

Sprucing up Supersenses: Untangling the Semantic Clusters of Accompaniment and Purpose

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Abstract

We reevaluate an existing adpositional annotation scheme with respect to two thorny semantic domains: accompaniment and purpose. ‘Accompaniment’ broadly speaking includes two entities situated together or participating in the same event, while ‘purpose’ broadly speaking covers the desired outcome of an action, the intended use or evaluated use of an entity, and more. We argue the policy in the SNACS scheme for English should be recalibrated with respect to these clusters of interrelated meanings without adding complexity to the overall scheme. Our analysis highlights tradeoffs in lumping vs. splitting decisions as well as the flexibility afforded by the construal analysis.

1 Introduction

Creating a semantic annotation scheme is a delicate balancing act between two seemingly contradictory requirements. An annotation schemer must *specialize* their labels to segregate them in semantically meaningful ways, but whenever possible they must also *generalize* as to capture semantic similarities across varying labels. While this lumpers-splitter problem pervades categorization efforts across disciplines, a linguistic annotation schemer faces an additional constraint: they must resolve the problem while making the schema accessible to annotators for the production of consistent annotations. Generally, semantic resources have maintained the balance in one of two ways: by creating many fine-grained labels that are systematically organized into hierarchies or ontologies, or by resorting to very small number of distinct labels and making them conditional on the relation they annotate. FrameNet (Ruppenhofer et al., 2016) and the TRIPS ontology (Allen et al., 2008) exemplify the former approach, while PropBank’s numbered arguments (Palmer et al., 2005) illustrate the latter one.

This paper focuses on the SNACS framework of Schneider et al. (2018)—a hierarchy of 50 semantic labels that seeks to characterize the semantic space of prepositions. Like most resources, SNACS falls somewhere in between the two extremes described above. What is unique about this scheme is that it tries to be as economical as possible with regards to the number of semantic types of prepositions it accepts into the hierarchy. However, it does so while being lexically agnostic of the identity of its syntactic governor (e.g., the governing verb). As a balancing mechanism between specialization and generalization of categories, it employs *construals*, a two-level annotation scheme: at the *function* level, it recognizes the semantics of individual prepositions, then at *scene role* level, it generalizes to the overall semantics projected by the frame or scene set by the verb or the construction.

In this paper, we identify two areas within SNACS that require attention, centered around the notions of purpose and accompaniment. The abstract concepts of purpose and accompaniment both span broad semantic areas, and contain many clusters of meaning, with nuanced differences between them. We argue that SNACS treats both too simplistically, and by ignoring the nuances, makes annotation difficult.

Both accompaniment and purpose present an opportunity for lumping the various sub-categories of meaning into standalone labels, or splitting them into many finer ones. We ask whether the mechanism

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Group	Examples	Old analysis (SNACS v2.3)	New analysis (SNACS v2.5)
co-location	the forks are with the knives; I’m over here with your sister	ACCOMPANIER	LOCUS~>ANCILLARY
compound entity	rice with beans; a polite smile with a nod is quite enough	ACCOMPANIER	ENSEMBLE~>ANCILLARY
property, part, or possession	kid with red hair/shorts/boundless energy; They arrived with a pie	{CHARACTERISTIC,PARTPORTION,POSSESSION}~>A.	
co-participant	Stop chatting/meeting/fighting with Jo; Combine butter with vanilla; the car collided with a mailbox	{CO-THEME,CO-AGENT}~>A. {AGENT,THEME,...}~>A.	
added participant	Walk with me to the park; Ron fought with Harry (against Voldemort); vacations with young children	ACCOMPANIER~>CO-AGENT	ANCILLARY

Table 1: Notions of accompaniment. The proposed approach alters the hierarchy, removing ACCOMPANIER, CO-AGENT, and CO-THEME and adding ANCILLARY and ENSEMBLE. “A.” is short for ACCOMPANIER in the old scheme and ANCILLARY in the new scheme.

of construal offers a balance. Our analysis suggests refinements to the existing SNACS guidelines to handle accompaniment and purpose. With the case of accompaniment, we propose a more specialized set of labels to better capture the nuances in the semantics. With purpose, we take the opposing approach where the definitions are further generalized in such a way that it is more amenable for edge cases. With an eye towards annotation, in both cases, we present tests that an annotator can employ to ascertain the boundaries of the new categories.

