

A SNACS Crash Course

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Part 1: Introduction to SNACS

Before we start: Helpful links!

- **Latest version of the SNACS guidelines (v2.6)**
 - <https://arxiv.org/pdf/1704.02134.pdf>
- **Xposition: online search interface for finding examples**
 - <https://www.xposition.org/>

Intro

- So you want to annotate SNACS supersenses...
 - Good 😎
- SNACS stands for **S**emantic **N**etwork of **A**dposition and **C**ase **S**upersenses
- In English, this means that we're annotating the meaning (**S**emantics) of prepositions and possessive pronouns (**A**dpositions and **C**ase)
- In other languages, this hierarchy applies to both adpositions and case marking of various types

But wait... what are “supersenses”?

- At a high level, they are categories which capture aspects of the different meanings (or “**senses**”) of words
- In principle, supersenses in general could be assigned to *any* word, not just adpositions
- However, the SNACS supersenses are tailored specifically for the different senses/meanings of **adpositions**

What are we targeting for SNACS annotation?

- Adpositions (transitive or intransitive)
 - We walked **to** the store.
 - We walked **over**.
- Possessive Markers
 - **My** car
 - Joe'**s** car
- Infinitive “to” (sometimes, typically alternating with “for” PP)
 - I walked to Georgetown (in order) **to** meet the new students.
 - I walked to Georgetown **for** a meeting with the new students.
- Prepositional Expressions
 - The game was cancelled **due to** rain.

Exceptions (**not** SNACS targets)

- Discourse expressions
 - “In other words”, “On the other hand”, “In my opinion”, etc.
 - Marked with the special ``d` tag, or marked `_Discourse` in INCEpTION
- Most cases of infinitive “to”
 - Marked with the special ``i` tag, or marked `_Other_Infinitive` in INCEpTION
 - I want to go **to** the store.
 - It’s difficult **to** understand this problem.

Why do we need “supersenses”?

- Broadly, because adpositions mean different things in different contexts
- Let’s look at a few examples...
- I wrote this essay **in London**
- I wrote this essay **in 1954**
- I wrote this essay **in an effort to spread my ideas**
- I wrote this essay **in German**

Same preposition, different meaning

- In each example, a prepositional phrase (headed by **in**) is modifying the verb “wrote”
- So why do the different prepositional phrases mean such different things?
- Clearly, **in** means different things in different contexts

1. I wrote this essay **in London**

2. I wrote this essay **in 1954**

3. I wrote this essay **in German**

Same preposition, different meaning

- In the first example, **in** introduces a static location (or **Locus** in SNACS supersense terms)
- In the second example **in** introduces a static point in time (**Time**)
- The third **in** tells us something about how the writing was done (**Manner**)

1. I wrote this essay **in London**

2. I wrote this essay **in 1954**

3. I wrote this essay **in German**

Same preposition, different meaning

- We've clearly seen that when **in** modifies a verb, it can have a pretty wide range of meanings
- But prepositions don't just modify *verbs*, they can modify *nouns* too!
- Adnominal prepositions also need supersenses. Consider the following examples...

1. A TV **with a big screen**

2. A person **with several cars**

3. Eggs **with bacon**

Same preposition, different meaning

- In all 3 examples, **with** relates two nominals
 - But each relation is slightly different
- In the first example, **with** introduces a description of one differentiable *part* of the TV (**PartPortion**)
- In the second example, **with** introduces something that is *owned* by a person (**Possession**)
- In the third example, **with** introduces two foods served grouped together (**Ensemble**)

1. A TV **with a big screen**

2. A person **with several cars**

3. Eggs **with bacon**

Overview of supersenses

- Clearly, adpositions have slightly different semantics in different contexts
 - We capture these differences by assigning different uses different **supersenses**
- In the last few slides, we got to see just a few SNACS supersenses in action
 - But there are lots more!
- Before we get too in depth in introducing all the different supersenses, we need to talk about a couple of properties of supersenses in more detail...
 1. **Granularity** of supersenses
 2. **Construal** of supersenses

