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# Motivation for argument structure

## 5 minute exercise

What is wrong with the following sentences?

1. Jack gave Mary
2. Petula put the beans
3. Julie laughed Peter

Verbs select the number of entities in the sentence. *Give* and *put* select 3 participants, but there are only 2 in the sentence. *Laugh* selects 1 participant, but there are 2 in the sentence.

## Valence

What is the valence of the following verbs?

1. Drive
2. Donate
3. Mix
4. Yawn
5. Slap
6. Rain

A verb ‘begs to be completed into a sentence’ (Tomasello, 1992)

The verb implies a certain number of participants (Valence)

Valence can range from 0 to 3.

Psycholinguistic studies demonstrate that even when we hear verbs in isolation we mentally represent the number of participants (e.g. Shapiro et al. 1987 lexical decision task, or Kim & Thomson, 2000)

## Thematic relations (roles)

Look at the following sentences:

1. Jane fears Peter
2. Peter scares Jane
3. Paul liked the play
4. The play pleased Paul
5. Mary gave Pete a present
6. Pete received a present from Mary

We can see that in order to use a verb properly, knowing the valence is not enough. We need to know which roles come in which positions. Otherwise we will get the meaning of the sentence wrong, e.g. we will say *Jane scares Peter*.

Consequently, when using a verb in a sentence, we need to know (a) the number of participants, (b) their roles in the sentence, and (c) how those roles are ordered.

# Argument structure

## Definition

Information included in the lexical entry of the verb, which specifies (a) the number of essential participants (valence), (b) their roles, and (c) the order of those roles.

Essential participants are known as ‘arguments’

Argument structure is partly semantic / partly syntactic:

1. Semantic level: roles specified by the verb
2. Syntactic level: ordering of roles

## Determining valency

How do we determine **essential** participants? Those which are obligatory? We can test for obligatoriness by omitting an presumed argument, and seeing how this impacts on grammaticality

1. She dropped ~~the pen~~
2. She took ~~the jacket~~

But most arguments can be rendered optional in certain contexts

1. She give money to charity
2. They all gave presents to Mary. Paul gave a pen (to Mary), Jenny gave a book (to Mary), and Brad gave a watch (to Mary)
3. COOKING INSTRUCTIONS: Chop (the carrots) and stir (them) into the sauce

So obligatoriness will only get you so far!

In addition, some verbs seem to elicit a wide variety of arguments

1. He paints walls
2. He painted the wall red
3. He painted the wall red with a paintbrush and some paint
4. This brush paints well

There are many potential arguments. Which ones are essential?

Finally sometimes verbs can take “extra-valent” arguments which sound “added on”

1. She swam ten lengths
2. They laughed the teacher out of the room

There is no foolproof way to determine valence

1. Method 1: Work out which arguments are “nearly” obligatory by looking at at a corpus
2. Method 2: Introspection. Shut your eyes and imagine the verb. How many entities are in the mental scene you have just conjured.

These two methods can occasionally give different results!

So there is no knock down method. If in doubt, shut your eyes, and click your heels together!

## Do we need argument structure?

Why not just assume that the way we use words in sentences is a direct result of their meanings? This approach is sometimes described as a *projectionist* approach. 2 problems:

1. Examples above (*Jane fears Peter / Peter scares Jane*) suggest that each verb must specify the order of the roles. A syntactic level of representation is arguably required for this, as we can’t work out the order of arguments from the verb meaning (*fear* and *scare* arguably convey the same situation, with the only difference being the order of arguments)
2. Verbs specify detailed information about sentence structure which is not obviously linked to their meaning, e.g. *say* versus *tell* have almost identical meanings, but are used in sentences in very different ways:

|  |  |  |
| --- | --- | --- |
|  | * Say | * Tell |
| * VERB + NOUN PHRASE | * He said his name | * X |
| * VERB + CLAUSE (mini sentence) | * He said [that he was hungry] | * X |
| * VERB + NOUN PHRASE + CLAUSE | * X | * He told his friend that he was angry |

* These meanings can be “boiled down” to a difference in argument structure (or more specifically *valency*). The main difference appears to be that *say* takes 2 arguments, while *tell* takes 3 arguments.

1. Verbs with very similar meanings have very different argument structure configurations, e.g.
   1. He gave a book to Mary / He gave her the book
   2. He donated a book to the library / \*He donated the library a book

* If we were just inferring a verb’s syntactic behaviour from its meaning, we would have no way to account for this. (NB it’s not sure how argument structure can account for this either)

# Propositions

The verb and its arguments from a *proposition*.

