

# A Lexical Relational Structure Analysis of English Complex-Intransitives\*

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This paper discusses Lee's (2004) unaccusative analysis of complex-intransitives and points out that the theoretical framework he worked in gives rise to an interpretive paradox and shows that the paradox can be resolved in Hale and Keyser's (2002) Lexical Relational Structure (LRS) theory. Testing this framework further against a wider variety of complex-intransitives, it shows that the Hale-Keyser LRS theory needs to be slightly modified to remain descriptively adequate.

**Keywords:** complex-intransitive verbs, Lexical Relational Structure, argument structure inheritance

## 1. Properties of complex-intransitives

In Huddleston and Pullum's (2002: 263-4) typology, the so-called "complex-intransitives" involve intransitive verbs with depictive predicate complements, which are illustrated in (1):

- (1) a. Kim felt lonely / an intruder.
- b. Her son remained ill / a danger.
- c. That seems plausible / a good idea.
- d. Pat proved reliable / a great asset.

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The complements describe physical, psychological or social states of affairs which are attributed to the subject referents to different degrees of strength. These complex-intransitives of the "depictive" type are further classified into the following three sub-groups:

- (2) a. feel, look INF, smell ADJ, sound INF, taste ADJ [*the sense verb*]
- b. continue ADJ INF, keep ADJ, remain [*the verbs of continuation of the state*]
- c. appear INF, seem INF, prove INF [*the verbs of seeming*].

The unmarked ones can take either adjectival or nominal phrases as their complements; those marked 'INF' also take infinitival complements; but those marked 'ADJ' take only AP complements.

The other group of complex-intransitives that Huddleston and Pullum describe take predicate complements stating the resulting states of affairs of the subject referents [the "resultative" type]; these are illustrated here in (3), and involve the verbs in (4):

- (3) a. He became ill / our main ally.
- b. The work got difficult for them.
- (4) become, come ADJ, fall, get ADJ INF, go ADJ, grow ADJ, turn ADJ

How should the sentences involving them be analyzed structurally? More specifically, how can we understand the relation between the intransitives and their dependents?

This paper is organized as follows: In section 2, we will discuss Lee's (2004) treatment of the complex intransitives and point out its limitations. In section 3, then, we will propose a way to revise his system in a way to overcome them. In section 4, we will summarize the discussion and present theoretical implications that this revision ushers in.

## 2. Lee's (2004) unaccusative analysis of complex-intransitives

Lee (2004) shows, first, that both types of verbs don't impose selectional restrictions on their surface subject constituents.

- (5) a. The boy/!The dress {was, felt} satisfied.
- b. The dress/!The boy {was, felt} revealing.
- (6) a. The boy/!The weather {was, became} intelligent.

- b. The weather/!The boy {was, became} windy.  
 [Lee 2004: 324, (3)-(6)]

Examples in (5) and (6) are said to show that *the boy* and *the dress* can both occur in the subject position of the verbs *feel* and *become* as well as of the verb *be*, and that they are semantically selected by the adjectival complements: *satisfied* and *revealing* in (5), and *intelligent* and *windy* in (6). He further points out that *feel* and *become* can take an expletive subject *it*, as in (7),

- (7) a. It feels good to do good when no one is watching.  
 b. Some time after the Korean War, it became possible to shoot down aircraft outside of the visual arena.
- (8) a. ... [VP feel [AP [NP the rock] smooth]]  
 b. ... [VP become [AP [NP the man] famous]]

[Lee 2004: 324-6, (7)-(8)]

and take these two facts as indicating that the two verbs don't have an external argument,<sup>1</sup> from which he deduces that the matrix subjects are to form small clauses along with the complement adjectival predicates, as in (8), and then move to matrix subject position. This analysis is believed to be strengthened with the following sentences as well.<sup>2</sup>

- (9) a. The skies may have been gray all day, but it felt sunny in that bar.  
 b. It became windy with gusts of 30 knots reported.

The weather expletive *it* can also appear in the subject position of the verbs in question.

One thing to notice at this point is that the occurrences of the verb *feel* in (5) in fact take two different sets of arguments: the one in (5a) seems to have an Experiencer and a Theme argument. Compare (10a), repeated from (5a), with (10b).