Granularity of supersenses

- In other words, what is the **level of detail** (in terms of meaning) that supersenses capture?
- They are more **coarse grained** than frame-specific roles / verb-specific roles
- They are generally more **fine grained** than argument-structure participant roles or theta roles
- So supersenses are... **semi-coarse grained** - somewhere in the middle between frame-specific roles and participant roles

Construal

- Sometimes we use prepositions in creative ways!
- Sometimes what a preposition means in a ***certain situation/context*** is different from what the preposition means ***more generally***
 - In other words, there can be two supersenses for a single preposition!
- Because of this, we actually annotate **two** supersenses for each preposition: its **Scene Role** and its **Coding Function**
- We'll talk a bit more about each of these below.

Scene Role and Coding Function

- Construal involves the combination of two different senses using only a single preposition
- The supersense which conveys the *actual* meaning of a prepositional phrase *in context* with its *governor* and *object* is called the **Scene Role**
 - **Scene Role** is a *deeper* meaning, targeting the *intended meaning in context*
- The supersense which is what is “typically” or “literally” conveyed by a choice of preposition is called the **Coding Function**, or just simply **Function**
 - **Function** is a *shallower* meaning, targeting the *prototypical* lexical meaning of a preposition

Construal: A simple example

Consider the following two sentences:

- I tossed my baseball **in the park** (for a few hours)
- I tossed my essay **in the trash**

Does **in** mean the same thing in these two sentences? Not quite!

- They both describe locations... sort of
- In the first one, **in** describes where the tossing event *took place*
- In the second sentence, **in** describes where the theme of the tossing event (or more specifically, the essay) *ends up*

Construal: A simple example

How can we explain the difference in meaning in our examples?

- We've seen **in** can be used to convey a static location
- But in “I tossed my essay **in** the trash”, it is actually an endpoint in a dynamic event!
- We can think of this as an example of **bivalent construal**: **in** is being construed as a dynamic endpoint (or **Goal**) in the context of the **Scene**, even though its usual **Coding Function** is to introduce a static location (or **Locus**)
- We would call this *Locus-to-Goal coercion* (**Goal** ~> **Locus**)

How do we annotate bivalent construal?

- In a lot of SNACS literature (including the [SNACS guidelines](#))
 - You will see this notation: **Scene Role Supersense** ~> **Coding Function Supersense**
- In INCEpTION, we annotate both **scene role** and **coding function** supersenses
- What are some common cases of bivalent construal with supersenses?
 - I'm glad you asked! We'll briefly touch on a few of the common cases in the next slide

Common Cases of Construal

Some types of construal are just common:

- Construing a static location as the goal of a movement event (**Goal** ~> **Locus**, also called *Locus to Goal coercion*)
- Using a motion preposition but in a static scene (**Locus** ~> **Source/Path/Goal**, also called *fictive motion*)
- Using “with” to talk about two sometimes opposing agents in an event (**Agent** ~> **Ancillary**)

Some supersenses only occur in scenes / always involve construal:

- **Participants:** **Originator**, **Recipient**, **Experiencer**, **Stimulus**
- **Configurations:** **Org**, **OrgMember**, **SocialRel**, **Ensemble**, **QuantityValue**
- Check [the guidelines](#) for examples of each type of construal!

Part 2: The SNACS Hierarchy

WARNING!!!

- This is a *brief* introduction to the supersenses of the SNACS hierarchy
- But there are **a lot** of interesting and difficult cases, which we will completely gloss over!
- Read the full [SNACS guidelines](#) for more detailed explanations of each supersense
- **Need more examples?** Visit [Xposition](#) for quick, searchable access to lots of examples of each supersense

The SNACS Hierarchy

- Supersenses aren't just a random collection of unrelated meanings
- They form a **Network** of similar supersenses with multiple levels of specificity
- Check out the full SNACS network (52 supersenses)!