2 Background: SNACS Framework

The Semantic Network of Adposition and Case Supersenses (SNACS) is a framework specifically created for the annotation of preposition semantics (Schneider et al., 2018). SNACS includes 50 broad-coverage semantic labels called *supersenses*, which is organized into three broad branches reflecting event participant roles (e.g., AGENT, THEME, RECIPIENT), roles relating to the circumstance of an event (e.g., TIME, LOCATION, GOAL) and relational roles between two entities (e.g., IDENTITY, POSSESSION). A supersense label, thus, indicates the semantic relationship between the constituent *object* or the *governing head* of the preposition. Unlike prior dictionary-based efforts in representing postpositional semantics (Litkowski, 2014; Litkowski and Hargraves, 2005), SNACS labels the prepositions within its context (e.g., “cat **on**/LOCUS the mat” vs. “found the cat in/LOCUS the box”) irrespective of the lexical type the target represents.

SNACS also utilizes the *construal analysis*, a mechanism that allows annotators to assign a preposition with *two* labels instead of one in a systematic manner. All prepositions are labeled at both the **scene role** and the **function** levels, where the scene role specifies the preposition’s role with respect to the scene set by the governing head (typically a verb) and function label indicates the semantic contribution the preposition makes. Construals are denoted by the convention SCENE ROLE~>FUNCTION.

- (1) a. The cat is **on** the mat. LOCUS~>LOCUS (or simply LOCUS)
- b. Put the cat **on** the mat. GOAL~>LOCUS
- c. Banish the cat **to** the mat. GOAL~>GOAL

In examples (1a, 1b) above, the function label reflects the generalization that both of the examples indicate a location (as contributed by **on**). The scene role, however, recognizes the divergence in meanings triggered by the verb *put*. With (1c), the prepositional phrase represents the final GOAL much like (1b) but differs in its function label.

3 Accompaniment

One of the most capricious English prepositions is the word **with**. It can take on many semantic guises, including INSTRUMENT (*open the door **with** a key*) and MANNER (*play the piano **with** gusto*). Here

we are concerned with the meanings in table 1, all associated with a loose notion of *accompaniment* or *togetherness* (also known as *comitative*): being in the same location, engaging in the same activity, etc.

The SNACS v2.3 guidelines analyze these usages as related by specifying **ACCOMPANIER** as the scene role and/or function. **ACCOMPANIER** is defined as “Entity that another entity is together with” (Schneider et al., 2019, p. 63). Effectively, the co-location and compound entity varieties are treated as the most basic examples of accompaniment and the others are treated as extended meanings, as can be seen in the third column of the table.

3.1 Problems

We point out several weaknesses of this analysis.

☞ Analyzing **co-location** examples as simply **ACCOMPANIER** misses the generalization that these can answer *Where?* questions, like locative PPs.

☞ The **compound entity** usage (as in the noun phrase *rice with beans is a delicious dish*) is semantically very similar to a coordinating conjunction (*rice and beans is a delicious dish*) in grouping two items together on roughly equal footing: neither item is a part of the other, in contrast to the “property, part, or possession” examples.

☞ The “**co-participant**” usages of **with** in table 1 involve a core participant in the situation engaged symmetrically, reciprocally, or in a qualitatively different way with respect to another participant. With respect to the criteria for applying SNACS labels, the sole distinction between the two participants is morphosyntactic (one is marked by a preposition and the other is not).¹ As such, it seems wrong to distinguish **AGENT** and **CO-AGENT** (or **THEME** and **CO-THEME**) at the scene level; SNACS ordinarily reflects morphosyntactic choices in the *function* label.

