

An Event Structure Approach to the Human vs. Non-human Distinction

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1. Introduction

1.1. The problem

There are some unexpected contrasts between human and non-human animate entities in terms of argument selection. In particular, an anomalous reading is given when non-human entities are selected as external arguments of some verbs. Consider the Verbs of Possessional Deprivation (Levin, 1993: 129) in example (1) and the Verbs of Killing (Levin, 1993: 230-233) in example (2).

- (1)
- a. The mailman robbed the pet store.
 - b. #The fox robbed the pet store.¹
 - c. The mailman stole the sandwich.
 - d. The fox stole the sandwich.
- (2)
- a. The mailman murdered the man.
 - b. #The fox murdered the man.
 - c. The mailman killed the man.
 - d. The fox killed the man.

In (1), *stole* can select both a human (*the mailman*) and a non-human (*the fox*) external argument, but *robbed* is restricted to selecting a human external argument; in (2), *killed* can select both a human and a non-human external argument, but *murdered* is restricted to selecting a human external argument. Crucially, *murder* and *kill* have the same result state, i.e. the death of the Patient argument, and *rob* and *steal* have the same result state, i.e. property has been removed from someone or something's possession.² Importantly, the anomalous readings are not due to the external arguments' lack of ability

* Lindsay Hracs, University of Calgary, lindsay.hracs@ucalgary.ca. First, thank you to Tova Rapoport for taking an interest in this project and being willing to spend hours discussing murder and robbery (in a grammatical context, of course) and helping me add to my collection of examples. I know that later versions of this project will benefit greatly from our ponderings. Second, thank you to Betsy Ritter for substantive feedback on earlier instantiations of this work and to the graduate students in the Linguistics department at the University of Calgary for being a constant sounding board. Finally, thank you to the audience at WCCFL 35 for the in-depth questions and discussion.

¹ A counter example to (1b) is as follows (thank you to Benjamin Bruening for pointing this out):

(1b') The fox robbed the henhouse.

One hypothesis is that (1b') is not anomalous as it is related to the idiom *fox in/guarding the henhouse*. If this were indeed the case, one could reasonably suggest that a speaker has a human referent in mind for the NP *the fox*. However, the issue arising from the (potentially) figurative use in (1b') will not be discussed in detail in this paper.

² The possessor of the property in verbs such as *steal* is typically expressed in a *from* PP, whereas the direct object of verbs such as *rob* is in the *of* variant of the locative phrase (Levin, 1993: 129). The difference is expressed as follows: *The mailman stole jewelry from the museum* vs. *The mailman robbed Shelly of her fortune* (adapted from Levin, 1993: 128-129). Thus, there are clear syntactic differences in the contexts where *steal* and *rob* occur. Ultimately, issues regarding the internal structure of the result state are not central to the analysis presented here, but it should be noted that there are slight differences in the argument structures of *steal* and *rob*.

to bring about the results states; this notion centres around an entity's *teleological capability*, or "the inherent qualities and abilities of the entity to participate in the eventuality denoted by the predicate" (Folli & Harley, 2008: 191, following Higginbotham, 1997). Additionally, it is important to note that *the fox* was deliberately chosen as a non-human entity for examples in this paper, (1) to ensure the non-human entity is teleologically capable of bringing about the result state of the verbs in question, and (2) to account for the anthropomorphizing of companion animals like *dog* (for a discussion see Epley et al., 2007; Gallagher, 2016; Morris et al., 2000; among others).³

Traditional analyses of argument selection, which rely on theta-role assignment as a primary mechanism, do not account for the selectional restrictions seen above. Specifically, the external arguments in (1) and (2) are equivalent in terms of agency. In fact, employing Dowty's (1991) proto-roles, an approach to defining theta-roles that specifies a prototype as well as allows for different degrees of membership, does not provide a finer-grained distinction between *the mailman* and *the fox*. Consider the examples in (3):

(3) Agent Proto-Role

- a. *volition/intention*
The mailman intentionally took the sandwich./The fox intentionally took the sandwich.
- b. *sentience/perception*
The mailman saw the rabbit./The fox saw the rabbit.
- c. *causation*
The mailman caused the farmer to worry (when his mail truck got stuck in a ditch)./
The fox caused the farmer to worry (when it started circling the chicken coop).
- d. *movement*
The mailman walked through the park./The fox walked through the park.
- e. *independent existence* (referent is de re)
The mailman fears loud noises./The fox fears loud noises.

