Argument Structure and Unaccusativity in the Constraint-based Lexicon

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Abstract

This paper addresses the issue of Split Intransitivity (SI) and Unaccusative Mismatches (UMs), proposing a constraint-based approach to SI and UMs within a recent framework of Head-driven Phrase Structure Grammar. I argue against the widely accepted dichotomous distinction of intransitive verbs, which has been advanced by the Unaccusative Hypothesis [Perlmutter (1978)]. I then propose a quadripartitive distinction of intransitive verbs on the basis of the distribution of subject argument in the semantically motivated argument structure, and show that this quadripartitive distinction allows a better understanding of SI and UMs. The main idea of this proposal will be summarized as the Quadripartitive Split Intransitivity Hypothesis (QSIH).

1 The Problem

It has long been observed cross-linguistically that intransitive verbs show some non-random grammatical heterogeneity. Ever since Perlmutter's Unaccusative Hypothesis [UH, Perlmutter (1978)], as formulated below in (1), later researchers have widely accepted the view that the heterogeneous behaviors of intransitive verbs, known as Split Intransitivity (SI), are accounted for by assuming two different classes of intransitive verbs.

(1) The Unaccusative Hypothesis [Perlmutter (1978, p.161)]
Certain intransitive clauses have an initial 2, but no initial 1.

The verbs of the clauses, the existence of which UH hypothesizes, are called unaccusative verbs. Intransitive verbs, called unergative verbs, normally have an initial 1. The basic ideas of UH have been later adopted within the Government-Binding (GB) framework and further developed [by Burzio (1986), among others]. In the GB framework, each class of intransitive verbs is represented differently in the syntactic configurations of D-structure: $[_S$ NP $[_{VP}$ [e] V]] for unergative verbs, and $[_S$ [e] $[_{VP}$ NP V]] for unaccusative verbs. The advocates of this approach, which I call "syntactic approach," try to explain SI by assigning each verb class a different syntactic configuration in the underlying or the initial structure [cf. Burzio (1986) and Rosen (1984)].

An alternative proposal tries to account for SI solely in terms of some semantic notions such as Aktionsart and agentivity [e.g. in van Valin (1987, 1990)], the telicity and the protagonistic control [e.g. in Zaenen (1988)], or lexical entailments along the lines of Dowty (1991) [e.g. Zaenen (1993)]. The proponents of semantic approaches basically deny the need to assume two different syntactic configurations for the different classes of intransitive verbs. What they do not deny is that intransitive verbs are sub-classified into unergative and unaccusative verbs. Thus, the foregoing accounts of SI, syntactic or semantic, are dichotomous in that they basically distinguish only two classes of intransitive verbs.

The dichotomous distinction of intransitive verbs has the following two straightforward consequences: First, each intransitive verb should be either an unergative or an unaccusative verb. No intransitive verbs which could be classified as a verb in between or outside of the two classes. Second, any intransitive verb should uniformly show either the unergative phenomena or the unaccusative phenomena.

There is, however, a set of intransitive verbs which seem to show some mixed properties, therefore they do not fall neatly into one of the two classes. This problem is widely acknowledged as Unaccusative Mismatches (UMs). The previous approaches based on the binary distinction of intransitive verbs sometimes regard UMs simply as idiosyncratic properties of the verbs, or as two instances of a single verb, depending on their use. I will point out some of the fundamental problems of these previous approaches.

I will show in this paper, in section 2, that the verbs showing UMs are not exceptional, but behave grammatically in a non-random way as well. I will also show that they cannot be simply regarded as two instances of a single verb since this view causes further UMs. Drawing from the mismatches between UMs and UH, I then propose a quadripartitive distinction of intransitive verbs on the basis of the distribution of the subject argument in the semantically motivated argument structure, and show that this distinction allows a better understanding of SI and UMs. The main idea of this proposal will be summarized as the Quadripartitive Split Intransitivity Hypothesis (QSIH). In section 3, I will briefly introduce the theoretical backgrounds, and formulate my ideas within this framework. Before drawing the conclusion in section 5, I will briefly sketch the analysis of the SI phenomena in German in section 4.

2 Unaccusative Hypothesis and Unaccusative Mismatches

The most frequently discussed split intransitivity phenomena can be summarized as follows: I call the phenomena listed in the middle column of table (2) unergative phenomena and the phenomena in the right column of table (2) unaccusative phenomena, respectively.

