

The Syntax and Semantics of Reaction Object Constructions in English*

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1. Introduction

Intransitive verbs such as *smile* and *nod*, so-called unergative verbs (Perlmutter (1978)), may be followed by a certain kind of NPs, as in (1):

- (1) a. Pauline smiled her thanks. (Levin and Rapoport (1988:277))
 b. The doctor nodded agreement. (BNC CCW)

The postverbal NPs *her thanks* and *agreement* describe particular emotions or attitudes of the subjects. The verbs convey the common meaning of expressing the emotions or attitudes as messages: For example, in (1a), Pauline expressed her thanks by smiling; in (1b), the doctor expressed his agreement by nodding. This article is concerned with this kind of sentences, which Levin (1993) calls reaction object constructions (henceforth, ROCs).

The postverbal NPs, i.e. reaction objects (ROs), seem to have contradictory properties. It is generally observed in the literature that they cannot undergo passivization, as in (2):

- (2) a. * Her assent was smiled. (Huddleston and Pullum (2002:305))
 b. * A cheerful welcome was beamed by Sandra. (Levin (1993:98))

These examples illustrate that the ROs *her assent* and *a cheerful welcome* cannot be passive subjects. However, ROs are sometimes allowed to be passive subjects:

- (3) a. Warm thanks were smiled at the audience.
 (Felser and Wanner (2001:108))
 b. On the day of departure, Glyndwr's men assembled, a few mounted, and wagons were ready to roll. *Final goodbyes were waved.*
 (J. E. Anthony, *The Castle of the Ghost*, italics mine)

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Unlike (2), the ROs *warm thanks* and *final goodbyes* in (3) serve as the subjects of the passive sentences. Thus, ROs can behave in two different ways, which shows the complex syntactic status.

The purpose of this article is to explain the syntactic behavior of ROCs in terms of their semantic status. More specifically, we argue that the behavioral pattern is accounted for by two properties of ROCs: effectedness of ROs and the coreferential relation between the subject NP and the possessive NP in ROs.

The organization of the following discussion is as follows. Section 2 investigates the two types of syntactic properties of ROCs, surveying those pointed out in the literature. In section 3, taking the semantic aspect of ROs into consideration, we suggest a syntactic analysis to explain such properties. Section 4 explores the issue of passivizability of ROCs, elucidating the relevant semantic constraint on the construction. Section 5 offers concluding remarks.

2. Argument and Non-Argument Properties of ROs

This section surveys the syntactic phenomena concerning ROCs, which show two distinct properties of ROs for their syntactic status.

2.1. Non-Argument Properties

Let us begin by considering the non-argument status of ROs. Huddleston and Pullum (2002:305) claim that the object NP in ROCs hardly expresses an argument of the verb. For example, the meaning of (4a) is represented approximately as (4b):¹

- (4) a. She smiled her assent.
b. She signaled her assent by smiling.

(Huddleston and Pullum (2002:305))

As shown by the paraphrase in (4b), the main verb of the sentence in (4a) is semantically represented as *signaled*, instead of *smiled*. The surface matrix verb *smile* describes a means for signaling her assent. The RO is understood to be the object of the implicit verb *signal*. It thus seems that the RO is not semantically selected by the surface verb *smile*. This suggests that ROs are not the syntactic objects of the verbs.

The crucial evidence for the non-argument status of ROs is that they cannot be made into passive subjects, as observed in (2a):²

¹ Similar paraphrases are proposed in Jespersen (1924, 1928), Ross (1970), Levin and Rapoport (1988), and Levin (1993).

² In contrast with the case of non-verbal communication verbs like *smile*, Huddleston and

- (5) * Her assent was smiled. (= (2a))

As well as Huddleston and Pullum (2002), many other researchers agree that passivization cannot apply to ROCs:

- (6) a. * A cheerful welcome was beamed by Sandra. (= (2b))
 b. * Grateful thanks were smiled by Rilla. (Massam (1990:180))
 c. * Satisfaction was smiled by John. (Omuro (1997:819))

Note that the restriction on passivization of ROs is shared by non-argument NPs:

- (7) a. * This morning was arrived by John.
 (cf. John arrived this morning.)
 b. * The wrong way was gone by George.
 (cf. George went the wrong way.)
 (Jones (1988:95))

Sentences (7) illustrate that adverbial adjuncts such as *this morning* and *the wrong way* cannot appear as subjects of passives. Given the parallel between (5-6) and (7), the failure of passivization in (5-6) means that the ROs are not arguments of the verbs.

