The Family of English Cognate Object Constructions

Manfred Sailer

University of Göttingen

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Abstract

In the Cognate Object Construction (COC) a typically intransitive verb combines with a postverbal noun phrase whose head noun is morphologically or semantically cognate to the verb. I will argue that English has a family of COCs which consists of four different types. The COCs share common core properties but differ with respect to some of their syntactic and semantic properties. I will capture the "cognateness" between the verb and the noun in all COCs by token identities at the level of their lexical semantic contribution. I will use an inheritance hierarchy on lexical rule sorts to model the family relations among the different COC types.

1 Introduction

In a *Cognate Object Construction* (CO construction, COC) a typically intransitive verb combines with an NP which has the same meaning or the same morphological stem. Classical examples form Sweet (1891) are as in (1).

(1) a. fight a good fight
b. sleep the sleep of the just

In addition to this semantic and morphological characterization, we only speak of a COC if the verb is highly restricted with respect to the nouns that it may combine with. Consequently, in (2-a) and (2-b) we have a real CO, while in (2-c) the noun *dance* can be considered a regular direct object and in (2-d) the noun *growth* is on par with other extension NPs.

(2) a. Smith died a gruesome death/ *a murderer/ *a suicide.
b. Sam lived a happy life/ *something happy.
c. Smith danced a jolly dance/ a jig.
d. The tree grew a century's growth/ a century's expansion within only ten years. (Nakajima, 2006)

While the distinction between real COs and apparent COs seems important, authors differ with respect to how they classify individual examples. It seems, thus, that an adequate characterization of the COC should also provide a basis for explaining why the (2-c) and (2-d) examples are sometimes taken as COCs.

In this paper I will pursue two arguments: First, all English cognate objects have argument status. Second, nonetheless we need to distinguish different types of cognate objects, which correlate with the interpretive possibilities of the CO. I

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The corpus data have been retrieved from the British National Corpus (BNC) using the corpus interface at corpus.byu.edu/bnc.

will address the syntax of the construction in Section 2 and its semantics in Section 3. In Section 4 I will present my analysis and I will conclude in Section 5.

2 Formal Properties of English Cognate Objects

In this section I will argue that all COs in English should be syntactically treated as complements (Section 2.1). Nonetheless, there are reasons to distinguish formally between two types of COCs. In Section 2.2 I will substantiate this second claim on the basis of corpus data collected in Höche (2009).

2.1 Adjunct vs. Complement

A major issue in the discussion of English COs is the question of whether they should be analyzed as adjuncts or complements. The adjunct analysis goes back to Jones (1988) but has also been maintained in Moltmann (1989) and Huddleston and Pullum (2002). Proponents of a complement analysis, on the other hand, are Quirk et al. (1985), Massam (1990), and Kuno and Takami (2004). Nakajima (2006) proposes that some English COs are complements, some are adjuncts.

Jones (1988) assumes the following empirical properties as the genuine properties of the COC:

(3) a. Obligatory modification: Dan slept a *(peaceful) sleep.
b. Manner paraphrase: Dan smiled a happy smile. = Dan smiled happily.
c. No passive: *A happy smile was smiled by Dan.
d. COs are indefinite: *Dan smiled the happy smile.
e. COs are non-referential:
*Maggi smiled a happy smile and then her brother smiled it.

To account for (some of) these properties, Jones analyzes COs as adjuncts: Adjuncts don't passivize, they can express manner, and are typically non-referential. Thus, the properties in (b), (c), and (e) follow immediately.

In subsequent work, such as Massam (1990), Macfarland (1995), and Kuno and Takami (2004), it was argued that there are counterexamples to each of the properties in (3). Some of these data are given in (4).

(4) a. No modification:
A smile was smiled somewhere. (Kuno and Takami, 2004)
b. No manner paraphrase: Alex has laughed the last laugh.
$\neq$ Alex has laughed lastly/ ?in the last way.
c. Passive: The last laugh has now been laughed.
(Kuno and Takami (2004); Höche (2009); see also (4-a))
d. Definite COs: You've got to live your life. (BNC, Höche (2009))
e. Referential COs: Marie Jollie sighed a sigh that said many things.
(www.writerscafe.org/writing/paddleduck/609427/, 5.10.2010)

An additional strong argument against the adjunct analysis of COs, brought forth in Massam (1990), is the observation that COs are not compatible with overt realizations of direct objects as in (5). Adjuncts are not sensitive to the number of complements a verb takes as they attach later than complements.

(5) a. They fought a heroic fight.
b. They fought the enemy heroically/ *a heroic fight.

Nakajima (2006) argues that English has two distinct types of COCs. A similar position can be found for a variety of other languages in Pereltsvaig (1999). The important bit of evidence for English comes from sentences like (6). Nakajima observes two readings for (6-a): A manner reading (*she lived happily*) and a non-manner reading in which *life* is seen as an abstract entity.[1] Passive is possible only with the second reading, which is therefore classified as an argument reading, whereas the manner reading is called an adjunct reading.

(6) a. The woman lived a happy life. (manner and non-manner reading)
b. A happy life was lived by the woman. (only non-manner reading)

I agree with Nakajima's intuition about the interpretation of (6), i.e., that COCs which do not show the properties in (3) should be analyzed differently from the classical manner COs. Nonetheless, the data in (5) clearly supports the argument analysis for all English COCs.

2.2 Different Types of Cognate Objects in English

Höche (2009) presents a quantitative study of more than 3,000 occurrences of cognate verb-noun combinations in the British National Corpus (BNC). I will show that COs of the form "indefinite article – adjective – noun" cover a large part of her overall data, but that they are under-represented in passives. From this I conclude that even though all English COs are syntactically arguments, there is reason to distinguish two types of COs: One type is restricted to indefinite NPs with a manner modifier and does not passivize. The other type is less constraint in form and syntactic flexibility.

