

Handout 1: Basic Notions in Argument Structure

Seminar *The syntax-semantic interface: Argument structure*, Andrew McIntyre

1 Introduction

1.1 Some basic concepts

➤ Part of the knowledge we have about certain linguistic expressions is that they must or may appear with certain other expressions (their **arguments**) in order to be interpreted semantically and in order to produce a syntactically well-formed phrase/sentence.

(1) *John put the book near the door*

put takes *John, the book* and *near the door* as arguments

near takes *the door* and arguably *the book* as arguments

(2) *Fred's reliance on Mary*

reliance takes *on Mary* and *Fred* as arguments

(3) *John is fond of his stamp collection*

fond takes *his stamp collection* and *John* as arguments

➤ An expression taking an argument is called a **predicate** in modern & philosophical terminology (distinguish from old terminology where *predicate* = verb phrase).

➤ An argument can itself be a predicate

(4) *Gertrude got angry* (in some theories, *angry* is an argument of *get*, and *Gertrude* is an argument of both *get* and *angry*)

➤ Some linguists say that arguments can be shared by two predicates, e.g. in (1) *the book* might be taken to be an argument of both *put* and *near*.

➤ **Argument structure (valency)**: the (study of) the arguments taken by expressions.

➤ In syntax, we say a predicate (e.g. a verb) *has, takes, subcategorises for, selects* this or that (or so-and-so many) argument(s).

➤ You cannot say you *know* a word unless you know its argument structure.

➤ A word's argument structure must be mentioned in its **lexical entry** (=the information associated with the word in the **mental lexicon**, i.e. the mental dictionary, the part of the speaker's memory which stores information which cannot be predicted by rules). E.g.:

(5) a. Egbert ate the chicken. b. Egbert ate.

(6) b. Egbert devoured the chicken. b. *Egbert devoured.

(7) a. *Egbert dined the chicken. b. Egbert dined.

(8) Lexical entry for *eat* (simplified):

a. Phonology: /i:t/

b. Semantics: X puts Y in X's mouth and digests it.

c. Argument structure: [_{NP} X] ([_{NP} Y])

➤ The entry for *dine* would omit ([_{NP} Y]). Entry for *devour* would have no parentheses.

1.2 The semantic and syntactic side of argument structure

➤ **Thematic roles** (also called *semantic roles, theta roles, θ roles*): descriptions of the *semantic* relation between predicate and its argument(s). Examples (more given later):

➤ **Agent**: Deliberate initiator of the event.

➤ **Patient**: Entity undergoing the effects of the action named by the verb.

➤ **Grammatical relations**: (also called *grammatical functions*) descriptions of the *syntactic* properties of an argument.

➤ **Subject**: NP/DP that appears outside the VP and determines verbal inflection.

➤ **Object**: NP/DP argument inside VP.

➤ Thematic roles and grammatical relations do not correlate one-to-one:

(9) a. *Jane*^{agent/subject} *has criticised* *Fred*^{patient/object}
 b. *Fred*^{patient/subject} *has been criticised* *(by Jane)*^{agent/PP}.

1.3 Some questions for argument structure theories

A. Given the mismatches between thematic roles and grammatical relations, what determines how an argument will be **realised/linked** in syntax? If we know an argument's thematic role, how can we predict what grammatical relation it will have?

(10) a. Egbert^{AGENT} ate the cake^{PATIENT}.

b. *The cake ate Egbert.

c. The cake was eaten.

(11) a. Basil likes the picture b. *Basil likes {of/to/at/about/on} the picture

c. *The picture likes Basil d. *The picture likes to Basil

➤ An inadequate response: add information about grammatical relations to the lexical entry for *eat* in (8). Problems:

➤ This misses a generalisation: every English verb with an AGENT and PATIENT behaves like *eat* in (10). E.g. *destroy, change, unwrap, polish...*

➤ If a new verb is created and has an AGENT and PATIENT, it will also behave like *eat* in (10). Real examples:

(12) a. Some protestors **gnomed** the Reserve Bank of Australia.

b. Bored teenagers **forked** someone's garden.