Pullum (2002:305) note that, as for manner of speaking verbs, passives are not in principle excluded, as illustrated in (i):

- (i) a. He roared the command.
 b. On the parade ground commands must be roared, not whispered.

In (ib), the object NP *commands* is made into the passivized subject.

However, the object NP does not refer to the subject's emotion or attitude expressed by the action of the verb; rather, it conveys the message containing particular content in verbal communication, as with the following examples:

- (ii) a. She whispered his name.
 b. He was shrieking obscenities and weeping.
 (COBUILD)

In contrast with these examples, what ROCs mean is transmission of emotion or attitude of the subject. Moreover, ROs cannot co-occur with a definite article, as shown in (iii):

- (iii) a. He waved good bye to Hagrid.
 (J. K. Rowling, *Harry Potter and the Order of Phoenix*)
 b. * He waved the good bye to Hagrid.

Thus, the object NP in (ia) does not belong to the RO. In this article, we focus the discussion on cases with a non-verbal communication verb such as *smile* and *nod*.

Although Huddleston and Pullum (2002) do not provide further evidence, their non-argument analysis is also corroborated by pronominalization of ROs:

- (8) a. * Pauline smiled thanks and Mary smiled them, too.
 b. * George nodded agreement, so I nodded it, too.

Examples (8) indicate that ROs cannot be pronominal, as with the case of adverbial adjuncts:

- (9) * He told me to read them in that way_i but I didn't read them (in) it_i.
 (Postal (1994:83 fn. 24))

In (9), the adverbial adjunct, like the ROs in (8), cannot be replaced by the pronoun *it*. By contrast, the object of a transitive verb can undergo pronominalization:

- (10) Rose hit the ball. The dog caught it and chewed it up. (Massam (1990:168))

In (10), the object NP *the ball* of the transitive verb *hit* undergoes pronominalization in the second sentence. Thus, the ungrammaticality of pronominalization in (8) can be considered as supporting evidence for the non-argument status of ROs.

The above syntactic behavior shows that, even though they appear in the postverbal position, ROs are not arguments of the matrix verbs.

2.2. *Argument Properties*

We now turn to the argument status of ROs. Contra Huddleston and Pullum (2002), Felser and Wanner (2001) claim that ROs are arguments taken by unergative verbs, and present three pieces of evidence for their argument (see also Wanner (2000)).³ Firstly, they give an example where a RO can appear as a passive subject:

- (11) Warm thanks were smiled at the audience. (= (3a))

This example demonstrates that passivization may apply to the ROC. Although this

³ More specifically, Felser and Wanner (2001:115-123) propose the Null Object Hypothesis for the syntactic structure of unergative verbs: As far as their argument structure is concerned, unergatives are like ordinary transitives and their theme argument is necessarily associated with a syntactic position, even though it will not normally be spelled out. If the theme argument is informationally richer than the corresponding bare noun of the verb, it will only be spelled out. Under this hypothesis, unergative verbs take an internal argument in their syntactic structure, either implicitly or explicitly. See Felser and Wanner (2001) for detail.

is the only example of passivized ROCs they present, there are a few more examples which argue for their grammaticality judgment in (11). Consider the italicized parts of the following examples (italics mine):

- (12) a. On the day of departure, Glyndwr's men assembled, a few mounted, and wagons were ready to roll. *Final goodbyes were waved.* (= (3b))
 b. "You got a smoke?" the young black man asks the older white man who is pulling hard on a cigarette. "This is all I got." "How about a drag?" Without hesitation it's handed over. *Thanks are nodded.* (*Newspaper of the Catholic Archdiocese of Atlanta, Local News Archive*)
 c. Unfortunately, just after *goodbyes were waved*, the plane ran off the runway and only finally stopped when its tail was high in the air and its nose buried deep in the mud. (J. B. Hancock, *Lady in the Navy*)

As opposed to examples (5-6), these passivized ROCs indicate their transitivity as they parallel with a typical transitive like (13), and bear out the argument status of ROs.