(adapted from Dowty, 1991: 573)

The minimal pairs in (3a-e) show that the external arguments *the mailman* and *the fox* exhibit the same distribution in relation to the properties of the Agent proto-role, suggesting that both should be able to be selected as external arguments for the verbs *rob* and *murder*. However, as seen (1b) and (2b), there is a requirement for a human animate entity to be selected. Ultimately, approaches involving theta-role assignment alone do not account for the selectional restrictions shown above.

1.2. An overview of the proposal

The approach presented in this paper is designed to answer the following question: *how is the requirement for a human external argument encoded in the grammar of English?* I argue that an event structure analysis can account for humanness restrictions in argument selection. In particular, I propose a tripartite event structure which includes a planning subevent, and suggest that the ability to plan is grammaticalized as a strictly human property. In other words, I argue that for English speakers, non-human entities are not represented as having the teleological capability of creating a plan.⁴

In the following section I explore *intention* in more detail, and argue that human and non-human entities differ in the type of intention that can be attributed to them. Specifically, I show that there are

³ On a related note, Susanne Carroll (personal communication, July 2017) points out that the claims made in this paper should be situated around a discussion of ecology and Theory of Mind. However, due to space constraints I will explore a subset of the semantic issues in isolation, and leave this discussion for future work.

⁴ Investigating whether non-human entities are endowed with the ability to plan is beyond the scope of this paper. Instead, the discussion in this paper focuses on how the grammar of English reflects English speakers' conceptualization of planning as an ability that non-human entities do not possess. As Tenny (1994: 131) puts it: "it is not a search for the nature of events as temporal entities *in the world*. It is a search for the nature of events as temporal entities *in natural language*."

two types of intention: *intention as acting to bring about a result* (INT₁) and *intention as planning* (INT₂). I demonstrate that INT₁ is an attribute of both human and non-human entities, but INT₂ is an attribute only human entities possess.

2. An exploration of planning and intention

2.1. Planning as a means of accounting for selectional restrictions

The event structure approach to humanness restrictions presented in this paper centres around *planning* being encoded as a strictly human property. Consider the examples in (4).

- (4)
- a. The mailman planned to kill the man.
 - b. #The fox planned to kill the man.⁵
 - c. The mailman planned to steal the sandwich.
 - d. #The fox planned to steal the sandwich.

Recall that (1) and (2) showed both *kill* and *steal* can take non-human external arguments. The examples in (4), however, show that modifying the proposition with an overt planning event results in anomalous readings when the external argument is a non-human entity. Furthermore, introducing a time-lag between planning and action reinforces the claim that non-human entities are conceptualized as not having the ability to plan.

- (5)
- a. Yesterday, the mailman planned to kill the man today.
 - b. #Yesterday, the fox planned to kill the man today.
 - c. Yesterday, the mailman planned to steal the sandwich today.
 - d. #Yesterday, the fox planned to steal the sandwich today.

2.2. Two types of intention

The examination of Dowty's (1991) Agent proto-role above (see (3)) showed that simply subscribing to theta-role assignment does not account for the selectional restrictions of some verbs in English. Crucially, however, Dowty (1991: 572) states that the list of properties which make up the Agent proto-role is not exhaustive and not exempt from further partitioning. In other words, one could potentially add to the list of properties Dowty puts forth, or break down existing properties in a way that allows for a finer-grained distinction. Rather than add to the list of properties, the approach presented here makes use of a reanalysis of *intention*. In effect, specifying two different types of intention, each with a corresponding event structure, can account for the humanness restrictions presented in the previous section. The two types of intention are characterized as follows:

Intention as acting to bring about a result (INT₁):

An entity initiates an action with the intention of generating a specific result state.

Intention as planning (INT₂):

An entity plans to initiate an action with the intention of generating a specific result state.

The details of INT₁ and INT₂ in terms of event structure are explored in more detail in the following section. Nonetheless, it is important to note that the crucial difference between INT₁ and INT₂ is that the event structure corresponding to INT₂ includes a planning subevent, making it tripartite in nature.

⁵ Note that if we take world knowledge into consideration and switch out the Patient argument in (4b) for an entity that a fox is more likely to kill, e.g. a rabbit, we are still left with an anomalous reading. This is shown in (4b') below:

(4b') #The fox planned to kill the rabbit.