☞ Another problem with the co-participant analysis is that specifying **CO-AGENT** and **CO-THEME** labels as part of the hierarchy (which was based on VerbNet) ties our hands when confronted with other participant roles marked with **with**. For example:

- (2) I agree **with** her. (scene: **EXPERIENCER**)
- (3) I share a house **with** my friend. (scene: **POSSESSOR**)
- (4) Let me check **with** my supervisor. (scene: **RECIPIENT**)
- (5) Don’t compare baseball **with** basketball. (scene: **COMPARISONREF**)

In (2), *agree* is a cognitive situation in which two individuals share the same mindset on an issue; in SNACS, nonagentive cognizers normally receive the scene role of **EXPERIENCER**. Similarly, (3) describes joint possession of an item. (4) describes an event in which the speaker contacts someone else; as the target of communication the supervisor should be a **RECIPIENT**. (5) uses the verb to express a comparison relation where the thing being compared against is marked by **with**. Ideally the scene role for such co-participant usages wouldn’t be constrained to **CO-AGENT** or **CO-THEME**.

☞ The difference between the last two rows of table 1 is that “**added participant**” usages reflect a freer (adjunct PP) addition of a participant that would not normally be assumed to play a distinct role in a scene. Typically the added participant is present when the main participant engages in the activity, and may engage in that activity in a similar manner or in cooperation.² Counterintuitively, SNACS v2.3 prescribes **CO-AGENT** as the function for such cases, leading to the bizarre situation where the same labels are swapped for the two kinds of agentive participants even though the preposition has not changed (again, usually the function reflects the choice of preposition):

- (6) a. Ron fought **with** Harry because he was jealous of him. [They fought each other.]
(co-participant: **CO-AGENT**~**ACCOMPANIER** [old approach])

¹This is not to say they are fully interchangeable—*a car collided with a mailbox ≠ a mailbox collided with a car*. However the SNACS semantic role criteria are not sufficiently fine-grained to distinguish these; both meet the semantic criteria for **THEME**.

²Though in general SNACS avoids a core/non-core role distinction to avoid being tied to any particular predicate lexicon, it makes the distinction between co-participants and added participants in order to disambiguate cases like (6), where there is a crucial difference in how the event is interpreted.

- b. Ron fought **with** Harry against Voldemort. [They fought on the same side.]
 (added participant: ACCOMPANIER \rightsquigarrow CO-AGENT [old approach])

While *fight with* presents a clear ambiguity, the current approach resolves it in a confusing way. Moreover, the v2.3 guidelines provide no test to determine whether the co-participant or added participant analysis is appropriate in borderline cases.

☞ We note that **with** as a marker seems to have less of an agentivity preference than many other morphosyntactic realizations of participants. In *vacations with young children*, for instance, it may be tough to decide whether children are AGENT-like (embarking on vacation with adults) or THEME-like (brought along at the mercy of adults). Thus, as far as the *function* is concerned, it may not be worthwhile to establish a CO-AGENT vs. CO-THEME contrast.³

3.2 Solution

Our solution is to dispense with the labels ACCOMPANIER, CO-AGENT, and CO-THEME, and add two new labels:

- **ANCILLARY**, defined as a **surplus participant** in relation to an event (or state/situation).
- **ENSEMBLE**, defined as an **entity that another entity is grouped with**.

ANCILLARY canonically applies to added participants, but also serves as the function label for all the usages in table 1: a broad notion of ‘second thing’ is taken to motivate the use of **with** for all these examples. We retire the name ACCOMPANIER to avoid confusion with the old scheme. Removing CO-AGENT and CO-THEME frees up the scene role slot for a wider range of supersenses in the co-participant usages: (2) becomes EXPERIENCER \rightsquigarrow ANCILLARY, (3) becomes POSSESSOR \rightsquigarrow ANCILLARY, etc.

ENSEMBLE applies to compound entity usages, as can be seen in table 1. In English, ENSEMBLE is used as scene role only, leaving the label open for more prototypical ENSEMBLE usages for conjunctive adpositions found in languages like Japanese and Korean.

