

Erasmus Lectures II: The Major Constructions of English Revisited

ROLAND HAUSSER
Computational Linguistics
Universität Erlangen Nürnberg
Germany



University of Jyväskylä, Finland
March 22–26, 2010, 12:15–13:45

Table of Contents

1. Functor-Argument Structure and Coordination	1
1.1 Comparing Three Different Approaches	1
1.2 Intrapropositional Functor-Argument Structure	12
1.3 Extra-Propositional Functor-Argument Structure	16
1.4 Intrapropositional Coordination	22
1.5 Extrapropositional Coordination	30
2. Intrapropositional Coordination in Extrapropositional FA Structure	32
2.1 Subject sentence	32
2.2 Object Sentence	36
2.3 Relative Clause with Subject Gap	40
2.4 Relative Clause with Object Gap	43
2.5 Adverbial Clause	46
3. Coordination and Gapping	50
3.1 Gapping in Main Clause	50
3.2 Subject Sentence	55
3.3 Object Sentence	59
3.4 Relative Clause	63
3.5 Adverbial Clause	66

1. Functor-Argument Structure and Coordination

1.1 Comparing Three Different Approaches

1.1.1 Basic differences between PSG trees and DBS trees

PSG: many non-terminal nodes, beginning with S
function words are part of the tree
trees defined in terms of dominance and precedence

DBS: no non-terminal nodes
no function words
/ and \ connect functor with argument
| connects modified with modifier
— connects conjunct with conjunct

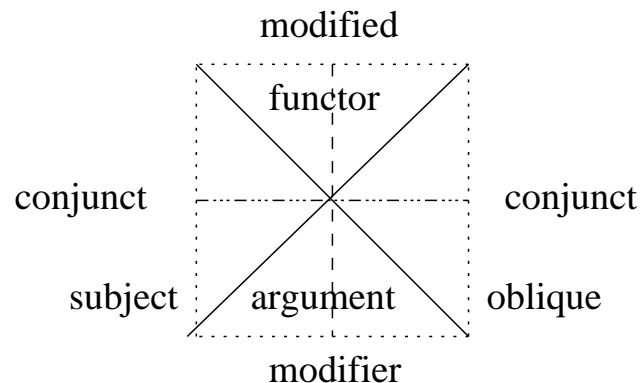
¹Thanks to Thomas Proisl for proof-reading, correcting, and help with the graphs.

1.1.2 Kinds of Semantic Relations in Natural Language

	<i>functor–argument</i> asymmetric	<i>coordination</i> symmetric
obligatory	noun–verb	
optional	modifier–modified	conjunct–conjunct

The interpreted connection in a DBS graph may be summarized as the following combination of two crosses in a square:

1.1.3 Cross of semantic relations in DBS



The diagonal lines show the obligatory valency relation between a noun and a verb, one for the subject, the other

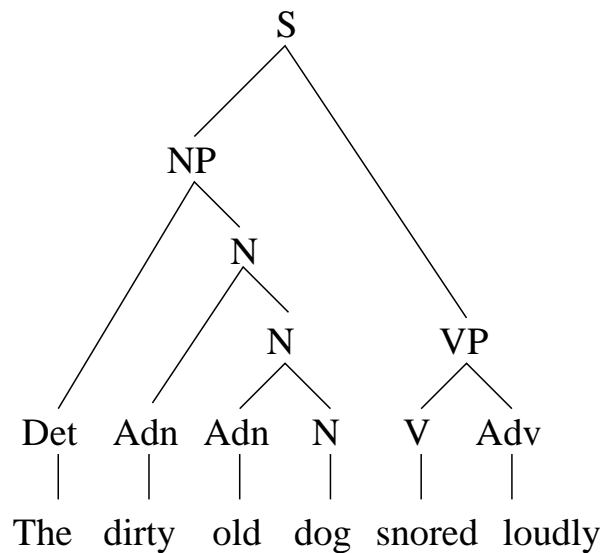
for the oblique cases, including prepositional phrases. The vertical line shows the optional relation between a modified and its modifier, the modified being either a noun (adnominal) or a verb (adverbial). The horizontal line shows the optional coordination relation between two conjuncts.

All three relations occur intrapositionally and extrapositionally. The extrapositional obligatory valency relation between a noun and a verb covers subordinate clauses called subject sentence and object sentence. The extrapositional optional relation between modifier and modified covers adverbial sentences and adnominal sentences (relative clauses). The extrapositional optional coordination relation covers the concatenation of propositions.

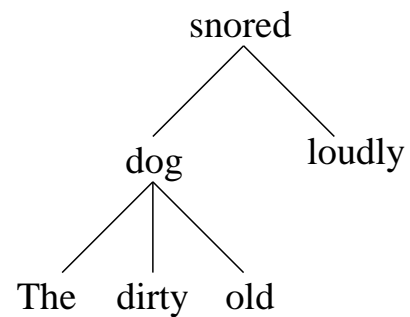
1.1.4 Intrapropositional functor-argument structure

The dirty old dog snored loudly.

*Constituent Structure Analysis
in Phrase Structure Grammar*

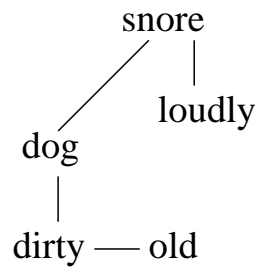


*Dependency Analysis
in Dependency Grammar*

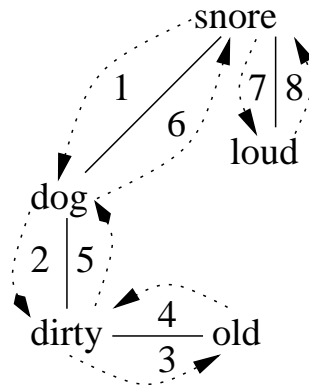


DBS analysis of The dirty old dog snored loudly.

*semantic relations analysis
in Database Semantics*



underlying navigation



surface realization

1 2 3 4-5 6 7 8
The dirty old dog snored loudly .

[adj: dirty &
cat: adn
sem: pos
mdd: dog
nc: old
prn: 23]

[adj: old
cat: adn
sem: pos
mdd:
pc: dirty
prn: 23]

[noun: dog
cat: snp
sem: def sg
fnc: snore
mdr: dirty &
prn: 23]

[verb: snore
cat: decl
sem: past
arg: dog
mdr: loud
prn: 23]

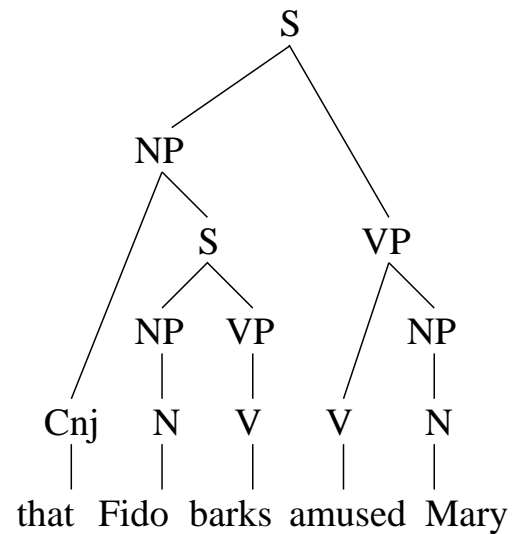
[adj: loud
cat: adv
sem: pos
mdd: snore prn: 23]

Surface order of core values. Cf. NLC'06, Chapt. 6.

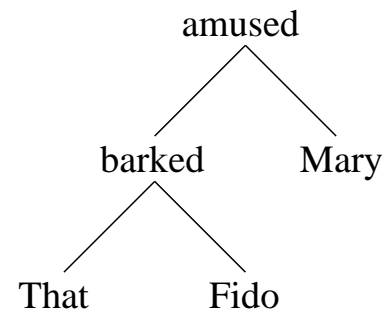
1.1.5 Extrapositional functor-argument structure

That Fido barked amused Mary.

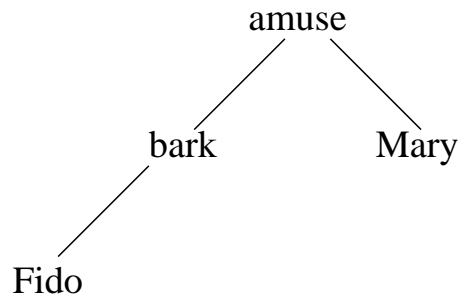
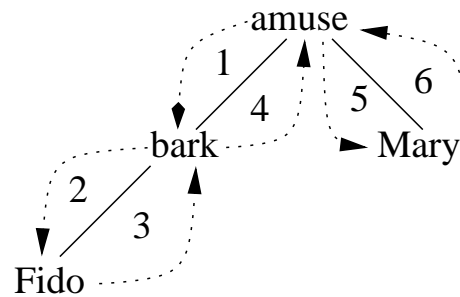
*Constituent Structure Analysis
in Phrase Structure Grammar*



*Dependency Analysis
in Dependency Grammar*



DBS analysis of That Fido barked amused Mary.

semantic relations*underlying navigation**surface realization*

1 2 3 4 5 6
 That Fido barked amused Mary .

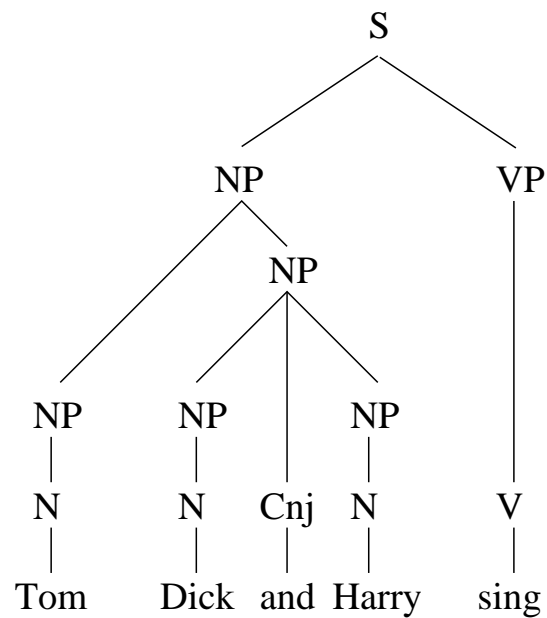
noun: Fido cat: nm sem: sg fnc: bark mdr: prn: 27	n/v: that bark cat: v sem: past arg: Fido fnc: (amuse 28) prn: 27	verb: amuse cat: decl sem: past arg: (bark 27) Mary mdr: prn: 28	noun: Mary cat: nm sem: sg fnc: amuse mdr: prn: 28
--	--	---	---

(surface order of core values, cf. NLC'06, Sect. 7.2)

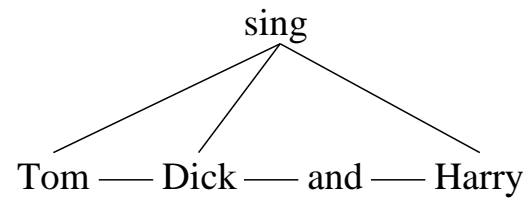
1.1.6 Intrapropositional coordination

Tom, Dick, and Harry sing.

*Constituent Structure Analysis
in Phrase Structure Grammar*

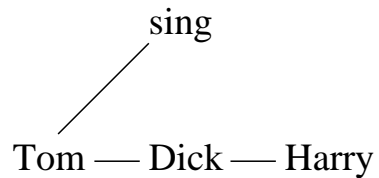


*Dependency Analysis
in Dependency Grammar*

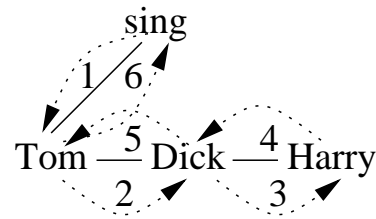


DBS analysis of Tom, Dick, and Harry sing.

*semantic relations analysis
in Database Semantics*



underlying navigation



surface realization

1 2 3 4-5-6
Tom Dick and_Harry sing_.

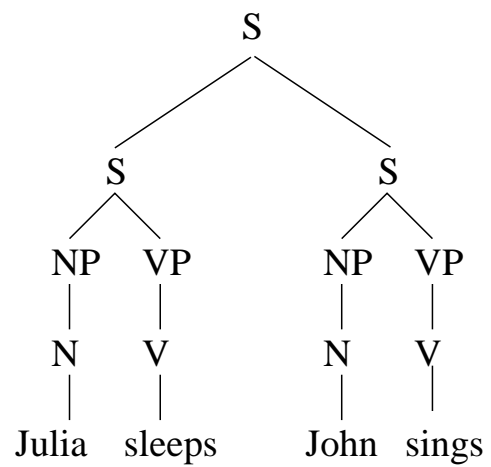
noun: Tom & cat: nm sem: sg fnc: sing nc: Dick pc: prn: 21	noun: Dick cat: nm sem: sg fnc: nc: Harry pc: Tom prn: 21	noun: Harry cat: nm sem: sg fnc: nc: pc: Dick prn: 21	verb: sing cat: decl sem: pres arg: Tom & prn: 21
--	---	---	---

(surface order of core values, cf. NLC'06, Sect. 8.2)

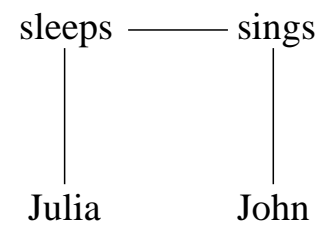
1.1.7 Extrapositional coordination

Julia sleeps. John sings.

*Constituent Structure Analysis
in Phrase Structure Grammar*

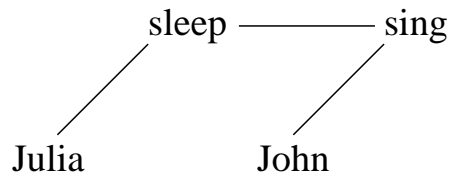


*Dependency Analysis
in Dependency Grammar*

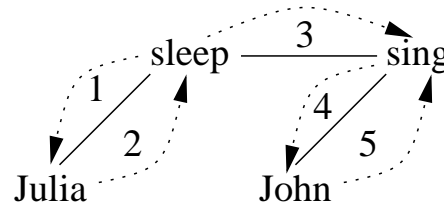


DBS analysis of *Julia sleeps. John sings.*

*semantic relations analysis
in Database Semantics*



underlying navigation



surface realization

1 2 3-4 5
Julia sleeps__ . John sings__ .

$\left[\begin{array}{l} \text{noun: Julia} \\ \text{cat: nm} \\ \text{sem: sg} \\ \text{fnc: sleep} \\ \text{prn: 24} \end{array} \right]$	$\left[\begin{array}{l} \text{verb: sleep} \\ \text{cat: decl} \\ \text{sem: pres} \\ \text{arg: Julia} \\ \text{pc:} \\ \text{nc: (sing 25)} \\ \text{prn: 24} \end{array} \right]$	$\left[\begin{array}{l} \text{noun: John} \\ \text{cat: nm} \\ \text{sem: sg} \\ \text{fnc: sing} \\ \text{prn: 25} \end{array} \right]$	$\left[\begin{array}{l} \text{verb: sing} \\ \text{cat: decl} \\ \text{sem: pres} \\ \text{arg: John} \\ \text{pc: (sleep 24)} \\ \text{nc:} \\ \text{prn: 25} \end{array} \right]$
---	---	---	--

(surface order of core values, cf. NLC'06, Sect. 9.2)

1.2 Intrapositional Functor-Argument Structure

1.2.1: THREE-PLACE VERB

The man gave the child an apple.