The quantitative results in Höche (2009) confirm that the generalizations in (3) are empirically problematic. Höche (p. 209) shows that while 44.8% of the COs occur with an adjectival modifier, 34.4% of the COs occur without any modifier at all. This makes it highly questionable that modification should be obligatory. If there is no modifier, it is not clear what a manner paraphrase should be. Even in cases where there is a modifier, i.e. an additional element in the CO, this is not necessarily an adjective. A manner paraphrase is not straightforward for PPs and relative clauses in the CO.

Höche investigated the passivizability of COs as well. Quoting from corpus literature, Höche estimates the overall occurrence of passives in English at a rate

[1] I will turn to the abstract entity reading in Section 3.

of 2–24% of the clauses, depending on genre, style, etc. Within her COC corpus, the percentage of passive clauses with a COC is 13.9% (Höche, 2009, p. 173). This suggests that COCs passivize just as frequently as other constructions. Finally, the restriction to indefinites can be questioned on a quantitative basis as well: Höche (p. 200) counts 55.5% of all COs as indefinite, and 43.8% of the COs as definite (with 0.7% as uncategorizable).

While Höche tends to reject the classical generalizations, I think that a more refined look at her data is fruitful. The distribution of the various properties in the data leads us to see that COs of the form "indefinite determiner – adjective – noun" make up a prominent subpart of the data and that COs of this type typically have the properties in (3). In contrast to this, I claim that there are COs whose internal structure is less restricted. This second type of COs can best be identified if the CO is definite, but it also occurs with indefinite COs, as we saw in (6-b). I will present three arguments that support the existence of the more restricted type of COC.

First, indefinite COs tend to occur with a modifier, whereas definite COs don't: We saw that the overall ration of unmodified COs in Höche's data is 43.8%. Among the unmodified COs, 64% are definite. This is even more striking since there are less definite than indefinite COs in the corpus.

Second, definite and indefinite COs show affinity to different kinds of modifiers, where the indefinites prefer adjectival modifiers. The table in (7) is a contingency table that displays how often indefinite COs and COs starting with a definite determiner occur with a PP or an adjective. Given the total numbers I calculated the expected values in each cell, which are given in brackets.[2]

(7) Adjectives or PPs as modifier (expected values in brackets):

	Adjective		PP		total
indefinite CO	788	(697)	137	(221)	925
CO with *the*	174	(255)	164	(81)	338
total	952		302		1263

The table shows that indefinite COs occur more often than expected with an adjective, but less often with a PP. For definite COs, this pattern is reversed. Moreover, indefinite COs have a strong preference for adjectives, but there is no clear tendency for definite COs.

Third, a look at the data on passives is informative: All examples of passives in Höche (2009) contained a CO with a definite determiner or a possessive expression. Very few examples of indefinite COs in passive are given in the literature. Kuno and Takami (2004) provide some examples of this type, given in (8).

(8) Examples of indefinite COs in passive (Kuno and Takami, 2004, p. 133)

a. A smile was smiled somewhere. (=(4-a))

b. Life can be lived in many different ways.

[2]The data used in (7) is not directly given in Höche (2009). I am grateful to Silke Höche for retrieving it from her data base and making it accessible to me.

c. Laughs are laughed, and some cheeks blush.

It is important for my point that all these examples are unmodified. Therefore, they do not have a manner paraphrase. These examples are of the same type as (6-b), i.e., they violate more than one of the properties in (3).

This closer look at the BNC data reveals that English has two COCs: One type of COC shows the classical properties in (3). Formally this type has a CO of the form "indefinite article – adjective – noun." The second type of COC is more flexible in form and also in its syntactic and semantic properties. The second type may contain indefinite COs, but definite and quantified COs are also possible here. It is important to note that the two constructions can only be identified on the basis of quantitative data because for both definites and indefinite COs, instances respecting or violating the classical properties can be found. If we look at the overall data pattern, however, we see that both the original intuitions behind the COC from Jones (1988) and the criticism brought forward against them in Massam (1990) are justified and do not contradict one another because they refer to different types of COCs. In the following I will look at the semantic properties of English COCs and relate them to their formal properties.

3 The Semantics of English Cognate Objects

Just as there are two prominent syntactic analyses of the COC there are two distinct approaches to its semantics. First, Moltmann (1989) analyzes COs as predicates over events. Second, Macfarland (1995) and Kuno and Takami (2004) treat them as the entities that result from the verbal event, i.e., they are analyzed as *effected objects*. In most of the literature, an adjunct analysis is combined with an event reading (Jones, 1988; Moltmann, 1989; Huddleston and Pullum, 2002), and a complement analysis with an effected object reading (Quirk et al., 1985; Macfarland, 1995; Kuno and Takami, 2004). However, this is not strictly necessary. Massam (1990) treats COs as syntactic complements which denote an event. This shows that, even though I follow the complement analysis of COs, this does not restrict my analytic possibilities as far as semantics are concerned.

I will argue that both event and effected object readings are attested in COCs (Section 3.1). Furthermore, we need to assume a difference between concrete (or particular) and abstract (or generic) COs (Section 3.2). This leads to a total of four semantically different COCs. In (9) I tried to construct as clear examples of the various types as possible.

(9) a. Alex lived a happy life. (particular event reading)
b. Bailey sighed a sigh that said many things. (concrete effected object)
c. Cameron slept the sleep of the just. (generic event reading)
d. Devin smiled the smile of reassurance. (abstract effected object)

I will show for each of the four readings in (9) that it corresponds to one of the

readings that are independently available to the NPs occurring as COs.

3.1 COs Denoting Events or Effected Object

The examples in (10) show that an NP headed by nouns such as *smile* can denote an event or an object. This systematic ambiguity of nominalizations is widely accepted and discussed (see Ehrich and Rapp (2000) for an overview and some tests). In the event reading, the noun *smile* refers to the action of smiling. Events have a duration and, consequently, can occur as the subject of verbs such as *last* as in (10-a). Objects, on the other hand, can appear and disappear: Example (10-b) shows that such a reading is possible for *smile*. In the object reading, the noun *smile* refers to a particular constellation of the facial muscles.