- (13) The door was opened by John.
 (cf. John opened the door.)

(Lyons (1977:487))

Secondly, Felser and Wanner (2001) point out the fact that ROs cannot be separated from the verb by a manner adverb:

- (14) *She nodded gracefully her approval. (Felser and Wanner (2001:108))

Sentence (14) indicates that the RO must be adjacent to the verb, as with the case of a transitive object like:

- (15) *Paul opened quickly the door. (Stowell (1981:113))

As observed in Stowell (1981), sentence (15) is unacceptable because the manner adverb *quickly* intervenes between the verb and the object NP (see Stowell (1981) for more detail on this phenomenon). In contrast, non-argument NPs can be separated from the verb, as in (16):

- (16) ... he came at me *full speed* with his head and horns low on the run.
 (G. Knapp, *Building the American Dream*)

The adverbial nominal *full speed* in (16) is separated from the verb *came* by the PP *at me*. In view of the adjacency condition, which is generally imposed on transitive sentences, the unacceptability of (14) suggests the transitivity of the sentence and the argument status of the RO.

Finally, Felser and Wanner (2001) refer to the fact that ROs can be modified by an attributive adjectival passive, as in (17):

- (17) a half-smiled goodbye (Felser and Wanner (2001:108))

In sentence (17), the RO *goodbye* is modified by the attributive adjectival passive *half-smiled*. Further examples of the adjectival passive formation are found in corpora. Observe the italicized expressions in the following examples:

- (18) a. Soon President Lincoln gave him *a nodded permission* to accompany the Union armies even on the battlefields.
(TIME 1946, Web Concordancer, italics mine)
- b. ... just as Lady Macbeth, the fiend-soul of the house, steps from the door, like the speech of the building, with *her falsely smiled welcome?*
(G. Macdonald, *A Dish of Oats*, italics mine)

According to Levin and Rappaport Hovav (1986, 1995), an attributive adjectival passive, which premodifies a head noun, can modify the direct argument, i.e. the object, of the base verb, while it cannot modify the external argument, i.e. the subject. Compare the next two examples:

- (19) a. a badly written letter
b. * a hard-worked lawyer
(Levin and Rappaport Hovav (1995:11))

The head NP *letter* in (19a) is the underlying direct argument of *write*, as in *Someone writes a letter badly*; by contrast, the *lawyer* in (19b) is the underlying external argument of *work*, as in *A lawyer works hard*. The parallel acceptability of (17-18) and (19a) bears out Felser and Wanner's (2001) argument: ROs are direct arguments so that they can be modified by adjectival passives.

To sum up, Felser and Wanner (2001) claim that ROs have the argument status, which is borne out by the above three pieces of evidence: passivization, the adjacency condition and adjectival passive formation.

From the considerations so far, ROs seem to have both argument and

non-argument properties. To explain the syntactic status of ROCs, it is necessary to capture the contradictory properties shown by the contrast in passivization as well as the other syntactic phenomena. The next section will consider the status of ROs as semantic objects and explain the syntactic phenomena other than passivization.

3. Effectedness of Reaction Objects and the Syntactic Behavior

In this section, we elucidate the syntactic status of ROs, taking into consideration their semantic property. The crucial property of ROs we focus on here is that they denote entities which come into existence after the activities denoted by the verbs; that is, they are effected objects. This leads us to assume that ROs are also objects at the syntactic level, which can explain the behavior of ROCs.

3.1. *Effectedness of ROs*

According to Fillmore (1968:4), there are two kinds of object NPs which differ semantically. Here are the relevant examples:

- (20) a. John ruined the table.
b. John built the table.

(Fillmore (1968:4))

The object NP *the table* in (20a) is interpreted as existing antecedently to John's ruining, whereas the existence of *the table* in (20b) results from the activity of John's building. The former has been called "affected (or affectum) object," and the latter, "effected (effectum or resultant) object."

The semantic difference of the objects in (20) is confirmed by the so-called *do to* test. Only the case with an affected object, as in (20a), is understood as an answer to the following question:

- (21) What did John do to the table?

(Fillmore (1968:5))

This question presupposes the existence of the target NP *the table* prior to the activity of the subject. In (20b), the table does not exist prior to John's building; that is, the NP function as the effected object. This is why sentence (20b) cannot reply to (21).