Cf. NLC'06, Sect. 6.2.

1.2.2: ADNOMINAL ADJECTIVES

The little black dog barked.

Cf. NLC'06, 6.3.1 and 6.3.2.

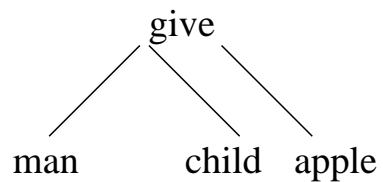
1.2.3: ADVERBIAL ADJECTIVE

Julia has been sleeping deeply.

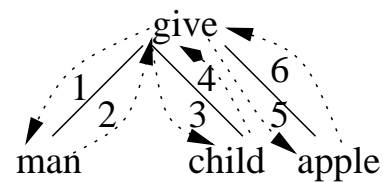
Cf. NLC'06, 6.3.3 and 6.3.4.

1.2.1 The man gave the child an apple. (**three-place verb**)

semantic relations



underlying navigation



surface realization

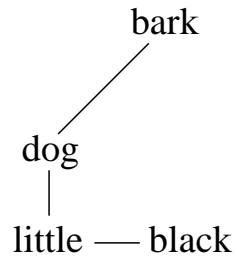
1 2 3 4-5 6
 The__man gave the__child an__apple .

noun: apple cat: snp sem: indef sg fnc: give mdr: prn: 1	noun: child cat: snp sem: def sg fnc: give mdr: prn: 1	verb: give cat: decl sem: past arg: man child apple mdr: prn: 1	noun: man cat: snp sem: def sg fnc: give mdr: prn: 1
---	---	--	---

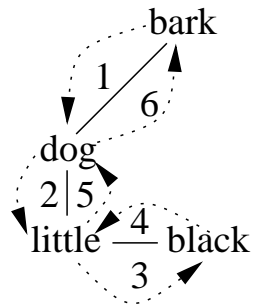
(alphabetical order of core values)

1.2.2 The little black dog barked. (adnominal adjectives)

semantic relations



underlying navigation



surface realization

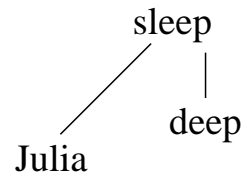
1 2 3 4-5 6
The little black dog barked__.

verb: bark cat: decl sem: past arg: dog mdr: prn: 2	adj: black cat: adn sem: pos mdd: pc: little prn: 2	noun: dog cat: snp sem: def sg fnc: bark mdr: little & prn: 2	adj: little & cat: adn sem: pos mdd: dog nc: black prn: 2
--	--	--	--

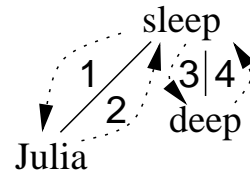
(alphabetical order of core values)

1.2.3 Julia has been sleeping deeply. (adverbial adjective)

semantic relations



underlying navigation



surface realization

1 2 3 4
 Julia has __been__ sleeping deeply .

noun: Julia cat: nm sem: sg fnc: sleep mdr: prn: 3	verb: sleep cat: decl sem: pres perf prog arg: Julia mdr: deep prn: 3	adj: deep cat: adv sem: pos mdd: sleep mdr: prn: 3
---	--	---

1.3 Extra-Propositional Functor-Argument Structure

1.3.1: SUBJECT SENTENCE

That Fido barked amused Mary.

Cf. NLC'06, Sect. 7.2.

1.3.2: OBJECT SENTENCE

John heard that Fido barked.

cf. NLC'06, Sect. 7.3.

1.3.3: ADNOMINAL SENTENCE, SUBJECT GAP

The dog which saw Mary barked.

Cf. NLC'06, Sect. 7.4.

1.3.4: ADNOMINAL SENTENCE, OBJECT GAP

The dog which Mary saw barked.

Cf. NLC'06, Sect. 7.5.

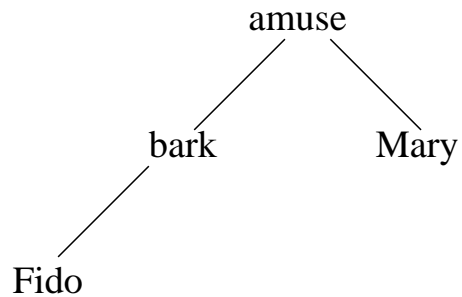
1.3.5: ADVERBIAL SENTENCE

When Fido barked Mary smiled.

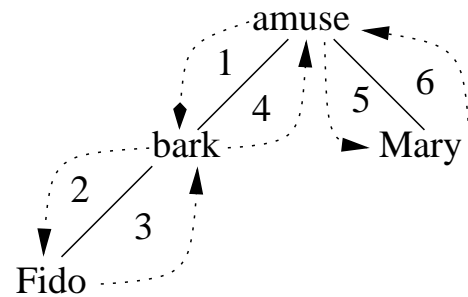
Cf. NLC'06, Sect. 7.6.

1.3.1 That Fido barked amused Mary. (subject sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6
 That Fido barked amused Mary .

[n/v: that bark
 cat: v
 sem: past
 arg: Fido
 fnc: (amuse 28)
 prn: 27]

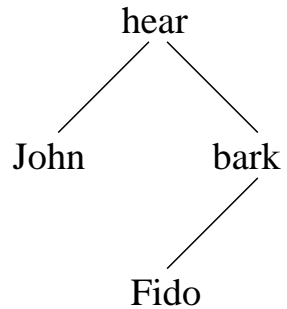
[noun: Fido
 cat: nm
 sem: sg
 fnc: bark
 mdr:
 prn: 27]

[verb: amuse
 cat: decl
 sem: past
 arg: (bark 27) Mary
 mdr:
 prn: 28]

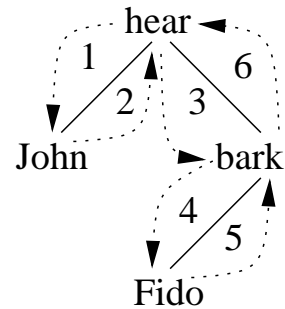
[noun: Mary
 cat: nm
 sem: sg
 fnc: amuse
 mdr:
 prn: 28]

1.3.2 John heard that Fido barked. (object sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6
 John heard that Fido barked .

[noun: John
 cat: nm
 sem: sg
 fnc: hear
 mdr:
 prn: 30]

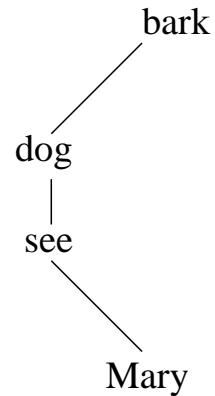
[verb: hear
 cat: decl
 sem: past
 arg: John (bark 31)
 mdr:
 prn: 30]

[n/v: that bark
 cat: v
 sem: past
 arg: Fido
 fnc: (hear 30)
 prn: 31]

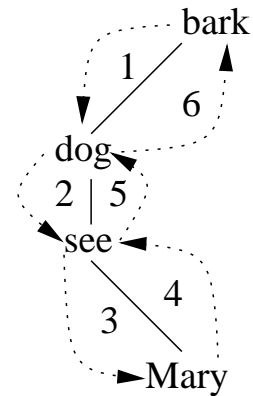
[noun: Fido
 cat: nm
 sem: sg
 fnc: bark
 mdr:
 prn: 31]

1.3.3 The dog which saw Mary barked. (adnominal sentence, subject gap)

semantic relations



underlying navigation



surface realization

1 2 3 4-5-6
 The dog which saw Mary barked .

[noun: dog
 cat: snp
 sem: def sg
 fnc: bark
 mdr: (see 33)
 prn: 32]

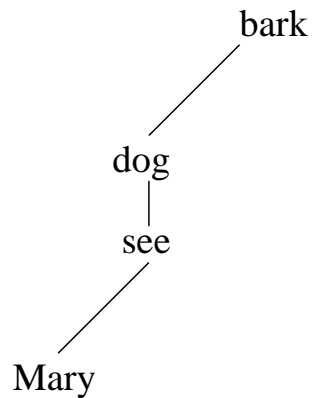
[a/v: see
 cat: v
 sem: past
 arg: # Mary
 mdd: (dog 32)
 prn: 33]

[noun: Mary
 cat: nm
 sem: sg
 fnc: see
 mdr:
 prn: 33]

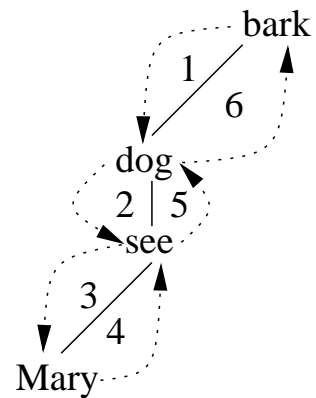
[verb: bark
 cat: decl
 sem: past
 arg: dog
 mdr:
 prn: 32]

1.3.4 The dog which Mary saw barked. (adnominal sentence, object gap)

semantic relations



underlying navigation



surface realization

1 2 3 4 5-6
 The__dog which Mary saw barked__.

[noun: dog
 cat: snp
 sem: def sg
 fnc: bark
 mdr: (see 33)
 prn: 32]

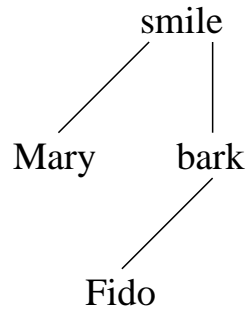
[a/v: see
 cat: v
 sem: past
 arg: Mary #
 mdd: (dog 32)
 prn: 33]

[noun: Mary
 cat: nm
 sem: sg
 fnc: see
 mdr:
 prn: 33]

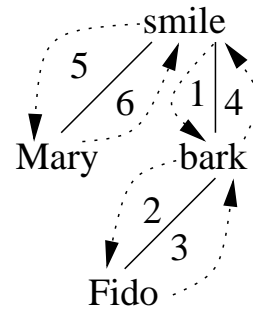
[verb: bark
 cat: decl
 sem: past
 arg: dog
 mdr:
 prn: 32]

1.3.5 When Fido barked Mary smiled. (adverbial sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4-5 6
 When Fido barked Mary smiled_.

[a/v: when bark
 cat: v
 sem: past
 arg: Fido
 mdd: (smile 37)
 prn: 36]

[noun: Fido
 cat: nm
 sem: sg
 fnc: bark
 mdr:
 prn: 36]

[noun: Mary
 cat: nm
 sem: sg
 fnc: smile
 mdr:
 prn: 37]

[verb: smile
 cat: decl
 sem: past
 arg: Mary
 mdr: (bark 36)
 prn: 37]

1.4 Intrapositional Coordination

1.4.1: SIMPLE NOUN COORDINATION, SUBJECT

The man, the woman, and the child slept.

Cf. NLC'06, 8.2.1 and 8.2.2.

1.4.2: SIMPLE NOUN COORDINATION, OBJECT

John bought an apple, a pear, and a peach.

NLC'06, 8.2.4 and 8.2.5.

1.4.3: TWO SIMPLE NOUN COORDINATIONS, SUBJECT OBJECT

The man, the woman, and the child bought an apple, a pear, and a peach.

Cf. NLC'06, 8.2.3.

1.4.4: SIMPLE VERB COORDINATION

John bought, cooked, and ate a pizza.

Cf. NLC'06, 8.3.2 and 8.3.3.

1.4.5: ADNOMINAL COORDINATION

John loves a smart, pretty, rich girl.

Cf. NLC'06, 8.3.4.

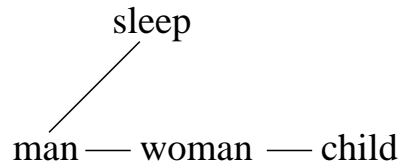
1.4.6: ADVERBIAL COORDINATION

John talked slowly, gently, and seriously.

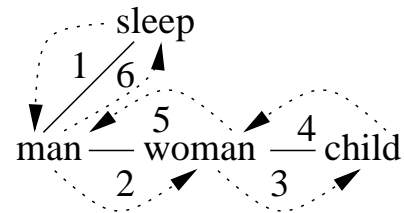
Cf. NLC'06, 8.3.5.

1.4.1 The man, the woman, and the child slept. (simple noun coordination, subject)

semantic relations



underlying navigation



surface realization

1 2 3 4-5-6
The man the woman and the child slept .

[
noun: man &
cat: snp
sem: def sg
fnc: sleep
nc: woman
pc:
prn: 26
]

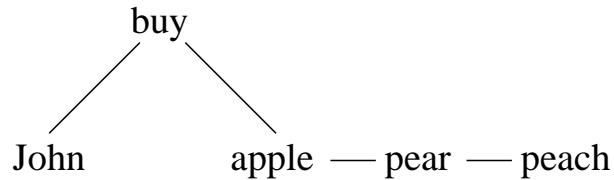
[
noun: woman
cat: snp
sem: def sg
fnc:
nc: child
pc: man
prn: 26
]

[
noun: child
cat: snp
sem: def sg
fnc:
nc:
pc: woman
prn: 26
]

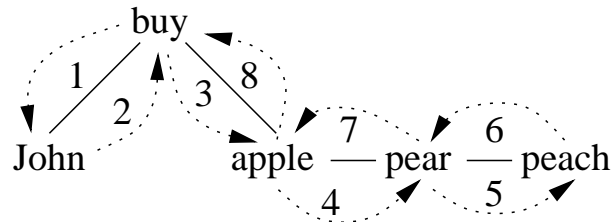
[
verb: sleep
cat: decl
sem: past
arg: man &
prn: 26
]

1.4.2 John bought an apple, a pear, and a peach. (simple noun coordination, object)

semantic relations



underlying navigation



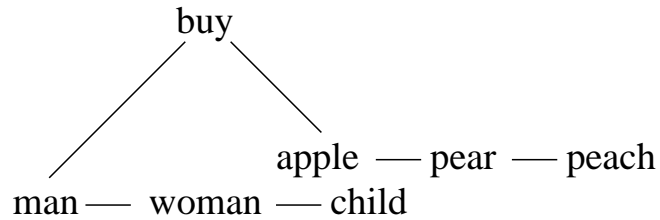
surface realization

1 2 3 4 5 6-7-8
 John bought an apple a pear and a peach .

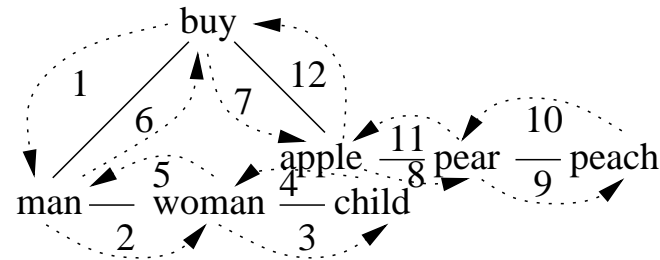
noun: John cat: nm sem: sg fnc: buy prn: 27	verb: buy cat: decl sem: past arg: John apple & prn: 27	noun: apple & cat: snp sem: indef sg fnc: buy nc: pear pc: prn: 27	noun: pear cat: snp sem: indef sg fnc: nc: peach pc: apple prn: 27	noun: peach cat: snp sem: indef sg fnc: nc: pc: pear prn: 27
---	---	--	--	--

1.4.3 The man, the woman, and the child bought an apple, a pear, and a peach.
(two simple noun coordinations, subject object)

semantic relations



underlying navigation



surface realization

1 2 3 4–5–6 7 8 9 10–11–12
 The man the woman and the child bought an apple a pear and a peach .