(10) a. But the smile lasted less than a heartbeat. (BNC, event)
b. A smile appeared on his face. (BNC, object)

The sentences in (10) refer to a particular event, respectively to a concrete muscular constellation.

3.1.1 The Particular Event Reading

A noun like *smile* or *life* can occur in its particular event reading inside a COC. If the CO denotes a concrete event, then this is exactly the event that the verb refers to. This results in a COC of the type that Jones (1988) and Moltmann (1989) looked at. The empirical test for this reading is the availability of a manner paraphrase.

(11) Alex lived a happy life (=(9-a)) = Alex lived happily

Here, the CO typically has the form "indefinite article – adjective – noun", i.e., it belongs to the special pattern that we identified in the corpus data. For this kind of COC a violation of the properties in (3) either leads to unacceptability or to the loss of the manner reading, as we saw in (6-b).

Researchers such as Moltmann (1989) and Mittwoch (1998) made use of event variables (Parsons, 1990) to model the particular event reading of COCs. I will follow this line of analysis. This leads to a semantic representation of the example sentence from (9-a)/(11) as given in (12).

(12) $\exists e(\mathbf{live}(e) \wedge \mathbf{happy}(e) \wedge \mathbf{Arg}_1(e, \mathbf{Alex}))$

Ignoring tense, this representation expresses the proposition that there is an event e which is a 'living'-event. This event happens happily and Alex is its participant.

3.1.2 The Concrete Effected Object Reading

Kuno and Takami (2004) claim that COs denote a result of the verb's activity. The result interpretation should lead to the prediction that COs are referential and COCs

are telic. This is plausible for some examples, as shown by the compatibility with an *in*-PP as in (13-a), but not for others, as in (13-b).

(13) a. Mayflies live their lives in a day. (Massam, 1990, p. 178)
b. #She smiled a winning smile in 10 seconds. (Real-Puigdollars, 2008)

Sentence (9-b) above is an instance of the concrete object meaning of a COC. The noun *sigh* refers to a concrete exhalation sound, probably combined with a particular facial expression. What is special in the COC is that this object comes into existence by the very activity expressed in the verb, i.e., it is an *effected object*, also called a *resultant object*. Many of the COC examples from Kuno and Takami (2004) are of this type. This reading can be identified by the use of non-manner modifiers such as quantificational expressions in (14-a) or modifiers that express physical qualities of the effected object as in (14-b). This reading can also allow for pronominal reference to the CO. The German example in (14-c) indicates by the gender agreement that the masculine pronoun *ihn* in the second sentence is coreferential with the effected object, which is a masculine noun, and not with the verbal event. In the latter case a neuter form of the pronoun would be required.

(14) a. Many questions were asked, many foods shared, many new games learned, and many, many laughs were laughed.
(www.vfp.org/volVoices/volunteer_UK.html, 10.10.2010)
b. That precise same scream was screamed by the murder victim.
(Kuno and Takami, 2004, p. 127)
c. Christine seufzte [einen lauten Seufzer]$_i$. Diana hörte ihn$_i$ noch
Christine sighed a loud sigh. Diana heard it even
im Nebenzimmer.
in the room next door.

In (15) I provide a semantic representation of the concrete effected object reading. In the formalization, I again use an event variable for the event expressed by the verb. This event has a participant: the subject. The event causes the existence of an object x, which is a sigh.[3]

(15) Bailey sighed a deep sigh. (=(9-b))
$\exists e(\textbf{sigh}(e) \wedge \textbf{Arg}_1(e, \textbf{Bailey})$
$\wedge \textbf{CAUSE}(e, \exists x_{obj}(\textbf{sigh}(x) \wedge \textbf{Arg}_1(x, \textbf{Bailey}) \wedge \textbf{deep}(x))))$

Let us briefly address the issue of compositionality. In (16) I show which parts of (15) are contributed by the basic verb, the CO, and the construction. The basic verbal meaning is given in (16-a). We saw above hat the concrete object reading

[3]Note that I assume a sorted universe, i.e., there are eventualities, objects, and kinds, as we will see in Section 3.2. I use the variables $e, e', \ldots$ for eventualities and the subscripts obj and k for objects and kinds respectively. Consequently, the denotation of predicates like **smile** differs depending on the sort of their argument. For example, **smile**(e) is true iff e is a smiling event, **smile**(x_{obj}) is true iff x is a smile in the object sense.

of the CO is one of the possible readings of the NP. This reading is represented in (16-b). The constructional meaning, given in (16-c), determines how the meanings of the verb the CO are connected.

(16) Meaning contributions of the individual parts in (15)::
  a. basic meaning of the verb: $\exists e(\textbf{sigh}(e) \wedge \textbf{Arg}_1(e, \ldots) \ldots)$
  b. meaning of the CO: $\exists x_{obj}(\textbf{sigh}(x) \wedge \textbf{Arg}_1(x, \textbf{Bailey}))$
  c. constructional meaning: $\ldots \wedge \textbf{CAUSE}(\ldots e \ldots, \ldots x \ldots)$

In my analysis in Section 4, I will encode the COC as an instance of a valence-changing verbal construction. I will follow Müller (2006) and encode such constructions in HPSG using a lexical rule. The lexical rule will, then, introduce the constructional meaning.

In this subsection I argued for the existence of both an event reading and an effected object reading for COs. In both cases the agent of the verbal event must also be the one argument of the CO. In the particular event reading, the noun and the verb denote the same event. Therefore, the agent of the verb and the implicit argument of the noun must be the same. Similarly, if the CO is an effected object, as in (9-b), the CO must denote the sigh of the sigher.

