1

Sentence meaning II - Argument structure

1.1 What is argument structure?

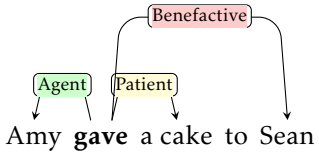
We saw in last week's lecture that each verb requires a certain number of entities which participate in the event / situation it describes. This is referred to as **valency**. For example, a one-place predicate, e.g. *laugh*, has a valency of one. A three-place predicate, e.g. *give*, has a valency of three. In addition to specifying the number of arguments, verbs also specify the roles of their arguments. Take the following sentences;

(1) Amy gave a cake to Sean

(2) Amy received a cake from Sean

The sentences have an identical structure. However, Amy clearly plays a different role in the two sentences, being a giver in the first example, and a receiver in the second example. How do we account for this fact? The answer is that the verb decides what role each argument is going to play. It gives them **thematic relations**. Without thematic relations we would not be able to account for the fact that two sentences can have the same form, but differ in terms of the roles played by arguments.

(3)



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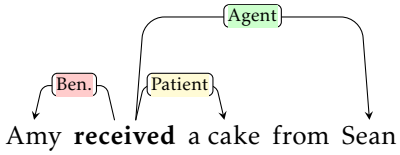
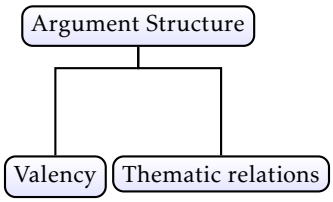


The term **thematic relation** is often used interchangeably with **thematic role** and **theta role**. However, there are subtle differences between these terms (those who are interested can consult Carnie, Chapter 7)

The **argument structure** or **predicate argument structure (PAS)** of a verb is a combination of its valency and kind of thematic relations it gives to its arguments.

Figure 1.1: Argument structure



Argument structures are often specified using triangular brackets. For example the argument structure for *give* is <agent, benefactive, patient> with the words describing the different thematic relations, and

the underlined argument being the argument which comes before the verb (sometimes called the **external argument**).

1.2 What is an argument?

We have mentioned that arguments are entities which participate in the event / situation described by the predicate. In addition, if we assume that arguments are "chosen" by the verb, then we need to rule out cases where participants are clearly not essential, e.g.

(5) She went to the cinema [with her friends]

Going *with friends* is clearly not essential to the predicate as we can go to the cinema by ourselves. So, to rule out (5), we must stipulate that an argument be semantically essential. For example, we can't imagine a hitting action without a thing being hit (you can't hit the air). So in the sentence *Charlie hit Drew*, *Drew* is clearly an argument. Likewise, we cannot imagine a giving action without both a thing being given and a recipient, so in the sentence *Amy gave Sean a cake* both *Sean* and *cake* are arguments.

Another property of arguments is that their omission can result in ungrammaticality. For example

(6) *Sam put the plates ~~on the table~~

(7) *Amy gave Sean ~~a present~~

However, this is not always the case. For example, when we imagine *painting* we normally imagine an entity doing the painting, a thing being painted, some paint, an instrument for painting with, and maybe even a colour. However, we can omit any entity depending on the context;

(8) He painted for five hours

(9) He painted the wall

(10) He painted the wall with some paint

(11) He painted the wall with some paint and a paintbrush

(12) He painted the wall red with some paint and a paintbrush

(13) This paintbrush paints well

Generally, we can omit arguments only if they are highly **accessible** to the listener, i.e. recoverable from context, or represented in encyclopaedic knowledge shared by both speaker and listener. For example, *Mary gave a book* sounds strange, but in the following example it sounds okay, because the recipient is recoverable from context;

(14) All Janice's friends decided to give her some presents. Paul gave a watch, Jacqueline gave a CD, and Mary gave a book

In addition we can say *she gives regularly to charity* because it is fairly obvious what the thing being given is (money). With regard to our encyclopaedic knowledge, when we imagine a painting action, we will almost invariably imagine a brush, some paint and a painting surface. Therefore we can omit these arguments.

So here's a definition of an **argument**;

- It is semantically essential; i.e. it is difficult to imagine the verb without it
- It is sometimes obligatory, e.g. *put*
- It can sometimes be omitted if it is highly accessible to both speaker and listener
  - e.g. part of our shared encyclopaedic knowledge
    - He painted the wall [with paint]

    - ▹ Mary gives [money] to charity
  - e.g. obvious from context
    - ▹ Mary gave a book (in above example)

1.3 Argument structure I - valency

There is little to mention here, as we have already covered valency. It is worth reiterating that there are four possible valencies; 0, 1, 2, and 3.