➤ Better response: Assume that at least some argument-structural facts are *predictable* and *systematic*, and try to work out how the system works.

B. Many questions concern the fact that most verbs are involved in **alternations**, i.e. can be used with different argument structures (see Levin 1993 for many other examples):

(13) **Dative alternation**

a. Mary gave Floyd a book.

b. Mary gave a book to Floyd.

(14) **Causative alternation**

a. Clive broke the cup.

b. The cup broke.

(15) **Object drop alternation**

a. Sally ate the pizza.

b. Sally ate.

(16) **Preposition drop alternation**

a. Frank jumped over the fence.

b. Frank jumped the fence.

(17) **Conative alternation**

a. Mavis pushed the car.

b. Mavis pushed on the car.

(18) **Locative alternations**

a. Ants crawled in the garden.

b. The garden crawled with ants.

c. John sprayed paint on the wall.

d. John sprayed the wall (with paint)

e. Twenty people slept in the guesthouse. e. The guesthouse sleeps twenty people

Questions that alternations raise:

➤ Do the variants in an alternation (e.g. (13)(a,b)) differ in meaning?

➤ Is one of the variants in an alternation somehow derived from the other?

➤ Why are there exceptions to alternations, cf. (13) and (19)?

(19) a. Marmaduke donated his stamp collection to the museum.

b. *Marmaduke donated the museum his stamp collection.

2 Details on thematic roles

Thematic roles (=semantic roles, **θ** roles, **theta roles**): names for the ways in which an argument relates semantically to the situation. Other introductory sources on thematic roles are Frawley (1992:ch 6), Saeed (2003: ch. 6) and Kearns (2000: ch. 8.3 and 10).

2.1 Agent and similar roles

➤ **Agent**: volitional intentional, deliberate initiator of an event. Sometimes the term is used without the condition that the act be initiated deliberately, but it is more accurate to use the term **Initiator** (also **Causer**) to cover such cases. Initiators need not be sentient/animate. Every agent is a type of initiator/causer, but the reverse does not hold.

- (20) FRED^{agent} painted the wall. The door was opened by MARY^{agent}
 (21) THE FOOD^{initiator} made me sick. A BRANCH^{initiator} crushed the car.
 (22) THE COMPUTER^{agent/initiator} opened the door. (agent if anthropomorphised)
 (23) FRED^{agent/initiator} accidentally broke the plate.

➤ **Tests for agentivity**. The tests given below are all applied to the stative verb *know*, whose subject has no control over the situation, to see what happens when the subject is not an agent. More details in Cruse (1973).

- Imperatives:
 (24) *Open the door, please.* vs. **Know the answer please*
 ➤ Purpose clauses:
 (25) *I opened the door to please Grandma* vs. **I knew the answer to please Grandma*
 ➤ Use of the clause in the complement of verbs like *persuade*, *ask* which require their objects to decide to carry out an action:
 (26) *I persuaded him to open the door* vs. **I persuaded him to know the answer*
 ➤ The construction *What x did was...* is possible if X is an agent, but also works (for at least some speakers) with certain other kinds of initiators.
 (27) *What I did was work* vs. **What I did was know the answer*
 (28) *?What the food did was make me sick.*
 (29) *What the programme does is search your hard disk for viruses.*
 (30) *What he did next was break the plate, but it was only accidental.*

2.2 Patient and theme

➤ **Patient**: entity affected/changed by the event, undergoing it:

- (31) He painted THE WALL. They shot JOHN

➤ **Theme**: Several different uses of the term:

- Entity whose position or direction is indicated.
 (32) He kicked THE BALL over the fence. THE BALL rolled down the hill
 (33) THE VASE is on the shelf. We left THE VASE on the shelf.
 ➤ Entity which has a property ascribed to it (mostly args. of adjectives):
 (34) THE VASE is old; JOHN stayed sober
 ➤ Some linguists (often loosely) use the term instead of 'patient'. This makes the most sense in cases where the verb explicitly says that one of its arguments enters a particular state as the result of an event, as is particularly clear in verbs derived from adjectives (cf. the use of *theme* in the previous paragraph):
 (35) They dried THE DISHES (=caused them to be dry)
 (36) THE SKY darkened (=became dark)
 ➤ Often, *theme* is used as a vague default term covering other structures for which there is no more specific term. Cf. e.g. the use with possessed objects.