3.2 Concrete and Abstract Denotations of COs

In the COCs considered so far we built the meaning on the basis of the particular event reading and the concrete object reading of the nominalization. I will now show that the relevant nouns have additional, more abstract readings. With the more abstract reading I refer to a kind reading. In formal semantics, kinds have been explored since Carlson (1980). Kinds are treated as abstract entities. They occur as arguments of kind-level predicates such as *be extinct/ widespread/ common/ rare*, see (17-a). To make the kind reading explicit, we can use special paraphrases using nouns such as *kind*, *sort*, *type*, *species* and others (Wilkinson, 1995). This is illustrated in (17-b).

(17) a. The dodo is extinct.
  b. = The species of the dodo is extinct.

Woisetschlaeger (1983) argues that relational nouns are usually ambiguous between an abstract (or kind) reading and a concrete reading that refers to an instance of this kind. He illustrates this with examples as the following.

(18) There was the wedding picture of a young couple among his papers.

World knowledge tells us that (i) a concrete copy of a picture was among the papers, (ii) there may be one "official wedding picture" of the couple, but there certainly are many copies of it. So, a singular definite relational NP can refer to the

(definite) general concept of wedding picture, the kind in Carlson's terminology, or to an (indefinite) concrete copy, i.e., to an instantiation or realization of this kind.

The nouns that occur as COs are relational nouns, since they have at least one argument, the argument that corresponds to the agent in the verb. We expect to find the abstract reading of these nouns if they occur with an overt syntactic realization of this argument.

(19) a. Then, the smile of contentment appeared. (*type of*-insertion possible) (www.scenesofvermont.com/blog/, 15.10.2010)
b. The (type of) dance of a dervish usually lasts about 10 minutes.

The example in (19-a) illustrates the kind reading of the noun *smile*. The NP describes a particular type of smile, namely that of contentment. We can insert an explicit kind noun such as *type* without changing the meaning. This is a further argument that we have to do with a kind-NP here. Finally, since the NP occurs as the subject of the verb *appear*, we know that it is used to refer to an object. In other words, the NP *the smile of contentment* is used in (19-a) to refer to "an instance of the type of smile of contentment."

In example (19-b) the verb *last* enforces an event reading on the subject. At the same time, a *type of*-paraphrase is possible, which indicates a kind reading. In the case of events, this is called a *generic event* or an *event type* rather than an event kind. So, in (19-b), the subject refers to an instance of a generic event.

The examples above show that, by virtue of being nominalizations, the nouns occurring as COs can be used as referring to abstract kinds or generic events or to instances of such abstract entities. In the rest of this subsection I will show that these two readings are also possible inside COCs.

3.2.1 Generic Event COs

In (20-a) the CO must be interpreted as a generic event. It cannot be analyzed along the lines of the particular event COC from Section 3.1.1. The reason is that the subject, *I*, is not necessarily identical with the argument of the noun *life*, which is *a slave*. In addition, (20-b) shows that a *kind of*-paraphrase is possible.

(20) a. For two long years I lived the life of a slave. (BNC)
b. = For two long years I lived the kind/type of life of a slave.

Kind COs typically specify an indefinite or generic definite participant which differs from the subject but occupies the corresponding semantic role inside the CO. Kind COs are referential, which is also evidenced by the possibility to form a wh-question as in (21).

(21) What kind of life did you life for two years? The life of a slave.

There are naturally occurring examples of COCs with explicit *kind of*-paraphrases, some of which I give in (22).

(22) a. Of course, when thinking of DJ's, everybody has a clear idea of what kind of life they live.
(www.electronicsession.com/, 8.10.2010)
b. The native peoples had lived a kind of life many of us yearn for.
(www.youmeworks.com/clingfree.html, 8.10.2010)

I rely on the standard formalization of kinds as in Carlson (1980) or Wilkinson (1995). I assume the two interpretations of the NP *the life of a slave* in (23), where I use **R** for the realization relation, i.e., $\mathbf{R}(e', e_k)$ is true iff e' is a particular event which is a realization of a generic event e_k. While the definite kind NP is ambiguous between the two readings, the corresponding indefinite *a life of a slave* can only have the interpretation in (23-b).

(23) a. kind reading of *the life of a slave*:
$\iota e_k : \forall e'(\mathbf{R}(e', e) \leftrightarrow \exists x(\mathbf{slave}(x) \wedge \mathbf{life}(e') \wedge \mathbf{Arg}_1(e', x)))$
b. "instance of a kind" reading of *the/a life of a slave*:
$\lambda P \exists e''(P(e'') \wedge \mathbf{R}(e'', \iota e_k : \forall e'(\mathbf{R}(e', e)$
$\leftrightarrow \exists x(\mathbf{slave}(x) \wedge \mathbf{life}(e') \wedge \mathbf{Arg}_1(e', x))))$

In a COC the event described by the verb is interpreted as an instance of the kind expressed in the CO. I assume that the CO is used in its kind-denoting way in (23-a). As for the concrete object reading, a lexical rule introduces a relation that combines the basic meaning of the verb with the meaning of the CO. In this case, we need the realization relation, **R**. The resulting interpretation of (20-a) is given in (24). The constructional meaning has the effect that the event denoted by the verb, e, is an instantiation (i.e. realization) of the kind denoted by the CO, e'_k.

(24) $\exists e(\mathbf{life}(e) \wedge \mathbf{Arg}_1(e, \mathbf{speaker})$
$\wedge \mathbf{R}(e, \iota e'_k : \forall e''(\mathbf{R}(e'', e') \leftrightarrow \exists x(\mathbf{slave}(x) \wedge \mathbf{life}(e'') \wedge \mathbf{Arg}_1(e'', x)))))$

3.2.2 Abstract (Kind) Object COs

The fourth possible reading of the CO is the abstract effected object reading, as in (9-d). The availability of a *kind of*-paraphrase shows that this is an abstract reading.