It has been suggested in the literature that ROs are semantically effected objects, since they refer to abstract entities that are brought about through the activities denoted by the verbs (Jespersen (1924, 1928), Poutsma (1926), Martínez Vázquez (1998), among others). Thus, the expressed message of her thanks in (22a) is brought about through Pauline's smiling; likewise, in (22b), the doctor's agreement comes into

existence only when the subject performs the act of nodding:

- (22) a. Pauline smiled her thanks.
 b. The doctor nodded agreement.

(= (1))

In fact, these object NPs do not permit interrogation of the verb with *do to*, as illustrated in (23) and (24):

- (23) A: What did Mary do to her thanks?
 B: * She smiled her thanks.
 (24) A: What did John do to his agreement?
 B: * He nodded his agreement.

As examples (23-24) show, it is evident that ROs are effected objects, which refer to abstract entities brought about through activities, as with the case of the concrete entity in (20b).

In addition to the *do to* test, we can further attest to effectedness of ROs by three pieces of empirical evidence. First of all, while many affected objects can occupy the subject position of the middle construction, effected objects in general are not allowed to appear in this position:

- (25) a. This glass broke easily.
 b. This bread cuts easily.

(Pinker (1989:106))

- (26) a. * These cabinets {construct / build} easily.
 b. * Wool sweater knits easily.

(Fellbaum (1986:17))

In (25), *this glass* and *this bread* denote entities which exist prior to the activities of breaking and cutting, respectively; hence they are affected objects. On the other hand, in (26), the entities *these cabinets* and *wool sweater* are produced by the activities denoted by the verbs, and therefore effected objects. The ungrammaticality of the latter examples indicates that the middle subject must not be an effected entity: The middle subject must exist prior to the activity encoded by the verb (See Kusayama (1994) for the question of why effected subjects in the middle cause the ungrammaticality).

With this fact in mind, let us consider the case of ROs. As with (26), ROs

cannot be subjects of middle constructions, as pointed out by Omuro (1995, 1997):⁴

- (27) a. * Agreement nods easily.
 b. * Forgiveness smiles easily.

(Omuro (1997:819))

This fact indicates that these subject NPs are underlying effected objects; that is, they are abstract entities brought about through the activities of the verbs; hence, their semantic status violates the condition on the middle subject, as illustrated in the contrast between (25) and (26). Thus, the fact that ROs cannot be the middle subjects provides empirical evidence for their effectedness.

Another evidence for the claim that ROs are effected objects comes from resultative constructions. It has been noted in the literature (e.g. Simpson (1983), Jackendoff (1990)) that the object NP in this construction must be affected by the activity of the verb. Consider the following examples:

- (28) a. John dug the ground rough.
 b. John painted the door green.
 (29) a. ?? John dug the grave rough.
 b. ?? John painted the portrait impressive and life-like.

(Tanaka (1990:51))

The object NPs *the ground* and *the door* in (28) denote entities affected by digging and painting of the subjects, respectively. By contrast, the objects *the grave* and *the portrait* in (29) describe entities that came into existence after the activities denoted by the verbs, and thus serve as effected objects.

According to Tanaka (1990), the ill-formedness of (29) is reduced to the occurrence of the resultative adjectives in addition to the effected objects. Resultative constructions are generally assumed to describe change of state of the

⁴ With respect to these unacceptable examples, Omuro (1997) proposes the Semantic Extension Analysis in terms of Dynamic Model of Grammar (see Kajita (1977), among others). Under the analysis, the ROs in (27) will be characterized as “derivative” arguments of “derivative” transitive verbs. This is because “they had been incorporated in their intransitive verbs at the earlier stages of English grammar acquisition and since they have come to be introduced as ‘excorporated’ arguments into English grammar” (Omuro (1997:819)). Indeed, ROCs are derivative transitive sentences, in that the intransitive verb takes the kind of object that is not strictly subcategorized by the verb; hence, in view of Semantic Extension Analysis, the case in (27) will be accountable by the derivative status of the ROs.