Co-participants vs. added participants. We still face the issue of distinguishing co-participants like (6a) from added participants like (6b). We propose to do this via a *together*-insertion test. Generally speaking, added participants (not licensed by the predicate) allow for the the insertion of the adverbial *together*, while co-participants do not. ANCILLARY also applies as the scene role only if *together* can be inserted:

- (7) a. Please trade your paper (*together) **with** the person behind you. AGENT \rightsquigarrow ANCILLARY
 b. Gina met (*together) **with** John. AGENT \rightsquigarrow ANCILLARY
 c. The plane collided (*together) **with** a dirigible. THEME \rightsquigarrow ANCILLARY
- (8) Harry is travelling (together) **with** his family. ANCILLARY

Note that this policy of using plain ANCILLARY for adjunct-like participant accompaniers excuses us from having to determine whether the accompanier is agentive. This can be viewed as an advantage since agentivity of added participants may be difficult to judge (e.g., if they are small children being brought somewhere by adults). On the other hand, it means that the event-specific role that the added participant ultimately fills is left underspecified. Consider the minimal pair with the verb *arrest*, which normally licenses a single AGENT arrester and a single THEME arrestee (Bill Croft, p.c.):

- (9) a. The officer_{*i*} arrested her_{*j*} (together) **with** his deputy. ANCILLARY^(*i*)
 b. The officer_{*i*} arrested her_{*j*} (together) **with** her husband. ANCILLARY^(*j*)

Both are simply labeled ANCILLARY.⁴ However this masks an important difference: In the preferred

³We considered merging these into a CO-PARTICIPANT label to serve only as a function, but in the end we settled on the broader label ANCILLARY as there was no additional disambiguation to be achieved by separating ANCILLARY and CO-PARTICIPANT.

⁴FrameNet’s policy is similar: the analogue of ANCILLARY is CO-PARTICIPANT, defined generally as “an entity that participates in a coordinated way in the same event as the primary protagonist, regardless of whether the protagonist, and hence the CO-PARTICIPANT, is more agent- or more undergoer-like. . . . In the **Arresting** frame, for instance, the extra-thematic frame

Group	Examples	Old analysis (SNACS v2.3)	New analysis (SNACS v2.5)
motivation & desired outcome	Minerva rose to give a speech; Everyone cheered for an encore; education for self-management	PURPOSE	PURPOSE
intended use	a shoulder to cry on; tools for weeding	CHARACTERISTIC~PURPOSE	PURPOSE
evaluated use	This cleaner is good for ◦ hardwood floors; a great place for Quidditch	PURPOSE	PURPOSE
valued services	It costs \$10 to see the movie; \$100 for ◦ wine is excessive; they paid for the meal	THEME~PURPOSE	THEME~PURPOSE
sufficiency & excess	That is too large a bag for ◦ groceries; scissors sharp enough to cut nails	COMPARISONREF~PURPOSE	COMPARISONREF~PURPOSE
modal construction	He needs to leave; We ready to help; They managed to exceed our expectations!	other-inf	other-inf

Table 2: Semantic groupings associated with purposes. ◦ denotes an implicit event in the purpose.

reading of (9a), the officer and deputy are both doing the arresting; the deputy may be equally active or may be assisting the officer in the arrest, but in any case is a surplus with respect to the **AGENT** role. Whereas in the preferred reading of (9b), the husband is also being arrested (treated like a surplus **THEME**). This is generally true of predicates with more than 2 participants. An additional layer of representation could index the added participant as **ANCILLARY** to another primary role (subscripts/superscripts in (9)) to facilitate the appropriate inferences.⁵

Configurational accompaniment. In addition to accompaniers that signal participation in an event or a situation, there are those that mediate configurational information with respect to its governing head. In (10a), the accompaniment specifies the location where Harry is standing; with phrase in (10b), specifies Vernon’s professional association with respect to a company; **together** signifies Lily and James’ particular state of social relationship in (10c); and in (10d), the preposition describes the possessive arrangement of the cup of tea with respect to Albus. Each of these cases receive a scene role, which reflects the configurational relationship.

