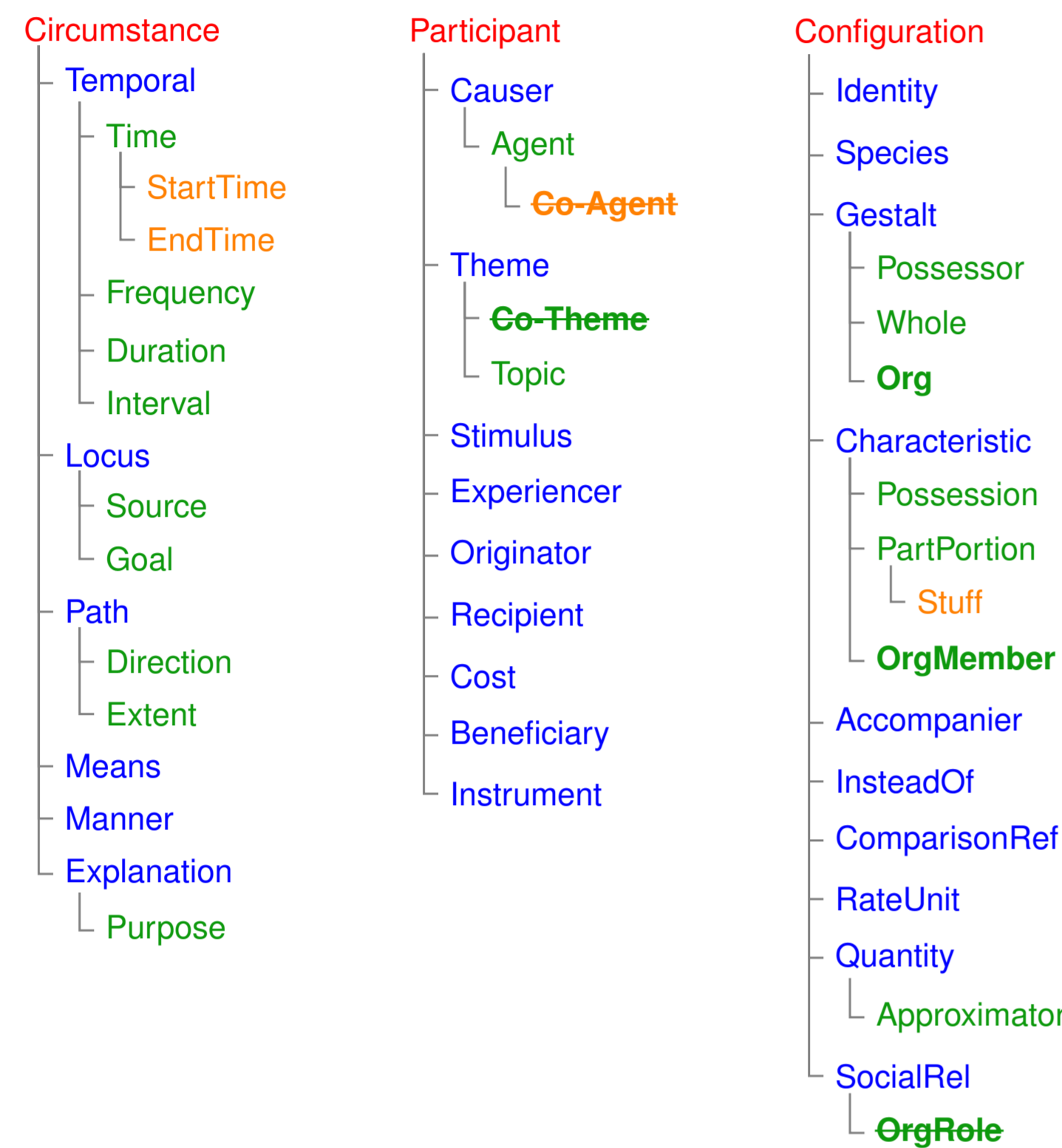


SNACS Background

SNACS (Semantic Network of Adposition and Case Supersenses) is a hierarchy of preposition and possessive supersenses (Schneider et al. ACL 2018).



We adopt SNACS and extend its use to annotate subjects and objects of verbs.

Note that many of the semantic labels in SNACS derive from VerbNet role labels. However, VerbNet and other frame-semantic approaches assume a lexicon as a prerequisite for semantic role annotation.

- (1) a. The bagel was eaten **by** AGENT Jane.
b. Jane dined **on** THEME a bagel.