<sup>1</sup> A *Studies in Generative Grammar* reviewer points out that *it* in subject position doesn't necessarily indicate that the predicate doesn't have an external argument, drawing our attention to Pesetsky's (1995) extraposition analysis of [*It surprised me that ...*]. The question is how we can distinguish unaccusative cases from extraposition cases. We will leave this important issue for future research.

<sup>2</sup> The examples were collected from [www.weather.bm/data/2001-07.html](http://www.weather.bm/data/2001-07.html) and [www.someoneinatree.com/2007/07/feeling-freedom.html](http://www.someoneinatree.com/2007/07/feeling-freedom.html).

- (10) a. The boy felt satisfied.  
 b. [H]e felt that he was satisfied (Brand 1926: 122).

The verb *feel* in (10b) takes an Experiencer and a propositional Theme arguments. If the two verb tokens in (10) are of the same verb, which seems to be the case, we are compelled to assume that the verb *feel* in (10a), and hence in (5a), will take the same two types of arguments.<sup>3</sup>

In contrast, the verb *feel* in (11a), taken from (5b), must have a non-Experiencer subject, perhaps a Theme argument, and an adjectival phrase attributing a property to the subject referent.

- (11) a. The dress felt revealing.  
 b. The first game felt awkward to me. [www.airhockeynews.com]

This version of *feel* is what is used in arguing for, and hence subject to, the "raising/unaccusative" analysis illustrated in (8a). What is interesting about it is that it sometimes can take an internal Experiencer argument as exemplified in (11b). (See note 8 as well.)<sup>4</sup>

Addressing other sense verbs like *taste* and *smell*, in fact, Lee (2004) considers the possibility that such depictive complex intransitives take two arguments as follows.

- (12) a. The food {is, tastes} delicious.  
 b. The theory {is, !tastes} well-founded.  
 (13) a. The flower {is, smells} sweet.  
 b. The boy {is, !smells} tall.

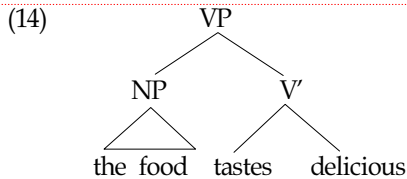
[Lee 2004: 326-7, (9)-(12)]

<sup>3</sup> A *Studies in Generative Grammar* reviewer has drawn our attention to the difference between the predicate complement in (10a) and the *that*-clause complement in (10b), which raises important questions including: (i) Is the *that*-clause interpreted in (10b) as a predicate? (ii) If not, can a theta-role be assigned to heterogeneous types of syntactic objects, like to a predicate and/or to an argument? We tentatively presume that the answer to either of them will be positive, relying on Gruber (1976) and Jackendoff (1972) among others.

<sup>4</sup> As a *Studies in Generative Grammar* reviewer correctly points out, the adjective *awkward* seems to come with an optional, internal Experiencer argument as the following example testifies:

(i) It is awkward to me.

This implies that (11b) may be ambiguous depending on which predicate the *to*-PP is thematically related to: *awkward*, *feel*, or both. Further advancement of the discussion would need more evidence concerning distribution of the Experiencer constituent, which will constitute another project in the future.



The unacceptable examples in (12b) and (13b) might indicate that the subjects don't satisfy the selectional restrictions of the verbs and that the verbs take two arguments as analyzed in (14). He, however, continues to argue that the dyadic analysis in (14) has two problems. If the verb theta-marks the AP *delicious*, first, the AP doesn't have any argument to theta-mark and violates the Theta-Criterion.

- (15) Each argument is assigned one and only one  $\Theta$ -role and each  $\Theta$ -role is assigned to one and only one argument (Chomsky 1981).

Second, he correctly points out that the theory will have difficulty explaining acceptable examples like (16), which seem to suggest that there is no selectional restriction imposed on the subject between the DP *the boy* by the verb *smell*.

- (16) The boy smells sweet.