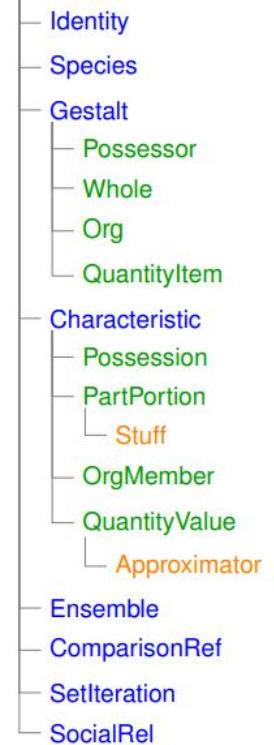
Circumstance



Participant



Configuration



About the SNACS Hierarchy

- The SNACS Hierarchy basically can be broken up into 3 main branches, the **Circumstance** branch, the **Participant** branch, and the **Configuration** branch
- Each branch covers a different broad category of supersenses
- Now let's talk about each branch in more detail! 😊

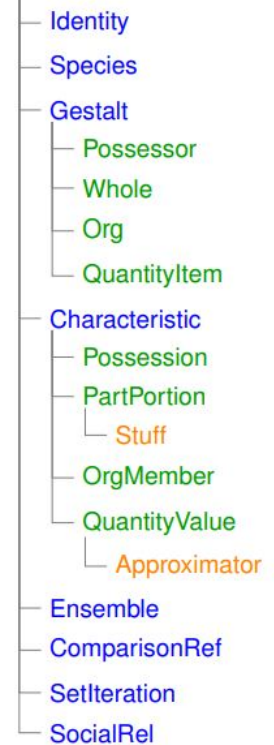
Circumstance



Participant



Configuration



The Circumstance Branch

- What type of information is in prepositional phrases?
- Often, they tell us *when* and *where* an event or object is located in space and time.
- They also can tell us *how* an event takes place
- In general, **Circumstances** tell us extra information about *when*, *where*, and *how* something happens.



Different Circumstances: Temporals

- How can we talk about the time of an event?
- We can say *when* something happens (**Time**)
- We can say when something *starts* or *ends* (**StartTime** and **EndTime**)
- We can say *how long* something lasts, or *how often* something happens (**Duration** and **Frequency**)
- We can say how much time passes *in between* occurrences of an event (**Interval**)

Temporals: Examples

Time

I went to bed **at** 9:30.

StartTime

They have been fighting **since** this morning.

EndTime

The meeting will run **until** 11:30.

Duration

I played videogames **for** 40 minutes.

Frequency

I go to the store **on** a regular basis.

Interval

I came to town **back** then.

Different Circumstances: Spatial

- So we've covered circumstances related to **Time**
- But events also occur in *space*
- **We often use prepositions to discuss spatial relationships:**
- We talk about *where* something occurs (**Locus**)
- We talk about *where* something/someone is *going* (**Goal**)
- We talk about *where* something is *coming from* (**Source**)
- We talk about the areas which someone moves *through/toward* (**Path** and **Direction**)
- We talk about *how far* something goes (**Extent**)

Spatials: Examples

Locus

The dog sleeps **in** the doghouse.

Goal

I drove **to** Georgetown.

Source

A package arrived **from** Argentina.

Path

The rabbit ran **through** the undergrowth.

Direction

Walk slowly **towards** the light.

Extent

We ran **for** 10 miles.

Other **Circumstance** Supersenses

- **We've got a few other supersenses that have to do with different ways to describe events:**
- What action *enables us* to carry out an event (**Means**)
- *How* an event happens (**Manner**)
- What is the *intended goal/motivation* of an event (**Purpose**)
- *For what reason* an event transpires (**Explanation**)

Other Circumstances: Examples

Means

He became king **by** poisoning his rivals.

Manner

He spoke **in** a solemn tone.

Purpose

The dogs begged **to** get the last treats.

Explanation

I fell asleep **due to** exhaustion.