(2) some split intransitivity phenomena (in German)

SI phenomena	**unergative verbs** *arbeiten* (to work)	**unaccusative verbs** *ankommen* (to arrive)
auxiliary selection	*haben* (to have)	*sein* (to be)
impersonal passive	yes	no
prenominal attribute	no	yes
`Agent` nominalization	yes (*-er*/*-or* in German)	no (*-ling* in German)

As suggested above, there are a set of verbs which raise UMs.[1] In this section, I question to what extent the unaccusative-unergative distinction can be maintained, and discuss German data related to UMs in theory-neutral terms [cf. Grewendorf (1989) and Kathol (1992)]. I present four pieces of evidence against UH and the dichotomous distinction of intransitive verbs, motivating a quadripartitive distinction of intransitive verbs.

2.1 Unaccusative Hypothesis and Transitivity

UH and subsequent syntactic approaches predict that all transitive verbs should form their perfect tense with the auxiliary *haben* (to have), since the selection of *sein* (to be) is due to the D-structural position of the single subject argument of the unaccusative verbs. Unfortunately, there are a small number of transitive verbs which select *sein* (to be) for the formation of perfect tense. Verbs showing such a mismatch include *durchgehen* (to go through), *eingehen* (to enter), *anlaufen* (to run through), *angehen* (to approach), etc. [data from Grewendorf (1989, p.9)].

(3) a. Ich **bin**/*habe [$_{acc}$ die Arbeit] durchgegangen.
I am/*have the work through-gone
'I have gone through the work.'

b. Er **ist**/*hat [$_{acc}$ die ganze Stadt] angelaufen.
He is/*has the whole city through-run
'He has run through the whole city.'

Grewendorf (1989) notes this problem as well, and argues that the accusative case of the object of these verbs might not be a real accusative, rather a partitive case marker. This view is problematic, because these verbs can be passivized just as other transitive verbs do, as acknowledged by Grewendorf (1989) himself and also pointed out by Kathol (1992).

(4) a. [$_{nom}$ Die Arbeit] ist von mir durchgegangen worden.
The work is by me through-gone been
'The work has been gone through by him.'

b. [$_{nom}$ Die ganze Stadt] ist von ihm abgelaufen worden.
The whole city is by him through-gone been
'The whole city has been gone through by him.'

The examples in (4) show that the object of these verbs is a real accusative, and that the verbs at issue are in fact transitive verbs. Then, it becomes fairly clear that the predication of the UH or the syntactic approaches might not be correct, at least to the effect that the auxiliary selection in German might not be attributed to the configurational position of the subject argument.

2.2 Verbs which are neither Unergative nor Unaccusative

The verbs listed below form their perfect tense with the auxiliary verb *haben* (to have). According to UH, they must be unergative verbs.

(i) **weather verbs:** *regnen* (to rain), *schneien* (to snow), *nieseln* (to drizzle), *blitzen* ((there is) lightning), *donnern* ((there is) thunder), etc.

(ii) **verbs of natural process:** *blühen* (to bloom), *grünen* (to green), etc.

(iii) **verbs of emission:** *stinken* (to stink), *dampfen* (to steam), *bluten* (to bleed), etc.

If they were unergative verbs, one would expect that they would show further unergative phenomena. But it is definitely not the case, as shown below in (5):

(5) a. Es wurde gestern *geregnet/*geblüht/*geblutet. (imp. pass.)
There was yesterday rained/bloomed/bled

b. *Regner/*Blüher/*Bluter (`Agent` nominalization)
rainer/bloomer/bleeder

These verbs show that UH, and therefore the dichotomous distinction of intransitive verbs, is not tenable.

2.3 Verbs of Manner of Movement

Verbs of manner of movement such as *laufen* (to run), *fahren* (to drive), *fliegen* (to fly), etc. show another aspect of UMs. They select *sein* (to be) for the formation of the perfect tense, independent of the existence of the directional prepositional phase such as *durch* *den Wald* (through the forest) [see (6a)]. According to UH, they must be unaccusative verbs, since it predicts that verbs selecting *sein* (to be) are unaccusative verbs.

But contrary to the predication of UH, the formation of impersonal passive is possible with these verbs, as illustrated in (6b). Furthermore, the contrast between (6c) and (6d) shows that only the variant with a directional PP (an entailment of the *movement with definite change of location*) can be used as a prenominal attribute, again raising a fundamental problem to the dichotomous distinction of intransitive verbs based on UH.