[noun: man &
 cat: snp
 sem: def sg
 fnc: buy
 nc: woman
 pc:
 prn: 14]

[noun: woman
 cat: snp
 sem: def sg
 fnc:
 nc: child
 pc: man
 prn: 14]

[noun: child
 cat: snp
 sem: def sg
 fnc:
 nc:
 pc: woman
 prn: 14]

[verb: buy
 cat: decl
 sem: past
 arg: man & apple &
 prn: 14]

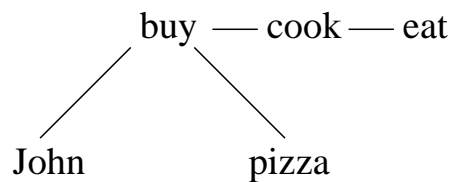
[noun: apple &
 cat: snp
 sem: indef sg
 fnc: buy
 nc: pear
 pc:
 prn: 14]

[noun: pear
 cat: snp
 sem: indef sg
 fnc:
 nc: peach
 pc: apple
 prn: 14]

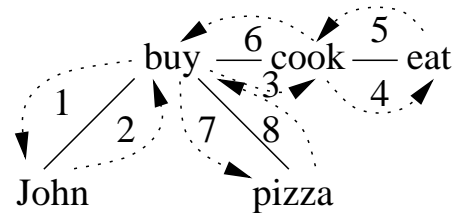
[noun: peach
 cat: snp
 sem: indef sg
 fnc:
 nc:
 pc: pear
 prn: 14]

1.4.4 John bought, cooked, and ate a pizza. (simple verb coordination)

semantic relations



underlying navigation



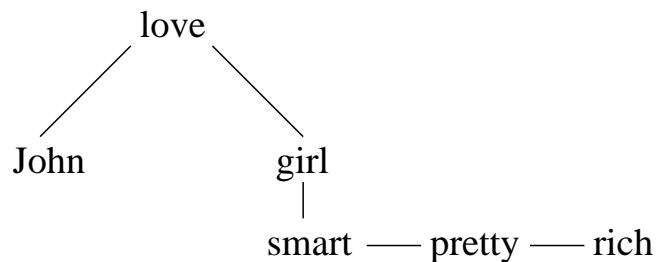
surface realization

1 2 3 4 5-6-7 8
 John bought cooked and_ate a_pizza .

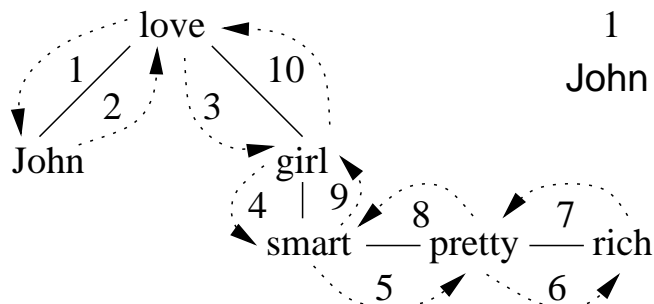
noun: John cat: nm sem: sg fnc: buy & prn: 15	verb: buy & cat: decl sem: past arg: John pizza nc: cook pc: prn:15	verb: cook cat: decl sem: past arg: nc: eat pc: buy prn:15	verb: eat cat: decl sem: past arg: nc: pc: cook prn:15	noun: pizza cat: snp sem: indef sg fnc: buy & prn: 15
---	---	--	--	---

1.4.5 John loves a smart, pretty, rich girl. (Adnominal coordination)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7-8-9 10
 John loves a smart pretty rich girl .

[noun: John
 cat: nm
 sem: sg
 fnc: love
 prn: 21]

[verb: love
 cat: decl
 sem: pres
 arg: John girl
 prn: 21]

[noun: girl
 cat: snp
 sem: indef sg
 fnc: love
 mdr: smart &
 nc:
 pc:
 prn: 21]

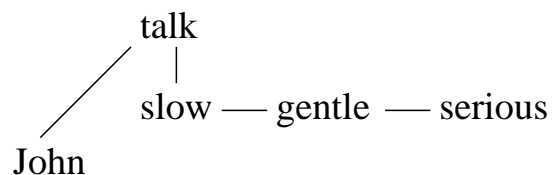
[adj: smart &
 cat: adn
 sem: pos
 mdd: girl
 nc: pretty
 pc:
 prn: 21]

[adj: pretty
 cat: adn
 sem: pos
 mdd:
 nc: rich
 pc: smart
 prn: 21]

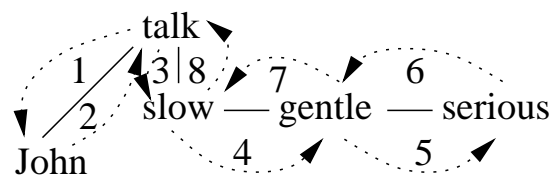
[adj: rich
 cat: adn
 sem: pos
 mdd:
 nc:
 pc: pretty
 prn: 21]

1.4.6 John talked slowly, gently, and seriously. (Adverbial coordination)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6-7-8
 John talked slowly gently and seriously .

noun: John cat: nm sem: sg fnc: talk mdr: nc: pc: prn: 29	verb: talk cat: decl sem: past arg: John mdr: slow & nc: pc: prn: 29	adj: slow & cat: adv sem: pos mdd: talk nc: gentle pc: prn: 29	adj: gentle cat: adv sem: pos mdd: nc: serious pc: slow prn: 29	adj: serious cat: adv sem: pos mdd: nc: pc: gentle prn: 29
--	---	--	---	--

1.5 Extrapositional Coordination

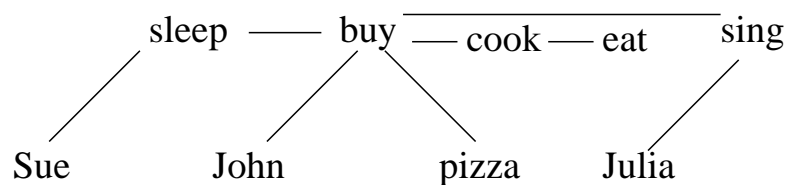
1.5.1: COMBINING INTRA- AND EXTRAPROPOSITIONAL COORDINATION

Sue slept. John bought, cooked, and ate a pizza. Julia sang.

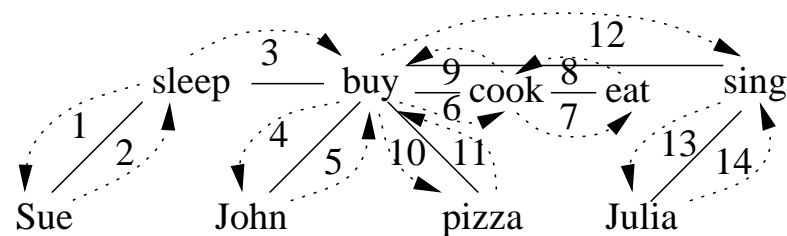
cf. NLC'06, 9.1.2.

1.5.1 Sue slept. John bought, cooked, and ate a pizza. Julia sang. (combining intra- and extrapositional coordination)

semantic relations



underlying navigation



surface realization

1 2 3-4 5 6 7 8-9-10 11 12-13 14
Sue slept . John bought cooked and ate a pizza . Julia sang .

[noun: Sue cat: nm sem: sg fnc: sleep prn: 40]	[verb: sleep cat: decl sem: past arg: Sue nc: (buy 41) pc: prn: 40]	[noun: John cat: nm sem: sg fnc: buy & prn: 41]	[verb: buy & cat: decl sem: past arg: John pizza nc: cook (sing 42) pc: (sleep 40) prn:41]	[verb: cook cat: decl sem: past arg: nc: eat pc: buy prn:41]	[verb: eat cat: decl sem: past arg: nc: pc: cook prn:41]	[noun: pizza cat: snp sem: indef sg fnc: buy & prn: 41]	[noun: Julia cat: nm sem: sg fnc: sing prn: 42]	[verb: sing cat: decl arg: Julia nc: pc: (buy 41) prn: 42]
--	---	---	--	--	--	---	---	---

2. Intrapositional Coordination in Extrapositional FA Structure

2.1 Subject sentence

2.1.1: NOUN COORDINATION AS THE SUBJECT OF A SUBJECT SENTENCE

That the man, the woman, and the child slept surprised Mary.

Cf. NLC'06, 9.3.1 (1).

2.1.2: VERB COORDINATION IN A SUBJECT SENTENCE

That the man bought, cooked, and ate the pizza surprised Mary.

Cf. NLC'06, 9.3.1 (2).

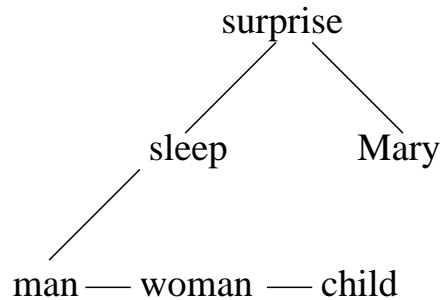
2.1.3: NOUN COORDINATION AS THE OBJECT OF A SUBJECT SENTENCE

That Bob ate an apple, a pear, and a peach, surprised Mary.

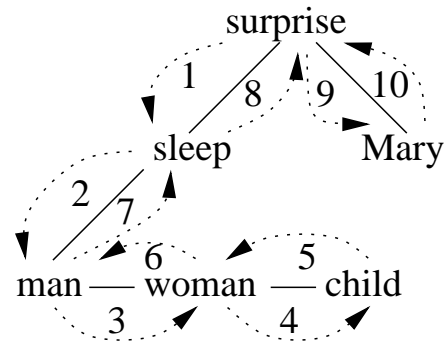
Cf. NLC'06, 9.3.1 (3).

2.1.1 That the man, the woman, and the child slept surprised Mary. (Noun coordination as the subject of a subject sentence)

semantic relations



underlying navigation



surface realization

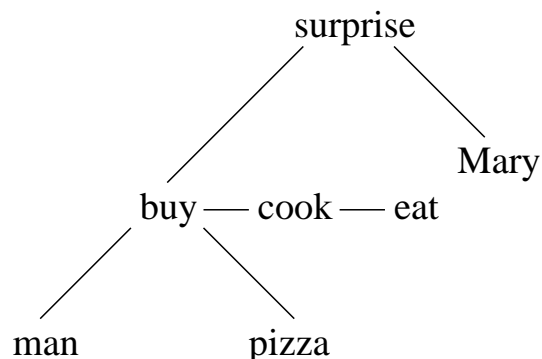
1 2 3 4 5-6-7 8 9 10
That the__ man the__ woman and__ the__ child slept surprised Mary .

<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> n/v: that sleep cat: v sem: past arg: man & fnc: (surprise 9) prn: 8 </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> noun: man & cat: snp sem: def sg fnc: sleep nc: woman pc: prn: 8 </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> noun: woman cat: snp sem: def sg fnc: nc: child pc: man prn: 8 </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> noun: child cat: snp sem: def sg fnc: nc: pc: woman prn: 8 </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> verb: surprise cat: decl sem: past arg: (sleep 8) Mary prn: 9 </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> noun: Mary cat: nm sem: sg fnc: surprise prn: 9 </div>
---	--	--	--	---	---

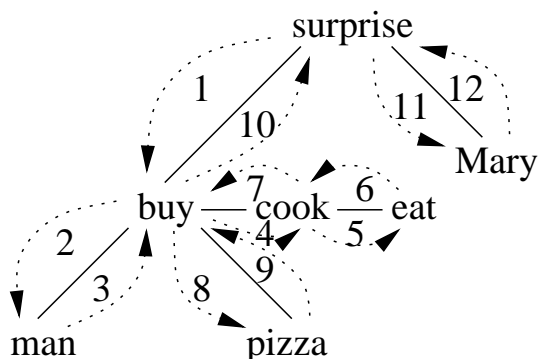
2.1.2 That the man bought, cooked, and ate the pizza surprised Mary.

(Verb coordination in a subject sentence)

semantic relations



underlying navigation



surface realization

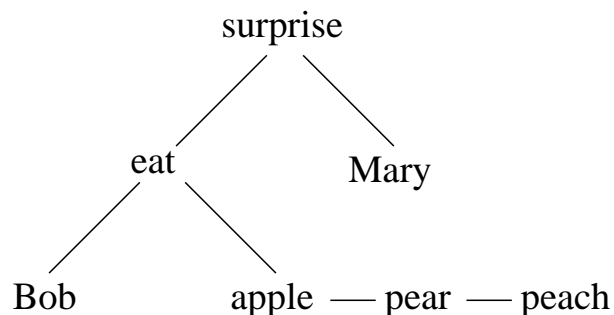
1 2 3 4 5 6-7-8 9-10 11 12
 That the man bought cooked and ate the pizza surprised Mary .

[noun: man cat: snp sem: def sg fnc: buy & prn: 10]	[n/v: that buy & cat: v sem: past arg: man pizza fnc: (surprise 11) nc: cook pc: prn: 10]	[verb: cook cat: v sem: past arg: nc: eat pc: buy prn: 10]	[verb: eat cat: v sem: past arg: nc: pc: cook prn: 10]	[noun: pizza cat: snp sem: def sg fnc: buy & prn: 10]	[verb: surprise cat: decl sem: past arg: (buy & 10) Mary prn: 11]	[noun: Mary cat: nm sem: sg fnc: surprise prn: 11]
---	--	--	--	---	---	--

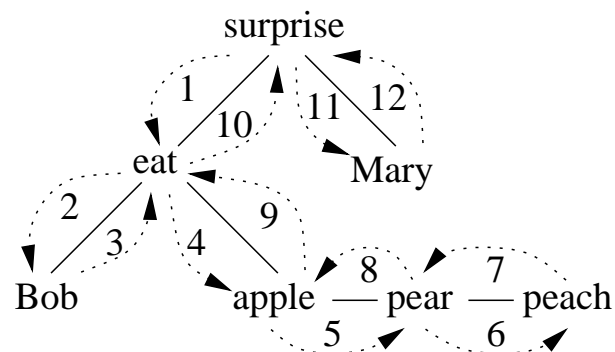
2.1.3 That Bob ate an apple, a pear, and a peach, surprised Mary.

(Noun coordination as the object of a subject sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7-8-9-10 11 12
 That Bob ate an apple a pear and a peach surprised Mary .

[noun: Bob cat: nm sem: sg fnc: eat prn: 12]	[n/v: that eat cat: v sem: past arg: Bob apple & fnc: (surprise 13) prn: 12]	[noun: apple & cat: snp sem: indef sg fnc: eat nc: pear pc: prn: 12]	[noun: pear cat: snp sem: indef sg fnc: nc: peach pc: apple prn: 12]	[noun: peach cat: snp sem: indef sg fnc: nc: pc: pear prn: 12]	[verb: surprise cat: decl sem: past arg: (eat 12) Mary prn: 13]	[noun: Mary cat: nm sem: sg fnc: surprise prn: 13]
--	---	--	--	--	---	--

2.2 Object Sentence

2.2.1: NOUN COORDINATION AS THE SUBJECT OF AN OBJECT SENTENCE

Mary saw that the man, the woman and the child slept.