- (10) a. Harry is standing **with** Hagrid. **LOCUS~ANCILLARY**
b. Vernon is **with** Grunnings. **ORG~ANCILLARY**
c. Lily and James are **together** (in a relationship). **SOCIALREL~ANCILLARY**
d. Albus settled into his chair **with** a hot cup of tea. **POSSESSION~ANCILLARY**

4 Purpose

Much like **ACCOMPANIER**, **PURPOSE** also demarcates a large semantic area and generally deals with motivation and intent of an action. In English, the preposition **for** is largely responsible for serving the role of purposive mediator in a given event. Additionally, SNACS annotation includes *infinitive to* that typically also marks **PURPOSE** clauses alongside **for**.

The SNACS v2.3 guidelines define **PURPOSE** as “Something that somebody wants to bring about, [which is] asserted to be why something was done, is the case, or exists”. **PURPOSE** is often defined as expressing the ‘why’ of the event, indicating a desired outcome as the motive for an action.⁶

- (11) a. Minerva rose **to** give a speech. **Q: Why did she rise? A: To give a speech.**
b. He plays **for** trophies. **Q: Why does he play? A: To (obtain) trophies.**

In practice, however, the semantic space associated with **PURPOSE**, especially as expressed with infinitives element **CO-PARTICIPANT** should be used to label phrases denoting people that are arrested... along with the **SUSPECT**, or others that assist the **AUTHORITIES**” (Ruppenhofer et al., 2016, p. 107).

⁵It seems that the primary use of the role will always be overt: *She was arrested with the deputy* cannot have the reading of (9a) where an implicit party and the deputy are sharing in the arrest.

⁶In the SNACS hierarchy, **PURPOSE** is a subtype of **EXPLANATION**, which additionally covers reasons that something happened which were not grounded in somebody’s intention (e.g. *We got wet due to the rain*).

and **for**-PPs, is far from homogeneous. **To** and **for** in (12a, 12b) do not express why the event happened or should happen; rather they specify a general purpose or use for the governing head: a shoulder is needed *for the use of* crying and the particular place is great *for the purpose of* playing Quidditch. In example (12c), the question of ‘why’ is out of place for the purpose clause, since **for** here supplies a product that can be obtained at the value specified by the governing head.

- (12) a. He needed a shoulder **to** cry on. *Q: Why does he need a shoulder? A: ??To cry on*
 b. a great place **for** playing Quidditch. *Q: Why is it a great place? A: ??To play Quidditch*
 c. \$100 **for** wine is excessive. *Q: ??*

4.1 Problems

We identify a number of problems with the definition.

☞ SNACS requires a better way of dealing with *affordance*-leaning subtypes. In practice, the **PURPOSE** category subdivides into two broad types of overlapping semantics. In line with the more common definition is the type of **PURPOSE** that expresses the motive behind an action like those seen in (11) (**motivation & desired outcome** in table 2). The second use covers a range of abstract goals to which an action or an entity can be applied to. The goal can signal an affordance or use an object can provide (i.e. **intended use, evaluated use, sufficiency & excess** in table 2), or a commercial product or service a certain capital or asset can afford (**valued services** in table 2). This latter type generally is amenable to the *for-the-purpose-of* test as shown in (13).

- (13) a. He needed a shoulder **to** cry on. *He needed a shoulder for the purpose of crying on.*
 b. a great place **for** playing Quidditch. *This is a great place for the purpose of playing Quidditch.*
 c. \$100 **for** wine is excessive. *\$100 for the purpose of purchasing wine is excessive.*

In SNACS, each of the subtypes—**intended use, valued services** and **sufficiency & excess**—are given distinct construals in recognition of their semantic divergence from the more prototypical **PURPOSE**. **Evaluated use**, however, does not.