(6) a. Der Junge **ist** im Wald/durch den Wald gelaufen. (*sein* (to be))
The boy is in the forest/through the forest run
'The boy has run in the forest/through the forest.'

b. Es wird im Wald/durch den Wald gelaufen. (imp. pass.)
It is in the forest/through the forest run

c. der durch den Wald gelaufene Junge (change of location)
the through the forest run boy

d. *der im Wald gelaufene Junge (location)
the in the forest run boy

One can draw from the data in (6) the conclusion that the prediction of UH is not correct, and that the dichotomous distinction of intransitive verbs may not be teanable.

2.4 Verbs of Manner of Motion

Verbs of manner of motion which do not inherently imply any change of location such as *tanzen* (to dance), etc. generally select *haben* (to have) for the formation of the perfect tense, as illustrated in (7a); but they select *sein* (to be), if a phrase implying a movement with definite change of location is added to, as illustrated in (7b).

(7) a. Hans **hat**/*ist im [$_{dat}$ Wohnzimmer] getanzt. (to dance)
Hans has/*is in the living room danced

b. Hans **ist**/*hat ins [$_{acc}$ Wohnzimmer] getanzt. (to dance to)
Hans is/*has in the living room danced

According to UH, they must be unergative verbs if they select *haben* (to have), and unaccusative verbs if they select *sein* (to be). Let's examine the use of these verbs selecting *sein* (to be): According to the dichotomous distinction of intransitive verbs based on UH, the impersonal passive cannot be formed and there should be no `Agent` nominalization with them.

(8) *tanzen* (to dance to) as used in (7b)

a. Es wurde ins [$_{acc}$ Wohnzimmer] getanzt. (imp. pass.)
There was in the living room danced

b. Tänzer/*Tänzling (`Agent` nominalization)
dancer/*the danced

The data in (8), however, show that this prediction is not correct, allowing one to conclude that the dichotomous distinction and UH should be carefully re-examined.[2]

2.5 Summary of Unaccusative Hypothesis Mismatches

The discussion above shows that intransitive verbs are certainly bifurcated into two groups with respect to split intransitivity phenomena, but the data also clearly show that the two distinguished groups of intransitive verbs do not exactly fall together. This means that it is definitely not the case that intransitive verbs which are not unergative are unaccusative, or vice versa. The data discussed so far can be summarized as follows:

(9) summary of the split intransitivity discussed (in German)

SI phenomena	*arbeiten/tanzen* (to work/dance)	*ankommen* (to arrive)	*laufen/tanzen*+PP (to run/dance to)	*regnen* (to rain)
auxiliary selection	*haben*	*sein*	*sein*	*haben*
impers. passive	yes	no	yes	no
prenom. attr.	no	yes	yes	no
`Agent` nominal.	yes	no	yes	no

From the data shown above, I can, thus, draw the conclusion that the dichotomous distinction of intransitive verbs is not tenable, as far as German data is concerned. Consequently, the previous accounts based on UH should be carefully re-examined.

3 4 Types of Intransitive Verbs and Argument Structure

In this section, I consider how these empirical observations can be accounted for within the framework of Head-driven Phrase Structure Grammar (HPSG, Pollard and Sag (1994)). Basically following the widely acknowledged insight that the grammatical behaviors of a predicate are to a large extent determined by its lexical meaning, I will try to show that the subject of intransitive verbs could be more naturally distinguished in a four-part way. Then, I will propose a Quadripartitive Split Intransitivity Hypothesis (QSIH), which states that the least oblique argument of intransitive verbs will have 4 different distributions in the "argument structure". Following QSIH and its underpinning insight that SI is semantically determined and lexically represented, I will suggest that, under the assumptions of HPSG [Pollard and Sag (1994)], the different classes of intransitive verbs should be differently represented in the lexical entries.

3.1 Theoretical Backgrounds: The Two-Level Linking Theory

For the representation of lexical information, I adopt the model of the two-level linking theory (TLLT), developed by Ryu (to appear). For the lack of space, only some of the relevant components of this model will be briefly introduced in this section.