1.4 Argument structure II - thematic relations

An inventory of thematic relations

Many linguists have attempted to devise an inventory of possible thematic relations. Notable works are Jackendoff 1990 (Jackendoff, R.S. (1990) *Semantic Structures*, MIT Press, Cambridge, MA.) and Givón 1984 (Givón, T. (1984) *Syntax: A Functional-Typological Introduction* I, Benjamins, Amsterdam.) The inventory we are going to learn is an inventory which is used specifically by the aphasia team at Newcastle. To help remember this inventory, use the following mnemonic; *After eating peas tiny babies avoid laughing in public*.

Table 1.1: Mnemonic for remembering thematic relations (see end of chapter for more detailed table)

Mnemonic	Thematic relation	Syntactic test	Lexical test
After	**A**gent	What X did was...,	X deliberately + VERB
Eating	**E**xperiencer	What happened to X was...,	I personally VERB
Peas	**P**atient	What happened to X was...,	
Tiny	**T**heme	Doesn't satisfy agenthood / patienthood tests	
Babies	**B**enefactive	In Indirect Object position	Can be introduced by *to*
Avoid	**A**ttributive	Comes in Subject Complement or Object Complement position. Can be a Noun Phrase, Adjective or a Prepositional Phrase	
Laughing	**L**ocative	Can be questioned using *where?*	Introduced by a preposition
In	**I**nstrument		Introduced by *with*
Public	**P**ossessor		Used with verbs *have*, *contain*, *belong*

You can see that for each thematic relation there are syntactic and lexical tests.

Links to therapy

A speech therapist called Alison Bryan has devised a system called colourful semantics (see reference in Further Reading section). Animate agents are coloured orange, inanimate patients are coloured green, and locatives are coloured blue. Children use these colours to learn about thematic relations in basic sentences, which typically consist of an animate agent acting on an inanimate patient. We are going to adapt this scheme by colouring agents, experiencers, benefactives and possessors (who are typically animate) orange. Instruments which are nearly always inanimate will be green, while patients which are can be either animate or inanimate will be light green (to show that while they have a tendency to be inanimate they can also be animate). Locatives will be

yellow, just like in the original Bryan framework. And Attributives will be purple.

1. **Agent**

   This is a normally **animate entity** who **initiates** the action. The action is normally **deliberate**, hence we can use the adverb *deliberately* (see lexical test column). Agents can be questioned using *What did X do?* and we can respond *What X did was...*, e.g.

   (15) Q. What did Charlie do?
   A. **What** Charlie **did was** he hit Drew.

   The Agent is normally in Subject position (i.e. before the verb), e.g.

   (16) The dog chased the cat
   AG PAT

   However, it can also come in other positions;

   (17) The cat was chased by the dog
   PAT AG

2. **Experiencer**

   This is normally an **animate** entity which **experiences** an event. The experience often consists of a **change of mental state**. This could be perceptual, e.g. *she felt a hand on her shoulder*, emotional, e.g. *she feels sad*, or epistemological (i.e. relating to thoughts, beliefs and opinions), e.g. she thought that the film was terrible. However, sometimes there is no change of state, e.g. *I know how to juggle*. The experience is **involuntary**. So in the following examples

   (18) Jack considered the proposal
   AG

   (19) I consider him my best friend
   EXP

   Jack could be regarded as the voluntary initiator of the action in (18), and hence the agent, but a passive experiencer in (19), as we have little conscious control over our opinions. If the experiencer is first person *(I / we)* we can insert the adverb *personally*, e.g. *I personally enjoy cricket*. Experiencers are normally in subject position (before the verb);

   (20) He enjoyed the film
   EXP

   but can sometimes come in object position (after the verb);

   (21) The film pleased him
   EXP

   Unlike the agent, the experiencer is questioned using *What happened to X was*, e.g.

   (22) Q. What happened to Mary?
   A. **What happened to** Mary **was** she felt a hand on her shoulder.

This is a useful way of distinguishing between the Agent and Experiencer, given that they both tend to occur in subject position (before the verb).

3. **Patient**

This is an entity which is **affected** by the action. We can make the following question about a patient; *what happened to X?*, e.g.

(23) **What happened to** Drew?
AG

(24) **What happened to** him **is** he was hit by Jack
PAT AG

The patient does not initiate the action and is the passive recipient of the action. Patients nearly always come **after the verb** in Direct Object position (see next week), though very occasionally they may come in different positions, e.g.