3. Planning in event structure

Investigations into event structure are often from perspective of the syntax-(lexical)semantics interface. Additionally, event structure is frequently discussed in terms of the semantic decomposition of events, however, the subevents which make up an event structure correspond to both the semantic and syntactic structure of a sentence (Tenny, 1994: 133). In other words, discussions of event structure can be framed in terms of both lexical-semantics and predicate-argument structure.

3.1. A brief overview of event structure

Event structures, along with the subevents that they are composed of, are represented by event templates. Event templates are not based on empirical evidence; instead, event templates are designed to reflect the relationship between a verb's meaning and its corresponding syntactic structure (McKoon & Macfarland, 2002: 8). Essentially, event templates are tools that are used to model the representation of lexical entries.

I assume four basic event types--*States*, *Activities*, *Achievements*, and *Accomplishments* (Vendler, 1957, 1967; Rappaport Hovav & Levin, 1998; Levin 1999; inter alia)--each of which corresponds to a specific event structure template. The templates can be seen in (6).

(6) Event Structure Templates

- a. State: [*x* <STATE>]
- b. Activity: [*x* ACT <MANNER>]
- c. Achievement: [BECOME [*x* <STATE>]]
- d. Accomplishment: [[*x* ACT <MANNER>] CAUSE [BECOME [*y* <STATE>]]]⁶

Each event structure template in (6) has a unique set of predicates. The elements *x* and *y* should be understood as variables that stand for the arguments. Examples and paraphrases of the event structures in (6) are shown in (7).

(7) Paraphrases of Event Structure Templates

- a. State: *x* was in the particular state, as represented by <STATE>
Dale wanted coffee. → [*Dale* <WANT OF COFFEE>]
paraphrase: 'Dale was in the state of wanting coffee'
- b. Activity: *x* was engaged in the activity specified by <MANNER>
Audrey danced. → [*Audrey* ACT <DANCE>]
paraphrase: 'Audrey was engaged in the activity of dancing'
- c. Achievement: *x* arrived at a particular state, as represented by <STATE>
Laura died. → [BECOME [*Laura* <DEAD>]]
paraphrase: 'Laura arrived at the state of being dead'
- d. Accomplishment: *x* was engaged in the activity specified by <MANNER>, which caused *y* to attain a particular state, as represented by <STATE>
Ed wrote a letter. → [[*Ed* ACT <WRITE>] CAUSE [BECOME [*letter* <WRITTEN>]]]
paraphrase: 'Ed was engaged in the activity of writing, which caused a letter to arrive at the state of being written'

⁶ Rappaport Hovav & Levin (1998) suggest that Accomplishments, depending on their ontological type, can also be represented by the following event structure template:

(6d') [*x* CAUSE [BECOME [*y* <STATE>]]]

The <MANNER> elements in the above event structure templates are not specified. In fact, the content of the <MANNER> element in a template is stipulated by additional lexical content of the verb in question (Rappaport Hovav & Levin, 1998; Levin 1999). Manner in verbs such as *kill* (or *murder*, *steal*, and *rob*) is not lexicalized; the result state can be brought about by any number of different activities. Compare this to a verb like *stab*, in which the manner is specified as <STAB>.

- (8) The mailman killed the man.
 → [[*The mailman* ACT <MANNER>] CAUSE [BECOME [*the man* <DEAD>]]]
- (9) The mailman stabbed the man.
 → [[*The mailman* ACT <STAB>] CAUSE [BECOME [*the man* <STABBED>]]]

The example in (8) can be paraphrased as '*the mailman* was engaged in some activity, ACT, which caused *the man* to arrive at the state of being dead'. Notice that the nature of the activity, or manner, has not been specified. Alternatively, (9) can be paraphrased as '*the mailman* was engaged in the activity of stabbing, STAB, which caused *the man* to arrive at the state of being stabbed'. In (9), the manner of the verb is lexicalized and thus specified in the event structure template. Crucially, the result state in (9) reflects that of the specific activity the external argument was in engaged in. That is to say, it is uncertain from the proposition alone if the activity resulted in the death of the Patient argument, so the result state is lexicalized as 'the state of being stabbed'.

3.2. A tripartite event structure

The next step is to determine where to introduce a planning subevent in the event structure templates. Achievements, in particular, cannot include a planning subevent because the external arguments of Achievement predicates *react* instead of *act*. This can be seen in (10).

- (10) a. #The mailman planned to recognize the man in the park.
 b. #The mailman planned to realize he dropped his keys.