[Lee 2004: 327]

He points out insightfully that what is wrong with the unacceptable cases in (12)-(13) must be found in the head-to-head s-selection between the verbs and the heads of their embedded small clauses: *taste* cannot s-select *well-founded*, nor can *smell* s-select *tall*.

- (17) a. [taste [<sub>AP</sub> [<sub>DP</sub> the theory] {!well-founded}]]

- b. [smell [<sub>AP</sub> [<sub>DP</sub> the boy] {!tall, sweet}]]

With the assumption that the small clauses are headed by the adjectives, that is, Lee can explain the odd cases of (12b) and (13b) successfully by means of the head-to-head s-selection as illustrated in (17).

However, there is an implication of Lee's monadic analysis shown in (17) that we must pay our attention to. Under that analysis, intransitive verbs like

*taste* and *smell* are to take , if not propositional, eventive or situational complements, which doesn't seem to make much sense. The object of tasting is an object, not a situation or event; this means that there must be a direct s-selectional relation between the verb *taste* and its subject, in addition to the one (17) describes. In fact, the resulting picture will become more akin to (14), which Lee considered but rejected.

We see here that in the theory that Lee couches his analyses, a small paradox arises between the analysis he has considered but rejected and the one that he supports: If the first dyadic analysis as in (14) is adopted, the adjectival complement violates the Theta-Criterion; if the second monadic analysis as in (17) is adopted, it produces an unwanted semantic interpretation.

Let us turn to the other type of complex intransitives. To the resultative type verbs in (3)-(4), we can basically apply Lee's (2004) unaccusative analysis of the verb *become*, as in (8b), especially in view of the following paradigms.

- (18) a. It came sunny.  
 b. It fell gloomy.  
 c. It got/went/grew/turned dark.

These sentences imply that the resultative type intransitives don't have external arguments. However, if we examine individual cases more closely, we immediately realize that matters are not so simple.

Consider the verb *fall*. It takes a locative or path-type PP as its complement as well as AP's (cf. Gruber 1976, Jackendoff 1972).

- (19) a. He fell sick/asleep  
 b. He fell in love/into a dark hole.

Here again, the object of falling is not a situation or an event; it is a person, an object. If the verb in (19b) is to be analyzed to take two arguments, a Theme and a Location, it is reasonable to have a similar assumption for the argument structure of the verb in (19a). A similar point can be made about the verbs *go* and *grow*.

- (20) a. He went crazy/wrong.  
 b. He went to the park.  
 (21)<sup>5</sup> a. [I] can probably only grow a plant 2 feet tall  
 b. The plants grow 2 feet tall and don't need staking.

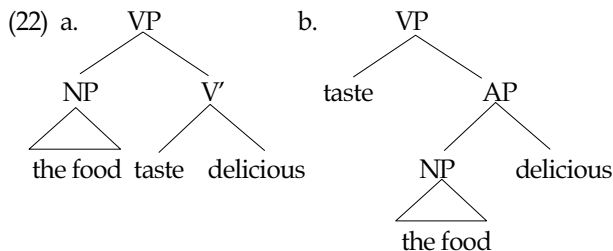
The verb *go* in (20b) requires a Theme and a Destination/Goal location argument. Though slightly metaphorical, the version in (20a) does not seem to be very far-fetched from that found with the other: It seems reasonable to say that it also has a Theme and a Goal state. The verb transitive *grow* takes an Agent and a Theme argument and an optional resultative phrase, while its intransitive version can take a Theme argument and a resultative complement. That is, the thing that grows is an object, not a situation or event.

Viewed from this perspective, it seems that even if it is true that the resultative complex predicates don't have external arguments, it doesn't necessarily lead to the conclusion that they will take monadic small clauses as complements, which will give rise to a semantic anomaly in interpretation. If we want to pursue the line of analyzing them as taking two internal arguments, then the theory will impose a violation of the Theta-Criterion, which Lee (2004) pointed out after considering the possibility for the sense verbs of the depictive type.

To summarize, complex intransitives are of two types: the depictive type and the resultative type. Their distribution provides some concrete pieces of evidence for Lee's (2004) unaccusative analysis. However, the theoretical framework that he works in seems to cause contradictory situations to arise, to which we will turn in the next section.