➤ Patients and themes (in the sense of entities changing state or location) are acceptable in constructions like *What happened to x was...* or *What I did to x was*.

- (37) *What happened to John was that Joe shot him*
 (38) **What happened to Joe was that he shot John*
 (39) *What I did to the vase was to break it*
 (40) *What happened to the car was that it rolled down the hill/became rusty.*

2.3 Roles associated with mental/emotional situations

➤ **Experiencer**: entity to which a particular emotion or psychological state is attributed. Usually this response is due to some other entity, which is called the **stimulus** or **theme**.

- (41) JOHN^{exp} feared/loved/admired/saw THE DOG^{stimulus/theme}
 (42) THE PICTURE^{stimulus/theme} frightened/appalled/appealed to/interested JOHN^{experiencer}
 (43) JOHN^{exp} was/felt angry at THE DOG^{stimulus/theme}
 (44) JOHN^{exp} thinks that the world is flat.

➤ For the notion 'experiencer' to be of any use, the psychological state has to be described explicitly by the predicate. For instance, treating the subject in *John got a parking ticket* or *John was sick* as an experiencer because he feels bad is not justified, since *get/sick* don't specifically describe John's mental state.

➤ Verbs which express mental/emotional phenomenon and have experiencer arguments are called **psych-verbs** (psychological verbs). They are a challenge for linking theory because experiencers can appear in more positions than e.g. agents or patients.

2.4 Spatial roles, and roles associated with prepositions

➤ **Source**: place or entity at start of path of theme:

- (45) He came out of THE HOUSE/ from LONDON; She left THE HOUSE

➤ **Goal**: place or entity at end of path traversed by the theme:

- (46) He went into THE HOUSE/ to LONDON; She entered THE HOUSE

➤ **Location**: Place of an entity or event. (Distinguish from Source/Goal.)

- (47) It was/remained in THE KITCHEN; I left it THERE
 (48) It is raining in LONDON

➤ The terms *source/goal/location* are used to describe either PPs or NPs inside PPs.

➤ **Path**: General term for directional PP which ignores source-goal distinction:

- (49) He went INTO/OUT OF THE HOUSE

➤ When talking about spatial PPs, it is useful to have a term which describes the NP which appears inside the PP, regardless of whether the PP expresses a Source, Goal or location. This NP is variously called **reference object**, *ground* or *landmark*. Such NPs act as reference points helping us to find the location of an NP outside the PP (variously called the **theme**, figure, trajectory, located object). See exercise K for more complex cases.

- (50) I put the book^{theme} on the shelf^{ref.obj}.
 (51) The book^{theme} stayed on the shelf^{ref.obj}.

2.5 Roles associated with possession

➤ **Recipient**: Person/thing receiving something. Recipients are sometimes called *goals*.

- (52) She gave/sent/bequeathed {JOHN the book/ the book TO JOHN}
 (53) After her death, her house went to HER SON.

➤ **Possessor**: person/thing which *has* something (more on this later in course). The possessed object is variously called a *theme*, *possessum* or *possession*.

- (54) MARY has/owns a car; The car belongs to MARY
 (55) MARY's book/leg/idea; THE BOOK's author/title/cover

2.6 Assorted other roles

- **Beneficiary:** (animate) entity benefitting from an action. Often the benefit is that an agent performs an act vicariously. Beneficiaries are often *intended* recipients, so they behave like recipients grammatically in some languages (e.g. double object construction in (b)).
- (56) a. I cooked his dinner for HIM; I opened the door for HIM; a present for HIM
b. I made HER some coffee (but drank it myself)
- **Instrument:** the means by which an action is performed. Instruments are acted on by agents, and in turn act on something else (often a patient). Instruments are impossible without (at least implicit) agents.
- (57) She polished the surface with A RAG; Lincoln was killed with A GUN
- **Predicative NPs:** NPs giving a property of another NP, or with which the other NP is equated. Predicative NPs always paraphrases involving copulas (*X was Y* etc.).
- (58) Mary seemed/remained/became A NICE PERSON. She is A TEACHER.
- (59) I described Grandma as THE BEST GUITARIST. I consider her (to be) A GENIUS.
- (60) They elected/made her PRESIDENT/THE LEADER.