☞ We also note that adding to the complexity of annotation is a syntactic behavior exhibited by the **for**-phrases: the object only specifies the entity affected by an event; the event itself is not made explicit. The ability to omit the purpose event cuts across the **PURPOSE** subtypes in table 2, where the \circ symbol stands for the implicit purpose event. Other instances where the object is an entity rather than an event are seen in example (14):

- (14) a. I went to the store **for** chocolates. *I went out for the purpose of (buying) chocolates*
 b. I had a surgery **for** my knee. *a surgery for the purpose of (fixing) my knee*

Generally the implicit event that underlies the affected entity is inferred via our general world knowledge about how the governor and the object are related. If we go to the store for chocolates, we are likely looking to *buy* some, and if we receive surgery for a knee, we are likely getting our knee *fixed*.

☞ Clearer guidelines are needed to deal with infinitival complements participating in **modal constructions**. The governing verb conveys desirability, necessity, likelihood or capability (among others) of the action in the infinitival phrase, and they are assigned the non-semantic label **other-inf** to indicate they are not covered by SNACS supersenses.⁷

4.2 Solution

We propose a single, unified **PURPOSE** category a more generalized definition that includes

- a desired outcome that somebody tries to achieve by performing an action
- a designed or incidental affordance with regards to an entity

The possibility of introducing a new label called **AFFORDANCE** to capture the latter definition was considered but discarded. As it turns out, the semantics of purpose and affordance sits on a cline, making their boundary rather difficult to identify and annotate. Consider borderline case examples in (15).

⁷In the existing SNACS guidelines these are notated \dot{i} . We use **other-inf** for clarity.

- (15) a. I bought some detergent **to** wash hardwood floors.
 b. I bought detergent **for** (the purpose of) washing hardwood floors.

Rather than split hairs here, it seems preferable to lump the affordance or **intended use** category with canonical **PURPOSES**, discarding the **CHARACTERISTIC**→**PURPOSE** analysis.⁸

As a more precise main definition of **PURPOSE** we suggest: “A desired outcome presented as contingent on some event, situation, entity, or resource. The **PURPOSE** may be specific (e.g., an outcome that somebody tries to achieve by performing an action) or generic (e.g., an entity that was designed for or incidentally provides some affordance).”

Further, we propose the following subcases and tests; infinitives that fail all tests should be labeled **other-inf**:

Paraphrase tests. First, if the relation can be phrased with *in order to*, *in order for (someone) to*, *for the purpose of*, or *that (someone) intends to*, it is sufficient grounds to label it as **PURPOSE**. Note for example that infinitival complements of modal verbs and **BENEFICIARY** uses of **for** fail this test:

- (16) a. (i) Minerva rose (in order) **to** give a speech.
 (ii) It costs \$10 (in order) **to** give a speech.
 (iii) Bring it to the store (in order) **to** get it repaired / for us **to** repair it / for it **to** be repaired
 (iv) He needs (*in order) **to** leave soon. (modal verb complement; **other-inf**)
 (v) It is fun (*in order) **to** see this movie. (expletive construction; **other-inf**)
 b. (i) I found a party (that I intend) **to** attend.
 (ii) I have a plane (that I intend) **to** catch.
 (iii) I want a sandwich (*that I intend) **to** eat. (modal verb complement; **other-inf**)
 c. (i) a couch **for** (the purpose of) sleeping on
 (ii) I went to the store **for** (the purpose of *buying*) chocolate.
 (iii) Allison built a house **for** (*the purpose of) her mum. (**BENEFICIARY**)

For implicit purposes the annotators are instructed to test for the inferred verb as exemplified in (16c-ii), taking care to be vigilant that the semantics of the preposition may be better captured by another label as seen in (17).