### 3. A Lexical Relational Structure analysis of complex-intransitives

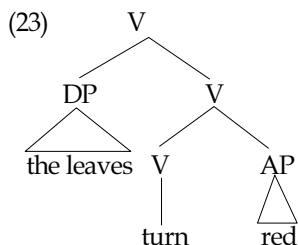
In the previous section we have seen that under the theoretical framework in which Lee (2004) analyzed complex intransitives gives rise to contradictions in the two versions he considered:



<sup>5</sup> The examples are taken from "en.wasalive.com/160937/en/need+advice" and from "www.heirloomseeds.com/peas.htm".

If we take the dyadic analysis (22a), the adjective (phrase) *delicious* ends up with being unable to assign its  $\Theta$ -role and violates the  $\Theta$ -Criterion; if we opt for the monadic analysis (22b), the object of tasting comes to be a situation or event, which is anomalous in semantic interpretation.

Hale and Keyser (2002) exactly address a similar problem related to the verb *taste*. They in fact define one type of argument based on the following inchoative verb structure, (23).



[Hale and Keyser 2002: 9, (20)]

That is, they view that the verb *turn* takes a DP specifier and an AP complement; they regard the specifier as internal to this lexical projection because it occurs in the object position of the sentence containing the verb's transitive version [*The cold turned the leaves red*], which they analyze by imposing a verbal projection above the lexical structure in (23) that adds a Cause/Agent argument.

In this analysis, the verb *turn* is basically monadic and it requires a complement; the adjective is also monadic and requires a specifier. The composite structure illustrated in (23) "satisfies the requirements of the two lexical nuclei: the adjective satisfies the complement requirement of the verb, and the verb supplies a place for the specifier required by the adjective" (p. 9). The two lexical items are parasitic to each other, and the result forms a "composite dyadic" structure.

An innovation Hale and Keyser (2002) have introduced (in view of the theoretical framework Lee's (2004) analysis was done in) is to allow a predicate to function as a complement (i.e. receive a  $\Theta$ -role in old terms), and to allow its requirement to be satisfied "indirectly" through the specifier of the head that takes it. This means that the verb *turn* or the verbal complex "inherits" the lexical requirement of its complement (or its predicate constituent) and takes a specifier to satisfy it, which is partially reminiscent of Grimshaw and Mester's (1988) treatment of light verbs. Basically adopting the Hale-Keyser approach, Rapoport (1995) proposes that a verb and its complement or modifier form a complex



predicator (see also other works mentioned in the paper), and Yim (2008) proposes that the verb *seem* and its *as if*-complement clause form a complex predicate.

Let us follow the lead of Hale and Keyser (2002) and others, and give up the thesis that only arguments (or "fully saturated" constituents) can receive a  $\Theta$ -role and the related condition that no lexical requirement may be inherited onto the selecting category or the mother constituent. Their treatment exemplified in (22) can be understood as follows in terms of argument structure distinguishing external and internal arguments (Levin & Rappaport 1986, Chung 2001, among others):

- (24) a. *turn*:  $\langle y \rangle$                       b. *red*:  $x \langle \ \ \rangle$                       c. [*turn* [*red*]<sub>i</sub>]:  $x \langle y_i \rangle$   
       d. [[*the leaves*]<sub>j</sub> [*turn* [*red*]]<sub>i</sub>]:  $x_j \langle y_i \rangle$

In this notational system, the pair of angled brackets include internal arguments, so the argument outside the brackets is an external argument; the argument that is connected to a linguistic constituent is given the same index as the argument constituent.

This change in the theoretical framework frees us so that we can get out of the paradox discussed in the previous section and choose the option illustrated in (22a). The verb *taste* can be treated virtually in the same way as the verb *turn* is.

- (25) a. *taste*:  $\langle y \rangle$                       b. *delicious*:  $x \langle \ \ \rangle$                       c. [*taste* [*delicious*]<sub>i</sub>]:  $x \langle y_i \rangle$   
       d. [[*the food*]<sub>j</sub> [*taste* [*delicious*]]<sub>i</sub>]:  $x_j \langle y_i \rangle$

Basically, the same analysis can be given to many complex-intransitives: *feel* in (5b), *become* in (6), *smell* in (13), *fall* in (19), *go* in (20), and *grow* in (21).

