7. Here again, the verb refers not to a specific instance of seeking or finding, but to the general practice of seeking and finding.

The object of a transitive verb may also be omitted when it is clearly recoverable from the discourse context. Δοῦναι, διδόναι, for example, when it indicates the transfer of something from one person to another, has two object arguments, one representing whatever is given and the other representing the recipient (ἔδωκεν αὐτοῖς ἐξουσίαν “He gave them authority,” Matthew 10:1). When either is clearly implied from the context, however, it may be omitted.⁶

On the basis of this observation we can assert that when δοῦναι, διδόναι has this particular sense all of its arguments are present *semantically*, even if one or more is not *phonologically* overt.⁷ That is to say, they can be recovered from the context even when they are not explicitly stated.

This contextual flexibility is not available with all verbs, though. The verb ἀπολείπειν, ἀπολείπειν (leave behind) always has an object argument when it is in the active voice:

8. τὸν φαίλῳνην ὃν ἀπέλιπον (2 Timothy 4:20)
 the coat which I.left
 the coat that I left
 the coat I left
9. Τρόφιμον... ἀπέλιπον ἐν Μιλήτῳ ἀσθενοῦντα (2 Timothy 4:20)
 Trophimus I.left in Miletus ill
 Trophimus I left ill at Miletus
 I left Trophimus ill at Miletus
10. ἀπέλιπόν σε ἐν Κρήτῃ (Titus 1:5)
 I.left you in Crete
 I left you in Crete
11. ἀγγέλους τε τοὺς... ἀπολιπόντας τὸ ἴδιον οἰκητήριον (Jude 6)
 angels_{acc.pl} the_{acc.pl} leaving_{acc.pl} the proper dwelling_{acc.sing}
 angels who... left their proper dwelling

When ἀπολειψαί, ἀπολείπειν is passive, its object argument becomes subject, and the one that would have been subject of an active construction may be eliminated:⁸

12. ἀπολείπεται σαββατισμὸς τῷ λαῷ τοῦ θεοῦ (Hebrews 4:9)
 it.is.left Sabbath_{nom} the people_{dat} the God_{gen}
 A Sabbath rest is left for the people of God
 There remains a Sabbath rest for God's people
 (See also Hebrews 4:6 and 10:26.)

Some verbs, because of their meaning, never occur with any argument other than their subject. These are called *intransitive* verbs. Καθευδῆσαι, καθεύδειν (*sleep*), for example, appears only with a subject, never an object.

13. αὐτὸς δὲ ἐκάθευδεν (Matthew 8:24)
 he_{nom} but slept
 But he slept
 But he was asleep

Similarly, πεσεῖν, πίπτειν has a subject, but not objects.

14. μὴ ἔπαισαν ἵνα πέσωσιν;
 they.stumbled in.order they.fall
 Have they stumbled so as to fall?

Argument Structure

Whether a verb is transitive or intransitive follows directly from its meaning. Verbs and other predicates express activities or states that involve definite numbers of *participants*. Ἀπολειψαί, ἀπολείπειν (*leave behind*) expresses an activity that involves two participants, one who does the leaving, and one that is left. When δοῦναι, διδόναι is used in the transfer sense mentioned above, it expresses an activity that involves three participants, one who gives something, one who receives it, and another that is the thing given. Καθεύδω expresses an activity that involves only a single participant,

the one who sleeps. “Argument structure” is the term for the way these participants relate to the predicate that requires them.

Some Terms Borrowed from Logic

While natural language is clearly not reducible to the categories of formal logic, I borrow and adapt some terminology from logic to help make my claims about the conceptual structures of **predicates** specific, clear, and testable. The notion of “participants in an activity”, for example, may be given formal specificity by using simple logical notation.⁹ The argument structure of 15 below can be represented as in 16.

A **predicate** in the sense intended here, is a word that ascribes a property to or relation between other elements within its clause.

15. ὁ λαὸς... ἔδωκεν αἶνον τῷ θεῷ (Luke 18:43)

The people... gave praise to God

16. Predicate(argument-1, argument-2, argument-3)

where Predicate = δίδωμι, argument-1 = ὁ λαὸς, argument-2 = αἶνον, and argument-3 = τῷ θεῷ

This notation indicates that the sequence of syntactically related words (the *string*) in example 15 contains three *referring expressions* (a = ὁ λαὸς, b = αἶνον, and c = τῷ θεῷ), that is, three expressions that pick out an entity, person, or even idea from those things the author is talking about—i.e., from the *universe of discourse*. String 15 also contains a *predicate* (P, ἔδωκεν). The predicate defines a relation between those referring expressions.

The logical notation in 16 asserts that the *predicate*, P takes three *arguments* (abc). Predicates that take three arguments are called *three-place* predicates in studies of logic and in much of the linguistics literature.¹⁰ I will call a predicate that takes only one argument, such as καθεύδω (*sleep*) or πταίω (*stumble*), a *one-place* predicate. A predicate that takes two arguments (a subject and one object in the case of a transitive verb), I will call a *two-place* predicate.

While the status of certain elements like indicators of location will be further clarified below, we can tentatively state the principle of semantic role assignment for verbs as follows:

17. Any given verb has an identifiable argument structure involving a specific number of distinguishable arguments, and each argument for any given verb is associated with a particular semantic role.

A Brief Introduction to Semantic Roles¹¹

By “semantic role” I mean more or less what linguists working within the Construction Grammar paradigm call “case” roles and what linguists working within other frameworks call θ -roles—roles like **AGENT** (the one who intentionally initiates the action expressed by the predicate), **PATIENT** (the person or entity that undergoes the action expressed by the predicate). I avoid the term *case*, however, to make it clear that

I am *not* talking about the morphological cases (nominative, accusative, dative, genitive, and vocative).¹²

I will focus on only a small number of semantic roles since it is not the *nature* of these roles that concerns me here, but the way they are represented syntactically, the way individual predicates require them and other elements within the immediate syntactic context fill them. Consider the use of νικήσαι as a two-place predicate:

18. ἐγὼ νενίκηκα τὸν κόσμον
 I I.have.overcome the world
 I have overcome the world (John 16:33)

The two argument NPs ἐγὼ and τὸν κόσμον bear different semantic relationships to the verb νικήσαι (νενίκηκα). The nominative case pronoun ἐγὼ functions *syntactically* as subject, but *semantically* as the **AGENT** of the activity expressed by the verb. The accusative-case NP τὸν κόσμον functions *syntactically* as the complement (direct object) of νενίκηκα while functioning *semantically* as **PATIENT**—the one who undergoes the action expressed by the predicate.