However, not only such a derivative character of ROs but their effectedness is to be considered to explain the syntactic behavior of ROCs, as to be discussed.

object referent. As in (28), affected objects, denoting a pre-existent entity which undergoes change of state, can occur in this construction. However, the resultatives in (29) contain effected objects, which denote created entities after the activities of the verbs; the resultant adjectives *rough* and *impressive and life-like* require the object NPs to be pre-existent to describe resultant states; and the semantic status of the NPs is thus incompatible with that required by the adjectives, which renders the sentences ungrammatical.

In light of this, let us turn to the case of ROs. In the same way as (29), ROs cannot occur in the resultative construction:

- (30) a. ?? He smiled his welcome noticeable.
 b. ?? He nodded approval open.

(Tanaka (1990:50))

In (30), the NPs *his welcome* and *approval* are not acceptable as the objects in the resultative constructions. The ungrammaticality in (30) suggests that the ROs function as effected objects. In other words, the resultative phrases *noticeable* and *open* require the objects to describe pre-existent, affected entities; on the other hand, they denote entities brought about through the activities of the verbs. Consequently, as with (29), the function required by the resultative phrases contradicts with that of the ROs, which leads to the ungrammaticality.

Finally, effectedness of ROs is also corroborated by telicity of the event encoded in the ROC. As sentences with an effected object describe telic events, i.e. events with a definite endpoint, they allow only a temporal adverbial phrase with *in*. This is shown in (31):

- (31) a. Sue wrote {#in five minutes / for hours}.
 b. Sue wrote a story {in five minutes / #for hours}.

(Harley (2005:43), with slight modifications)

The sentence in (31a) denotes a durative, atelic event, which is confirmed by the fact that only the temporal adverbial with *for* can occur in the sentence. In (31b), on the other hand, the sentence with the effected object *a story* denotes a telic event, as shown by the compatibility only with the *in*-adverbial.

Like the sentence with the effected object in (31b), ROCs denote telic events, as exemplified below:

- (32) a. She sang {*in an hour / for an hour}.
 b. She sang her thanks {in an hour / *for an hour}.
 (Aue-Apaikul (2006:126))

As it permits only the durative time adverbial *for an hour*, the intransitive sentence in (32a) denotes an atelic event. The ROC in (32b), on the other hand, is compatible only with the *in an hour*, and hence the sentence denotes a telic event. This parallel behavior suggests that ROs pertain to the class of effected object.

It is by now clear that ROs are effected objects, denoting entities which come into existence after the activity described by the verb. As will be seen in the next subsection, this claim enables us to capture the syntactic behavior of the ROC observed in section 2.

3.2. *Effectedness and the Syntactic Behavior of ROCs*

We have discussed so far that ROs have the semantic status as effected objects. If this is on the right track, it is reasonable to assume that ROs also have the same syntactic status as effected objects, i.e. syntactic arguments. This accounts for their apparently contradictory properties and enjoys empirical support from the parallel behavior of effected objects such as (*build*) *a house* and (*write*) *a paper*.

Firstly, let us consider the adjacency condition on ROCs. If we assume that ROs occupy the object position in ROCs, the case of adjacency violation in ROCs follows straightforwardly from this assumption. The relevant example is repeated here for ease of exposition:

- (33) *She nodded gracefully her approval. (= (14))

This example shows that the manner adverbial *gracefully* cannot intervene between the verb *noded* and the NP *her approval*. This fact is explained by claiming that the postverbal NP is the syntactic object. In fact, the same behavior can be observed in the case of effected objects denoting created entities like *a house*:

- (34) *John built yesterday a house.

As illustrated in (34), the time adverbial *yesterday* may not appear between the verb *built* and the effected object *a house*. The parallel behavior in (33-34) corroborates the common syntactic status of the postverbal NPs: They are effected objects, and occupy the syntactic object position; hence, the adverbials cannot appear in the immediately postverbal position.