Cf. NLC'06, 9.3.2 (1).

2.2.2: VERB COORDINATION IN AN OBJECT SENTENCE

Mary saw that the man bought, cooked, and ate the pizza.

Cf. NLC'06, 9.3.2 (2).

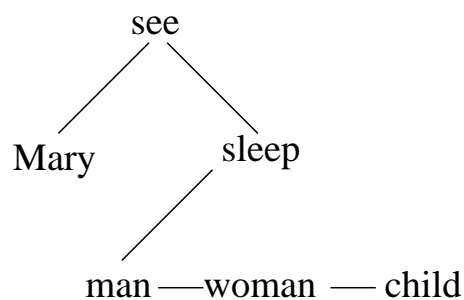
2.2.3: NOUN COORDINATION AS THE OBJECT OF AN OBJECT SENTENCE

Mary saw that Bob bought an apple, a pear, and a peach.

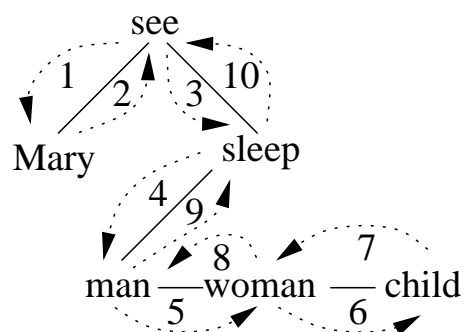
Cf. NLC'06, 9.3.2 (3).

2.2.1 Mary saw that the man, the woman and the child slept. (Noun coordination as the subject of an object sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7-8-9 10
 Mary saw that the man the woman and the child slept .

[noun: Mary
 cat: nm
 sem: sg
 fnc: see
 prn: 14]

[verb: see
 cat: decl
 sem: past
 arg: Mary (sleep 15)
 prn: 14]

[n/v: that sleep
 cat: v
 sem: past
 arg: man &
 fnc: (see 14)
 prn: 15]

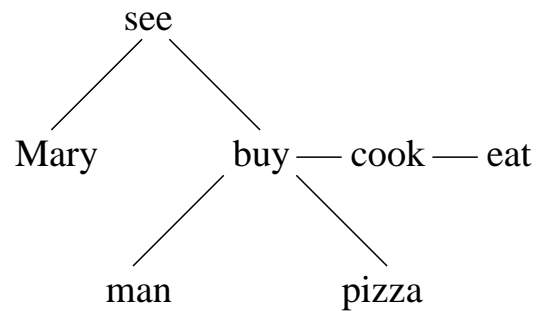
[noun: man &
 cat: snp
 sem: def sg
 fnc: sleep
 nc: woman
 pc:
 prn: 15]

[noun: woman
 cat: snp
 sem: def sg
 fnc:
 nc: child
 pc: man
 prn: 15]

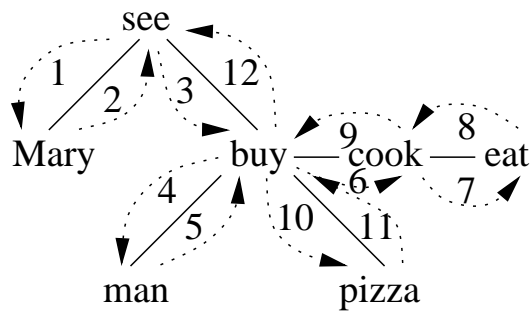
[noun: child
 cat: snp
 sem: def sg
 fnc:
 nc:
 pc: woman
 prn: 15]

2.2.2 Mary saw that the man bought, cooked, and ate the pizza. (Verb coordination in an object sentence)

semantic relations



underlying navigation



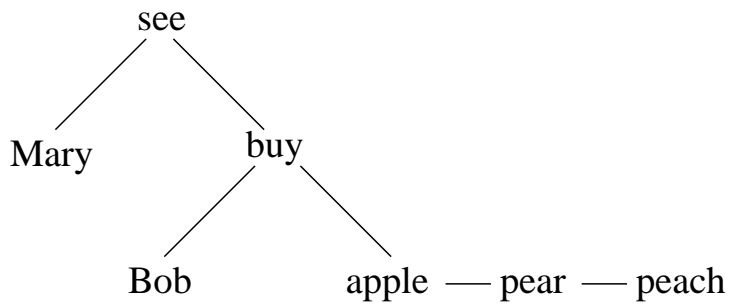
surface realization

1 2 3 4 5 6 7 8-9-10 11-12
 Mary saw that the man bought cooked and ate the pizza .

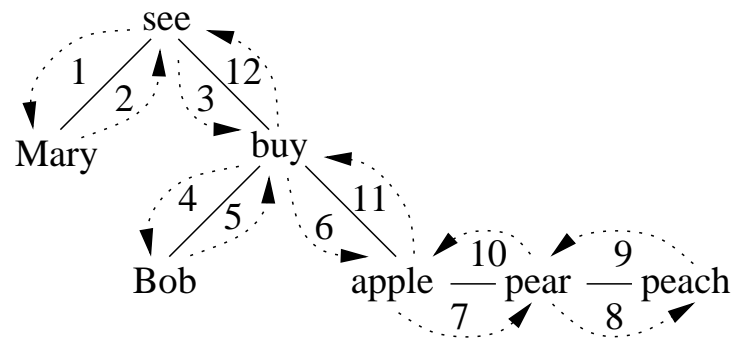
[noun: Mary cat: nm sem: sg fnc: see prn: 16]	[verb: see cat: decl sem: past arg: Mary (buy & 17) prn: 16]	[noun: man cat: snp sem: def sg fnc: buy & prn: 17]	[n/v: that buy & cat: v sem: past arg: man pizza fnc: (see 16) nc: cook pc: prn: 17]	[verb: cook cat: v sem: past arg: nc: eat pc: buy prn: 17]	[verb: eat cat: v sem: past arg: nc: pc: cook prn: 17]	[noun: pizza cat: snp sem: def sg fnc: buy & prn: 17]
---	--	---	---	--	--	---

2.2.3 Mary saw that Bob bought an apple, a pear, and a peach. (Noun coordination as the object of an object sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7 8 9-10-11-12
 Mary saw that Bob bought an apple a pear and a peach .

[noun: Mary cat: nm sem: sg fnc: see prn: 18]	[verb: see cat: decl sem: past arg: Mary (buy 19) prn: 18]	[noun: Bob cat: nm sem: sg fnc: buy prn: 19]	[n/v: that buy cat: v sem: past arg: Bob apple & fnc: (see 18) prn: 19]	[noun: apple & cat: snp sem: indef sg fnc: buy nc: pear pc: prn: 19]	[noun: pear cat: snp sem: indef sg fnc: nc: peach pc: apple prn: 19]	[noun: peach cat: snp sem: indef sg fnc: nc: pc: pear prn: 19]
---	--	--	--	--	--	--

2.3 Relative Clause with Subject Gap

2.3.1 Noun coordination as the subject of an adnominal clause with a subject gap

Structurally excluded, cf. NLC'06, 9.3.3 (1).

2.3.2: VERB COORDINATION IN AN ADNOMINAL SENTENCE WITH A SUBJECT GAP

Mary saw the man who bought, cooked, and ate the pizza.

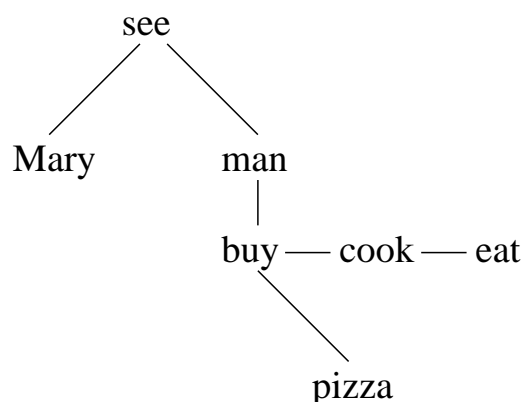
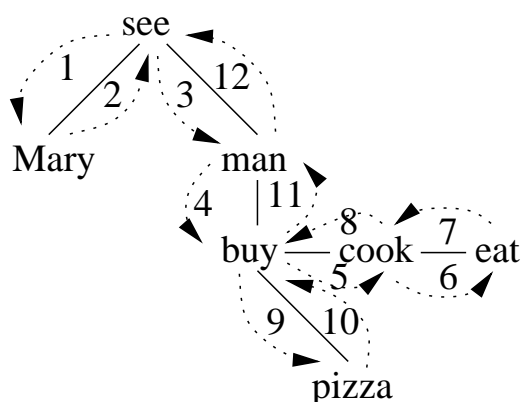
Cf. NLC'06, 9.3.3 (2).

2.3.3: NOUN COORDINATION AS THE OBJECT OF AN ADNOMINAL CLAUSE WITH A SUBJECT GAP

Mary saw the man who bought an apple, a pear, and a peach.

Cf. NLC'06, 9.3.3 (2).

2.3.2 Mary saw the man who bought, cooked, and ate the pizza.

(Verb coordination in an adnominal sentence with a subject gap)*semantic relations**underlying navigation**surface realization*

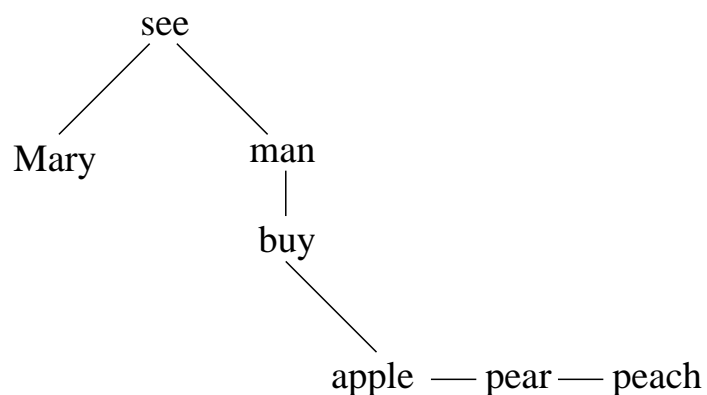
1 2 3 4 5 6 7-8-9 10-11-12
 Mary saw the man who bought cooked and ate the pizza .

[noun: Mary cat: nm sem: sg fnc: see prn: 20]	[verb: see cat: decl sem: past arg: Mary man prn: 20]	[noun: man cat: snp sem: def sg fnc: see mdr: (buy & 21) prn: 20]	[a/v: buy & cat: v sem: past arg: # pizza mdd: (man 20) nc: cook pc: prn: 21]	[verb: cook cat: v sem: past arg: nc: eat pc: buy prn: 21]	[verb: eat cat: v sem: past arg: nc: pc: cook prn: 21]	[noun: pizza cat: snp sem: def sg fnc: buy & prn: 21]
---	---	--	--	--	--	---

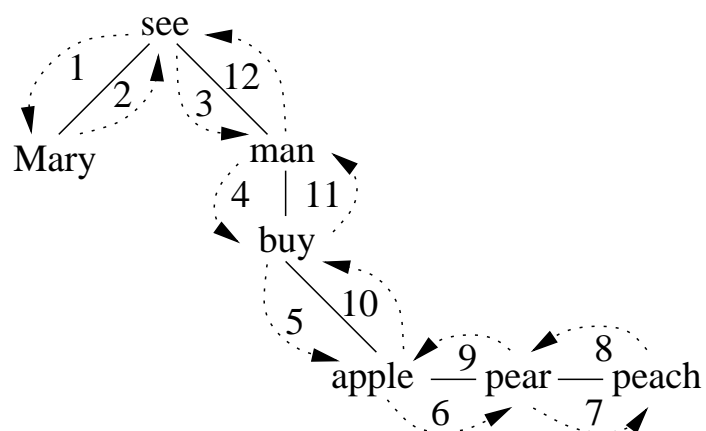
2.3.3 Mary saw the man who bought an apple, a pear, and a peach.

(Noun coordination as the object of an adnominal clause with a subject gap)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7 8-9-10-11-12
 Mary saw the man who bought an apple a pear and a peach .

[noun: Mary]	[verb: see]	[noun: man]	[a/v: buy]	[noun: apple &]	[noun: pear]	[noun: peach]
cat: nm	cat: decl	cat: snp	cat: v	fnc: buy	fnc:	fnc:
sem: sg	sem: past	sem: def sg	sem: past	nc: pear	nc: peach	nc:
fnc: see	arg: Mary man	fnc: see	arg: # apple &	pc:	pc: apple	pc: pear
prn: 22	prn: 22	mdr: (buy 23)	mdd: (man 22)	prn: 23	prn: 23	prn: 23
prn: 22		prn: 22	prn: 23			

2.4 Relative Clause with Object Gap

2.4.1: NOUN COORDINATION AS THE SUBJECT OF AN ADNOMINAL CLAUSE WITH AN OBJECT GAP

Mary saw the pizza which Bob, Jim, and Bill ate.

Cf. NLC'06, 9.3.4 (1).

2.4.2: VERB COORDINATION IN AN ADNOMINAL CLAUSE WITH AN OBJECT GAP

Mary saw the pizza which the man bought, cooked, and ate.

Cf. NLC'06, 9.3.4 (2).

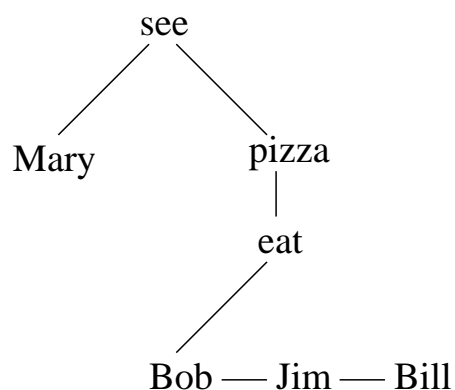
2.4.3 Noun coordination as the object of an adnominal clause with an object gap

structurally excluded, cf. NLC'06, 9.3.4 (3)

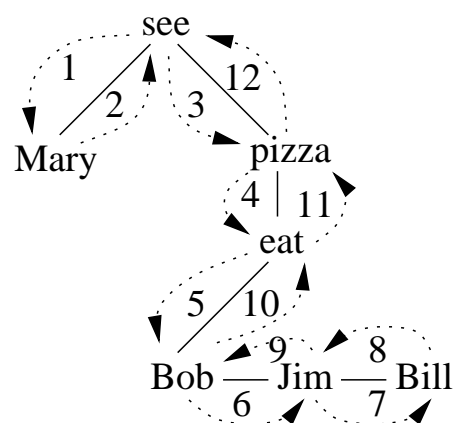
2.4.1 Mary saw the pizza which Bob, Jim, and Bill ate.

(Noun coordination as the subject of an adnominal clause with an object gap)

semantic relations



underlying navigation



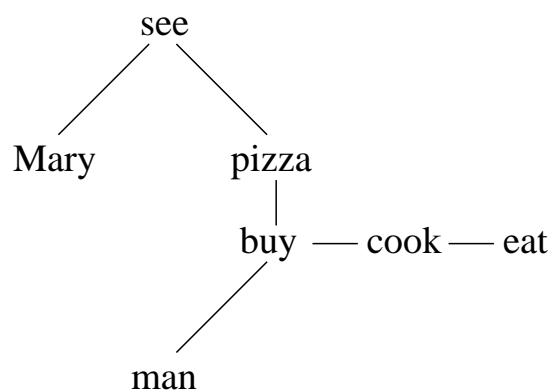
surface realization

1 2 3 4 5 6 7 8-9-10 11-12
 Mary saw the__pizza which Bob Jim and__Bill ate .