(25) The cat was chased by the dog
PAT AG

(26) The car broke down
PAT

NB you'll find that the "what happened to" test words for both *the cat* and *the car*

4. **Theme**

Patients are highly affected by the action and are identified using the test *What happened to X was....* However, sometimes an argument which comes in object position (the typical position for a patient) is not highly affected, e.g.

(27) Jake enjoyed the book
EXP TH
?What happened to the book was Jake enjoyed it

(28) Jason wrote his name
AG TH
?What happened to the name was Jake wrote it

We use the label **theme** to describe this type of thematic relation. Often themes are paired with experiencers. We can have **experiencer-theme verb**s;

(29) Jake enjoyed the book
EXP TH

Sometimes themes come in subject position, as in the case of **theme-experiencer verb**s;

(30) The book pleased Jake
TH EXP

Other examples of experiencer-theme verbs are; *like, love, enjoy, hate,* and other examples of theme-experiencer verbs are *frighten, satisfy, enrage, move*.

Many inventories do not distinguish between the themes and patients, and instead use a single "theme" category. However, I think the theme versus patient distinction is useful because it captures the notion of whether or not the entity is highly affected by the event or action.

5. **Benefactive**

   This is the recipient. It is normally **animate**. It normally comes in **indirect object position** (see next week). It normally comes after the propositions *to* and *for*;

   (31) Amy gave a cake to Sean
   AG PAT BEN

   (32) Amy made a cake for Sean
   AG PAT BEN

   (33) Sean received a cake from Amy
   BEN PAT AG

   NB I've called *a cake* and *Amy* PATIENT and AGENT respectively. We can see that they play these roles if we rephrase the sentence using *give* as opposed to *receive*, as in (32). However, *Amy* no longer passes the syntactic test for agenthood, e.g. **What Amy did was Sean received a cake from her*. This is just one of those instances where rules-of-thumb break down slightly.

   Some frameworks have a thematic relation called "SOURCE" which could be ascribed to *Amy*, but the particular framework we are using does not have this thematic relation.

6. **Attributive**

   This **attributes** a property to an entity. It comes after the copula, and verbs such as *seem*, *appear*, *look*;

   (34) Ruth **is** / **seems** / **appears** tired
   ATT (Adjective)

   (35) Ruth **seems** in a bad mood
   ATT (Prepositional Phrase)

   (36) Ruth **is** a good friend
   ATT (Noun Phrase)

   The above examples use an adjective, a Prepositional Phrase, and a noun respectively in Attributive position.

7. **Locative**

   This describes a location. The phrase expressing the locative typically begins with a preposition, e.g.

   (37) I live there
   LOC

   Under the Whitworth framework, a distinction is made between the locative and the to-locative, with the latter being used when a verb of movement is used;

   (38) I went to the shops
   TO-LOC

8. **Instrument**

   This is literally an instrument which is used to perform an action. It normally comes after *with*, e.g.

(39) Jake covered the plate with the cloth
AG PAT INS

(40) They used a hammer to put up the shelf
AG INS

Attention

There is a often a slight mismatch between our criteria for identifying arguments, and our use of thematic relations. Have a look at the *with*-phrase in the following sentences

(41) I sprayed the wall with paint

(42) I covered the bubbling stew with the lid

(43) She scratched her back with the back-scratcher

The with phrases all denote some kind of instrument (though in (41) it could possibly be described as a "location"). The INSTRUMENT thematic relation therefore seems appropriate. However, it's not that clearcut if we think about our criteria for defining arguments. Quite clearly, *spraying* and *covering* actions need an instrument of some sorts, so the *paint* and *lid* are semantically essential, and therefore an argument. However, does *scratching* require an instrument in the same way? There is no right or wrong answer here, as there are clearly degrees of "essentialness". There are also degrees of obligatoriness, another of our criteria for defining arguments, as very few verbs actually specify obligatory arguments, and most can be omitted in particular contexts. In fact *put* is the only verb I can think of where the sentence is always ungrammatical if we omit the post-verbal arguments, e.g. **I put*

You will therefore come across many cases where it's difficult to decide whether a particular constituent is an argument or not. This isn't your fault - this is a problem for linguistic theory! It's also important to remember that if a phrase is not an argument, technically it doesn't receive a thematic relation. In the exam (BScs only) you will be given a box to describe your thought-processes when assigning thematic relations, so if you think a particular phrase is not an argument you should explain why.

If you wish to read about this issue in detail you can have a look at this article, which argues that all instrumental with-phrases (as above) should be treated as adverbials, not arguments. However, there is clearly a lot of debate about this!