Secondly, the assumption that ROs are syntactic objects can explain the possibility of the attributive adjectival passives in (17-18), repeated here as (35):

- (35) a. a half-smiled goodbye
 b. Soon President Lincoln gave him *a nodded permission* to accompany the Union armies even on the battlefields.
 c. ... just as Lady Macbeth, the fiend-soul of the house, steps from the door, like the speech of the building, with *her falsely smiled welcome?*

Recall that attributive adjectival passives must modify the underlying internal argument (i.e. the object), as suggested by Levin and Rappaport Hovav (1986, 1995). In light of this, the behavior in (35) can be drawn from our assumption: ROs, which function as the head nouns, are underlying objects, and hence the adjectival passive modification is acceptable. This is endorsed by the following examples:

- (36) a. a recently built house (Goldberg and Ackerman (2001:798))
 b. a collectively written paper (BNC CGY)
 c. a crisply baked cake of cooked pigeon (BNC A89)

In (36), the effected entities *house*, *paper*, and *cake* are modified by the attributive adjectival passives, respectively. The parallelism between the examples in (35-36) demonstrates that ROs are the underlying syntactic objects.

Thirdly, let us turn to the case of pronominalization. It might be argued that analyzing ROs as syntactic objects fails to account for the fact that they cannot undergo pronominalization:

- (37) a. * Pauline smiled thanks and Mary smiled them, too.
 b. * George nodded agreement, so I nodded it, too.
 (= (8))

However, this holds true not only in the case of ROs, but also in that of other effected objects. Namely, effected objects in general cannot undergo pronominalization, as shown below:

- (38) a. * John built a house in Boston and Sam built it in Philadelphia.
 b. * Mary wrote a book for her pleasure and Jane wrote it for money.
 (Matsumoto (1996:208))

The examples in (38) show that the direct objects taken by verbs of creation cannot become the antecedents of the object pronouns.

The unacceptability of (37-38) is reduced to the common property of the object NPs: Each of the object NPs indicates an individuated entity belonging to the subject, and the created entity cannot be created twice by another participant (cf. Matsumoto (1996)). For example, the house in (38a) is construed as a particular created entity owned by John; it is impossible for another to recreate John's house. The same goes for the object NP *a book* in (38b). Similarly, the *thanks* in (37a) denotes a created entity ascribed to Pauline, so that her thanks cannot be expressed again by another participant. In (37b), too, it is impossible to express George's agreement by other participant's nodding. Thus, the case of pronominalization is explained by the property of effected objects and does not constitute a counterexample against the claim that ROs are effected objects and syntactically occupy the object position. Rather, this phenomenon endorses the common status of the object NPs between (37) and (38).

As we have discussed above, the assumption that ROs serve as syntactic objects accounts for the syntactic phenomena in ROCs. This conclusion is independently supported by the so-called *do so* substitution test. It has been assumed that the *do so* substitution serves as a criterion for VP constituency. Observe first the following contrast:

- (39) a. Miss Marple will read the letters in the garden shed this afternoon and
Hercule Poirot will do so, too. (Haegeman (1991:88))
b. * Miss Marple will read the letters in the garden shed this afternoon and
Hercule Poirot will do so the diaries in the garage after dinner.
(Haegeman (1991:91))

In (39a), *do so* in the second conjunct substitutes for the entire VP *read the letters in the garden shed this afternoon*; *do so* in (39b) substitutes just for the V *read*. In short, with the direct object left behind, *do so* cannot simply replace the V. By contrast, adverbial adjuncts can be left behind by the substitution:

- (40) a. John will buy the book on the table on Tuesday, and Paul will do so on
Thursday. (Radford (1988:234))
b. Sue smiled (in) this way and Ben did so (in) this way.
(Mittwoch (1998:329))

Note here that the adverbials *on Thursday* and *(in) this way* are stranded in the second conjuncts. These examples show that the adverbials syntactically appear outside the

VP, in contrast to the case of the objects shown in (39).

In regard to this phenomenon, ROCs show the same behavioral pattern as the case of a direct object in (39):

- (41) a. She smiled warm thanks and Mary did so, too.
 b. * She smiled warm thanks and Mary did so vague thanks.

Examples (41) show that *did so* in the second conjunct can substitute the preceding VP *smiled warm thanks*, but cannot just the V *smiled* without the RO. Thus, the *do so* substitution indicates that the RO appears inside the VP and empirically supports the claim that ROs are syntactic objects.

In sum, ROs are effected objects not only at the level of semantics, but at the level of syntax: They are syntactic arguments. This accounts for the behavior in a series of phenomena such as adjacency violation, adjectival passive modification, pronominalization and *do so* substitution.