(25) Devin smiled the (kind of) smile of reassurance.

There are two typical syntactic patterns of this reading, as illustrated in (26): In (26-a) the CO is definite and followed by a PP which embeds an abstract noun. In (26-b) there is a possessive determiner and a further modifier.

(26) a. ... she smiled the smile of reassurance and of calm. (BNC)
b. Sachs smiled his irresistible smile. (BNC)

In (26-a) the PP does not fill the argument slot of the "smiler." Instead, it is a modifier whose meaning can be paraphrased as "indicating reassurance." In

the examples the concrete smile is an effected object and an instance of the kind specified in the CO. This leads to the following semantic representation:

(27) Devin smiled the smile of reassurance. (=(9-d))
$\exists e(\textbf{smile}(e) \wedge \textbf{Arg}_1(e, \textbf{Devin}) \wedge$
$\textbf{CAUSE}(e, \exists x_{obj}(\textbf{R}(x, \iota y_k(\forall z(\textbf{R}(z, y) \leftrightarrow$
$\textbf{smile}(z) \wedge \textbf{indicate-reassurance}(z)))))))$

The abstract effected object reading has the most complicated semantic representation of the four discussed in this paper. The basic meaning of the verb is as in the other readings. The CO has its kind reading, which is the expressed in the ι-term $\iota y_k(\ldots)$. The constructional meaning combines the effected object reading by the introduction of the **CAUSE** relation with the instantiation reading, expressed by the realization relation **R**.

In this section I argued that the NPs that occur as COs can receive various interpretations and that these interpretations can be found also in their CO use. The semantic representation of the particular event COC is the simplest, since the verb and the CO refer to the same event. For the other types of COC, there is a special constructional meaning contribution that determines how the interpretation of the CO is related to the verbal event. This can be in the form of an effected object relation, as a realization relation or as both.

4 Analysis

The central innovation of my HPSG analysis is the focus on the "cognateness" of the verb and the head noun of CO. I will model this relatedness as an identity of semantic contributions. For all types of COCs the core lexical semantic contribution of the verb and the noun are identical. For the particular event COC this identity goes even further, such that the referential indices of the verb and the noun are identical as well. In Section 4.1 I will briefly present the framework that allows the use of this kind of identities.

To account for the similarity between the four types of COCs, I will develop an analysis as a family of constructions in the sense of Goldberg and Jackendoff (2004). This family behavior will be encoded by organizing the COCs in a sort hierarchy (Section 4.2). In Sections 4.3–4.5 I will present the analysis for the individual COC types.

4.1 Framework

An identity-based analysis is not straightforwardly compatible with a semantic combinatorics as proposed in Pollard and Sag (1994). However, the introduction of tools of underspecified semantics into HPSG as in *Underspecifed DRT* (Frank and Reyle, 1995), *Minimal Recursion Semantics* (MRS, Copestake et al. (2005))

and others have opened up new analytic possibilities. I will use the framework of *Lexical Resource Semantics* (LRS, Richter and Sailer (2004)) because it allows me to stick to a standard semantic representation language and, more importantly, the idea of identities of semantic contributions has been employed in LRS accounts of other phenomena (such as negative concord and multiple interrogatives).

In LRS, like in other frameworks of underspecified semantics, the semantic contribution of a sign is a list of expressions from a semantic representation language — here some version of predicate logic. These expressions may contain "holes", i.e., they need not be fully specified. The semantic expressions associated with a sign occur in the sign's PARTS value. The PARTS list of a phrase is the concatenation of the PARTS lists of its daughters. The logical form of an utterance, i.e. the semantic representation of its reading, is the result of combining all contributed expressions in such a way that all "holes" are filled. At each combinatorial step there may be constraints on how these holes can be filled. These constraints restrict the set of possible readings of a sentence in the appropriate way.

Richter and Sailer (2004) argue that if two signs combine to form a phrase, it is in principle possible that some of the elements on their PARTS list are token identical. This has the effect that, even though two words may contribute a particular semantic operator, say negation, the overall clause may only have one negation in its semantic representation.

In addition to the PARTS list, LRS assumes some features that capture the lexical semantic contribution of a word. These are the INDEX value, which encodes the referential index of a sign, and its MAIN value, which expresses the main lexical semantic contribution of the sign. For example, the INDEX value of the verb *smile* is some eventuality variable e, its MAIN value is the semantic constant **smile**.[4]

In LRS we assume a distinction between local and non-local semantic features. This distinction is motivated in Sailer (2004). The lexical semantic features such as INDEX and MAIN occur inside the CONTENT feature. For the non-local semantics a feature L(OGICAL-)F(ORM) is defined on each sign. The feature PARTS is located inside the LF value.

4.2 The Family of English Cognate Object Constructions

As said above, the COC is a construction that manipulates the valence of the input verb. Müller (2006) has argued that such constructions are best analyzed by means of lexical rules. Since Meurers (2001) it is common to encode lexical rules in HPSG as objects of the sort *lexical-rule* which embed two lexical signs, one being the input, the other being the output of the lexical rule. Meurers presents various ways to incorporate this idea into an HPSG grammar. The most common of these has been adapted for example in Sag (2007). Here, lexical rules are seen as giving rise to unary-branching syntactic structures in which the output of the lexical rule is the mother and the input is the only daughter. To be neutral about the concrete

[4]The features PARTS, INDEX, and MAIN have a function similar to that of the features RELS, INDEX, and KEY in MRS.