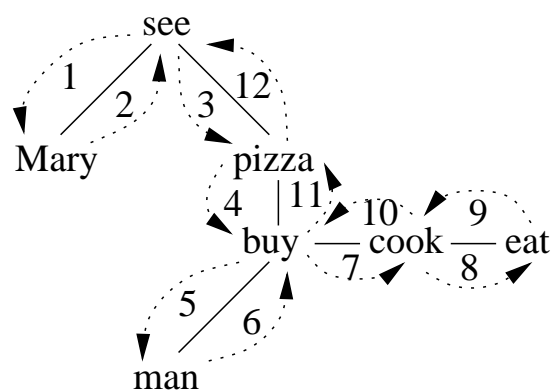
[noun: Mary cat: nm sem: sg fnc: see prn: 24]	[verb: see cat: decl sem: past arg: Mary pizza prn: 24]	[noun: pizza cat: snp sem: def sg fnc: see mdr: (eat 25) prn: 24]	[a/v: eat cat: v sem: past arg: Bob & # mdd: (pizza 24) prn: 25]	[noun: Bob & cat: nm sem: sg fnc: eat nc: Jim pc: prn: 25]	[noun: Jim cat: nm sem: sg fnc: nc: Bill pc: Bob prn: 25]	[noun: Bill cat: nm sem: sg fnc: nc: pc: Jim prn: 25]
---	---	--	---	--	---	---

2.4.2 Mary saw the pizza which the man bought, cooked, and ate. (Verb coordination in an adnominal clause with an object gap)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7 8 9-10-11-12
 Mary saw the pizza which the man bought cooked and ate .

[noun: Mary
 cat: nm
 sem: sg
 fnc: see
 prn: 26]

[verb: see
 cat: decl
 sem: past
 arg: Mary pizza
 prn: 26]

[noun: pizza
 cat: snp
 sem: def sg
 fnc: see
 mdr: (buy 27)
 prn: 26]

[noun: man
 cat: snp
 sem: def sg
 fnc: buy &
 prn: 27]

[a/v: buy &
 cat: v
 sem: past
 arg: man #
 mdd: (pizza 26)
 nc: cook
 pc:
 prn: 27]

[verb: cook
 cat: v
 sem: past
 arg:
 nc: eat
 pc: buy
 prn: 27]

[verb: eat
 cat: v
 sem: past
 arg:
 nc:
 pc: cook
 prn: 27]

2.5 Adverbial Clause

2.5.1: NOUN COORDINATION AS THE SUBJECT OF AN ADVERBIAL SENTENCE

Mary arrived after Bob, Jim, and Bill had eaten a pizza.

Cf. NLC'06, 9.3.5 (1).

2.5.2: VERB COORDINATION IN AN ADVERBIAL SENTENCE

After Bob had bought, cooked, and eaten the pizza, Mary arrived.

Cf. NLC'06, 9.3.5 (2).

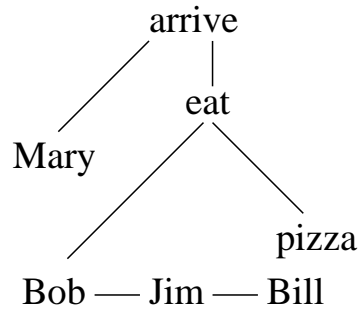
2.5.3: NOUN COORDINATION AS THE OBJECT OF AN ADVERBIAL SENTENCE

Mary arrived after Bob had eaten an apple, a pear, and a peach.

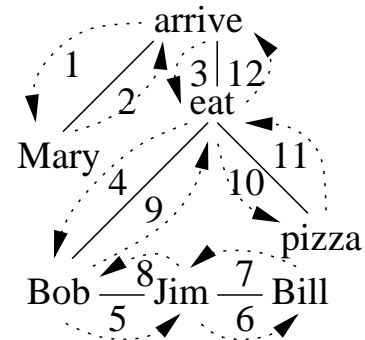
Cf. NLC'06, 9.3.5 (3).

2.5.1 Mary arrived after Bob, Jim, and Bill had eaten a pizza. (Noun coordination as the subject of an adverbial sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7-8-9 10 11-12
 Mary arrived after Bob Jim and Bill had eaten a pizza .

[noun: Mary
 cat: nm
 sem: sg
 fnc: arrive
 prn: 28]

[verb: arrive
 cat: decl
 sem: past
 arg: Mary
 mdr: (eat 29)
 prn: 28]

[a/v: after eat
 cat: v
 sem: past perf
 arg: Bob & pizza
 mdd: (arrive 28)
 prn: 29]

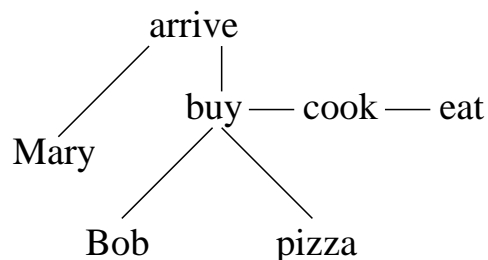
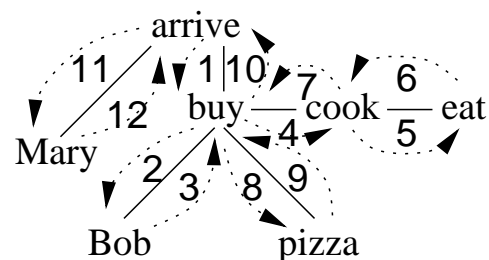
[noun: Bob &
 cat: nm
 sem: sg
 fnc: eat
 nc: Jim
 pc:
 prn: 29]

[noun: Jim
 cat: nm
 sem: sg
 fnc:
 nc: Bill
 pc: Bob
 prn: 29]

[noun: Bill
 cat: nm
 sem: sg
 fnc:
 nc:
 pc: Jim
 prn: 29]

[noun: pizza
 cat: snp
 sem: indef sg
 fnc: eat &
 prn: 29]

2.5.2 After Bob had bought, cooked, and eaten the pizza, Mary arrived.

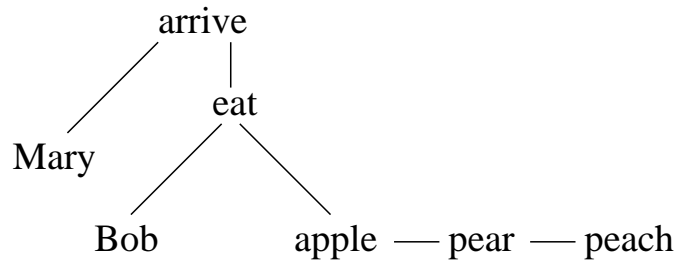
(Verb coordination in an adverbial sentence)*semantic relations**underlying navigation**surface realization*

1 2 3 4 5 6-7-8 9-10-11 12
 After Bob had bought cooked and eaten the pizza Mary arrived .

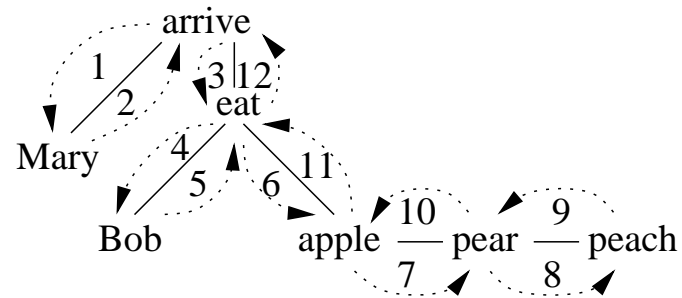
[noun: Bob cat: nm sem: sg fnc: buy & prn: 30]	[a/v: after buy & cat: v sem: past perf arg: Bob pizza mdd: (arrive 31) nc: cook pc: prn: 30]	[verb: cook cat: v sem: past perf arg: nc: eat pc: buy prn: 30]	[verb: eat cat: v sem: past perf arg: nc: pc: cook prn: 30]	[noun: pizza cat: snp sem: def sg fnc: buy & prn: 30]	[verb: arrive cat: decl sem: past arg: Mary mdr: (buy 30) prn: 31]	[noun: Mary cat: nm sem: sg fnc: arrive prn: 31]
--	--	---	---	---	---	--

2.5.3 Mary arrived after Bob had eaten an apple, a pear, and a peach. (Noun coordination as the object of an adverbial sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7 8 9-10-11-12
 Mary arrived after Bob had eaten an apple a pear and a peach .

[noun: Mary cat: nm sem: sg fnc: arrive prn: 32]	[verb: arrive cat: decl sem: past arg: Mary mdr: (eat 33) prn: 32]	[noun: Bob cat: nm sem: sg fnc: eat prn: 33]	[a/v: after eat cat: v sem: past perf arg: Bob apple & mdd: (arrive 32) prn: 33]	[noun: apple & cat: snp sem: indef sg fnc: eat nc: pear pc: prn: 33]	[noun: pear cat: snp sem: indef sg fnc: nc: peach pc: apple prn: 33]	[noun: peach cat: snp sem: indef sg fnc: nc: pc: pear prn: 33]
--	---	--	---	--	--	--

3. Coordination and Gapping

3.1 Gapping in Main Clause

3.1.1: VERB OBJECT COORDINATION, SUBJECT GAPPING

Bob ate an apple, walked the dog, and read the paper.

Cf. NLC'06, 8.4.1, 8.4.5.

3.1.2: CORRESPONDING SIMPLE VERB AND OBJECT COORDINATIONS – HYPOTHETICAL

Bob ate, walked, and read the apple, the dog, and the paper.

Cf. NLC'06, 8.4.4.

3.1.3: SUBJECT OBJECT COORDINATION, VERB GAPPING

Bob ate an apple, Jim a pear, and Bill a peach.

Cf. NLC'06, 8.5.1, 8.5.4.

3.1.4: SUBJECT VERB COORDINATION, OBJECT GAPPING

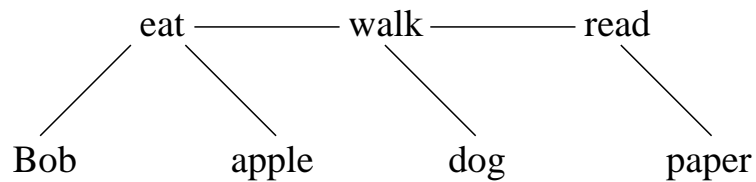
Bob bought, Jim peeled, and Bill ate a peach.

Cf. NLC'06, 8.6.1, 8.6.4.

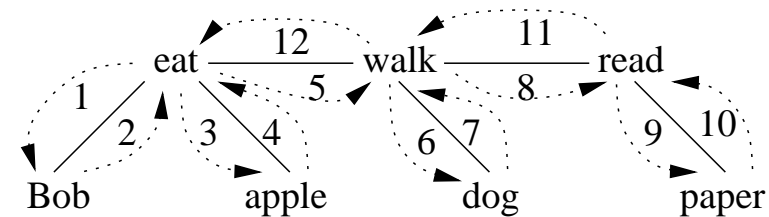
3.1.1 Bob ate an apple, walked the dog, and read the paper.

(Verb object coordination, subject gapping)

semantic relations



underlying navigation



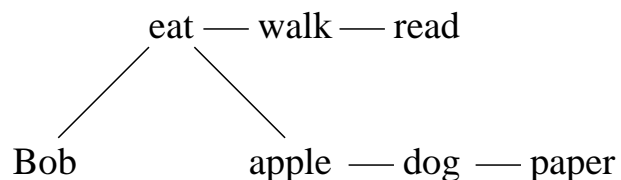
surface realization

1 2 3 4-5 6 7-8 9 10-11-12
 Bob ate an__apple walked the__dog and__read the__paper .

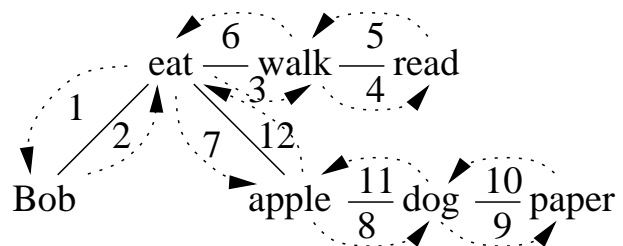
$\left[\begin{array}{l} \text{noun: Bob} \\ \text{cat: nm} \\ \text{sem: sg} \\ \text{fnc: eat \&} \\ \text{prn: 30} \end{array} \right]$	$\left[\begin{array}{l} \text{verb: eat \&} \\ \text{cat: decl} \\ \text{sem: past} \\ \text{arg: Bob apple} \\ \text{nc: walk} \\ \text{pc:} \\ \text{prn: 30} \end{array} \right]$	$\left[\begin{array}{l} \text{noun: apple} \\ \text{cat: snp} \\ \text{sem: indef sg} \\ \text{fnc: eat \&} \\ \text{prn: 30} \end{array} \right]$	$\left[\begin{array}{l} \text{verb: walk} \\ \text{cat: decl} \\ \text{sem: past} \\ \text{arg: \# dog} \\ \text{nc: read} \\ \text{pc: eat} \\ \text{prn: 30} \end{array} \right]$	$\left[\begin{array}{l} \text{noun: dog} \\ \text{cat: snp} \\ \text{sem: def sg} \\ \text{fnc: walk} \\ \text{prn: 30} \end{array} \right]$	$\left[\begin{array}{l} \text{verb: read} \\ \text{cat: decl} \\ \text{sem: past} \\ \text{arg: \# paper} \\ \text{nc:} \\ \text{pc: walk} \\ \text{prn: 30} \end{array} \right]$	$\left[\begin{array}{l} \text{noun: paper} \\ \text{cat: snp} \\ \text{sem: def sg} \\ \text{fnc: read} \\ \text{prn: 30} \end{array} \right]$
--	---	---	--	---	--	---

3.1.2 Bob ate, walked, and read the apple, the dog, and the paper. (corresponding simple verb and object coordinations – hypothetical)

semantic relations



underlying navigation



surface realization

1 2 3 4 5-6-7 8 9 10-11-12
 Bob ate walked and read the apple the dog and the paper .

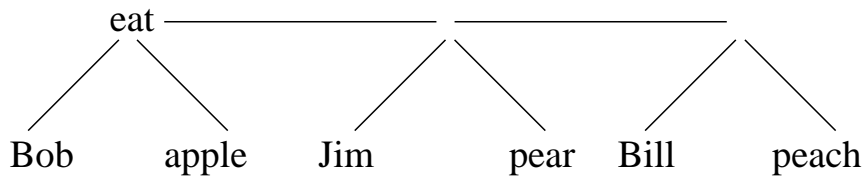
[noun: Bob]	[verb: eat & cat: decl sem: past arg: Bob apple & nc: walk pc: prn: 7]	[verb: walk cat: decl sem: past arg: pc: eat nc: read prn: 7]	[verb: read cat: decl sem: past arg: pc: walk nc: prn: 7]	[noun: apple & cat: snp sem: def sg fnc: eat & pc: nc: dog prn: 7]	[noun: dog cat: snp sem: def sg fnc: pc: apple nc: paper prn: 7]	[noun: paper cat: snp sem: def sg fnc: pc: dog nc: prn: 7]
-------------	--	---	---	--	--	--

A meaningful example of the same structure is Bob bought, peeled, and ate an apple, a pear, and a peach.