However, the analysis proposed here cannot account for passivization of ROCs: If ROs occupy the syntactic object position, it will be predicted that ROs can undergo passivization; but this is not always the case. As we have seen in section 2, there are two contrastive behaviors of ROCs depending on whether they undergo passivization or not. For ease of illustration, the relevant examples are repeated below:

- (42) a. * Her assent was smiled. (= (5))
 b. * A cheerful welcome was beamed by Sandra. (= (6a))
 (43) a. Warm thanks were smiled at the audience. (= (11))
 b. On the day of departure, Glyndwr's men assembled, a few mounted, and wagons were ready to roll. *Final goodbyes were waved.* (= (12a))

For most researchers, passivized ROCs, as in (42), are not acceptable. But there are in fact a few examples of passivized ROCs like (43). As will be clear from the following discussion, the passivized ROCs are allowed under a certain condition. In the next section, we will first consider why ROCs do not generally undergo passivization, and then what renders passivized ROCs acceptable.

4. Passivizability of ROCs

In this section, we concern ourselves with the nature of passivization in ROCs, especially the two contrastive cases of passivizability. First, we clarify the constraint on the referential relation between the subject NP and the possessor NP in the construction, which prohibits passivization of ROCs. Second, we argue that the

constraint may be lifted by backgrounding elements that encode the agent participant.

4.1. Coreferential Relation

Many researchers have pointed out that ROs cannot be passivized, as in (43). This subsection deals with the question of why ROCs are not generally passivized. The important feature of ROCs to answer this question is that a possessive NP modifying a RO is necessarily coreferential (i.e. refer to the same entity) with the subject NP (Ross (1970:266)). Consider the examples presented in (44):

- (44) a. Tom_i frowned (his_i) displeasure.
 b. * Tom frowned {Ann's / my} displeasure.

(Ross (1970:266))

The contrast in (44) shows that a possessive NP in the ROC must refer back to the subject NP. From another viewpoint, the possessive pronoun serves as an anaphoric expression, which must be bound by the antecedent NP (cf. Chomsky (1981)). If there is no appropriate antecedent, the possessive NP is ruled out, as in (44b).

This coreferential constraint accounts for the incompatibility of ROCs and passivization. According to Zubizarreta (1985), in English passives, the NP in the *by*-phrase cannot establish coreference with the possessive pronoun in the subject. Observe the following examples:

- (45) a. John_i loves his_i mother.
 b. * His_i mother is loved by John_i.
 c. John_i played his_i role.
 d. * His_i role was played by John_i.

(Zubizarreta (1985:255-256), with slight modifications)

In (45b, d), the possessive pronouns in the subject NPs cannot be coreferential with the antecedent NPs in the *by*-phrases, respectively. In light of this observation, passivized ROCs, as exemplified in (46) below, are disallowed due to the coreferential constraint seen in sentences (44), since no coreferential relation between the antecedent in the *by*-phrase and the possessive NP is available:

- (46) a. * Her thanks were smiled by Rilla. (Massam (1990:180))
 b. * Her assent was smiled. (= (42a))

Sentence (46a) has the same illicit structure as (45b, d), where the possessive is not

bound by the antecedent NP; in (46b), even if it lacks the *by*-phrase which contains the antecedent, the sentence is ruled out because no appropriate referential relation is established for the possessive pronoun in the subject NP. Thus, the ungrammaticality of these passivized ROCs can be accounted for in terms of the coreferential constraint on possessive NPs.

Interestingly enough, this constraint is imposed at the level of semantics. Recall that passivized ROCs without a possessive pronoun cannot be allowed either. The relevant examples are repeated here as (47):

- (47) a. * A cheerful welcome was beamed by Sandra.
 b. * Grateful thanks were smiled by Rilla.
 c. * Satisfaction was smiled by John.

In spite of lack of an overt possessive pronoun, these passivized ROCs are regarded as ungrammatical. Massam (1990) proposes that the ROs in the above examples contain a possessive pronoun that necessarily refers back to the subject NP, even if it is not syntactically realized. In other words, those in (47) semantically correspond to the sentences below:

- (48) a. * Her cheerful welcome was beamed by Sandra.
 b. * Her grateful thanks were smiled by Rilla.
 c. * His satisfaction was smiled by John.

As with (46), the implicit possessives in the ROs cannot be coreferential with the antecedent in the *by*-phrase. Following Massam (1990), the ungrammaticality of (47) follows from the coreferential constraint on the implicit possessive NPs.