Achievements like *recognize* and *realize* are construed as instantaneous, which is why an anomalous reading is given when an overt planning event is used to modify the proposition. Moreover, if planning cannot be included in the event structure of Achievements, and planning is indeed a mental capability encoded in the grammar of English, there should be no humanness restriction in Achievements. Consider the examples in (11).

- (11) a. The mailman recognized the man in the park.
 b. The fox recognized the man in the park.
 c. The mailman realized he dropped his keys.
 d. The fox realized it dropped its prey.

Notice that the Achievement verbs *recognize* and *realize* do not display any humanness restrictions, which is what we would expect if planning cannot logically be included as part of the event structure of such verbs.

Unlike States, Activities, and Achievements, which are considered to have a simple event structure comprised of a single subevent, Accomplishments are considered to have a complex event structure consisting of a causing subevent and a resulting subevent, making them bipartite in nature (Rappaport Hovav & Levin, 1998; Levin, 1999; and Levin & Rappaport Hovav, 1999). As shown in (6d), Accomplishments have an ACT predicate as part of the causing subevent. Building upon this structure, I argue that verbs that require a human external argument necessarily include a planning subevent, resulting in a tripartite structure. The proposed event structure template can be seen in (12).

(12) Proposed Tripartite Event Structure

$[x_i$ **PLAN** $[[x_i$ ACT <MANNER>] CAUSE [BECOME [y <STATE>]]]]

Circling back around to the two different types of intention proposed in section 2.2., (13) and (14) make explicit the corresponding event structure template for each type.

(13) INT₁: An entity initiates an action with the intention of generating a specific result state.

$[x$ ACT <MANNER>] CAUSE [BECOME [y <STATE>]]]

(14) INT₂: An entity plans to initiate an action with the intention of generating a specific result state.

$[x_i$ **PLAN** $[[x_i$ ACT <MANNER>] CAUSE [BECOME [y <STATE>]]]]

To summarize, *intention as acting to bring about a result* (INT₁) corresponds to the standard Accomplishment event template which is comprised of two subevents, and *intention as planning* (INT₂) corresponds to the Planning event template which is comprised of three subevents. I discuss selectional restrictions in relation to these event types in the next section.

4. Selectional restrictions as *planning*

In the first section of this paper, I showed that verbs of the same lexical class can show differences in selectional restrictions, arguing that anomalous readings were due to a requirement of the verb to select a human external argument. A summary of the results can be seen in Table 1.⁷

	<i>steal</i>	<i>rob</i>	<i>kill</i>	<i>murder</i>
selects human argument	✓	✓	✓	✓
selects non-human argument	✓	✗	✓	✗

Table 1: Summary of selection restrictions

Importantly, *rob* and *murder* must select human external arguments. The selectional restrictions are due to the type of intention that can be attributed to the external argument. Specifically, human entities are grammaticalized as having the capability to create a plan, whereas non-human entities are not.⁸ Consequently, the event structure templates corresponding to *rob* and *murder* must include the planning stage, however, *steal* and *kill* can be represented with the bipartite event structure.

- (15) a. The mailman stole the sandwich.
 → $[[the\ mailman\ ACT\ <MANNER>]\ CAUSE\ [BECOME\ [the\ sandwich\ <STOLEN>]]]$
 b. The fox stole the sandwich.
 → $[[the\ fox\ ACT\ <MANNER>]\ CAUSE\ [BECOME\ [the\ sandwich\ <STOLEN>]]]$
- (16) a. The mailman killed the man.
 → $[[the\ mailman\ ACT\ <MANNER>]\ CAUSE\ [BECOME\ [the\ man\ <DEAD>]]]$
 b. The fox killed the man.
 → $[[the\ fox\ ACT\ <MANNER>]\ CAUSE\ [BECOME\ [the\ man\ <DEAD>]]]$

⁷ Table 1 is dedicated to Betsy Ritter, who is a huge fan of tables.

⁸ The discussion presented here takes for granted that there are lexical-semantic consequences to this approach. Future work must include a more detailed account of exactly what the content of a lexical entry is. Levin (1999: 7) assumes that there are two parts to a verb's meaning, (1) its core meaning, i.e. the information that is idiosyncratic to that verb, and (2) its event structure. While on the surface this assumption fits with the current analysis, more investigation needs to be done before any amount of psychological reality can be posited.