Every predicate requires or permits a certain number of arguments, and those arguments play specific roles in relation to the predicate. If a verb expresses an activity involving two participants, it will require two arguments, and unless one of those arguments has already been established in the discourse context, the clause in which the predicate appears will contain at least two additional constituents to express those two arguments.

Moving Beyond Transitivity

Defining argument structure in this way allows us to move beyond the notions of transitivity discussed above. If a speaker of Greek knew the meaning of καθεύδω—that is, if she knew what activity it expressed—she would also know how many participants are necessary for that activity, and therefore how many arguments the verb takes. She would also have a sense of which role each argument represents in relationship to that predicate.

A native speaker would have a tacit understanding of the meaning, pronunciation, and usage of each word in his or her vocabulary. Let us call each one of these bodies of conscious and subconscious knowledge about a particular word or similar unit a '*lexical entry*' and call the total collection of such lexical entries the speaker's or writer's '*lexicon*'.¹³ For predicates this implicit knowledge would contain, in addition to the meaning, the predicate's syntactic category, the number and type of arguments it takes, and the roles those arguments play.¹⁴

Diversity of Syntactic Realizations of Arguments

Any given semantic role may be represented in our corpus in a variety of types of constituents. Observe the two examples below:

19. ἀγρὸν ἠγόρασα
field I.bought
I bought a field (Luke 14:18)
20. εἰ μήτι... ἡμεῖς ἀγοράσωμεν εἰς πάντα τὸν λαὸν τοῦτον βρώματα
if not we we.buy for all the people this food
unless... we buy food for all these people (Luke 9:13)

In 19 ἀγοράσαι (ἠγόρασα) appears with two arguments—one represented only by the personal ending of the verb, the other by the accusative case noun ἀγρὸν.¹⁵ In 20, however, the same verb appears with the same two arguments, but also with a prepositional phrase (PP) expressing the people benefitting from the purchase (the **BENEFACTIVE** role). When the **BENEFACTIVE** of this predicate is not expressed overtly as a separate constituent from the subject, the *subject* of ἀγοράσαι represents the **BENEFACTIVE** of the purchase, even though the subject also expresses the **AGENT**. That is, in 19 the person who bought the field bought it for himself. The addition of the PP in 20 prevents this interpretation by stating a **BENEFACTIVE** who is different from the *default* **BENEFACTIVE**—the grammatical subject. We could say that the PP is an *optional* expression of the **BENEFACTIVE** of ἀγοράσαι, though we would mean by this only that the expression of the **BENEFACTIVE** as a PP is present only under certain circumstances—namely, when the *subject* is not assigned the **BENEFACTIVE** role.

With this verb, then, the role **BENEFACTIVE** is always semantically present, but is not always overtly expressed syntactically as a separate constituent from the **AGENT**. The native speaker's internal lexicon, then, may be said to include the **BENEFACTIVE** argument with ἀγοράσαι, but not require its overt expression.

Observe the following notation for the argument structure of ἀγοράσαι:

21. ἀγοράσαι, ἀγοράζειν (**AGENT**^σ, **PATIENT**, [**BENEFACTIVE**]^σ)

This representation asserts that the meaning of the verb ἀγοράσαι implies two to three participants. The **AGENT** (listed as the first argument) is the default subject. The **PATIENT** (listed as the second argument) serves as direct object unless the verb is passive voice, in which case it becomes the subject. To reflect that the **BENEFACTIVE** role is not always realized as a separate constituent, it is enclosed in square brackets. The superscript σ (σ) is used to indicate that when the **BENEFACTIVE** role is not expressed overtly, it is co-referential with the first argument (**AGENT**).

There is another situation in which a single verb may appear in different contexts with a different number of arguments. Observe the examples in 22 and 23 below:

22. ἐγὼ νενίκηκα τὸν κόσμον (John 16:33)
I I.have.overcome the world
I have overcome the world
23. ὅπως... νικήσεις ἐν τῷ κρίνεσθαί σε (Romans 3:4)
that you.may.prevail in the to.be.judged you
That... you may prevail when you are judged

The predicate νικήσαι (νενίκηκα, νικήσεις) has two arguments in 22, but only one in 23.¹⁶ These two contexts imply different meanings for νικήσαι, though the two

meanings are clearly related. When νικῆσαι is a two-place predicate it implies something like “conquer” or “defeat.” When it is a one-place predicate its implications are more like “prevail” or “avoid defeat.” We may represent these different senses in terms of argument structure as follows:

24. νικῆσαι, νικᾶν ν (AGENT, PATIENT)

25. νικῆσαι, νικᾶν ν (AGENT)

This notation is used to indicate that the PATIENT argument is not merely optional. Its presence or absence signals a difference in the meaning of the predicate.

As we saw above (19–21), there are times when two or more semantic roles are assigned to the same argument by a single predicate. There are also instances in which a single constituent serves as an argument of more than one predicate. In Matthew 8:14 (below) the NP τὴν πενθερὰν αὐτοῦ (his mother-in-law) is assigned the semantic role AGENT by the participle βεβλημένην (having lain down), EXPERIENCER by the participle πυρέσσουσιν (having a fever), as well as THEME by the main verb ἶδεν (he saw).