This constraint for ROCs may be motivated by the semantic relationship between the RO and the subject NP. In most cases, the message expressed by a non-verbal communication act is inferred as an entity belonging to the agent participant who creates it, not to another participant non-coreferential with the agent: For example, if Pauline smiled her thanks, the emotion of thanks she expressed by smiling is assumed to be her own emotion. This intuitive feature of ROCs is confirmed by descriptions in COBUILD:

- (49) a. *smile*:
 When you smile, the corners of your mouth curve up and you sometimes show your teeth. *People smile when they are pleased or amused, or when they are being friendly.*

b. *nod*:

If you nod, you move your head downwards and upwards *to show that you are answering 'yes' to a question, or to show agreement, understanding, or approval.*

(COBUILD, italics mine)

The italicized portions mention that the agents of the actions express their own emotions or messages. These descriptions suggest that our knowledge of the world constrains the possible reference of the possessive NP contained in a RO. That is, the coreferential constraint seems to be induced on the basis of the semantic relationship between the RO and the subject.

This idea is independently supported by the case of body-part nouns in idiomatic expressions. This type of noun denotes an entity which constitutes a part of the subject referent. The body-part noun is understood to establish a closely related relationship with the subject: an inalienable possession relationship. Of particular interest to us here is that such nouns show the same syntactic behavior as ROs. First, the possessive NP modifying a body-part noun must refer back to the subject NP:

- (50) a. Jenifer craned {her / *his} neck.
b. Linda winked {her / *his} eye.

(Levin (1993:220-221))

As illustrated in these examples, the possessive NPs are subject to the coreferential constraint, as in the case of ROs. Second, this kind of object NPs cannot be passive subjects even if they do not co-occur with a possessive pronoun, as pointed out by Massam (1990:180):

- (51) a. * His toe was stubbed by Philip.
b. * A toe was stubbed by Philip.

(Massam (1990:180))

In (51), the body-part noun *toe* of the idiom *stub one's toe* is realized as the subject in the passive sentence. Note here that although the NP in (51b) does not include a possessive, it cannot be the subject in the passive sentence. Thus, a body-part noun in an idiomatic expression is subject to the coreferential constraint imposed at the level of semantics. From these facts, body-part nouns, which describe entities semantically close-related to the subject referents, behave syntactically in the same way as ROs. This supports the idea that the coreferential constraint is correlated to the semantic

The above account based on the effect of agent backgrounding is empirically supported. In fact, any explicit element denoting the agent degrades the acceptability of the sentences in (52), as illustrated in the following examples:

- (54) a. ?* Warm thanks were smiled at the audience by Mary.
 b. ?* Final goodbyes are waved by the people.

Examples (54) illustrate that agent participants formally realized as *by*-phrases render the sentences unacceptable. Thus, passivized ROCs are licensed when the agent is backgrounded in the relevant sentence, causing the coreferential relation to be lifted.

The same effect of agent backgrounding is also observed in idiomatic expressions with a body-part noun. As Jackendoff (1990) remarks, idiomatic expressions with a body-part noun, such as *gnash one's teeth*, can be passivized only when there is no explicit element encoding the agent participant in the clause:

- (55) a. * His teeth were gnashed (by Bill). (Jackendoff (1990:216))
 b. Many teeth were gnashed as the home team went down to defeat.
 (Jackendoff (1990:298))

Example (55a) shows that the possessive pronoun in the subject (and the *by*-phrase) denotes the agent participant in the event, which leads to violation of the coreferential constraint. In (55b), no element expressing the agent appears in the sentence: The agent is backgrounded. In this case, too, the possibility of the passive form can be explained by the agent backgrounding, which lifts the coreferential constraint on the construction. This empirical evidence independently supports the licensing mechanism for passivization of ROCs proposed here.

5. Conclusion

In this article, we have concerned ourselves with the syntactic behavior of ROCs. Apparent two distinct properties of ROs for the argumenthood can be accounted for by (i) the status of ROs as effected objects, and (ii) the coreferential constraint imposed on the subject NP and the possessive NP in the RO. This consequence leads us to conclude that, while ROs are syntactic objects, their semantic properties interact with the syntactic behavior.

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