- (17) The mailman robbed the pet store.
 → [*the mailman*_i **PLAN**] [[*PRO*_i ACT <MANNER>] CAUSE [BECOME [*the pet store* <ROBBED>]]]]
- (18) The mailman murdered the man.
 → [*the mailman*_i **PLAN**] [[*PRO*_i ACT <MANNER>] CAUSE [BECOME [*the man* <DEAD>]]]]

In (15) and (16), both a human and non-human external argument can be selected, thus both *the mailman* and *the fox* can be represented in the event structure. On the other hand, *rob* and *murder* must select a human external argument, as shown in (17) and (18) respectively. The structure in (17) can be paraphrased as 'the mailman planned for PRO (himself) to initiate an action with the intention of causing the pet store to become robbed', and (18) can be paraphrased as 'the mailman planned for PRO (himself) to initiate an action with the intention of causing the man to become dead'. In (17) and (18), the planner and the actor are the same entity. I will not go into detail about the syntactic consequences of the event structures, but I consider (17) and (18) to be like control structures. That being said, a tripartite event structure with a planning component also accounts for situations in which the planner and the actor are not the same entity. Consider the following examples:

- (19) The mailman planned for the chef to rob the pet store.
 → [*the mailman* **PLAN**] [[*the chef* ACT <MANNER>] CAUSE [BECOME [*the pet store* <ROBBED>]]]]
- (20) The mailman planned for the chef to murder the man.
 → [*the mailman* **PLAN**] [[*the chef* ACT <MANNER>] CAUSE [BECOME [*the man* <DEAD>]]]]

The template in (19) can be paraphrased as 'the mailman planned for the chef to initiate an action with the intention of causing the pet store to become robbed', and (20) can be paraphrased as 'the mailman planned for the chef to initiate an action with the intention of causing the man to become dead'. The examples in (19) and (20) show that the restriction on *rob* and *murder* to have external arguments that are grammaticalized with the capability to plan can be satisfied even if the planner and the actor are not the same entity.

Ultimately, the unexpected contrasts summarized in Table 1 can be accounted for by positing that some verbs have a tripartite event structure that is comprised of a planning subevent, a causing subevent, and a resulting subevent.

5. Conclusion

The arguments outlined in this paper are intended to answer the question: *how is the requirement for a human external argument encoded in the grammar of English?* Approaches to argument selection that rely on theta-role assignment as the primary mechanism fail to account for some restrictions related to humanness in external arguments. I argue that seeking a finer-grained distinction with respect to grammaticalized intention successfully accounts for these restrictions. Specifically, this paper presents a novel approach to dealing with humanness restrictions in argument selection by proposing two different types of intention, *intention as acting to bring about a result* and *intention as planning*, each of which corresponds to a distinct event structure. Building on the assumption that native speakers of English conceptualize human entities as having the teleological capability to create a plan, I provide support for a tripartite event structure which includes a planning subevent. Under this analysis, verbs that are lexicalized with a tripartite event structure must necessarily select human external arguments. The tripartite event structure template I propose builds on the widely-accepted event structure template for Accomplishments. Essentially, my proposed event structure includes a planning subevent, a causing subevent, and a resulting subevent. Through examples, I provide evidence to support my claim that the external argument of some verbs must be a human entity, and that it is possible for the planner (i.e. the argument selected by the PLAN predicate) and the actor (i.e. the argument selected by the ACT predicate) to be the same human entity or different human entities, with consequences for syntactic structure. This

work is still in its infancy; given that it exists at the interface of syntax and lexical-semantics, there are many avenues to explore before one could consider this analysis fully developed. Nonetheless, the approach outlined here provides a novel approach to a problem that does not yet have an elegant solution.

6. Future directions

One obvious direction for future research is to expand on the selection of verbs included in the analysis. Ideally, the event structure approach should be generalizable to problems with argument selection in other verb classes. Secondly, the discussion of teleological capabilities encoded in grammar should be situated in a discussion of ecology and Theory of Mind to avoid potential biases introduced by exploring the linguistic data in isolation. Furthermore, investigating humanness restrictions cross-linguistically is pertinent. Citing, Levin & Rappaport Hovav 1995, McKoon & Macfarland (2002: 8) point out that event structures are construed very differently across languages. Finally, investigating the concept of humanness from the perspective of gradience is required. In particular, we need to better understand how anthropomorphism interacts with grammar. Empirical data, from corpus studies or acceptability judgment tasks for example, are needed to strengthen the claims and further develop the approach outlined in this paper.

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