Further, it can describe the complex-intransitives that take a weather complement, as in (26): *feel* and *become* in (9), *come*, *fall*, *get*, *go*, *grow*, and *turn* in (18).

- (26) a. *feel*:  $\langle y, (x) \rangle^6$                       b. *sunny*:  $\langle \ \ \rangle$                       c. [*feel* [*sunny*]<sub>i</sub>]:  $\langle y_i, *x \rangle$   
       d. [[*it*] [*feel* [*sunny*]]<sub>i</sub>]:  $\langle y_i, *x \rangle$

Since the weather adjective doesn't require an external argument, the combination

<sup>6</sup> The parenthesized argument *x* indicates the optional, internal Experiencer.

[*feel sunny*] doesn't require any external argument either. Since it doesn't require an external argument, as a *Studies in Generative Grammar* reviewer correctly points out, the main verb *feel* is an unaccusative one in this case.

The Experiencer subject verb *feel* in (1a, 5a, 10a) requires a slight modified treatment. Let us reproduce the examples in (10) below.

- (10) a. The boy felt satisfied.  
 b. [H]e felt that he was satisfied (Brand 1926: 122).

The verb *feel* in (10a) must have an Experiencer as external argument as supported by (10b). Then, the following analysis must be pursued:<sup>7</sup>

- (27) a. *feel*:  $x \langle y \rangle$ <sup>8</sup>      b. *satisfied*:  $x \langle \rangle$       c. [*feel* [*satisfied*]<sub>i</sub>]:  $x \langle y_i \rangle$   
 d. [[*the boy*]<sub>j</sub> [*feel* [*satisfied*]<sub>i</sub>]<sub>j</sub>]:  $x_j \langle y_i \rangle$

That is, we have to recognize a composite dyadic structure which involves a merger of two arguments of the same type at least,<sup>9</sup> as a variant of Hale and Keyser's composite dyadic structure.

<sup>7</sup> A *Studies in Generative Grammar* reviewer asks how expressions like *feel proud of John* can be analyzed in the present system. It will probably be analyzed as follows:

- (i) a. *feel*:  $x \langle y \rangle$       b. *proud*:  $x \langle z \rangle$       c. [*proud of* [*John*]<sub>i</sub>]:  $x \langle z_i \rangle$   
 d. [*feel* [*proud of John*]<sub>i</sub>]:  $x \langle y_i \rangle$ .

<sup>8</sup> The treatments of *feel* in (26) and (27) assume that the verb has two argument structures: (a)  $\langle y, (x) \rangle$ , and (b)  $x \langle y \rangle$ . This assumption is in fact behind the following "alternation" whose observation a *Studies in Generative Grammar* reviewer attributes to Gruber (1976) and others:

- (i) a. It feels (/tastes/smells) good to me.  
 b. I feel good about it.

Semantically, *it* is related to *good* in both cases. This is obviously the case for (ia) if we assume that *good* has the argument structure of " $z \langle (x) \rangle$ ", which is supported by example (iia) as well.

- (ii) a. You are so good to me.  
 b. What's good about him?

Independently of the verb *feel*, further, *good* occurs as in (iib) with an *about*-phrase as well. Perhaps, we might have to assume that the adjective here has the argument structure of " $w \langle (z) \rangle$ ", alternating with " $z \langle (x) \rangle$ " for (iia), and further that the external argument *w* must perhaps be suppressed in (ib). To summarize, the Experiencer and Theme roles in (i) are analyzed in the present system to partially or whole come from different predicates: *feel* and *good*. We will leave a further exploration of argument suppression mentioned here for future research.

<sup>9</sup> As a *Studies in Generative Grammar* reviewer suggests, this merger of two arguments can be regarded as an extension of Higginbotham's (1985) "theta-binding", which was posited for the relation between the D operator and a predicative N(P). The argument merger may be understood as an argument-chain formation, as proposed by Ahn (2009).

This slight extension is also demanded by the following "agentive" version of the verb *go*.