A. What are the thematic roles of the underlined expressions in the following sentences? There may be more (or less) than one satisfactory answer in some cases.

1. Jimmy forgot the answer.
2. Stanley got a book
3. Stanley got sick
4. The money went to Mavis
5. Eileen made Basil a fruitcake
6. Svetlana noticed the problem.
7. Angie heard/listened to music.
8. The metal polishes easily
9. Mary danced
10. Mary danced out of the room into the garden
11. Mabel called Fritz an ambulance
12. The painting appealed to Wayne.
13. The car was destroyed by rioters
14. Gary thought about the situation.
15. He plunged (himself) into the sea; They blew (themselves) up
16. John seems to me to have been angry.
17. Simone used the computer to write this.

B. **Nominalisations** (=nouns derived from verbs or other categories) often have arguments *inherited* from the word from which they are derived. What are the thematic roles of the arguments of the nouns in the examples below? One example is an instance of a so-called *passive nominalisation* because it parallels a passive construction. Which one?

1. The doctor's examination of the patient.
2. The city's destruction by barbarians.
3. The conservatives' abhorrence of Bill Clinton.
4. The uncertainty of the politicians.

C. **Nominalisations** like those below express arguments of the source verb. What are the thematic roles expressed by the following nominalisations?

1. writer.
2. dishwasher
3. arrestee
4. copy

2.7 General points on thematic roles

- When more than one thematic role appears applicable to an NP, some options may be excluded because they are not **grammatically relevant**, i.e. the argument or verb doesn't exhibit the grammatical behaviour typically found in clear cases of the thematic role in question. This is an advanced point (sometimes missed by good linguists). Examples:

A. The subject of *read* is clearly an agent, but one author called it an experiencer (presumably since reading involves seeing). The latter analysis seems wrong/irrelevant because apparently no language treats 'readers' like arguments of psych verbs grammatically. We never find things like *The book read me* or *To me read a book*.

B. The subject of *I swam to the shore* could be a theme or an agent. One *might* argue that the theme analysis is better given that German uses the *be*-perfect in such contexts, which is known to require theme subjects. (It uses the *have*-perfect only when no PP is present, when the speaker sees the event as an action and not a means of locomotion, i.e. when the subject is clearly an agent, not a theme.) Similar remarks apply to verbs like *leave*, *enter*, *go*, *arrive* when used with what appears to be an agentive subject. (Cf. the *be*-perfects used with such verbs in French.) To assess the validity of this argument, one would have to see whether other languages give evidence to the contrary.

- (61) a. Ich {bin/*habe} ans Ufer geschwommen.
I {am/have} to.the shore swum.
b. Ich habe geschwommen.
I have swum. (i.e. 'I did some swimming')

D. It is possible to query the grammatical relevance of calling the subject in example 1 below an instrument. Can you find another thematic role for *the crane* which is applicable in sentence 1 but not 2? Your answer should help explain the contrast between 1 and 3.

1. The crane unloaded the truck.
2. They unloaded the truck with a crane.
3. *The fork ate the chips.
4. I ate the chips with a fork.

- We will see later in the course that many linguists find thematic roles problematic (e.g. since there is no consensus on the definition and number of roles used by the grammar). However, it is crucial to understand them as a first step in understanding argument structure, whence the detailed treatment here.

- It is sometimes claimed that a single NP cannot receive more than one thematic role from a verb (e.g. the *theta criterion* of older Principles and Parameters theory). Among other things, this was meant to block sentences like **John hit* (where *John* is agent and patient).

E. Why do the following data (at least superficially) challenge the claim that a single NP must have only one thematic role? Advanced question: How could one defend this idea in the face of these apparent exceptions.