- (2) [Jane] AGENT ate [a bagel] THEME. **NEW!**

SNACS is unique in allowing two semantic labels per target:

Scene Role

What semantic role is most closely associated with the type of scene?

Function

What semantic role is most salient in the morphosyntactic coding of the phrase?

In many cases, the scene role will be identical to the function. These are called **congruent** construals. But in other cases, they can differ.

Phrase	Scene Role	Coding	Function	Congruent?
The ball was hit by the batter	AGENT	by	AGENT	✓
Put the book on the shelf	GOAL	on	LOCUS	✗
Put the book onto the shelf	GOAL	onto	GOAL	✓
I talked to her	RECIPIENT	to	GOAL	✗
I heard it in my bedroom	LOCUS	in	LOCUS	✓
I heard it from my bedroom	LOCUS	from	SOURCE	✗
John's death	THEME	's	GESTALT	✗
the windshield of the car	WHOLE	of	WHOLE	✓

Applying SNACS

Scene Role and function

- (3) [Jane] RECIPIENT→AGENT bought [the book] POSSESSION→THEME.
(4) [Bingley] SOCIALREL→THEME married [Jane] SOCIALREL→THEME.

The scene role indicates the participation role of the target in the scene described by the verb. The function label, on the other hand, captures the orthogonal dimension, which is more closely tied to syntactic realization.

Scene role prioritization

In some cases, multiple supersenses are equally applicable at the scene level. In such cases we give highest priority to more complex and less scenes types such as: (ORIGINATOR, RECIPIENT) or (ORGMEMBER, ORG, SOCIALREL). The causal roles (AGENT, INSTRUMENT, THEME) are prioritized next, the highly frequent locatives (LOCUS, SOURCE, GOAL) are given the lowest priority.

- (5) [Jane] RECIPIENT→AGENT took the book from me. RECIPIENT takes priority over GOAL.

Role duplication

Unlike the latest version of SNACS we adopt for our study, in this work we allow participant labels such as AGENT or THEME to appear multiply in a given sentence.

- (6) [A reception] THEME→THEME will precede [the dinner] THEME→THEME.
(7) [He] EXPERIENCER→THEME heard the news [with a stranger] EXPERIENCER→ACCOMPANIER.
(8) Replace [the old one] THEME→THEME [with the new one] THEME→ACCOMPANIER.

Thematic hierarchy

The function label generally reflects AGENT-THEME relations of a proposition. More specifically, we annotate all subjects and direct objects with a function in the following thematic hierarchy: {AGENT, CAUSER} > {INSTRUMENT, MEANS} > {THEME, TOPIC, COST}

Copular sentences

These are treated differently from non-copular sentences. The English copula relates a subject to an object in what is semantically an identificational or predicational relationship.

- (9) a. [John] IDENTITY→IDENTITY is [a man] IDENTITY→IDENTITY.
b. [John] GESTALT→THEME is [tall] CHARACTERISTIC→CHARACTERISTIC.

Interannotator Agreement Study

Data

We piloted our guidelines using a sample of 100 scenes from the English UCCA annotated Wiki corpus as detailed by Abend and Rappoport (2013).

Annotators

Four annotators (A, B, C, D), all authors of this paper, took part in this study. All are computational linguistics researchers with advanced training in linguistics.

Quantitative results

Subjects/objects: For the scene role, all annotators agree on 46% of items (26/57), and at least 3 annotators on 84%. For the function, 51% have total agreement, and 86% have a majority. Average pairwise κ is 0.66 for scene and 0.61 for function.

PPs: At the scene level, 48% (20/42) have total agreement, and 71% have a majority. For the function, 64% have total agreement, and 88% have a majority. Average pairwise κ is 0.64 for scene and 0.77 for function.

Subjects/Objects (N=57)					PPs (N=42)					
κ	A	B	C	D	κ	A	B	C	D	
A		.75	.38	.72	Function	A		.68	.68	.68
B	.64		.42	.83		B	.54		.79	.84
C	.50	.63		.54		C	.57	.64		.92
D	.68	.83	.65			D	.60	.75	.75	
Scene Role					Scene Role					

Disagreements involving agentivity

We found it can be difficult to choose between AGENT and THEME for the function of a subject with borderline agentivity, e.g., in scenes of *befriending* someone or *forming* a musical group with others.

Likewise, the line between AGENT and THEME for the function can be unclear in cognition scenes like: *[She] enjoyed the fame*

Conclusion

We explored whether a system for semantic relation annotation can be extended beyond prepositions and possessives to cover English subjects and objects.

While initial annotation results are promising, further work is needed to substantiate the approach on a larger scale, and ideally in multiple languages.