(28) I intentionally went crazy.

The subject here cannot be simply interpreted as a Theme argument; it must be an Agent. Then we must assume that the verb *go* here is a dyadic predicate, similar to the version in (20b). Then, (28) will be analyzed in the same way as in (27).

(29) a. *go*:  $x \langle y \rangle$                       b. *crazy*:  $x \langle \rangle$                       c. [*go* [*crazy*]<sub>i</sub>]:  $x \langle y_i \rangle$   
       d. [[*I*]<sub>j</sub> [*go* [*crazy*]<sub>i</sub>]]:  $x_j \langle y_i \rangle$

#### 4. Summaries and Implications

To summarize the discussion thus far, we have pointed out that the theoretical framework which does not allow  $\Theta$ -marking a predicate, which Lee (2004) worked in, gives rise to an interpretative paradox, and shown that the paradox can be resolved if a predicate can be taken as a complement as in Hale and Keyser's (2002) Lexical Relational Structure analysis. Then, we have also shown that the Hale-Keyser theory must be slightly extended so that it allows a merger of two arguments of the same type and can describe complex-intransitives verbs taking an Experiencer or an Agent as external argument.

This analysis seems to be extendable to the so-called raising predicates in (2b-c): *continue*, *keep*, *remain*; *appear*, *seem*, *prove*. In fact, Yim (2008) exactly addresses this aspect of the theory when he analyzes examples like (30) as involving a complex predicate: [*seem* [*as if he knew everything*]].

(30) John seems as if he knew everything.

Even if the verb *seem* is to be a monadic predicate, the complex predicate [*seem as if ...*] can have an external argument in the Hale-Keyser system because the predicative *as if*-clause demands one.<sup>1011</sup>

<sup>10</sup> Yim (2008) also assumes that the *as if*-clause complement in (30) is a predicative element. He further assumes that the formation of the complex predicate does not reduce the adicity of the verb *seem*, producing the same extensional effect as the present analysis. He, however, does not clarify whether the formation involves a thematic "discharge" between the matrix verb and the *as if* clause or not. Examples like the following appear to imply that such a thematic relation must be involved.



They then wonder why (33a) is not bad, and propose that *likely* is ambiguous between being a monadic or dyadic predicate and that (33a) is analyzed as in (35).

- (35) a. [How likely [ $t_1$  to win] is John<sub>1</sub>  
 b. [How likely [PRO<sub>1</sub> to win] is John<sub>1</sub>

Just like (33b-c), (35a) violates the Condition in question; (35b) doesn't, however, because the preposed adjectival phrase doesn't have a trace not bound.

They do not explicate the argument structure of the adjective *likely* in that analysis. Under the system considered here, (35b) will be analyzed as (36) probably without PRO.

- (36) [How likely [to win]] is John

Since the preposed adjectival phrase doesn't involve any trace unbound, the structure doesn't fall prey to the Proper Binding Condition.

As supporting evidence, Lasnik and Saito (1993) present the following judgment pattern.

- (37) a. ??John's likelihood to win  
 b. \*advantage's likelihood to be taken of John  
 c. John's promise to work on the problem  
 [Lasnik and Saito 1993: ch. 4, (172), (173), (178a)]

Their point is that (37a) is only marginal, which is in sharp contrast with the unacceptability of (37b), which involves a genuine case of NP-movement. Since the reason for this unacceptability is that NP-movement is not allowed in a nominal as in (37b), the marginality of (37a) supports their claim that *likely* can belong to the same class of verbals as *promise*.

Their insightful analysis, however, leaves the question why (37a) should be marginal at all if *likely* were a control predicate just like *promise*. The current complex predicate seems to provide a handle to deal with this problem. Perhaps, we may say that the merge of argument structures occur more readily between a verb and its complement predicate.

One last remark is in order. Perhaps, the *tough*-type adjectives are of the same nature as the complex-intransitives in that it is basically a monadic predicate, but it may take a predicate (*to*-infinitive) as its complement whether

the predicate is formulated by means of a null operator as in Chomsky (1981) and others or of a predicate operator as in Yeo (1997).

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