1. We told Bob to clean the kitchen.
2. Claudine was reluctant to sing.
3. Ethel bought/sold the record.
4. Keith listened to the record stoned.
5. The ball hit Francine on the head.

3 More on grammatical relations

- **Subject:** (in English) NP triggering agreement on verb and able to invert with auxiliaries in questions. Depending on the type of syntax you have done, the subject is more exactly defined as specifier of TP/IP or as the NP immediately dominated by S.)

(62) *She sing_s* vs. *They sing*; *She will sing* vs. *Will she sing*?

- We later discuss complications to the notion 'subject', e.g. in sentences like *There seem to be three problems*.

- **Object:** NP argument of verb which is inside VP. In double object constructions, distinguish **direct** object and **indirect** object. (The terms *direct* and *indirect* arguably make little sense for English. They are used here because they are common. Better terms sometimes used are *first/second object*.)

(63) I gave [_{NP} the person]^{indirect/first object} [_{NP} the book]^{direct/second object}

- **Oblique:** PP inside VP; usually an argument of the verb:

(64) I gave the book to Mary; I sat on the chair; I relied on the software

- **Complement:** argument of a head which is its sister (i.e. directly next to it in a given analysis of the constituent structure):
 - (65) *she* [_{VP} *saw* [_{NP} *the* [_N *students*] [_{PP} [_P *of*] [_{NP} *physics*]]]]
 - (Here *physics* is complement of *of*, the PP is complement of *student* and *the students of physics* is complement of *see*.)
- **External argument:** argument of a head which does not appear inside the phrase of which it is head (e.g. subjects are external arguments of verbs). The opposite notion is that of an **internal argument**.
 - (66) External arg. of V = subject of sentence.
 - (67) Ext. arg. of P: *I put BOOKS* [_{PP} *on the shelf*]; *BOOKS were put* [_{PP} *on the shelf*]
 - (68) Ext. arg. of A: *THE BOOK seems to be* [_{AP} *very good*]
- **Expletives** arguments which lack an interpretation, and thus have no thematic role. Their sole *raison d'être* is to fill a particular position in a sentence when the verb provides no other argument to do so. Expletives give another argument for distinguishing grammatical functions from thematic roles.:
 - (69) *THERE was/were three books on the table*
 - (70) *IT rained* ('weather it')
 - (71) *When the police came, the crooks legged IT out of there*
 - (72) *Do not lord IT over other people*
- Some theories (e.g. Minimalism) deny that grammatical functions are primitive in grammar (=our cognitive ability to form words and sentences). Instead, generalisations about grammatical functions are really generalisations about other things e.g. generalisations about objects are really generalisations about the types of arguments of VP which typically stay inside the VP in active clauses. Other theories, e.g. Lexical Functional Grammar, see grammatical functions as primitive. More on this later in course.

F. The mismatch between grammatical relations and thematic roles was illustrated in (9) above. Try to find ways of changing the following sentences to make the same point with roles other than just agent and patient.

1. Cuthbert gave Gertrude a book.
2. Nina opened the door with the key.

4 Case

- The inflection of a NP which is partially –though not directly– related to thematic roles and grammatical relations.
 - (73) He relied on {me/*I}; She saw {me/*I} (complement of P, object of V gets accusative/objective case while subject gets nominative;
- In some theories (e.g. minimalism), case can be **abstract**, in that it isn't expressed overtly by case morphology. E.g. *Ann* in (74) is assumed to move to subject position to get case.
 - (74) He_i was [_{VP} praised *t_i*] [_τ= trace: original position of *he*]
- Three types of case:
 - **Structural** case: alternates with other cases, depending on the syntactic context:
 - (75) a. **He** went to the party; b. For **him** to go to the party would be silly
 - c. I saw **him** go to the party
 - (76) a. She saw **him** b. **He** was seen