Exercises: Circumstantials

1. I moved the lawn **for** an hour.
2. I like to sing **in** the shower.
3. We watched movies **until** 3 a.m.
4. The movie ended **in** the evening.
5. I arrived **for** the movie.
6. The cat jumped **onto** the ledge.
7. He reacted **in** anger.

Exercises: Circumstantials

- | | |
|---|-----------------|
| 1. I moved the lawn for an hour. | Duration |
| 2. I like to sing in the shower. | Locus |
| 3. We watched movies until 3 a.m. | EndTime |
| 4. The movie ended in the evening. | Time |
| 5. I arrived for the movie. | Purpose |
| 6. The cat jumped onto the ledge. | Goal |
| 7. He reacted in anger. | Manner |

One branch down!



Next up: Participants!

Participant branch

- Prepositions don't just provide descriptions of events
- They also can introduce people, animals and things which *take part* in events by playing certain *roles*
- These entities that are introduced are called **Participants**
- The supersenses surrounding the types of participants form the **Participant** branch



Different Participants: “Agent-like”

- **Some participants exert their own will or power to *cause* or *do* an event:**
- They can *cause* someone else to perform/do an event, without doing the event themselves (**Causer**)
- They can provide the necessary action or power to *instigate* an event (**Force**)
- If they are *alive* and *animate*, they can *choose* to *instigate* an event, or provide the *action* needed to *do* an event (**Agent**)

“Agent-like”: Examples

Causer

No good example for English, but important for causative constructions in other languages

Force

Our home was destroyed **by** the hurricane.

Agent

The surgery was performed **by** an esteemed cardiologist.

Different Participants: “Patient-like”

Other participants are acted upon in an event, or are the main focus of an event:

- They can undergo a change of state or location by being acted upon (**Theme**)
- They can be the subject matter of communication or other sources of information (**Topic**)
- They can be the literal message that is conveyed through communication or another source of information (**Content**)

“Patient-like”: Examples

Theme

I asked the waiter **for** a new fork.

Topic

We always talk **about** sports.

Content

Not conveyed by adpositions in English, see [the guidelines](#) for more details

Different Participants: Experienter and Stimulus

Some participants are both “agent-like” and “patient-like” in some ways:

- An entity that is perceived or experienced by a person (**Stimulus**)
- An animate entity that is aware of a sensation or emotion (**Experienter**)

Experiencer / Stimulus: Examples

Experiencer

Ghosts are scary **to** me.

Stimulus

I was scared **by** a ghost.

Notice how the two sentences are almost mirrors of each other. Many situations involve an Experiencer and a Stimulus, and either one can be the subject, or the object of a preposition.

Other Participants

- An entity participating in an event *together* with the main agent or another participant (**Ancillary**)
- An animate entity who is the *creator* or original owner of something (**Originator**)
- An animate entity who ultimately *gains possession* of something through a transfer event (**Recipient**)
- A usually animate entity which is *positively* (or negatively) *impacted* by an event (**Beneficiary**)
- An *item* that is used to *complete an action* by having force applied to it (**Instrument**)
- *How much* something costs (**Cost**)

Other Participants: Examples

Ancillary

I raise pigeons **with** my brother.

Originator

The poem was written **by** an anonymous author.

Recipient

I returned my Christmas gifts **to** Santa Claus.

Beneficiary

This auction is being held **for** charity.

Instrument

I ate my ramen **with** a fork.

Cost

I sold a wild frog **for** 1 dollar.

Exercises: Participants

1. They argued **over** the plan.
2. He gave the story **to** his editor.
3. The pizza feels hot **to** me.
4. The mechanic worked **on** the car.
5. These are clothes **for** the children.
6. I care **about** you.
7. A vote **by** the city council.