26.	NP _{nom}	V	NP _{acc}	NP _{gen}	V _{part.acc}
	ὁ Ἰησοῦς...	ἶδεν	τὴν πενθερὰν	αὐτοῦ	βεβλημένην
	the Jesus...	saw	the mother.in.law	his	having.lain.down
	Jesus. . .	saw	his mother-in-law	lying	down
	Conj	V _{part.acc}			
	καὶ	πυρέσσουσιν	(Matthew 8:14)		
	and	having.a.fever			
	with a fever				

Similarly, multiple roles may be assigned to a single constituent in constructions with middle voice verbs. The form βεβλημένην in Matthew 8:14 (above) functions as middle voice, not passive. No other AGENT apart from τὴν πενθερὰν αὐτοῦ (his mother-in-law) is implied who might have laid his mother-in-law down. The Greek middle voice may sometimes serve to render a transitive verb intransitive, yet often such forms have a clearly reflexive implication (*She lay herself down*), with the verb functioning as a two-place predicate (as can be seen in its active voice occurrences). The NP τὴν πενθερὰν αὐτοῦ serves as both the AGENT and the PATIENT in relation to the predicate βεβλημένην (*having lain down*).

Most of the arguments I have discussed so far have been NPs or PPs, but notice that—as in other languages—clauses may also function as arguments in Greek. Notice the parallel function of the DP τὸ εὐαγγέλιον (*the good news*) in Mark 16:15 and the clause ὅσα ἐποίησεν αὐτῷ ὁ Ἰησοῦς (*how much Jesus had done for him*) in Luke 8:39.

27. κηρύξατε [τὸ εὐαγγέλιον] πάσῃ τῇ κτίσει
Preach [the good news] to the whole creation (Mark 16:15)

28. καὶ ἀπῆλθεν καθ' ὅλην τὴν πόλιν κηρύσσων
 [ὅσα ἐποίησεν αὐτῷ ὁ Ἰησοῦς].
 and he went away, proclaiming throughout the whole city (Luke 8:39)
 [how much Jesus had done for him]

Both the NP in 27 and the clause in 28 have the semantic role **THEME** (what is proclaimed) in relation to the predicate κηρύσσω.

Some individual verbs display this entire range of constituent types in the realization of their arguments. Observe the arguments of πιστεύω below. I have enclosed relevant argument in square brackets [].

29. πιστεύετε [ὅτι δύναμαι τοῦτο ποιῆσαι]; (Matthew 9:28)
 Do you believe [that I am able to do this]?
30. ἐγὼ πεπίστευκα [ὅτι σὺ εἶ ὁ χριστός. . .] (John 11:27)
 I believe [that you are the Christ. . .]
31. οὐκ ἐπίστεύσατε [αὐτῷ_{dat}] (Matthew 21:32)
 you did not believe [him]
 you did not trust [him]
32. οὐκ ἐπίστευσας [τοῖς λόγοις_{dat} μου] (Luke 1:20)
 you did not believe [my words]
33. πιστεύεις τοῦτο; (John 11:26)
 Do you believe [this_{acc}]?
34. πιστεύσομεν [ἐπ' αὐτόν] (Matthew 27:42)
 we will believe [in him]
 we will trust [him]
35. πιστεύετε [ἐν τῷ εὐαγγελίῳ] (Mark 1:15)
 Believe [in the good news]
 Trust [the good news]

In 29 and 30, πιστεύσαι has a clausal second argument. In 31–33 the second argument is a NP, but it is dative Case in 31 and 32 while accusative Case in 33. In 34 and 35, the second argument is a PP, but the preposition is ἐπί (ἐπ') in 34 and ἐν in 35. In each example the second argument expresses what is believed or trusted—it has the same semantic role (though the difference between 31 and 32 on the one hand and 33 on the other could conceivably be characterized in terms of semantic roles¹⁷).

These examples are sufficient to show that there is no direct relationship between *semantic roles* and *syntactic categories*. While there may exist some limitations on the relationship between semantic roles and syntactic categories, such limitations are weak at best and are unlikely to have been a part of the native speaker's lexical knowledge. For example, while the role **AGENT** is frequently associated with the syntactic function *subject*, it is not always assigned to the subject (as you will see below), and there would be little value in specifying this tendency in the lexicon.¹⁸

In addition to a clear definition, our representation of what a native speaker might have known about a given predicate need include only that predicate's syntactic category (V, N, A...) and the relevant semantic roles, as in 36.

36. πιστεύσαι, πιστεύειν V (EXPERIENCER, PATIENT)

This entry indicates that πιστεύω is a verb, and that it functions as a two-place predicate requiring the semantic roles **EXPERIENCER** and **PATIENT**. It also indicates —by virtue of the order of these roles in the specification—that the default syntactic *subject* in an active voice construction represents the **EXPERIENCER** of the faith or trust expressed by the verb, and the object/complement represents the **PATIENT** (the one in whom faith is placed).

 Adjuncts

The categories *predicate* and *argument* cannot account for all of the elements found in ancient Greek clauses. To do that, we must also distinguish between **arguments** (units that must accompany a predicate at least semantically, even if not always syntactically) and **adjuncts** (units that may be present to extend or otherwise modify the meaning of the predicate, but are not obligatory, even in this semantic sense).

Take another look at the text from Romans 3:4 cited above as 23 and repeated here as 37.

37. ὅπως... νικήσεις ἐν τῷ κρίνεσθαί σε
 that you.may.prevail in the to.be.judged you
 That... you may prevail when you are judged (Romans 3:4)

In this text the PP ἐν τῷ κρίνεσθαί σε functions as a temporal modifier of the predicate νικήσεις. It is not required by the meaning of νικήσεις, but offers further specification making overt the relationship between the predicate and its particular context.

Similarly, the PP ἐν Κρήτη in Titus 1:5 (8 above, repeated here as 38) functions to specify the location where the action named by the verb took place, but it is not required by the meaning of that verb:

38. ἀπέλιπόν σε ἐν Κρήτη
 I left you in Crete (Titus 1:5)

In the same way, ἐπὶ τὸ πτερύγιον τοῦ ἱεροῦ in Matthew 4:5 (below) specifies where the action expressed by στήναι¹⁹ (ἔστησεν) takes place, but is not required by the meaning of στήναι.