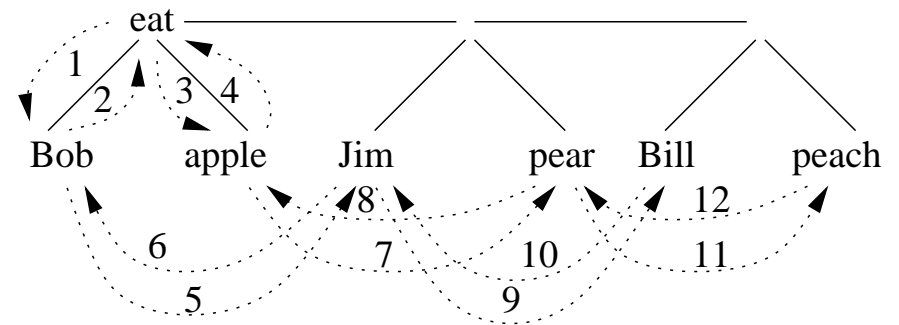
3.1.3 Bob ate an apple, Jim a pear, and Bill a peach.

Subject object coordination – verb gapping

semantic relations



underlying navigation



surface realization

1 2 3 4-1-5 6-2-3-7 8-4-1-5-9 10-6-2-3-7-11 12-8-4
 Bob ate an apple Jim a pear and Bill a peach .

[noun: Bob &
 cat: nm
 sem: sg
 fnc: eat
 nc: Jim
 pc:
 prn: 31]

[verb: eat
 cat: decl
 sem: past
 arg: Bob & apple &
 prn: 31]

[noun: apple &
 cat: snp
 sem: indef sg
 nc: pear
 pc:
 prn: 31]

[noun: Jim
 cat: nm
 sem: sg
 fnc: #
 nc: Bill
 pc: Bob
 prn: 31]

[noun: pear
 cat: snp
 sem: indef sg
 fnc: #
 nc: peach
 pc: apple
 prn: 31]

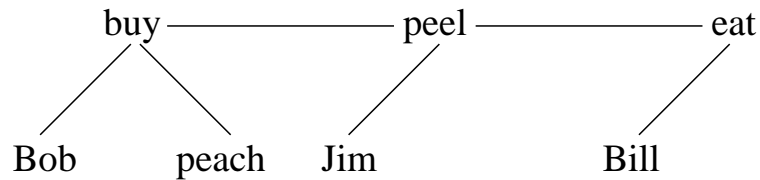
[noun: Bill
 cat: nm
 sem: sg
 fnc: #
 nc:
 pc: Jim
 prn: 31]

[noun: peach
 cat: snp
 sem: indef sg
 fnc: #
 nc:
 pc: pear
 prn: 31]

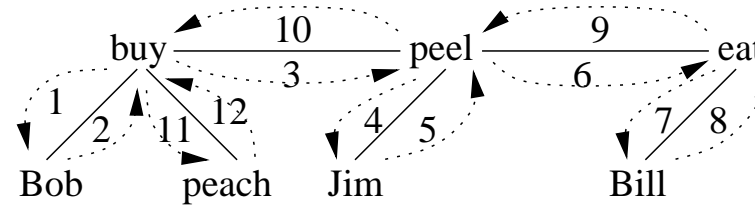
3.1.4 Bob bought, Jim peeled, and Bill ate a peach.

Subject verb coordination, object gapping

semantic relations



underlying navigation



surface realization

1 2 3-4 5 6-7 8 9-10-11 12
 Bob bought Jim peeled and Bill ate a peach .

[noun: Bob cat: nm sem: sg fnc: buy & prn: 32]	[verb: buy & cat: decl sem: past arg: Bob peach nc: peel pc: prn: 32]	[noun: Jim cat: nm sem: sg fnc: peel prn: 32]	[verb: peel cat: decl sem: past arg: Jim # pc: buy nc: eat prn: 32]	[noun: Bill cat: nm sem: sg fnc: eat prn: 32]	[verb: eat cat: decl sem: past arg: Bill # pc: peel nc: prn: 32]	[noun: peach cat: snp sem: indef sg fnc: buy & prn: 32]
--	---	---	---	---	--	---

3.2 Subject Sentence

3.2.1: VERB–OBJECT COORDINATION (SUBJECT GAPPING) IN A SUBJECT SENTENCE

That Bob ate an apple, walked the dog, and read a paper, amused Mary.

Cf. NLC'06, 9.4.1 (1).

3.2.2: SUBJECT–OBJECT COORDINATION (VERB GAPPING) IN A SUBJECT SENTENCE

That Bob ate an apple, Jim a pear, and Bill a peach, amused Mary.

Cf. NLC'06, 9.4.1 (2).

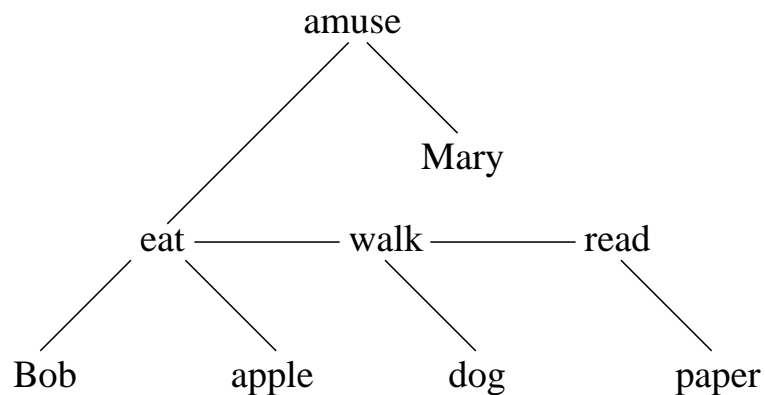
3.2.3: SUBJECT–VERB COORDINATION (OBJECT GAPPING) IN A SUBJECT SENTENCE

That Bob bought, Jim peeled, and Bill ate the peach, amused Mary.

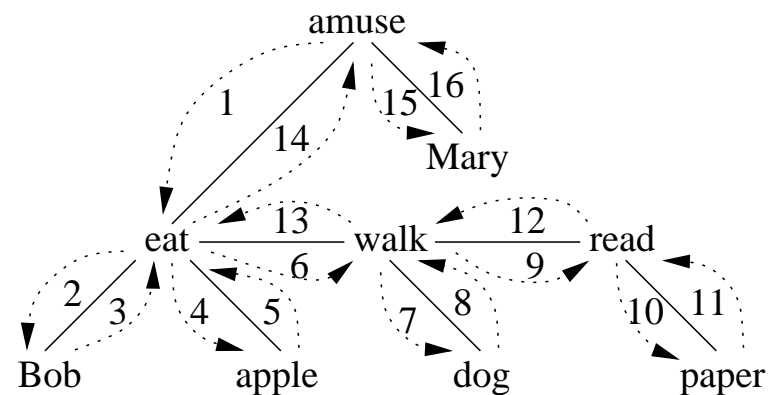
Cf. NLC'06, 9.4.1 (3).

3.2.1 That Bob ate an apple, walked the dog, and read a paper, amused Mary. (Verb-object coordination (subject gapping) in a subject sentence)

semantic relations



underlying navigation and surface realization



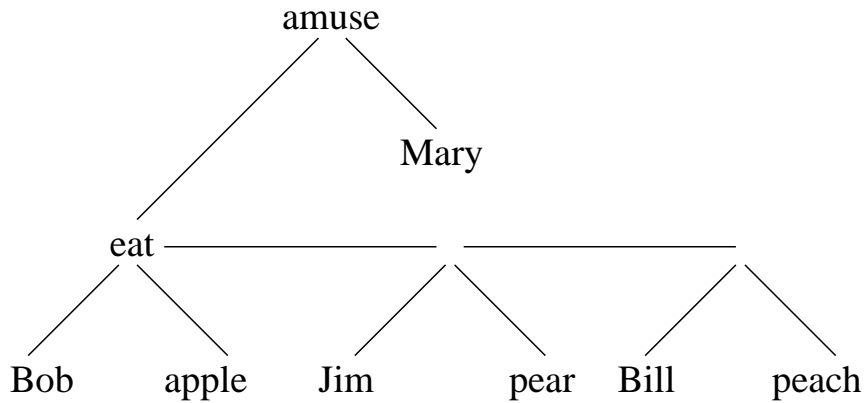
surface realization

1 2 3 4 5–6 7 8–9 10 11–12–13–14 15 16
 That Bob ate an apple walked the dog and read the paper amused Mary .

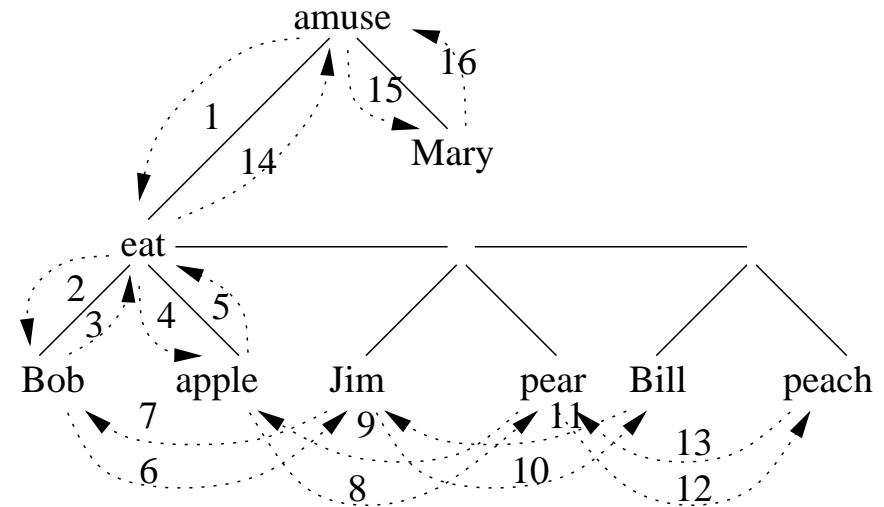
[noun: Bob cat: nm sem: sg fnc: eat & prn: 29]	[n/v: that eat & cat: v sem: past arg: Bob apple fnc: amuse 30 nc: walk pc: prn: 29]	[noun: apple cat: snp sem: indef sg fnc: eat & prn: 29]	[verb: walk cat: v sem: past arg: # dog nc: read pc: eat prn: 29]	[noun: dog cat: snp sem: def sg fnc: walk prn: 29]	[verb: read cat: v sem: past arg: # paper nc: pc: walk prn: 29]	[noun: paper cat: snp sem: indef sg fnc: read prn: 29]	[verb: amuse cat: decl sem: past arg: eat & 29 Mary prn: 30]	[noun: Mary cat: nm sem: sg fnc: amuse prn: 30]
--	---	---	---	--	---	--	--	---

3.2.2 That Bob ate an apple, Jim a pear, and Bill a peach, amused Mary. (Subject–object coordination (verb gapping) in a subject sentence)

semantic relations



underlying navigation



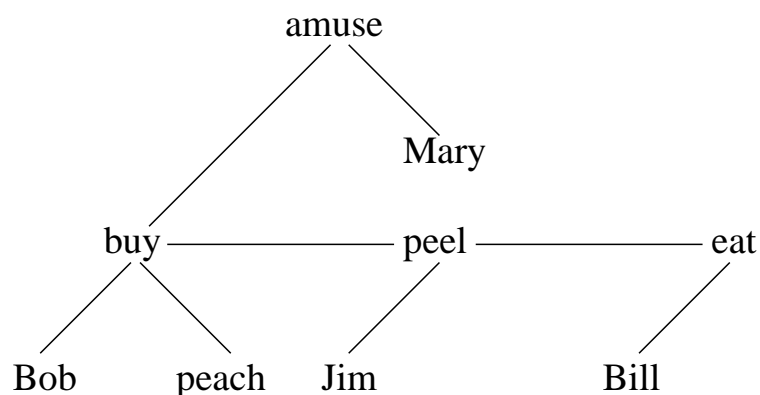
surface realization

1 2 3 4 5-2-6 7-3-4-8 9-5-2-6-10 11-7-3-4-8-12 13-9-5-14 15 16
 That Bob ate an__apple Jim a__pear and__Bill a__peach amused Mary .

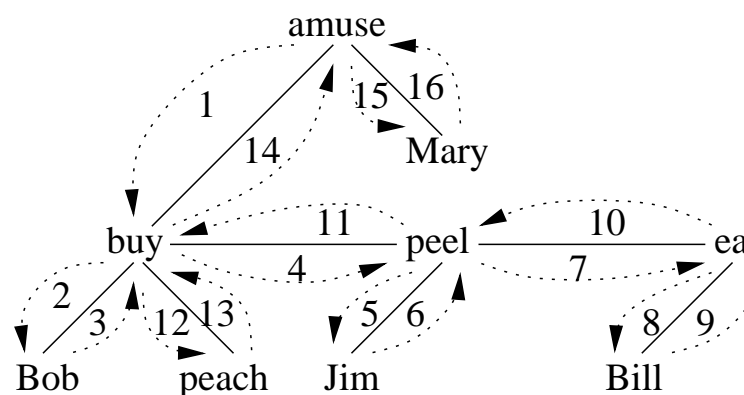
n/v: that eat cat: v sem: past arg: Bob & apple & fnc: amuse 32 prn: 31	noun: Bob & cat: nm sem: sg fnc: eat nc: Jim pc: prn: 31	noun: apple & cat: snp sem: indef sg fnc: eat nc: pear pc: prn: 31	noun: Jim cat: nm sem: sg fnc: # nc: Bill pc: Bob prn: 31	noun: pear cat: snp sem: indef sg fnc: # nc: peach pc: apple prn: 31	noun: Bill cat: nm sem: sg fnc: # nc: pc: Jim prn: 31	noun: peach cat: snp sem: indef sg fnc: # nc: pc: pear prn: 31	verb: amuse cat: decl sem: past arg: eat 31 Mary prn: 32	noun: Mary cat: nm sem: sg fnc: amuse prn: 32
--	--	--	---	--	---	--	--	---

3.2.3 That Bob bought, Jim peeled, and Bill ate the peach, amused Mary. (Subject–verb coordination (object gapping) in a subject sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4–5 6 7–8 9 10–11–12 13–14 15 16
 That Bob bought Jim peeled and_ Bill ate the_ peach amused Mary .

<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: Bob cat: nm sem: sg fnc: buy & prn: 33] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [n/v: that buy & cat: v sem: past arg: Bob peach fnc: amuse 34 nc: peel pc: prn: 33] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: Jim cat: nm sem: sg fnc: peel prn: 33] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [verb: peel cat: v sem: past arg: Jim # nc: eat pc: buy prn: 33] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: Bill cat: nm sem: sg fnc: eat prn: 33] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [verb: eat cat: v sem: past arg: Bill # nc: pc: peel prn: 33] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: peach cat: snp sem: def sg fnc: buy & prn: 33] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [verb: amuse cat: decl sem: past arg: buy & 33 Mary prn: 34] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: Mary cat: nm sem: sg fnc: amuse prn: 34] </div>
--	---	---	--	---	---	---	--	---

3.3 Object Sentence

3.3.1: VERB–OBJECT COORDINATION (SUBJECT GAPPING) IN AN OBJECT SENTENCE

Mary saw that Bob ate an apple, walked his dog, and read a paper.