- (17) a. I babysat **for** (the purpose of *helping*) my uncle.
 = I babysat as a favor to my uncle. (**BENEFICIARY**)
 b. We eat seaweed soup **for** (the purpose of *celebrating*) birthdays.
 = We eat seaweed soup on the occasion of birthdays. (**CIRCUMSTANCE**)

Evaluated use. As shown in table 2, *good for*, *bad for*, etc. are covered as a special case of **PURPOSE** in the 2.3 guidelines. This is fitting as a variant of intended use or non-use—a couch **for** *sleeping on* is presumably a *good couch for sleeping on*—so we retain the label **PURPOSE**, which we have extended to intended use infinitivals.

Indefinite pronoun head. Consider cases where the infinitival modifies an indefinite pronoun or maximally vague noun like *stuff*:

⁸In FrameNet 1.7, some frames specify an **INHERENT_PURPOSE** role: e.g., “money **for** our daughter’s college education” is an example in the Money frame. This parallels the **CHARACTERISTIC**→**PURPOSE** analysis, where **CHARACTERISTIC** represents the purpose as a constitutive property of the entity itself. But we find there is a slippery slope with regard to entity-modifying purposes: for some it is difficult to ascertain the creator’s intended use or whether that use is considered intrinsic to the entity. For example, should “couch **for** sleeping on” be considered plain **PURPOSE** because sleeping is not the prototypical design of a couch, or should intent take into consideration the couch possessor’s objective in owning said couch? Is there really an inherent use of a body part like shoulder in (12a) outside its biological/structural use? Lumping avoids the need to vex annotators with such questions.

A related notion is the telic quale of qualia structure (Pustejovsky, 1998) which is taken to explain why a default activity involving an entity may be left unspecified or underspecified in a sentence (“use”, etc.), as well as metonymies such as entity-for-user. A Generative Lexicon analysis of the head noun might therefore distinguish inherent and transient purposes, but this is a different level of representation than SNACS seeks to achieve.

- (18) a. I found something/stuff **to** eat. **PURPOSE**
 b. I found something/stuff **to** do. **other-inf**

Schneider et al. (2019, p. 32) specify “something **to** eat” as an example of the intended use cluster, which in our revised approach is labeled **PURPOSE**. While this seems sensible, the same analysis is problematic for (18b), where the noun referring to an activity (*something* or *stuff*) cannot really be semantically separated from the infinitive verb (*do*). Thus, we propose the criterion that the vague head noun must imply an **entity referent** involved in the infinitival event in order for it to be considered a **PURPOSE**; otherwise it is **other-inf**.

Sufficiency and excess. We maintain the distinction that infinitival clauses licensed by *too*, *enough*, and similar should receive **COMPARISONREF** as the scene role, because they provide a reference point against which sufficiency or excess is evaluated. Thus the examples in table 2 remain **COMPARISONREF**→**PURPOSE**, along with the following passive examples:

- (19) a. I’m old enough **to** be allowed into the movie. **COMPARISONREF**→**PURPOSE**
 b. (i) The chick is too young **to** be eaten. **COMPARISONREF**→**PURPOSE**
 (ii) The chick is too young (for someone) **to** eat. **COMPARISONREF**→**PURPOSE**

It is immaterial that (19b) does not specify who intends to eat the chick: much like the intended use category, the presumption is that somebody *might* want to do so.

What the SNACS 2.3 guidelines fail to point out is that this construction may also license infinitivals that do not meet the definition of **PURPOSE** because they are not desired outcomes. We use **GOAL** as the function because these are potential **results** of the sufficiency or excess, and **GOAL** subsumes the notion of end state or result:

- (20) a. The forest canopy is too dense **to** let light through. **COMPARISONREF**→**GOAL**
 b. I’m clumsy enough **to** trip and kill myself. **COMPARISONREF**→**GOAL**
 c. The boat is small enough **to** be blown off course. **COMPARISONREF**→**GOAL**

This is somewhat related to the infinitival surprise-result sense, which the guidelines specify as **GOAL**:

- (21) We arrived at the airport only **to** find that our flight had been canceled. (Schneider et al., 2019, p. 23)

Valued services. The guidelines state that a service within a commercial event which is expressed as a **for-PP** or infinitival should be **THEME**→**PURPOSE** in order to capture that it is an intended outcome but also something that incurs a cost. This distinguishes a potential adjunct purpose:

- (22) I paid **for**/**THEME**→**PURPOSE** the surgery (in order) **to**/**PURPOSE** prevent my friend from going bankrupt.