39. ὁ διάβολος... ἔστησεν αὐτὸν ἐπὶ τὸ πτερύγιον τοῦ ἱεροῦ (Matthew 4:5)
 the devil_{nom} set him_{acc} on the pinnacle_{acc} the temple_{gen}
 The devil... set him on the pinnacle of the temple

In all of these examples, the PP is what linguists call an **adjunct**. Adjuncts need not be represented in the lexicon for a particular predicate. Their semantic roles would not have been a part of the inherent meaning of any particular predicate in the native speaker's internalized lexicon. Including information about their roles in our lexical tools now would not help today's readers understand what a native speaker of Ancient Greek knew.

Predicates Other Than Verbs

A native speaker's internalized lexicon would also include information regarding the argument structure of words other than verbs. Notice the structure of the examples in 40–46:

40. ἐπίστευσαν εἰς αὐτὸν οἱ μαθηταὶ αὐτοῦ (John 2:11)
 believed in him the disciples his
 were.loyal to him the disciples his
 his disciples believed in him
 his disciples were faithful to him
41. πάντα τὸν πιστεύοντα εἰς αὐτόν (Acts 10:43)
 every the believing in him
 every the being.loyal to him
 everyone who believes in him
 everyone who is loyal to him

The prepositional phrases with εἰς in 40 and 41 are clearly arguments of the verb πιστεύω and express the GOAL of the faith/faithfulness expressed by that verb. In examples 42–44 (below) the prepositional phrases function similarly, but in relation to the noun πίστις. In fact, example 42 contains two arguments of the noun πίστις: the PP εἰς Χριστὸν, and the genitive-case pronoun ὑμῶν. The pronoun functions here like the nominative-case subject of the verb πιστεῦσαι.

42. τῆς εἰς Χριστὸν πίστεως ὑμῶν (Colossians 2:5)
 the in Christ faith your
 the to Christ faithfulness your
 your faith in Christ
 your faithfulness to Christ
43. πίστιν εἰς τὸν κύριον ἡμῶν Ἰησοῦν (Acts 20:21)
 faith in the lord our Jesus
 loyalty to the lord our Jesus
 faith in our Lord Jesus
 loyalty to our Lord Jesus
44. τῆς εἰς Χριστὸν Ἰησοῦν πίστεως (Acts 24:24)
 the in Christ Jesus faith
 the to Christ Jesus faithfulness
 faith in Christ Jesus
 faithfulness to Christ Jesus

Notice that in 45 below, while an argument paralleling the subject of πιστεῦσαι is expressed (σου), no object PP is found.²⁰ In 46, there are no arguments at all accompanying the noun πίστις. This is, in fact, a characteristic of deverbal nouns in general: their arguments are all optional in the restricted sense outlined above.

45. ἡ πίστις σου σέσωκέν σε
the faith your has.healed you
your faith has healed you (Matthew 9:22)
46. εὕρησει τὴν πίστιν ἐπὶ τῆς γῆς;
he.will.find the faith upon the earth
will he find faith upon the earth? (Luke 18:8)

Our representation of what the native speaker knew about individual predicates must be flexible enough to recognize this diversity of realizations of arguments, but not be crippled by it.

Canonical Realization of Semantic Roles

While a wide variety of realizations is clearly possible, definite patterns arise as we observe large numbers of predicates and their arguments. I will call the most frequently occurring patterns the *canonical realizations* of the semantic roles they represent.

Notice the variety of ways that the role **AGENT** may be realized, for example. In clauses where the main verb is active voice, the semantic role **AGENT**, if present at all, is usually assigned to the subject.

47. NP_{nom} V P NP_{acc}
ὁ Ἰησοῦς εἶπεν πρὸς αὐτόν. . . (Matthew 3:15)
the Jesus said to him
Jesus said to him. . .
48. NP_{nom} V Conj. V NP_{dat}
ἄγγελοι προσῆλθον καὶ διηκόνουν αὐτῷ. (Matthew 4:11)
angels came and ministered him
Angels came and ministered to him

In passive constructions the role **AGENT** may be assigned to a variety of constituent categories. A dative Case NP is sometimes assigned this role as in 49 and 50.

49. NP_{dat} V
εἰ . . . πνεύματι ἄγεσθε (Galatians 5:18)
if by.spirit you.are.led
If you are led by the spirit
50. V NP_{dat}
ὤφθη ἀγγέλοις (1 Timothy. 3:16)
he.was.seen by.angels
He was seen by angels

A genitive Case NP may also be used, as in example 51:

51. V Art_{nom} V_{part.nom} NP_{gen}
δεῦτε οἱ εὐλογημένοι τοῦ πατρός μου (Matthew 25:34)
Come the being.blessed by.the father my
Come, you who are blessed by my Father

The **AGENT** role may also be assigned to certain PPs in a passive construction as in the italicized phrases in 52 and 53:

52. V P Art_{dat} N_{dat} N_{dat} PP
 ἐβαπτίζοντο ἐν τῷ Ἰορδάνῃ ποταμῷ ὑπ' αὐτοῦ (Matthew 3:6)
 they.being.baptized in the Jordan River by him
 They were being baptized in the Jordan River by him
53. V DP_{nom} DP_{gen} PP
 ἀναπέπαιται τὸ πνεῦμα αὐτοῦ ἀπὸ πάντων ὑμῶν (2 Corinthians. 7:13)
 been.set.at.rest the spirit of.him by all of.you
 His mind has been set at rest by all of you

A genitive Case NP (including individual nouns or pronouns) may be assigned the **AGENT** role in relation to a NP predicate in what traditional Greek grammars call the subjective genitive construction. In fact, this is the standard way of expressing the **AGENT** of nominal predicates:

54. NP_{dat} NP_{gen}
 ἀγαπητοῖς θεοῦ (Romans 1:7)
 beloved by God
55. Art NP_{gen} N
 τὴν πάντων ὑμῶν ὑπακοήν (2 Corinthians 7:15)
 the of.all of.you obedience
 the obedience of all of you
56. Art PP DP DP_{gen}
 τῆς εἰς Χριστὸν πίστεως ὑμῶν
 the in Christ faith your_{gen.pl.}
 your faith in Christ
 your faithfulness to Christ

Despite this impressive diversity of realizations, the **AGENT**, when stated explicitly, is most frequently a nominative Case noun if the predicate is an active voice verb, and a genitive Case noun if the predicate is a noun. We can speak of these forms as the **canonical realizations** of the **AGENT** argument.