Cf. NLC'06, 9.4.2 (1).

3.3.2: SUBJECT–OBJECT COORDINATION (VERB GAPPING) IN AN OBJECT SENTENCE

Mary saw that Bob ate an apple, Jim a pear, and Bill a peach.

Cf. NLC'06, 9.4.2 (2).

3.3.3: SUBJECT–VERB COORDINATION (OBJECT GAPPING) IN AN OBJECT SENTENCE

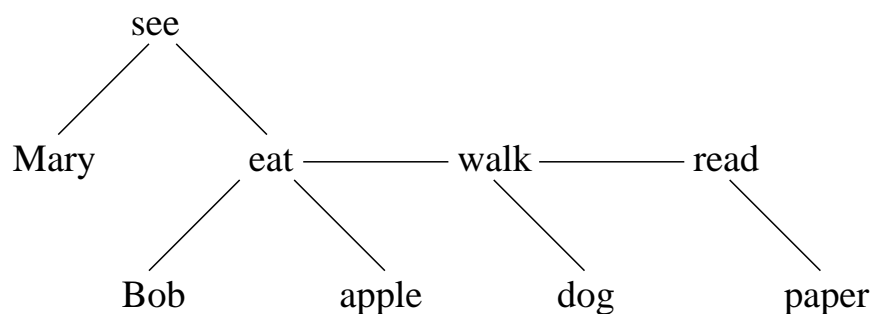
Mary saw that Bob bought, Jim peeled, and Bill ate the peach.

Cf. NLC'06, 9.4.2 (3).

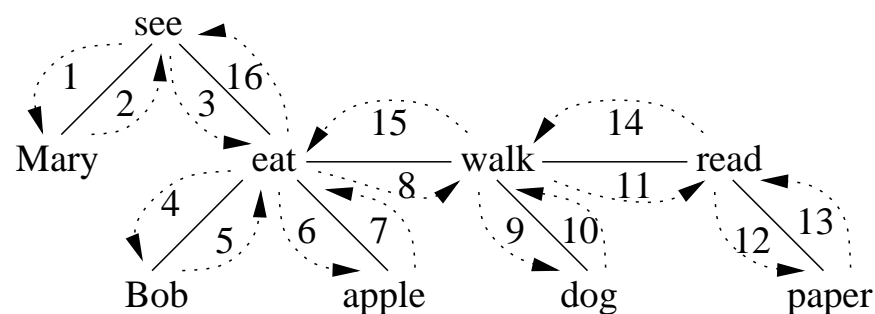
3.3.1 Mary saw that Bob ate an apple, walked his dog, and read a paper.

(Verb–object coordination (subject gapping) in an object sentence)

semantic relations



underlying navigation



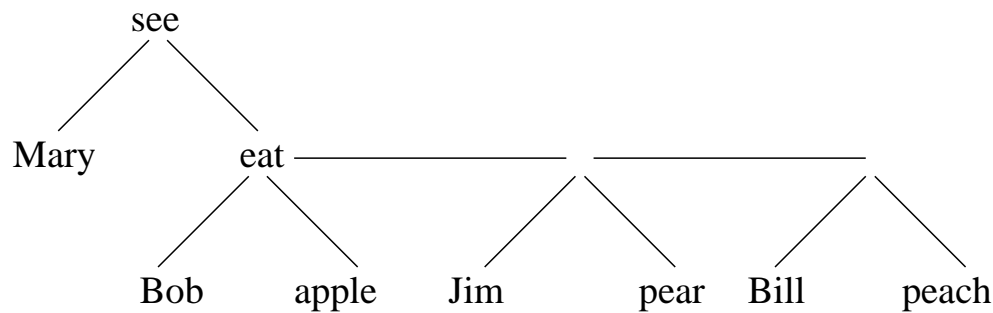
surface realization

1 2 3 4 5 6 7–8 9 10–11 12 13–14–15–16
 Mary saw that Bob ate an apple walked his dog and read the paper .

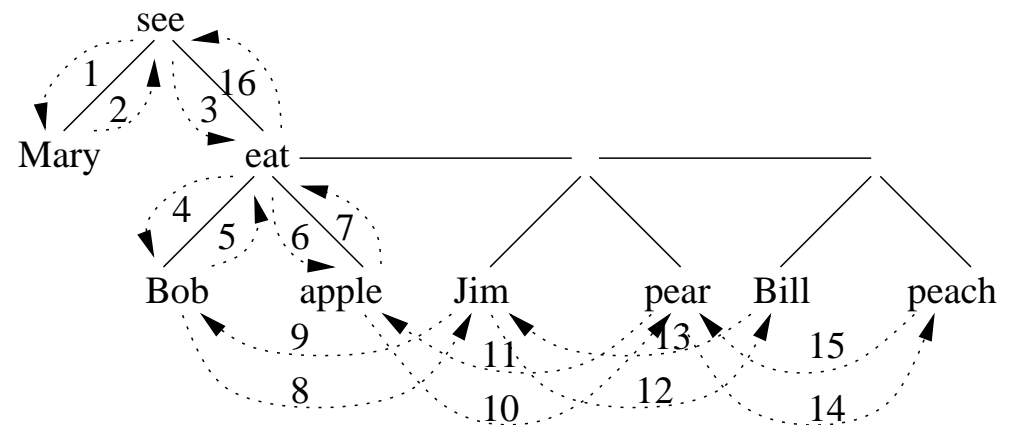
[noun: Mary cat: nm sem: sg fnc: see prn: 34]	[verb: see cat: decl sem: past arg: Mary eat & 35 prn: 34]	[noun: Bob cat: nm sem: sg fnc: eat & prn: 35]	[n/v: that eat & cat: v sem: past arg: Bob apple fnc: see 34 nc: walk pc: prn: 35]	[noun: apple cat: snp sem: indef sg fnc: eat & prn: 35]	[verb: walk cat: v sem: past arg: # dog nc: read pc: eat prn: 35]	[noun: dog cat: snp sem: poss_s3m sg fnc: walk prn: 35]	[verb: read cat: v sem: past arg: # paper nc: pc: walk prn: 35]	[noun: paper cat: snp sem: indef sg fnc: read prn: 35]
---	--	--	---	---	---	---	---	--

3.3.2 Mary saw that Bob ate an apple, Jim a pear, and Bill a peach. (Subject–object coordination (verb gapping) in an object sentence)

semantic relations



underlying navigation



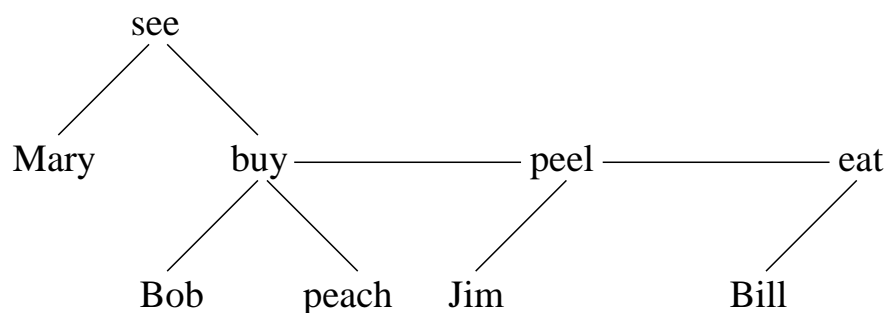
surface realization

1 2 3 4 5 6 7-4-8 9-5-6-10 11-7-4-8-12 13-9-5-6-10-14 15-11-7-16
 Mary saw that Bob ate an apple Jim a pear and Bill a peach .

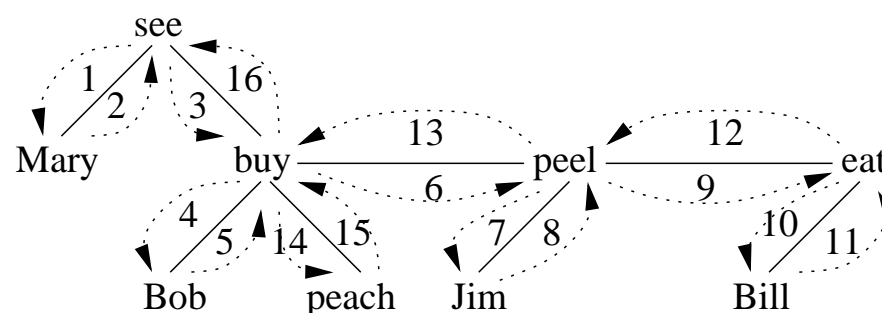
[noun: Mary cat: nm sem: sg fnc: see prn: 36]	[verb: see cat: decl sem: past arg: Mary eat& 37 prn: 36]	[noun: Bob & cat: nm sem: sg fnc: eat & nc: Jim pc: prn: 37]	[n/v: that eat cat: v sem: past arg: Bob & apple & fnc: see 36 prn: 37]	[noun: apple & cat: snp sem: indef sg fnc: eat & nc: pear pc: prn: 37]	[noun: Jim cat: nm sem: sg fnc: # nc: Bill pc: Bob prn: 37]	[noun: pear cat: snp sem: indef sg fnc: # nc: peach pc: apple prn: 37]	[noun: Bill cat: nm sem: sg fnc: # nc: pc: Jim prn: 37]	[noun: peach cat: snp sem: indef sg fnc: # nc: pc: pear prn: 37]
---	---	--	--	--	---	--	---	--

3.3.3 Mary saw that Bob bought, Jim peeled, and Bill ate the peach . (Subject–verb coordination (object gapping) in an object sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6–7 8 9–10 11 12–13–14 15–16
 Mary saw that Bob bought Jim peeled and Bill ate the_ peach .

[noun: Mary]
 cat: nm
 sem: sg
 fnc: see
 prn: 38

[verb: see
 cat: decl
 sem: past
 arg: Mary buy & 39
 prn: 38]

[noun: Bob]
 cat: nm
 sem: sg
 fnc: buy &
 prn: 39]

[n/v: that buy &
 cat: v
 sem: past
 arg: Bob peach
 fnc: see 38
 nc: peel
 pc:
 prn: 39]

[noun: Jim]
 cat: nm
 sem: sg
 fnc: peel
 prn: 39]

[verb: peel
 cat: v
 sem: past
 arg: Jim #
 nc: eat
 pc: buy
 prn: 39]

[noun: Bill]
 cat: nm
 sem: sg
 fnc: eat
 prn: 39]

[verb: eat
 cat: v
 sem: past
 arg: Bill #
 nc:
 pc: peel
 prn: 39]

[noun: peach]
 cat: snp
 sem: def sg
 fnc: buy &
 prn: 39]

3.4 Relative Clause

3.4.1: VERB–OBJECT COORDINATION (SUBJECT GAPPING) IN ADNOMINAL SENTENCE WITH SUBJECT GAP)

The man who ate an apple, walked his dog, and read a paper loves Mary.

Cf. NLC'06, 9.4.3 (1).

3.4.2 Subject–object coordination (verb gapping) in an adnominal sentence with subject gap

structurally excluded! Cf. NLC'06, 9.4.3 (2).

3.4.3 Subject–verb coordination (object gapping) in an adnominal sentence with subject gap

structurally excluded! Cf. NLC'06, 9.4.3 (3).

3.4.4 Verb–object coordination (subject gapping) in a adnominal sentence with object gap

structurally excluded! Cf. NLC'06, 9.4.4 (1).

3.4.5 Subject–object coordination (verb gapping) in an adnominal sentence with object gap

structurally excluded! Cf. NLC'06, 9.4.4 (2).

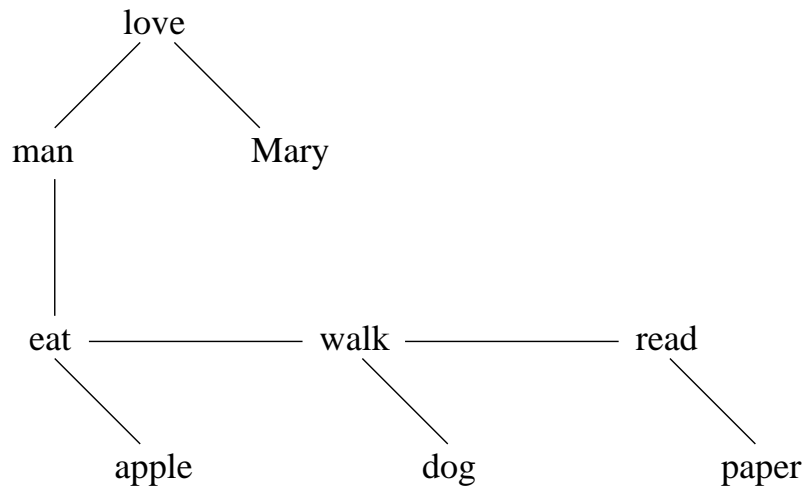
3.4.6: SUBJECT–VERB COORDINATION (OBJECT GAPPING) IN ADNOMINAL SENTENCE WITH OBJECT GAP

Mary saw the peach which Bob bought, Jim peeled, and Bill ate.

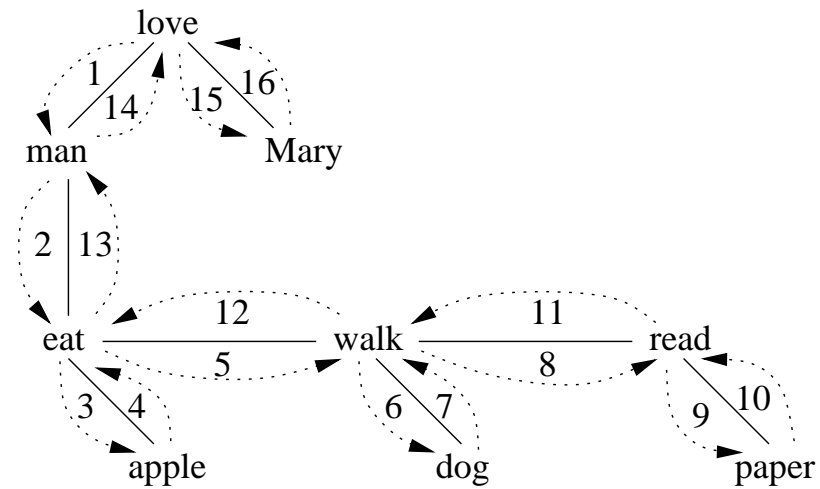
Cf. NLC'06, 9.4.4 (3).

**3.4.1 The man who ate an apple, walked his dog, and read a paper loves Mary.
 (Verb-object coordination (subject gapping) in an adnominal sentence with subject gap)**

semantic relations



underlying navigation



surface realization

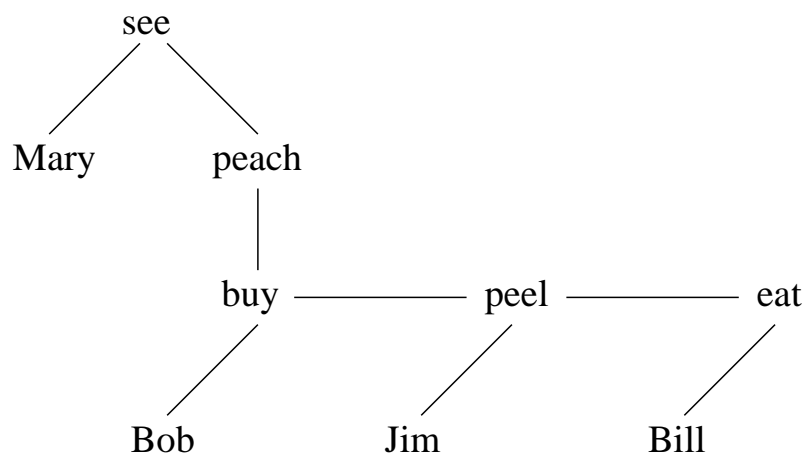
1 2 3 4-5 6 7-8 9 10-11-12-13-14 15 16
 The man who ate an apple walked his dog and read a paper loves Mary .