A proposition is a *mental scene* involving at least one *participant* (or argument) participating in an event or situation (expressed by the verb, or “predicate”)

A proposition contains those entities which make the most important contributions to the **truth conditions** of the sentence (the real world conditions under which the sentence is true). Nouns (arguments) and verbs make a major contribution to truth conditions, e.g.

1. The **dog chased** the cat -> The **robot washed** the cat: TRUTH CONDITIONS HAVE COMPLETELY CHANGED
2. The dog chased **the** cat -> The dog **quickly** chased **a** cat: MINOR CHANGE TO TRUTH CONDITIONS

Propositions come at the bottom of a three way heirarchy:

1. Propositional level

* chase(dog,cat)

1. Sentence level
   1. The dog chased the cat
   2. It chased the cat
   3. The cat was chased by the dog
2. Utterance level

* A: Is your dog energetic? B: Well, it chases the neighbour’s cat every day!

We need propositions to explain how different surface forms (e.g. 2) can have the same underlying meaning. The proposition IS the underlying meaning.

# Thematic relations (roles)

Researchers have proposed that the roles given by verbs are universal (i.e. found across languages), and finite (i.e. there are a small set of them).

## Main roles for Noun Phrases

The main roles for Noun Phrases are **AGENT**, **PATIENT**, **EXPERIENCER** and **THEME**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test | AGENT | PATIENT | EXPERIENCER | THEME |
| Does entity deliberately initate the action? Can we say ‘what X did was Y…’ | **Yes** | No | No | No |
| Is entity affected?Cann we say ‘what happend to X was…’ |  | Yes | Yes | **No** |
| Is entity affected physically? |  | **Yes** | **No** |  |

NB this table should be read as a decision tree.

Try to determine the thematic relations of the Noun Phrases in the following sentences:

1. Charles crashed the car
2. Mavis heard the noise
3. The noise startled Mavis
4. The tree fell down in the storm
5. Ali considered the exciting proposal
6. Fatimah hated the start of term
7. The swing broke under his weight
8. The doctor felt the patient’s foot
9. I like having a bath with my clothes on
10. Jack liked Susan’s holiday snaps on Facebook.

## Other roles for Noun Phrases

**Benefactive** is the role typically given to Indirect Object Noun Phrases, e.g.

1. She gave him a book
2. She bought a book for him

**Possessor** is the owner of something

1. Jack has/owns a Ferrari
2. The house belongs to Martha

## Roles for other types of phrases

### Attributives

Phrases which describe a property of something else are called ATTRIBUTIVES, e.g.

1. Janice feels **happy**
2. Losing at bingo makes Martha **sad**
3. Jack is **in a mood**

We can often make questions about attributives using the question word *how*, e.g.

1. Q: How does janice feel? A: Happy

ATTRIBUTIVES are mapped to Subject and Object Complements (Cs, Co)

### Locatives

Phrases which describe locations are sometimes called LOCATIVES, e.g.

1. Jason is **in the park**
2. Pat loaded the hay **onto the wagon**

But be careful for a LOCATIVE to be a genuine argument, it has to be selected by the verb. In the following sentences

1. The girls played baseball **in the park**

the phrase *in the park* is not technically an argument because it is not chosen by the verb. However, researchers and clinicians have a tendency to label these non-arguments as arguments! How completely sloppy!

We can make questions about locatives using the question word *where*, e.g.

1. Q: Where is Jason? A: In the park.

### Instruments

An instrument is an object used to perform and action, e.g.

1. Angela covered the food **with a cloth**

This is actually a dubious candidate for a genuine thematic relation. If a verb requires a specific instrument, the instrument is often made explicit in the verb, e.g.

1. He **hammered** the nail (with a hammer)
2. She **filed** her nails (with a nail file).

If a verb does not require a specific instrument, it is expressed using *with*, e.g.

1. He scratched his back **with a loofah**

This is arguably not an essential participant in the scratching action, and this kind of phrase is always omissible. So it probably shouldn’t be categorised as an argumnet (but many people do!)

# Remember thematic relations

After Eating Peas All Tiny Babies Avoid Laughing In Public

AGENT, EXPERIENCER, PATIENT, THEME, BENEFACTIVE, ATTRIBUTIVE, LOCATIVE, INSTRUMENT, POSSESSOR

# Further practice

1. Jack considers himself a real gigolo
2. Angie sent her father the bundle of letters last Tuesday
3. The steering wheel came off in his hands
4. Jance watched the hovering buzzard
5. Who does this pencil case belong to?
6. Jake painted the wall with red paint.
7. Alina smelt the beautiful flowers

# Five minute exercise

How many possible ways can you think of to complete the following sentence?

(NB think of how many different **syntactic structures** can be used after the verb)

1. Doctor Who remembered …