While knowing the canonical realizations of arguments is clearly significant, it does not follow that this information should be restated in the lexical entry for every predicate. Canonical realizations represent patterns that apply to many predicates, not something defining about individual predicates. It is highly doubtful that native speakers of Ancient Greek would have been able to list all of the constituent types that could be used with each argument of each verb they knew, and it is no more reasonable to expect that modern readers should have that ability. Knowledge of canonical realizations lies outside the argument structure of individual predicates.

Semantic Roles and Passivization

Having surveyed in basic terms the nature of argument structure and some of the issues it raises in active voice constructions, let us now turn our attention to how assignment of semantic roles map to constituents in passive constructions. Consider the use of νικήσαι as a two-place predicate as illustrated in 22 (above) repeated here as 57:

57. ἐγὼ νενίκηκα τὸν κόσμον
 I I.have.overcome the world
 I have overcome the world (John 16:33)
58. νικήσαι, νικᾶν *V* (AGENT, PATIENT)

The two argument NP's ἐγὼ and τὸν κόσμον bear different semantic relationships to the verb νενίκηκα. The nominative case pronoun ἐγὼ functions *syntactically* as subject and *semantically* as the AGENT of the activity expressed by the verb. The accusative Case NP τὸν κόσμον functions *syntactically* as the complement (direct object) of νενίκηκα (I have overcome) while functioning *semantically* as PATIENT—the one who undergoes the action expressed by the predicate.

When a verb is made passive, the argument that would be the subject of an active voice form of the same verb, may be eliminated or expressed in a looser syntactic relationship to the verb. The remaining argument (or the second argument in the case of a three-place predicate) may then be made the subject. In the case of νικήσαι, the PATIENT argument is made the subject of the passive construction:

59. μὴ νικῶ ὑπὸ τοῦ κακοῦ ἀλλὰ νικά ἐν τῷ ἀγαθῷ τὸ κακόν (Romans 12:21)
 Do not be overcome by evil, but overcome evil with good.

Here both instances of νικήσαι are second person singular imperatives. The first instance (νικῶ) is passive.²¹ While in the active construction (νικά ἐν τῷ ἀγαθῷ τὸ κακόν) the subject argument represents the AGENT of the action expressed by νικήσαι, in the passive construction (μὴ νικῶ ὑπὸ τοῦ κακοῦ) the subject represents the PATIENT of that same action.

When the verb is passive the argument that would be the object of an active voice construction (bearing the semantic role PATIENT in this case) is made the subject, and the argument that would have been subject in an active construction is assigned to a constituent more loosely tied to the verb: the prepositional phrase ὑπὸ τοῦ κακοῦ in 59.

We express this in our notation by the ordering of the semantic roles in relation to the predicate that requires them.

60. PREDICATE (ROLE 1, ROLE 2, ROLE 3)

The first role is the one assigned to the subject of an active voice construction. The second role is the default assigned to the subject of the passive construction.²² In any *active* voice occurrence of νικάω as a two-place predicate, both of its implied semantic roles are assigned to overt DPs unless one is already established in the discourse context and need not be stated explicitly.

Semantic Roles and the Copula

Special considerations arise when discussing semantic roles in clauses with the copula, εἰμί (and other verbs that function in similar ways). Compare the following two examples, one with εἰμί and one without.

61. DP_{nom} A_{nom}
 ὁ ἄνθρωπος οὗτος δίκαιος (Luke 2:25)
 the man this righteous
 this man [was] righteous
62. DP_{nom} A_{nom} V
 ὁ ἄνθρωπος οὗτος δίκαιος ἦν (Luke 23:47)
 the man this righteous was
 this man was righteous

In contrast to 61, the copula (ἦν) in 62 adds explicit person and number marking as well as specific verb morphology (imperfect rather than present). The context marks both constructions as past-referring.²³ The thematic relations of the relevant predicate remain identical. That is, in both cases it is predicated of ὁ ἄνθρωπος (*the man*) that he was δίκαιος (*righteous*). The predicate is the adjective δίκαιος in both constructions. It is a one-place predicate, with its only argument being the subject, ὁ ἄνθρωπος.

How, then, may we account for the argument structure of the verb (copula) εἰμί? Our representation of the native speaker's implied knowledge should state at least that when εἰμί is used as a copula, it does not assign thematic roles, but merely provides explicit person, number, and tense/aspect marking to a construction in which its syntactic complement assigns a semantic role to its subject.²⁴

Conclusion: Production of Language Acquisition Tools

By cataloging this information we can enable the development of tools that will allow future readers of ancient Greek texts to better understand what an ancient native speaker of Greek would have known implicitly. The logical notation I have outlined is easily adaptable to computer programming, and enhancing existing reliable databases with argument structure data should enable us to place much of that implicit knowledge at the disposal of readers in a digital reading environment. I envision a work environment that will specify not only immediate access to how *many* arguments each predicate could take, but which semantic roles those arguments play.

By making explicit what a native speaker would have known intuitively about the argument structure of every predicate in the New Testament and other Hellenistic Greek texts we will enable users of the language to more easily move beyond translation equivalents to a fuller understanding of the syntactic and semantic relationships in which each word has the potential to function. The lexica we produce today cannot hope to mirror all that a native speaker would have known about each word in his or her vocabulary, of course, but the tools we provide for today's readers can aim for the level

of efficiency that we know native speakers of any language demonstrate in their use of that language. A digital lexicon should include the information needed to understand the meaning of a word well enough to predict its usage, but not more. Observations about semantic roles in general, not tied to specific predicates, are better located in a grammar than a lexicon.