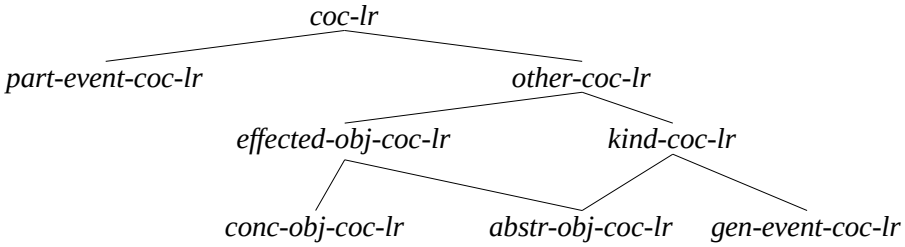

Figure 1: Sort hierarchy for the English COC family

cognate-object-construction-lexical-rule:

$$\left[\begin{array}{ll} \text{SYNS LOC} & \left[\begin{array}{ll} \text{CAT} & \left[\text{HEAD } \textit{verb}\right] \\ \text{CONT} & \left[\begin{array}{ll} \text{INDEX} & e \\ \text{MAIN} & \boxed{1} \end{array}\right] \end{array}\right] \\ \text{ARG-ST} & \langle \boxed{2} \rangle \end{array}\right] \mapsto \left[\text{ARG-ST } \left\langle \boxed{2}, \text{NP} \left[\text{LOC } \left[\text{CONT } \left[\text{MAIN } \boxed{1}\right]\right]\right] \right\rangle\right]$$

Figure 2: Constraint on the sort *cognate-object-construction-lexical-rule*

implementation of lexical rules, I will write them in the format "*XX-lexical-rule*: $\delta_{in} \mapsto \delta_{out}$", where *XX-lexical-rule* is the sort of a lexical rule, δ_{in} is a description of the input sign, and δ_{out} is a description of the output sign.

I will introduce a sort *cognate-object-construction-lexical-rule* (*coc-lr*). To model the family behavior of the English COC types, I will introduce subsorts of the sort *coc-lr*. The sort hierarchy below *coc-lr* is given in Fig. 1. Ultimately, there are four maximally specific subsorts, each corresponding to one of the COC types discussed in Section 3. The intermediate sorts serve the purpose of capturing common properties of the various COC types.[5]

There is a constraint on the top sort in Fig. 1 that expresses the general properties of all COCs. In my analysis there are three such conditions: (i) The input must be an intransitive, unergative verb. (ii) The output has an additional argument NP. (iii) To account for the cognateness, the new argument NP must make the same basic lexical semantic contribution as the verb. Fig. 2 shows this constraint on the sort *coc-lr*, where I ignore the restriction to unergative verbs. Note that this constraint needs to be read in the following way: For each object of sort *coc-lr*, the input sign must satisfy the description preceding the "$\mapsto$"-arrow and the output sign must satisfy the description following the arrow. The cognateness condition is implemented as identity on the MAIN values, for which I use the tag $\boxed{1}$.

We saw in the empirical section that the particular event COC is syntactically more restricted than the other three types. For this reason, the sort *coc-lr* has two

[5]The usually convention with lexical rules is that everything that is not explicilty altered in the outpus specification of a lexical rule stays as in the input (Meurers, 2001). I assume that this convention is only applied at maximally specific lexical rule sort and respects all inherited constraints.

particular-event-coc-lr:

$$\left[\text{SYNS LOC}\left[\text{CONT}\left[\text{INDEX}\ \boxed{4}\right]\right]\right] \mapsto \left[\text{ARG-ST}\left\langle \ldots, \left[\text{LOC}\left[\begin{array}{l}\text{CAT HEAD}\begin{bmatrix}\text{PRED} & + \\ \text{DEF} & -\end{bmatrix} \\ \text{CONT}\left[\text{INDEX}\ \boxed{4}\right]\end{array}\right]\right]\right\rangle\right]$$

Figure 3: Constraint on the sort *particular-event-coc-lr*

immediate subsorts: the sort *part(icular)-event-coc-lr* which captures the properties of the particular event COC, and the sort *other-coc-lr*, which captures the other types. The other types violate the restrictions in (3). The sort *other-coc-lr* has two subsorts as well: the sort *effected-obj(ect)-coc-lr* and the sort *kind-coc-lr*. The sort *effected-obj-coc-lr* accounts for the two effected object readings and introduces a **CAUSE** relation to the semantics. The sort *kind-coc-lr* accounts for the abstract readings discussed in Section 3.2. It requires that the CO be a kind and it introduces a realization relation to the semantic representation. These two sorts have two subsorts each, with one overlapping.

The subsorts of *effected-obj-coc-lr* are those that model the COCs with an effected object as the CO, such as the concrete effected object COC, modelled by the sort *conc(rete)-obj-coc-lr*, and the abstract effected object COC, modelled by *abstr(act)-obj(ect)-coc-lr*. The latter type of COC contains a realization relation. For this reason, it is also a subsort of *kind-coc-lr*, as is *gen(eric)-event-coc-lr*, which encodes the properties of the generic event COC.

4.3 Analysis of the Particular Event COC

The inheritance in the hierarchy in Fig. 1 makes it possible to write simple additional constraints on the subtypes of *coc-lr*. For example, the constraint on the sort *part-event-coc-lr* is given in Fig. 3. All that remains to be said in this constraint is that (i) the INDEX of the CO and the verb must be identical, indicated with the tag 4, and (ii) that the CO is an indefinite predicative category.

Every instance of the particular event COC must obey the constraints on the sorts *coc-lr* and *part-event-coc-lr*. This combination leads to a description of the lexical rule as in Fig. 4. This figure can be used to show how my analysis captures the core properties of the particular event COC.

This rule turns an intransitive verb into a verb with two elements on its ARG-ST list, the original subject and the CO. These properties follow from the general constraint on COCs in Fig. 2. In addition to an identity of the MAIN values, the constraint on the specific COC type in Fig. 3 requires that the INDEX values of the verb and the CO be identical. The CO is specified as a predicative NP. This excludes passivization as predicative complements do not passivize in English.

To illustrate the effect of the lexical semantic identities I sketch the semantic combinatorics for sentence (9-a). In (28) the rows in the table show the PARTS lists of the individual signs. The cells in each row separate elements of the PARTS list.