Exercises: Participants

1. They argued **over** the plan.
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Topic

Recipient~>Goal

Experiencer~>Goal

Theme

Beneficiary

Stimulus~>Topic

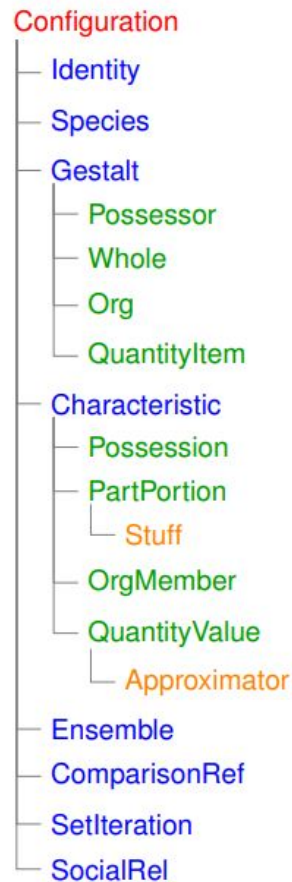
Agent

Two branches down! 🙄

One more!

The **Configuration** supersenses

- So far, we've mostly talked about participants and modifiers of *events*
- But not all preposition usages even involve events
- Some prepositions convey the type of relationship between two *entities*
- Such prepositions make up the **Configuration** branch



Different Configurations: **Gestalt** sub-branch

Generally this sub-branch applies to possession / part-whole relationships that are framed in relation to the whole:

- An overall thing with respect to one of its *properties* (**Gestalt**)
- More specifically, an animate entity with an alienable possession (**Possessor**)
- An *entire* entity which is described in relation to its *parts* (**Whole**)
- An *organization* or *institution* described in relation to its *members* (**Org**)
- An entity whose *amount* or *quantity* is given (**QuantityItem**)

Gestalt sub-branch Examples

Gestalt (pure)	The sugary consistency of the cookies
Possessor	My dog, the dog of my extended family
Whole	The windows of my home / my home's s windows
Org	The agents of the CIA
QuantityItem	12 glasses of water

Different Configurations: **Characteristic** sub-branch

Describes a part in a part-whole relationship, property, condition, or possession:

- A specific property of some entity (**Characteristic**)
- An item that is *possessed* by someone else (**Possession**)
- An item which is a *part* of some larger entity (**PartPortion**)
- Something which an entire entity *consists of* or is made of (**Stuff**)
- Individuals who are in an organization or institution (**OrgMember**)
- The quantity of some other entity (**QuantityValue**)
- An amount that is an *estimation* of a more specific amount (**Approximator**)

Characteristic sub-branch Examples

Characteristic	A hotel of renown
Possession	A dog with many collars
PartPortion	A home with a nice bedroom
Stuff	A pile of rocks
OrgMember	My friend's s after-school club
QuantityValue	The deaths numbered in the thousands.
Approximator	There were around 40 people at the party.

Other Configurations

- A category assigned to an entity (**Identity**)
- A more specific category describing the *type* or *breed* of an entity (**Species**)
- An entity that another entity is *grouped with* in some way (**Ensemble**)
- Something that serves as a *reference point* for a comparison (**ComparisonRef**)
- A set-wise relationship, often describing the *unit of measurement* for a rate of something (**SetIteration**)
- An individual or group which has an affiliation with another individual or group (**SocialRel**)

Other Configuration Examples

Identity

The age **of** eight.

Species

A dangerous strain **of** viruses

Ensemble

Hats **with** matching socks

ComparisonRef

She is as tall **as** me.

SetIteration

Gas costs 3 dollars **per** gallon.

SocialRel

I am friends **with** my coworkers.

Exercises: Configurations

1. Joan is a student **of** Ms. Zarves.
2. The price **of** the tea
3. The south **of** France
4. I have 2 years **of** experience.
5. Employees **of** the company.
6. A car **of** high quality
7. A sandwich **with** mustard

Exercises: Configurations

1. Joan is a student **of** Ms. Zarves.
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SocialRel~>Gestalt

Gestalt

Whole

QuantityItem

Org

Characteristic

PartPortion

Three branches down!

We're done, right?
For now...