When I first raised this issue in 1995, my proposal that the guild must produce such a lexicon must have seemed outrageous to some listeners. At that time very little work on Greek argument structure had been accomplished. Simon Wong's dissertation on the verbs in the Pauline corpus was the only work of any length yet produced, and even that was not yet published. Since that time Wong's dissertation has become a published book, and Paul Danove has moved the work forward through his analyses of verbs of experience and of all the verbs and prepositions in Mark's Gospel.

In 1995 we were all imagining print media. Since that time advances in digital text analysis, storage, display, and manipulation have occurred, and high quality syntactic and morphological databases have been developed, creating possibilities we had not even imagined. While an enormous amount of work remains to be done, the goal is now in sight.

We need not wait for the production of a new lexicon to take advantage of the progress that has been made. Work on digital markup of the New Testament text is rapidly advancing, and it is now possible to embed this information directly in electronic editions of the text, enabling students to access the relevant data at the click of a button or a simple mouse-over.

Notes

¹ This article is a further development of work that began as a paper presented to the Biblical Greek Grammar and Linguistics Section of the Society of Biblical Literature (SBL) at its national meeting in November 1995. A slightly revised and updated version of that paper was published as “From the Lexicon to the Sentence: Argument Structure in Hellenistic Greek,” *Forum: the Academic Journal of the Westar Institute*, New Series 2:2 (1999): 215-238. This latest formulation seeks to recast some of the ideas expressed in that paper in ways more amenable to incorporation into digital tools for the study of Greek.

² The issue of argument structure is not new to linguistics. As early as the 1960s articles began to appear arguing that this issue should be central to language analysis and understanding of the human language capacity. See Charles Fillmore, “The case for case” in Emmon Back and Robert Harms, eds. *Universals in Linguistic Theory*, (New York: Holt, Rinehart, and Winston, 1968), pp. 1-88 and Jeffrey S. Gruber, *Studies in Lexical Relations*, Ph.D. dissertation, MIT, 1965 (distributed by Indiana University Linguistics Club, Bloomington, 1970).

What I am calling “argument structure” here, using the term common in many forms of generative linguistics, is closely related to what is called “valency” in other varieties of linguistic theory. For an examination of valency in Classical Greek see Helena Kurzová, “Morphological semantics and syntax in the non-formalized sentence structure of Greek,” in A. Rijksbaron, H.A. Mulder, and G.C. Wakker, eds., *In the Footsteps of Raphael Kühner* (Amsterdam: J.C. Gieben, 1988).

³ A number of linguists would now classify this phrase as a Determiner Phrase (DP) rather than a NP. The DP hypothesis was first proposed by Stephen Abney in his 1987 MIT dissertation, “The English Noun Phrase and its Sentential Aspect.” While I see much to recommend the DP hypothesis for ancient Greek, I will continue to use the term NP here since it is in wide use, and the point I am arguing is not affected by the choice of terminology.

⁴ A Construction Grammar approach to Hellenistic Greek was first proposed by Paul Danove at the meeting of the SBL in New Orleans in November, 1990. Danove’s paper, “The Theory of Construction Grammar and its Application to New Testament Greek,” was later published in *Biblical Greek Language and Linguistics: Open Questions in Current Research*, Ed. Stanley E. Porter and D.A. Carson, JSNT Supplement Series 80, (Sheffield: Sheffield Academic Press, 1993). For a detailed look at the Construction Grammar Model as it applies to argument structure, see Adele E. Goldberg, *Constructions: A Construction Grammar Approach to Argument Structure* (Chicago: University of Chicago Press, 1995).

Edwin Williams examined the same issues from a Minimalist perspective in “Theta Theory” in *Government and Binding and the Minimalist Program*, Ed. Gert, Webelhuth (Oxford, UK: Blackwell, 1995), pp. 97–124. Chapter two of Peter W. Culicover, *Principles and Parameters: an Introduction to Syntactic Theory*, Oxford Textbooks in Linguistics (Oxford: Oxford University Press, 1997) provides a clear overview.

Proponents of Relational Grammar have also discussed these issues. See, for example, Patrick Farrel, *Thematic Relations and Relational Grammar*, Outstanding Dissertations in Linguistics (New York: Garland Publishing, 1994). Role and Reference Grammar, a functionalist approach to syntax, also treats these issues using the same general terminology. See for example, Robert D. Van Valin, Jr., *Exploring the Syntax-Semantics Interface* (Cambridge: Cambridge University Press, 2003).

⁵ I adopt the practice recommended by Randall Buth of listing the two infinitive forms of the verb rather than the present active indicative first person singular. See “Verbs Perception and Aspect, Greek Lexicography and Grammar: Helping Students to Think in Greek,” in *Biblical Greek Language and Lexicography*, eds., Bernard A. Taylor, John A. L. Lee, Peter R. Burton, and Richard E. Whitaker (Grand Rapids: Eerdmans, 2004).

⁶ In Acts 7:38, for example, the direct object of δοῦναι, διδόναι is the same as the object of the verb in the main clause immediately before it, and is neither repeated nor represented by a pronoun: ὃς ἐδέξατο λόγια ζῶντα δοῦναι ἡμῖν (*He received living oracles to give to us.*)

⁷ This observation holds for *finite* occurrences of δίδωμι. When used as an infinitive, δίδωμι may appear with none of its arguments stated explicitly.

⁸ Passivization is discussed in more detail below. See the section “Semantic Roles and Passivization.”

⁹ For many years the standard introduction to the ways formal logic may serve the interests of linguists was to be found in Jens Allwood, Lars-Gunnar Andersson, and Östen Dahl, *Logic in Linguistics*, Cambridge Textbooks in Linguistics (Cambridge: Cambridge University Press, 1977). A more recent survey of the topic is presented in James D. McCawley, *Everything that Linguists have always Wanted to Know about Logic* *but were Ashamed to Ask*, 2nd ed. (Chicago: University of Chicago Press, 1993). Johan F.A.K. van Benthem and Alice ter Meulen’s *Handbook of Logic and Language*, 2 ed. (Elsevier, 2010) provides a detailed coverage of logic in everything from Linguistics to Game Theory.