The lexicon in HPSG, hence in TLLT, is defined by means of the Word Principle (WP), which is formulated in terms of King's Speciate Re-entrant Logic (SRL) [see King (1994)] as in (10).[3] WP says that every feature structure of the sort *word* must satisfy a lexical entry and all linking constraints.

(10) The Word Principle [= a revision of the Word Principle of Höhle (1995)]
$:\!\sim word \rightarrow (E_1 \vee, \ldots, \vee E_n) \wedge (L_1 \wedge, \ldots, \wedge L_n)$,
where E_i ($1 \preceq i \preceq n$) is a lexical entry in the base lexicon and L_i a linking constraint.

As can be seen in (10), the linking is viewed in TLLT as conjunctive descriptions of admissible feature structures. TLLT has two closely related components: (i) the constraints on the interrelation between the thematic structure (= NECLEUS) and argument structure (= ARGSTR), and (ii) the constraints on the interrelation between ARGSTR and valence features (VAL). The former constraints will be called "pre-linking" and the latter "post-linking" (hence the name TLLT). Argument structure is characterized as a collection of argument *indices* (note: not *synsem* objects), one of which is classified as the external argument and one as the internal argument. I define feature descriptions for *word* and *argstr* as in (11) and (12).

(11) feature declaration for *word*
word: [ARGSTR *argstr*]

(12) feature declaration for *argstr*
$$argstr: \begin{bmatrix} \text{EXTARG} & \textit{list-of-length-1 (ref)} \\ \text{INTARG} & \textit{list-of-length-1 (ref)} \\ \text{ARGS} & \textit{list (index)} \end{bmatrix}$$

Thematic structure is the object of the sort *quantifier-free-parametrized-state-of-affairs* (*qfpsoa*). The lexical entailments in the sense of Dowty (1991) are hierarchically structured and considered as subsorts of *qfpsoa*. Some selected partitions of relevant sorts are given as follows:

(13)
a. Partition of *qfpsoa*: *initial-rel*, *issue-rel*, *oblique-rel*, *neutral-rel*
b. Partition of *initial-rel*: *cause*, *act*
c. Partition of *issue-rel*: *affected*, *unaffected*
d. Partition of *neutral-rel*: *neutral*, *soa-arg*
e. Partition of *act*: *sentience*, *change*
f. Partition of *sentience*: *volition*, *non-volition*
g. Partition of *volition*: *influence*, *commitment*, *orientation*
h. Partition of *change*: *change-of-state* (= *cos*), *change-of-location* (= *col*)
i. Partition of *change-of-location*: *manner-of-movement* (= *mom*), *move-with-a-definite-change-of-location* (= *definite-col*)
j. Partition of *manner-of-movement*: *directed-movement*, *non-directed-movement*

For the introduction of argument roles, I define the following feature declarations.

(14) feature declarations for the introduction of argument roles

a. *cause*:	[CAUSE *ref*]	b. *act*:	[ACT *ref*]
c. *affected*:	[AFF *ref*]	d. *unaffected*:	[UND *ref*]
e. *oblique-rel*:	[OBL *oblique*]	f. *neutral*:	[NEUT *non-ref*]
g. *soa-arg*:	[SOA-ARG *psoa*]		

3.2 Linking Constraints: Pre-linking and Post-linking

The linking of the arguments between NUCLEUS and ARGSTR is constrained by a small set of pre-linking descriptions. The following pre-linking constraint holds globally: All argument indices which occur in the *qfpsoa* must also occur in the list value of the feature ARGS. The argument indices will be arranged in the argument structure according to the following hierarchy: <CAUSE, ACT, AFF, UND, SOA-ARG, NEUT>

The patterns of argument linking between ARGSTR and VALENCE are constrained by the post-linking. One of the post-linking constraints, called the "subject linking constraint", constrains the linking of subject argument of the finite form of verbs, as formulated in (15):

(15) (:∼*word* ∧ :SYNSEM LOC CAT HEAD VFORM∼*finite*) → (:SYNSEM LOC CAT VALENCE SUBJ FIRST LOC CONTENT INDEX ≈ :ARGSTR ARGS FIRST)

The constraint (15) says: Link the *index* of the least oblique argument in the list value of the ARGS feature to the *index* of the unique value in the list of the SUBJ feature of the finite verbs! Because the least oblique argument in the list of ARGS will be realized as the subject of a finite sentence, one needs only to examine with which index the index of the first argument in the ARGS list is token-identical.