[noun: man cat: snp sem: def sg fnc: love mdr: eat & 41 prn: 40]	[a/v: eat & cat: v sem: past arg: # apple mdd: 40 man nc: walk pc: prn: 41]	[noun: apple cat: snp sem: indef sg fnc: eat & prn: 41]	[verb: walk cat: v sem: past arg: # dog nc: read pc: eat prn: 41]	[noun: dog cat: snp sem: poss_s3m sg verb: walk prn: 41]	[verb: read cat: v sem: past arg: # paper nc: pc: walk prn: 41]	[noun: paper cat: snp sem: indef sg verb: read prn: 41]	[verb: love cat: decl sem: pres arg: man Mary prn: 40]	[noun: Mary cat: nm sem: sg fnc: love prn: 40]
---	--	---	---	--	---	---	--	--

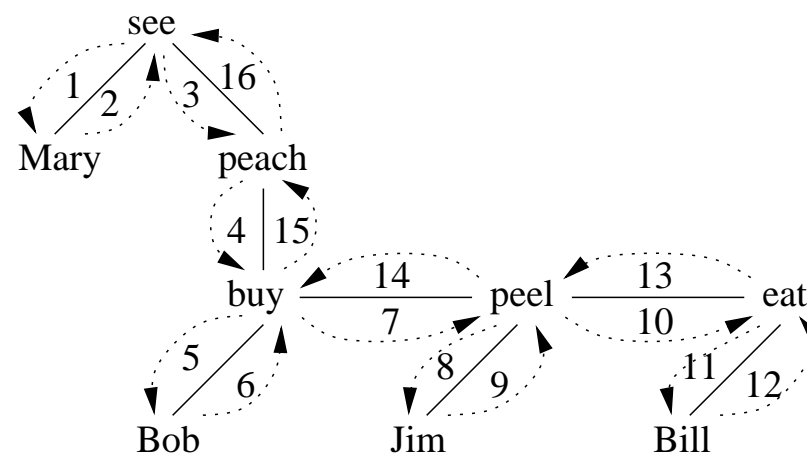
3.4.6 Mary saw the peach which Bob bought, Jim peeled, and Bill ate.

(Subject–verb coordination (object gapping) in an adnominal sentence with object gap)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6 7–8 9 10–11 12 13–14–15–16
 Mary saw the_ peach which Bob bought Jim peeled and_ Bill ate .

[noun: Mary] cat: nm sem: sg fnc: see prn: 42	[verb: see cat: decl sem: past arg: Mary peach prn: 42	[noun: peach cat: snp sem: def sg fnc: see mdr: buy & 43 prn: 42	[noun: Bob] cat: nm sem: sg fnc: buy & prn: 43	[a/v: buy & cat: v sem: past arg: Bob # mdd: peach 42 nc: peel pc: prn: 43	[noun: Jim] cat: nm sem: sg fnc: peel prn: 43	[verb: peel cat: v sem: past arg: Jim # pc: buy nc: eat prn: 43	[noun: Bill] cat: nm sem: sg fnc: eat prn: 43	[verb: eat cat: v sem: past arg: Bill # nc: pc: peel prn: 43
---	--	---	--	---	---	---	---	--

3.5 Adverbial Clause

3.5.1: VERB–OBJECT COORDINATION (SUBJECT GAPPING) IN AN ADVERBIAL SENTENCE

Mary arrived after Bob had eaten an apple, walked his dog, and read a paper.

Cf. NLC'06, 9.4.5 (1).

3.5.2: SUBJECT–OBJECT COORDINATION (VERB GAPPING) IN AN ADVERBIAL SENTENCE

After Bob had eaten an apple, Jim a pear, and Bill a peach, Mary arrived.

Cf. NLC'06, 9.4.5 (2).

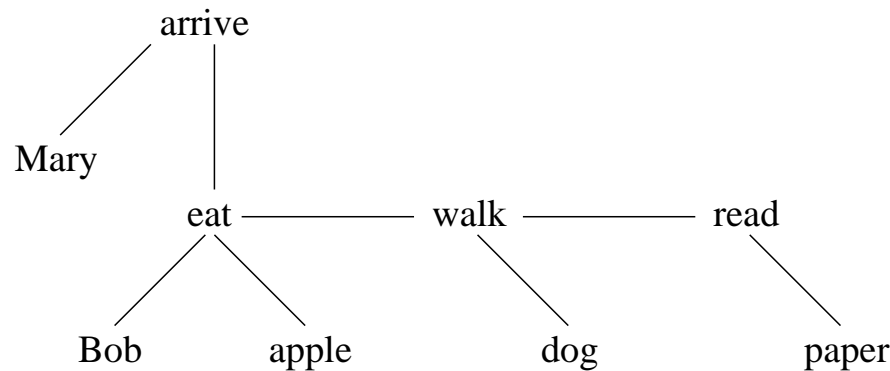
3.5.3: SUBJECT–VERB COORDINATION (OBJECT GAPPING) IN AN ADVERBIAL SENTENCE

Mary arrived after Bob had bought, Jim had peeled, and Bill had eaten the peach.

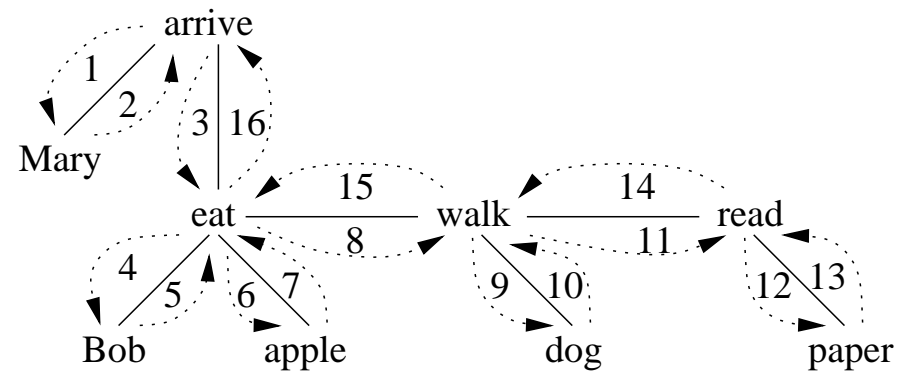
Cf. NLC'06, 9.4.5 (3).

3.5.1 Mary arrived after Bob had eaten an apple, walked his dog, and read a paper. (Verb-object coordination (subject gapping) in an adverbial sentence)

semantic relations



underlying navigation



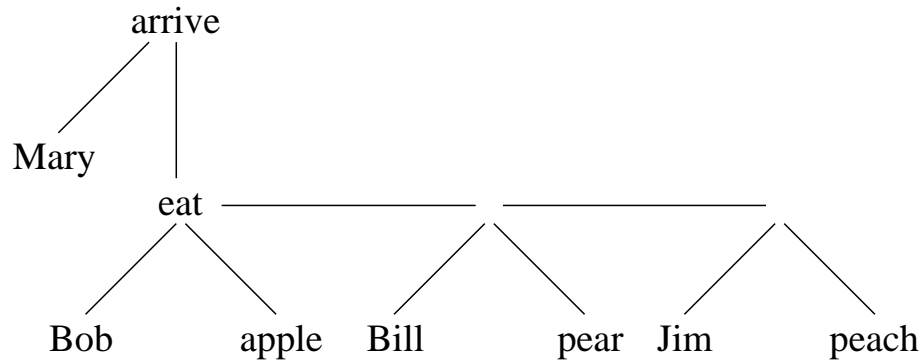
surface realization

1 2 3 4 5 6 7-8 9 10-11 12 13-14-15-16
 Mary arrived after Bob had_eaten an_apple walked his_dog and_read a_paper .

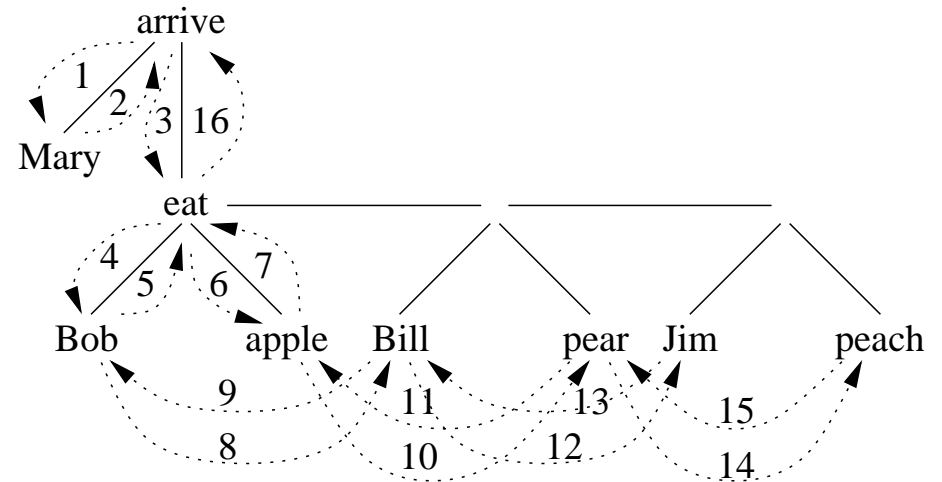
[noun: Mary cat: nm sem: sg fnc: arrive prn: 44]	[verb: arrive cat: decl sem: past arg: Mary mdr: eat 45 prn: 44]	[a/v: after eat & cat: v sem: past perf arg: Bob apple mdd: arrive 44 nc: walk pc: prn: 45]	[noun: Bob cat: nm sem: sg fnc: eat prn: 45]	[noun: apple cat: snp sem: indef sg fnc: eat prn: 45]	[verb: walk cat: v sem: past perf arg: # dog nc: read pc: eat prn: 45]	[noun: dog cat: snp sem: poss_s3m sg fnc: walk prn: 45]	[verb: read cat: v sem: past perf arg: # paper nc: pc: walk prn: 45]	[noun: paper cat: snp sem: indef sg fnc: read prn: 45]
--	---	--	--	---	--	---	--	--

3.5.2 After Bob had eaten an apple, Jim a pear, and Bill a peach, Mary arrived.
(Subject–object coordination (verb gapping) in an adverbial sentence)

semantic relations



underlying navigation



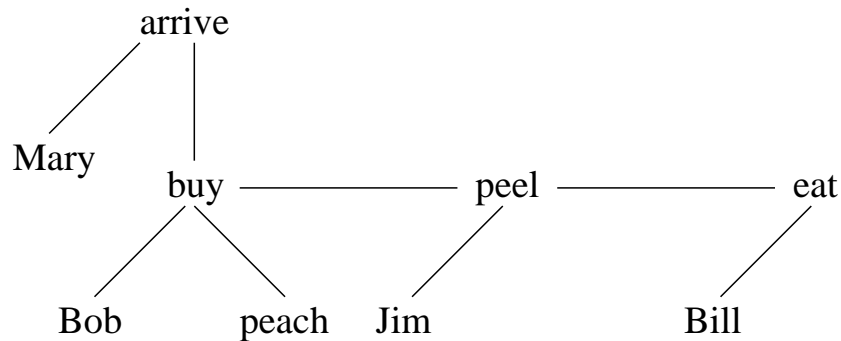
surface realization

1 2 3 4 5 6 7-4-8 9-5-6-10 11-7-4-8-12 13-9-5-6-10-14 15-11-7-16
 Mary arrived after Bob had_eaten an_apple Bill a_pear and_Jim a_peach .

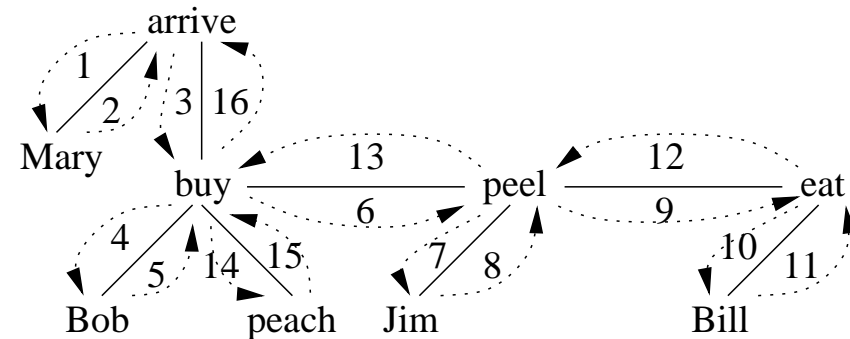
[a/v: after eat cat: v sem: past perf arg: Bob & apple & mdd: arrive 47 prn: 46]	[noun: Bob & cat: nm sem: sg fnc: eat nc: Jim pc: prn: 46]	[noun: apple & cat: snp sem: indef sg fnc: eat nc: pear pc: prn: 46]	[noun: Jim cat: nm sem: sg fnc: # nc: Bill pc: Bob prn: 46]	[noun: pear cat: snp sem: indef sg fnc: # nc: peach pc: apple prn: 46]	[noun: Bill cat: nm sem: sg fnc: # nc: pc: Jim prn: 46]	[noun: peach cat: snp sem: indef sg fnc: # nc: pc: pear prn: 46]	[noun: Mary cat: nm sem: sg fnc: arrive prn: 47]	[verb: arrive cat: decl sem: past arg: Mary mdr: eat 46 prn: 47]
---	--	--	---	--	---	--	--	---

3.5.3 Mary arrived after Bob had bought, Jim had peeled, and Bill had eaten the peach. (Subject–verb coordination (object gapping) in an adverbial sentence)

semantic relations



underlying navigation



surface realization

1 2 3 4 5 6–7 8 9–10 11 12–13–14 15–16
 Mary arrived after Bob had bought Jim had peeled and Bill had eaten the peach .

<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: Mary cat: nm sem: sg fnc: arrive prn: 48] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [verb: arrive cat: past sem: past arg: Mary mdr: buy & 49 prn: 48] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: Bob cat: nm sem: sg fnc: buy & prn: 49] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [a/v: after buy & cat: v sem: past perf arg: Bob peach mdd: arrive 48 nc: peel pc: prn: 49] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: Jim cat: nm sem: sg fnc: peel prn: 49] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [verb: peel cat: v sem: past perf arg: Jim # nc: eat pc: buy prn: 49] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: Bill cat: nm sem: sg fnc: eat prn: 49] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [verb: eat cat: v sem: past perf arg: Bill # nc: pc: peel prn: 49] </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> [noun: peach cat: snp sem: def sg fnc: buy & prn: 49] </div>
--	---	--	--	---	---	---	--	---

Reference

NLC'06 = Hausser, R. (2006) *A Computational Model of Natural Language Communication*, Heidelberg Berlin New York: Springer