¹⁰ *Verbs* that take three arguments (one subject and two objects) are called “ditransitive” verbs in popular Greek reference grammars because they have two objects. From this point forward I adopt the term *three-place predicate* for two reasons. First, it serves as a reminder that the subject is also an argument. Second, the term *predicate* can be applied to syntactic categories other than verbs. My comments address this broader range of items.

When I say that a word is an *n*-place predicate, I actually mean that a *particular meaning* of that word is such a predicate. A different meaning of the same word may imply a different argument structure.

¹¹ There are several possible approaches to the problem of describing the semantic import of arguments. Construction Grammar and Relational Grammar both provide accounts of these facts. See Patrick Farrell, *Thematic Relations and Relational Grammar*, Outstanding Dissertations in Linguistics (New York: Garland Publishing, 1994), for example. For a statement of the relationship between arguments and semantic roles (θ -roles) within the Principles and Parameters framework, see Michael Brody, “ θ -Theory and Arguments,” *Linguistic Inquiry*, 24, 1 (Winter 1993). To see how these same phenomena are handled within the Minimalist Program, see Heidi Harley, “A Minimalist Approach to Argument Structure,” in *The Oxford Handbook of Linguistic Minimalism*, ed. Cedric Boeckx, (Oxford University Press, 2011).

¹² Some interesting work has been done on the issue of morphological case and its relationship to semantic issues. For a discussion of changes in the case-marking system through the history of ancient Greek, see V. Acson, “A diachronic view of case-marking systems in Greek: a Localistic Lexicase Analysis,” Ph.D. Dissertation, University of Hawaii, 1979. Alan Libert has utilized data from Hellenistic Greek in his 1992 McGill University dissertation, “On the Distinction between Syntactic and Semantic Case,” though his concern is not directly with the issue of morphological case marking.

¹³ Such knowledge would not be uniform from one user of the language to another, and some of the individual differences in usage we now find in the corpus may stem from individual differences in the authors’ internalized lexicons.

¹⁴ There are a number of competing ways to represent the contents of these “lexical entries.” In some of the Linguistics literature this information is represented in what is called a “thematic grid” or “theta grid”. In other parts of the literature, similar information is contained in “case frames”. I am less interested in the formal mechanisms we chose to represent this information than I am in what should be included. The convention that I use is not intended to be standard, but merely functional.

¹⁵ Unlike English, ancient Greek did not require an explicitly stated subject NP. It did, however, represent the basic grammatical information about the person and number of the subject of all finite clauses through the morphological marking of the verb.

The semantic value of the subject is virtually always recoverable from the context in such clauses, and is made semantically local by the verb morphology. In this sense, we may say that the subject argument is always present in finite clauses and available for assignment of a semantic role by the main predicate. For this reason the first argument of any verbal predicate can always be assigned to some morpho-syntactic constituent unless passivization has occurred or the clause is non-finite.

¹⁶ The PP ἐν τῷ κρίνεσθαι σε is a temporal modifier of the verb νικήσεις, not an argument. See the section on adjuncts below.

¹⁷ This difference in morphological Case should not be overlooked as insignificant. It may very well correlate with a difference in semantic focus. For a discussion of the problem of second arguments assigned a Case other than accusative, see Mulder, “Non-accusative Second Arguments of Two-place Verbs in Ancient Greek.” Alan Libert’s McGill University dissertation, “On the Distinction between Syntactic and Semantic Case” also contains relevant theoretical discussions.

¹⁸ My thinking on this issue has changed significantly since 1995 when I first raised many of the issues discussed in this paper.

¹⁹ στήναι is the aorist infinitive form of the verb listed in New Testament lexica as ἴστημι.

²⁰ The Noun πίστις may also have a PP argument with ἐν rather than εἰς. Occurrences of this N with a PP argument using ἐν are often more complex than the ones with εἰς since PPs with ἐν may also serve as **LOCATIVE** adjuncts rather than arguments. In Matthew 8:10 and Romans 1:5, for example, the PP with ἐν does not really serve as an argument of πίστις at all, but expresses a **LOCATIVE** role in relation to a different constituent.

παρ’ οὐδενὶ τοσαύτην πίστιν ἐν τῷ Ἰσραὴλ εὗρον (Matthew 8:10)

Never have I found such faith even in Israel

εἰς ὑπακοὴν πίστεως ἐν πᾶσιν τοῖς ἔθνεσιν (Romans 1:5)

for obedience of faith among all the Gentiles

for faithful obedience among all the Gentiles

In Galatians 3:26, however, either reading is possible.

Πάντες γὰρ υἱοὶ θεοῦ ἐστε διὰ τῆς πίστεως ἐν Χριστῷ Ἰησοῦ

For through **faith in Christ Jesus** [you are all sons of God]—**GOAL**

For **in Christ Jesus** [you are all sons of God through faith]—**LOCATIVE**

These two readings differ not only in the semantic role assigned to the PP ἐν Χριστῷ Ἰησοῦ. They also differ in the structural description assigned to the clause as a whole. Is ἐν Χριστῷ Ἰησοῦ to be taken as the complement of πίστεως, with διὰ τῆς πίστεως ἐν Χριστῷ Ἰησοῦ modifying Πάντες γὰρ υἱοὶ θεοῦ (as in the first reading), or should ἐν Χριστῷ Ἰησοῦ be taken as a separate adverbial modifier? (i.e. You are all sons of God in Christ Jesus, AND you are all sons of God through faith.). While the order of constituents suggests the first reading, the second cannot be ruled out on merely structural grounds. If the PP ἐν Χριστῷ Ἰησοῦ is taken as the complement of the N πίστις (πίστεως), it must be assigned the **GOAL** semantic role.

²¹ Because νικήσαι is a contract verb (listed in New Testament lexica as νικάω), its present *passive imperative* second singular form is identical to its present *active indicative* first singular: νικῶ. The presence of the PP ὑπὸ τοῦ κακοῦ, however, mandates a passive interpretation, and the context of the following clause makes the imperative value clear.