Figure 4: Description resulting from combining the constraints on *coc-lr* and *part-event-coc-lr*

For better readability, I have arranged the cells in such a way that they all add up to the overall semantic representation of the sentence. I have underlined the MAIN value of each sign. The verb *smiled* contributes its MAIN value, **smile**, its INDEX, e, as well as the specification of the semantic role of the subject, $\mathbf{Arg}_1(e, \ldots)$, and an existential quantification over the index. The noun *smile* makes a similar semantic contribution. Due to the lexical rule, the MAIN value of the noun and its index are identical with those of the verb. The adjective *happy* predicates over the index of the noun. The index identity between the noun and the verb has the effect that *happy* actually predicates over the eventuality expressed by the verb.

(28) [Alex [smiled$_V$ [a happy smile$_N$]$_{NP}$]$_{VP}$.]$_S$

smiled$_V$:	$\exists e($	**smile**(e)		$\wedge$	$\mathbf{Arg}_1(e,$		$))$
smile$_N$:		**smile**(e)					
happy$_A$:			$\wedge$**happy**(e)				
NP:		**smile**(e)	$\wedge$**happy**(e)				
VP:	$\exists e($	**smile**(e)	$\wedge$**happy**(e)	$\wedge$	$\mathbf{Arg}_1(e,$		$))$
Alex:						**Alex**	
S:	$\exists e($	**smile**(e)	$\wedge$**happy**(e)	$\wedge$	$\mathbf{Arg}_1(e,$	**Alex**	$))$

The lexical rule in Fig. 4 accounts for most of the properties in (3) but not for the obligatory modification requirement. This property follows from an independently motivated principle. My analysis of the particular event COC depends on the possibility that different words in a clause make the same meaning contribution. If this is allowed, the question arises how far such an identity may go. It seems reasonable to assume that in a phrase, the semantic contributions of the daughters should be distinct to some degree. This is expressed in the principle in (29).

(29) Principle of Semantic Discernibility:
In each phrase, for each daughter d with a non-empty PARTS list: The semantic contribution of d must not be fully included in that of another daughter.

The principle in (29) is sufficient to exclude instances of particular event COs without a modifier. Consider (28) again. Without the adjective *happy*, the semantic contribution of the CO would only be **smile**(e). At the VP level, the CO's semantic

other-coc-lr:

$$\begin{bmatrix} \text{SYNS LOC} \begin{bmatrix} \text{CONT} \begin{bmatrix} \text{INDEX} \ \boxed{4} \end{bmatrix} \end{bmatrix} \\ \text{LF PARTS} \ \boxed{3} \end{bmatrix} \mapsto \begin{bmatrix} \text{ARG-ST} \left\langle \ldots, \begin{bmatrix} \text{LOC} \begin{bmatrix} \text{CAT HEAD} \begin{bmatrix} \text{PRED} \ - \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \text{INDEX} \ \boxed{5} \end{bmatrix} \end{bmatrix} \end{bmatrix} \right\rangle \\ \text{LF PARTS} \ \boxed{3} \oplus \textit{list} \oplus \langle \ldots \wedge \textbf{REL}(\boxed{4}, \ldots \boxed{5} \ldots) \rangle \oplus \textit{list} \end{bmatrix}$$

and $\boxed{4} \neq \boxed{5}$

Figure 5: Constraint on the sort *other-coc-lr*

contribution would be fully included in the semantics of the head daughter. This would be a violation of the semantic discernibility requirement in (29).

We will see in the following subsection that the Principle of Semantic Discernibility allows for unmodified instances of the other types of COCs.

4.4 Analysis of the Concrete Effected Object COC

The concrete effected object COC is modelled with the lexical rule sort *conc-obj-coc-lr*. This is a subsort of the sorts *other-coc-lr* and *effected-obj-coc-lr*. For this reason, I will first introduce the constraints on these two sorts.

The COCs other than the particular event COC do not obey the restrictions in (3). In particular, they can passivize, the CO need not be modified and the choice of the determiner is free. In the semantic analysis in Section 3, (16) illustrated that the CO contributes a semantic index of its own and that there is a constructional meaning contribution which tells us how the referent of the CO relates to the event expressed by the verb. This is encoded in the constraint on the sort *other-coc-lr* given in Fig. 5.

The CO in the output is specified as non-predicative. This implies that there are no syntactic reasons to block passivization for these COC readings. There are no restrictions on the definiteness of the CO either.

There is a requirement that the indices of the verb and the CO be distinct ($\boxed{4} \neq \boxed{5}$). Therefore, the CO's semantic contribution is always discernible from that of the verb, even if there is no modifier inside the CO. Thus, we correctly capture the observation that the modifier restriction from (4-a) does not hold for these COCs.

In addition, the PARTS list of the output must be longer than that of the input: It contains a relation that relates the index of the verb and the index of the CO. In the figure I use the symbol **REL** as a placeholder of an arbitrary binary relation. Depending on the subtype of COC, this will be filled by the **CAUSE** relation or the realization relation **R**.

We can now turn to the special properties of the effected object readings. They all contain occurrence of the relation **CAUSE** in their semantic representation. Thus, we can formulate the constraint on the sort *effected-obj-coc-lr* in Fig. 6. It says that the PARTS list of the output contains the relation **CAUSE**.