- (77) a. Sie sahen den Mann (German; structural accusative case)
They saw the man^{accusative}
- b. {Der Mann/*Den Mann} wurde gesehen
The man^(nominative/accusative) was seen
- **Inherent** case: is assigned by some particular head as an unpredictable property of that head. It cannot alternate (e.g. change in passive).
- (78) a. Sie gedachten des Mannes (German; inherent genitive case)
They commemorated the man^{genitive}
- b. {Des Mannes/*Der Mann} wurde gedacht
The man^(nominative/genitive) was commemorated
- **Semantic** case: a case directly associated with a particular semantic role. E.g.:
 - (79) *Allative case*: characterises NP as a goal: Basque *etexera* 'to the house'
 - (80) *Comitative case*: "in the company of": Basque *gizonaekin* 'with the man'
- Semantic cases may be seen as markers of particular thematic roles, but structural case can't (otherwise it would be invariable). The tie-in between cases and grammatical relations is a complex matter that we may not be able to discuss in this course.
- Butt (2006) is a textbook on case.

5 Arguments vs. modifiers (adjuncts)

- It is crucial to distinguish arguments from **modifiers** (=adjuncts). We can explain this using the following phrases (the heads of the phrases are underlined; the arguments of the head are in capitals; modifiers are in italics; optional constituents are in parentheses).
 - (81) VP: a. (constantly) relied ON HER (throughout the crisis)
 b. (*quickly*) devoured THE LEFTOVERS (*in the kitchen*) (*on Friday*)
 c. gave HER THE BOOK (*on Friday*) (*in the kitchen*) (*to make her happy*)
 c. (*often*) claimed THAT HE WAS GOD'S PERSONAL MESSENGER (*despite somewhat sceptical reactions*)
 - (82) AP: a. reliant ON HER PARENTS (*during the crisis*)
 b. fond OF HIS WIFE (*in every way*)
 c. proud (OF HER CHILDREN) (*above all justification*)
 d. unable (TO KEEP THE APPOINTMENT) (*because of the accident*)
 e. (*completely*) bereft/devoid OF INSPIRATION (=lacking it)
 - (83) NP a. his fondness/liking FOR STRONG DRINK (*during the Winter months*)
 b. my (*misguided*) reliance ON MICROSOFT SOFTWARE (*in writing these notes*)
 c. the expert (ON PHYSICS) (*on the committee*) (*in an orange waistcoat*)
 d. her (*profound*) faith (IN DIVINE BEINGS) (*during the crisis*)
 e. the (*generous*) friends (OF THE ACCIDENT VICTIMS)
 f. the (*better known*) kings (OF ENGLAND) (*before the fifteenth century*)
 - (84) PP: a. towards THE FENCE
 b. (*right*) inside (THE HOUSE)
 c. despite STATE INTERVENTION
- Basic difference: Modifiers are less closely related to the head they are dependent on than are arguments. More specifically:

A. The **definition** of a word must mention its arguments but not its modifiers. E.g. a definition of *give* must mention the agent, recipient and theme, but it would contain redundancies if it mentioned the possibility of modifiers like those in (81)c) (e.g. *give* means 'x causes y to have z at a certain time in a certain place for a certain reason').

B. Consequence of A: The arguments of a word must be mentioned in its **lexical entry**, but its modifiers should not. Cf. the lexical entries in (8) and (85). However you formulate the lexical entry for *give*, there would be no need to mention the possibility of adding the bracketed phrases in (81)c) in the lexical entry. The use of modifiers should follow from general semantic, syntactic and pragmatic principles, not from the lexical entry of the word they modify.

(85) **Lexical entry for *give*** (simplified):

- Phonology & morphology: /gIv/ (past: /geIv/, participle: /gIvn/)
- Semantics: ‘an event in which a person *x* causes a person *y* to have some object *z*’
- Syntactic category: Verb
- Argument structure: [_{VP} V [_{NP} *y*] [_{NP} *z*]] OR [_{VP} V [_{NP} *z*] [_{PP} to [_{NP} *y*]]]

C. Modifiers are always **optional**, while arguments are often **obligatory**. The claim is *not* that arguments are *always* obligatory. The object of *eat* is optional, but can be shown to be an argument by various other tests (which ones?). Furthermore, if *eat*’s object is not pronounced, it is *implicitly* present: *I ate* is interpreted like *I ate something*. Similarly, the PP in *proud (of himself)* is an argument because if we don’t pronounce it we understand *proud* as meaning something like ‘proud of himself/his achievements etc.’. See exercises J, K for more examples of such *implicit arguments*. The main uncertainty regarding implicit arguments is whether or not they are present in the syntax as unpronounced NPs/PPs etc.