²² In some languages, the third semantic role, when present, may also be assigned to the subject of a passive construction, but some mechanism for differentiating instances of role 2 and role 3 is necessary. Compare these two English sentences, for example:

Each student was given a new book.

GOAL **PATIENT**

A new book was given to each student.

PATIENT **GOAL**

The argument structure of the English verb “give” is (**AGENT, GOAL, PATIENT**). The **GOAL** argument is listed second because it is the default subject of the passive form of this verb. In the second sentence the preposition “to” is introduced to identify the **GOAL** argument because it is not serving its default syntactic function (subject) and is hence not in its default location.

²³ Work on tense and aspect in Hellenistic Greek over the past three decades has established that what older grammars called *tense* forms actually grammaticalize *aspect*. To what extent they may also grammaticalize distinctions of *tense*, has remained a debated issue. See Buist Fanning, *Verbal Aspect in New Testament Greek* (Oxford: Clarendon, 1990), Stanley Porter, *Verbal Aspect in the Greek of the New Testament, with Reference to Tense and Mood*, Studies in Biblical Greek 1 (New York: Peter Lang, 1989), and Mari Broman Olsen, *A Semantic and Pragmatic Model of Lexical and Grammatical Aspect* (New York: Garland Publishing, Inc., 1997).

²⁴ Wong says of εἶμί and related verbs, “What seems to be the situation is that verbs of existence and happening are not predications per se, but conditions of predications,” *Semantic Case-Relations*, p. 210. He also notes other verbs that appear not to assign semantic roles, such as aspect markers: “These verbs do not take case frames of their own,” p. 213.

Glossary

Argument: a phrase directly related to a *predicate* via a *semantic role* (theta role, or Case frame).

Ditransitive: requiring two objects. A verb is said to be *ditransitive* if it is accompanied by two grammatical objects, as in “Sarah gave James a notebook” where *James* and *notebook* are objects of the verb *gave*.

Intransitive: with no grammatical object. A verb is *intransitive* if it is not accompanied by a direct or indirect object.

Predicate: an expression that takes a subject (and potentially one or more objects) to form a clause or sentence.

String: a sequence of interrelated words.

Transitive: requiring an object. A verb is said to be *transitive* if it requires a direct object. See also *intransitive* and *ditransitive*.

Bibliography

- Allwood, Jens, Lars-Gunnar Andersson, and Östen Dahl.** *Logic in Linguistics*. Cambridge Textbooks in Linguistics. Cambridge: Cambridge University Press, 1977.
- Randall Buth.** "Verbs Perception and Aspect, Greek Lexicography and Grammar: Helping Students to Think in Greek." In *Biblical Greek Language and Lexicography*. Eds., Bernard A. Taylor, John A. L. Lee, Peter R. Burton, and Richard E. Whitaker. Grand Rapids: Eerdmans, 2004.
- Culicover, Peter W.** *Principles and Parameters: an Introduction to Syntactic Theory*. Oxford Textbooks in Linguistics. Oxford: Oxford University Press, 1997.
- Danove, Paul.** "Distinguishing Goal and Locative Complements of New Testament Verbs of Transference." *Filología Neotestamentaria*. Vol. 20 (2007) 51-66.
- Danove, Paul.** *Linguistics and Exegesis in the Gospel of Mark*. Journal for the Study of the New Testament Supplement 218. T. & T. Clark Publishers, Ltd, 2005.
- Danove, Paul.** "The Theory of Construction Grammar and its Application to New Testament Greek." *Biblical Greek Language and Linguistics: Open Questions in Current Research*. Ed. Stanley E. Porter and D.A. Carson, JSNT Supplement Series 80. Sheffield: Sheffield Academic Press, 1993.
- Danove, Paul.** "Verbs of Experience: Toward a Lexicon Detailing the Argument Structure Assigned by Verbs." In *Linguistics and the New Testament: Critical Junctures*, Ed. Stanley E. Porter and D.A. Carson, JSNT Supplement Series 168 (Sheffield: Sheffield Academic Press, 1999)
- Farrel, Patrick.** *Thematic Relations and Relational Grammar*, Outstanding Dissertations in Linguistics. New York: Garland Publishing, 1994.
- Fillmore, Charles.** "The case for case." In *Universals in Linguistic Theory*, Ed. Emmon Back and Robert Harms. New York: Holt, Rinehart, and Winston, 1968. pp. 1-88.
- Goldberg, Adele E.** *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: University of Chicago Press, 1995.
- Grimshaw, Jane.** *Argument Structure*, Linguistic Inquiry Monograph Eighteen. Cambridge, Massachusetts: MIT Press, 1990.
- Gruber, Jeffrey S.** *Studies in Lexical Relations*, Ph.D. dissertation, MIT, 1965.
- Haegeman, Liliane.** *Introduction to Government and Binding Theory*, 2nd ed. Oxford, UK: Blackwell, 1994.
- Jackendoff, Ray.** *Semantic Structures*, Current Studies in Linguistics. Cambridge: The MIT Press, 1990.
- Kyrzová, Helena.** "Morphological semantics and syntax in the non-formalized sentence structure of Greek." In *In the Footsteps of Raphael Kühner*. Eds. A. Rijksbaron, H.A. Mulder, and G.C. Wakker. Amsterdam: J.C. Gieben, 1988.
- Louw J.P.** "Linguistic Theory and the Greek Case System," *Acta Classica*, 9, 1966.

McCawley, James D. *Everything that Linguists have always Wanted to Know about Logic* *but were Ashamed to Ask.* 2nd ed. Chicago: University of Chicago Press, 1993.

Nieuwhof, Hein. "Arguments and Concepts," *Journal of Linguistics*, 30, 1994.

Williams, Edwin. *Thematic Structure in Syntax*, Linguistic Inquiry Monograph Twenty-Three (Cambridge, Massachusetts: MIT Press, 1994).

Van Valin, Jr., Robert D. *Exploring the Syntax-Semantics Interface.* Cambridge: Cambridge University Press, 2003.

Wong, Simon. *A Classification of Semantic Case-Relations in the Pauline Epistles.* New York: Peter Lang Publishing, 1997.