9. **Possessor**

Literally an entity that possesses another entity;

(44) Angie has a mini
POS

(45) The mini belongs to Angie
POS

Thematic relations and the copula

Most inventories of thematic relations argue that the subject of the copula has no thematic relation. We can demonstrate this with the following example;

(46) I consider him (to be) my best friend
EXP TH ATT

We can see that the thematic relation Attributive can be assigned even without the copula. In fact it receives this role as part of the argument structure of the verb *consider*. So the copula clearly has no role in assigning the thematic relation. The following examples also show how the copula does not assign a thematic relation;

(47) It is likely that Patrick will leave soon
AG

(48) Patrick is likely to be leaving soon
AG

In both these examples, Patrick is the Agent of *leave*, which clearly bestows the thematic relation. In the second, Patrick moves up the sentence and becomes the subject of the copula, but brings the thematic relation with it. So, the copula does not assign a thematic relation. The same is true for a number of verbs such as *seem*, *appear*, *look* which are often described as **copula-type verbs** because they do not assign a thematic relation to the subject, and are substitutable by the copula;

(49) Patrick seems / appears / looks likely to leave soon.

A final reason why the copula does not bestow a thematic relation is that many languages have no copula whatsoever. So, for example, if we wish to say **??** in Turkish we would say something like *Ruth happy*.

The syntax of arguments

Arguments are typically expressed by nouns. However, sometimes they can be expressed by different word classes or syntactic categories. Attributives can be expressed by adjectives and Prepositional Phrases. Moreover, sometimes arguments can be expressed by "mini sentences";

(50) He predicted an earthquake
TH (Noun Phrase)

(51) He predicted that there would be an earthquake
TH (mini sentence)

These mini sentences are called **clauses** and will be covered later in the course.

Where argument structure meets syntax

Argument structure is **semantic** phenomenon. According to most syntactic theory, each verb specifies the number of arguments (valency) the thematic relations and which argument is the **external argument**, i.e. which argument comes in subject position (i.e. before the verb). This is often shown in triangular brackets, e.g.

(52) *swim* <agent>

(53) *kiss* <agent, patient>

(54) *give* <agent, patient, benefactive>

Note that, besides the external argument, word order is not specified. So *give* can be used in two different word orders, e.g. *she gave the dog a bone*, *she gave the bone to the dog*, but the argument structure only lists one order.

The **syntactic** realisation of arguments is determined by the **complement-selection** or **c-selection** properties of the verb;

(55) *swim* [_]

(56) *kiss* [_ NP]

(57) *give* [_ NP NP] / [_ NP to NP]

The underscore _ shows the verb, and the c-selection frame specifies what comes after the verb. The c-selection frame is sometimes called the **subcategorisation frame**.

Useful Terms

Thematic relations, (predicate) argument structure, external argument, valency, agent, experiencer, patient, benefactive, attributive, locative, instrument, possessor, copula-type verbs, complement-selection, subcategorisation frame

Further Reading

Bryan, A.(1997). Colourful semantics: Thematic role therapy. In S. Chiat, J. Law, & J. Marshall (Eds.), Language disorders in children and adults: Psycholinguistic approaches to therapy (pp. 143-161). London: Whurr.

Carnie, Chapter 7

Table 1.2: Mnemonic for remembering thematic relations

Mnemonic	Thematic relation	Example	Animate?	Instigator of event?	Volitional? (willing participant in event)	Syntactic test	Lexical test
After	**A**gent	**He** broke the egg	Animate	Yes	Volitional	What X did was...,	X deliberately + VERB
Eating	**E**xperiencer	**She** felt the ground shake	Animate	No	Maybe	What happened to X was...,	I personally VERB
Peas	**P**atient	He broke **the egg**	Can be animate or inanimate	No	Maybe	What happened to X was...,	
Babies	**B**enefactive	She gave the present to **Martha**	Animate	No	Maybe	In Indirect Object position	Can be introduced by *to*
Avoid	**A**ttributive	They painted the wall **red**	N/A	N/A	N/A	Comes in Subject Complement or Object Complement position. Can be a Noun Phrase, Adjective or a Prepositional Phrase	
Laughing	**L**ocative	He went **to the bank**	N/A	N/A	N/A	Can be questioned using *where?*	Introduced by a preposition
In	**I**nstrument	She washed the plate **with the sponge**	Inanimate	No	Non-volitional		Introduced by *with*
Public	**P**ossessor	He **has** two houses	Normally animate	No	Depends, e.g. *He has a cold* (non-volitional) versus *He has a house* (volitional)		Used with verbs *have, possess, belong*