Finally, there is a constraint on the sort *conc-obj-coc-lr*, given in Fig. 7. For the concrete effected object reading, the **CAUSE** relation is the only constructional

effected-object-coc-lr:

$$\left[\begin{array}{l}\textsc{syns loc}\ \left[\textsc{cont}\ \left[\textsc{index}\ \boxed{4}\right]\right] \\ \textsc{lf parts}\ \boxed{3}\end{array}\right] \mapsto \left[\textsc{lf parts}\ \boxed{3} \oplus \mathit{list} \oplus \left\langle \ldots \wedge \mathbf{CAUSE}(\boxed{4}, \ldots)\right\rangle \oplus \mathit{list}\right]$$

Figure 6: Constraint on the sort *effected-object-coc-lr*

concrete-object-coc-lr:

$$\left[\textsc{lf parts}\ \boxed{3}\right] \mapsto \left[\textsc{lf parts}\ \boxed{3} \oplus \left\langle \ldots \wedge \mathbf{REL}(\ldots, \ldots)\right\rangle\right]$$

Figure 7: Constraint on the sort *concrete-object-coc-lr*

semantic contribution. To achieve this, it suffices to limit the growth of the PARTS list of the output: Only one relation can be introduced.

4.5 Analysis of the Kind COCs

In this subsection I will sketch the analysis of the two kind readings from Section 3.2. The kind readings are modelled by a subsort of *other-coc-lr*. Therefore, the cognateness is restricted to identity of MAIN values and the CO is syntactically free. The constraint on the sort *kind-coc-lr* is analogous to the constraint on the sort *effected-obj-coc-lr*, with the difference that the relation introduced is the instantiation/realization relation. In addition, the index of the CO must be an abstract entity, a kind. This is summarized in Fig. 8.

The verb's PARTS list, $\boxed{3}$, is extended to allow for the integration of the CO's semantic contribution. It now includes the relation **R** and the index of the CO must occur inside the second argument of this relation.

For the generic event COC we require that there be no constructional meaning contribution other than the realization relation. This is achieved by a constraint on the sort *gen-event-coc-lr*, which is analogous to the constraint in Fig. 7 above. The constraint is given in Fig. 9.

We saw in Section 3.2.2 that semantic representation of the abstract effected object COC contains both a **CAUSE** operator and a realization relation. In the family encoding of the COC types, this follows by making the sort *abstr-obj-coc-lr* inherit from both the sort *effected-obj-coc-lr* and the sort *kind-coc-lr*. The only thing that remains to be said in the constraint on the sort *abstr-obj-coc-lr* is that

kind-coc-lr:

$$\left[\textsc{lf parts}\ \boxed{3}\right] \mapsto \left[\begin{array}{l}\textsc{arg-st}\left\langle \ldots, \left[\textsc{loc}\ \left[\textsc{cont}\ \left[\textsc{index}\ x_k\right]\right]\right]\right\rangle \\ \textsc{lf parts}\ \boxed{3} \oplus \mathit{list} \oplus \langle \ldots \wedge \mathbf{R}(\ldots, \ldots x_k \ldots)\rangle \oplus \mathit{list}\end{array}\right]$$

Figure 8: Constraint on the sort *kind-coc-lr*

generic-event-coc-lr:
$\left[\text{LF PARTS } \boxed{3}\right] \mapsto \left[\text{LF PARTS } \boxed{3} \oplus \left\langle \ldots \wedge \textbf{REL}(\ldots,\ldots) \right\rangle\right]$

Figure 9: Constraint on the sort *generic-event-coc-lr*

abstract-object-coc-lr:
$\left[\text{LF PARTS } \boxed{3}\right] \mapsto \left[\text{LF PARTS } \boxed{3} \oplus \left\langle \ldots \wedge \textbf{REL}(\ldots,\ldots) \right\rangle \oplus \left\langle \ldots \wedge \textbf{REL}(\ldots,\ldots) \right\rangle\right]$

Figure 10: Constraint on the sort *abstract-object-coc-lr*

there is no further constructional meaning, i.e., again, we have to restrict the size of the output's PARTS list. This is done in Fig. 10.

In this section I provided an HPSG account of the syntactic and semantic properties of the English COC presented in Sections 2 and 3. The use of LRS is important for my analysis in various ways. First, LRS allows me to express the cognateness condition, which I formalize as an identity of the main lexical semantic contribution of the verb and the CO. Second, I derive the properties of the particular event COC by assuming an identity of the indices of the verb and the CO. Third, as LRS singles out individual meaning contributions as elements of the PARTS list, constructional meaning contributions can be added at various places in the inheritance hierarchy to capture the family resemblance among the different COCs.

5 Conclusion

In this paper I have proposed a new analysis of the English cognate object construction. I singled out the particular event COC as being syntactically and semantically distinct from other types of COCs. I argued that the cognate object is syntactically and semantically more independent in these other constructions: The CO has its own index and it is linked to the semantics of the verb by an additional constructional semantic contribution. The existence of four COC types is directly derived from the possible readings of the NPs that occur as COs.

There are a number of open issues concerning the English COC. I will briefly address two of them which relate to the question of cognateness of the CO. One problem is why the data in (2-c) and (2-d) are often considered instances of the COC as well. In the case of all real COCs we have an enforced identity of the MAIN values. In HPSG identities may arise if they are not explicitly excluded by a constraint. For this reason, nothing prevents incidental MAIN identities in examples such as (2-c) or (2-d). In the case of such incidental identities the structures satisfy the conditions on the output specified in the constraint on *other-coc* in Fig. 5. This provides a natural explanation why such sentences are sometimes treated as cognate object constructions.

Another issue concerns examples like (30). Kuno and Takami (2004) use such examples to argue that the CO need not be a strict cognate, but may refer to a subset of the events expressed by the verb.

(30) Let's wipe our brows and smile a graduation grin. (Macfarland, 1995)

To allow for head nouns in the CO that are not strictly cognate to the verb, but only hyponyms of real cognates, it is necessary to loosen the restriction on MAIN identity. Instead, we would have to require that the MAIN value of the CO stands in hyponymic relation to the MAIN value of the verb.

Besides being the first analysis of the COC in HPSG, the present account is semantically more differentiated than previous analyses of the COC in other frameworks. It also provides further empirical support for the use of techniques of underspecified semantics within theoretical linguistics.

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