We retain this policy in our approach.

5 Additional Related Work

In the literature, there is a broad spectrum of linguistic work about the concepts of purpose (Faraci, 1974; Jones, 1991; Green, 1992; Johnston, 1999, *inter alia*) and accompaniment (Haspelmath, 2003; Schlesinger, 2006; Stassen, 2008, *inter alia*). The literature spans grammatical and syntactic issues, and defining the boundaries between purpose and accompaniment with respect to other semantic categories. However, space limitations prohibit an extensive discussion here. Table 3 briefly summarizes the how the various dimensions of meaning discussed above are handled in the literature.

Purpose. The left side of table 3 shows a short list of works in the linguistics and semantic resource literature that provide semantic definitions for purpose. As expected, there is a general consensus that the most prototypical purposive cases, i.e., clauses specifying motivation and desired outcome, fall under the purpose category. Some sources also include adjunct **BENEFICIARY** clauses under the purpose category,

PURPOSE				BENEF	other-inf	ANCILLARY		*→ANCILLARY	ENS→A
✓	✓								
✓	✓	✓	✓						
✓	✓	✓	✓	✓					
✓	✓	✓							
✓	✓	✓				✓	✓	✓	✓
✓	✓	✓				✓	✓	*	
✓	✓	✓			✓	✓	✓	*	✓
✓	✓	✓	✓		✓	✓	✓	*	✓
						✓	✓	✓	?
						✓	✓	✓	✓
						✓	✓	✓	?
						✓	✓	✓	✓

Table 3: Coverage of purpose and accompaniment discussion in literature. On the left side are purpose and related examples, and on the right side are examples that relate to accompaniment. The middle three highlighted references (top-to-bottom) represent the annotation guidelines and manuals from PropBank, the tectogrammatical annotation layer of the Prague Czech-English Dependency Treebank, and FrameNet, respectively. Check marks show topics that are covered under each of the references. The asterisked cells (*) refer to co-participants that get separate treatment as verbal arguments. **ENS** and **BENEF** are short for **ENSEMBLE** and **BENEFACTIVE**, respectively.

and in a couple of cases we see non-SNACS **other-inf** usages included in the categorization. The discussion and categorization of purpose clauses with nominal heads has received less attention in the literature (fourth **PURPOSE** column in table 3).

Accompaniment. The right columns in table 3 show literature that deals with the semantics of accompaniment. It is a well-studied phenomenon as most languages retain grammatical strategies to mark accompaniment (Stassen, 2008). And as discussed earlier, its semantics is well-known to be highly variable and can easily bleed into other semantic categories such as instrumental, possessive, and conjunctive uses (Schlesinger, 2006; Haspelmath, 2003). Each of the three semantic resources (highlighted in yellow in table 3) include a label that directly corresponds to **ANCILLARY** for added participants and the co-participants are distinguished via separate labels in each of these resources (e.g., PropBank assigns numbered labels and FrameNet uses the Co-Participant role). Much like purpose, discussion of clauses with nominal heads as accompaniers has, on the whole, received less attention than their verbal head counterparts.

6 Conclusion

We have detailed a revised approach to categorizing semantic relations associated with various flavors of accompaniment and purpose as marked by English prepositions and infinitive clauses. Our proposals involve restructuring the SNACS inventory in some cases and better circumscribing current categories in others. We suggest revised definitions and paraphrase tests to better delineate groups of usages for annotators. English annotation applying the revised guidelines is planned, and we also hope to investigate how well these criteria can be adapted to other languages.

Our improvements have been implemented in the SNACS v2.5 guidelines (Schneider et al., 2020) and the STREUSLE v4.3 dataset release.⁹

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⁹<https://github.com/nert-nlp/streusle>

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