D. Modifiers can be added **recursively**, i.e. there is in principle no limit to the number of modifiers a word can have within its phrase, cf. (86). By contrast, arguments are limited by the lexical entry of the word selecting them. With few exceptions, verbs have at most three arguments, while other categories can have at most two.

- (86) a. [sometimes] walked THE DOG [slowly] [in the park] [on Fridays] [after work] [for two hours] [to clear his mind]
 b. [big], [black], [fluffy], [dangerous] dogs [without collars] [in the park]

E. With the exception of external arguments (subjects), the arguments of a head mostly appear **closer to the head** of the phrase than do modifiers, cf. the examples above. Exceptions (discussed in class) involve movement operations.

F. Observation E follows from a principle that arguments are combined with their heads before modifiers are. I.e. **head+argument(s) forms a constituent which excludes modifiers**. The modifiers are added to the head+argument(s) constituent but create a bigger instance of the same category. This operation is called **adjunction**. (This explains why modifiers are often called *adjuncts*.) Adjunction is a recursive operation, explaining point D above. Examples:

- (87) a. [_{NP} clever [_{NP} students of physics]] (NP=N’ in some theories)
 b. [_{VP} often [_{VP} slowly [_{VP} ate his dinner] in the kitchen]]] (VP=V’ in some theories)

G. Some **proforms** stand for head+argument(s) constituents. These proforms can’t be used if the complement is repeated:

- (88) *the student (of maths) with long hair and the one with short hair*
 **the student of maths and the one of linguistics*
 (89) *I read (a book) in the kitchen and she did so in the living room*
 **I read a book and she did so a magazine*

G. Some of the thematic roles apply to modifiers as well as arguments. Decide whether the location roles below are arguments or modifiers. Multiple answers are not excluded.

- The cows stayed in Neuchâtel.
- Sheila finally lived in Sydney.
- His wife left him in Vladivostok.
- He wrote a letter in London.

H. Are the PPs below complements or modifiers?

- a professor of physics
- a ring of gold
- the brother of Mary
- we decided on a boat
- a fan of the band
- interested in physics
- I behaved in a bad way
- I slept in that bed
- the side of the car
- funding for research

I. Are the items listed in brackets below each sentence below complements or modifiers, and what are they are complements or modifiers of? More than one answer may be right.

- People started loudly applauding the performance of the band in the next room.*
[loudly, in the next room, of the band]
- She gave Mary a book on French art at the party.*
[at the party, Mary, on French art]
- They unanimously rejected the application for a second trip to America in May.*
[in May, unanimously, for a second trip to America (in May)]

J. Find the **implicit arguments** (cf. point C above) in the following sentences and describe their interpretation.

- We saw a pub, but we didn’t go in because John doesn’t drink.
- He was afraid, so he put his hat on and left.
- To be a successful author, you must write quickly. Support from publishers is crucial.

K. **Phrasal verbs** (=particle verbs) consist of a verb and a preposition-like element with an **implicit argument**. Re-read section 2.4 on the thematic roles associated with prepositions and describe the interpretations of the implicit arguments associated with the prepositional particles in the following examples.

- Grandma put her false teeth in.
- The protestors walked out.
- I poured the water out.
- I poured the bucket out.
- I wiped the dust off.
- I wiped the table off.

L. Use the data below to design a hypothesis about when –ing-forms are usable as adjectives. Hint: the –ing form must have an implicit argument with a particular thematic role.

- striking innovations / *striking bricks (=falling bricks which strike people)
- arresting ideas / *arresting policemen
- a chilling movie /*a chilling freezer

6 Bibliography

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