There are a set of further descriptions that state which argument should be assigned to the external argument and which to the internal argument, respectively. The following three linking constraints are immediately relevant for the analysis of unaccusativity:

(16)
a. the CAUSE-linking constraint:
(:∼*word* ∧ :SYNSEM LOC CONTENT NUCLEUS∼*cause*) → (:SYNSEM LOC CONTENT NUCLEUS CAUSE ≈ :ARGSTR EXTARG FIRST)
b. the ACT-linking constraint:
(:∼*word* ∧ :SYNSEM LOC CONTENT NUCLEUS∼*act*) → (:SYNSEM LOC CONTENT NUCLEUS ACT ≈ :ARGSTR EXTARG FIRST)

c. the AFF-linking constraint:
(:∼*word* ∧ :SYNSEM LOC CONTENT NUCLEUS∼*aff*) → (:SYNSEM LOC CONTENT NUCLEUS AFF ≈ :ARGSTR INTARG FIRST)

The constraint in (16a) is informally paraphrased as follows: In an object of the sort *word*, the value of the feature CAUSE must be token-identical to the FIRST value of the feature EXTARG. The constraint in (16b) says that in an object of the sort *word*, the value of the feature ACT must be token-identical to the FIRST value of the feature EXTARG. On the basis of their lexical entailments, I assume that the subject of verbs *arbeiten* (to work), *tanzen* (to dance (to)), *laufen* (to run) etc. undergoes this constraint. The constraint in (16c) says that in an object of the sort *word*, the value of the feature AFF must be token-identical to the FIRST value of the feature INTARG. On the basis of their lexical entailments, I assume that this constraint holds for the subject of verbs *ankommen* (to arrive), *einschlafen* (to fall asleep), *wachsen* (to grow), *ersticken* (to suffocate), etc. The following two types of argument structure result from these constraints:

(17) a. intransitive verbs of Type 1

$${}_{\textit{argstr}}\left[\begin{array}{l} \text{EXTARG} < \boxed{1} > \\ \text{INTARG } \textit{elist} \\ \underset{\textit{nelist}}{\text{ARGS}} \left[\begin{array}{l}\text{FIRST } \boxed{1} \\ \text{REST } \textit{list (index)}\end{array}\right] \end{array}\right]$$

b. intransitive verbs of Type 2

$${}_{\textit{argstr}}\left[\begin{array}{l} \text{EXTARG } \textit{elist} \\ \text{INTARG} < \boxed{1} > \\ \underset{\textit{nelist}}{\text{ARGS}} \left[\begin{array}{l}\text{FIRST } \boxed{1} \\ \text{REST } \textit{list (index)}\end{array}\right] \end{array}\right]$$

It should be noted that the status of each argument will be directly induced by lexical semantic information, or equivalently, by the thematic structure in TLLT. The two types of argument structure above roughly correspond to the configurations of the dichotomous distinction of intransitive verbs.

For verbs like "*tanzen*" + directional PP (to dance to), "*laufen*" + directional PP (to run through), in which, beside the entailment *act*, the entailment *definite-change-of-location* can be also established, I define a further constraint such as in (18).

(18) the *definite-col*-linking constraint (parochial):
(:∼*word* ∧ :SYNSEM LOC CONTENT NUCLEUS∼*definite-col*) →
(:SYNSEM LOC CONTENT NUCLEUS ACT ≈ :ARGSTR INTARG FIRST)

This constraint says that in an object of the sort *word*, the value of the feature ACT must be token-identical to the value of the feature INTARG if the corresponding sort of this object is subsumed by the sort *definite-col*. This constraint may well be parochial to German. As a consequence, verbs like *tanzen* (to dance to), *laufen* (to run through) with an entailment of *definite-col* have an argument structure such as in (19a). The linking in TLLT is defined declaratively, so that TLLT allows such cases as Type 3 in the example (19a). It should also be noted that, since neither *cause*, *act*, *affected* nor *definite-col* may be assigned to the subject of weather verbs, verbs of emission etc. discussed in section 2.2, these verbs have an argument structure such as in (19b).

(19) a. intransitive verbs of Type 3

$${}_{\textit{argstr}}\left[\begin{array}{l} \text{EXTARG} < \boxed{1} > \\ \text{INTARG} < \boxed{1} > \\ \underset{\textit{nelist}}{\text{ARGS}} \left[\begin{array}{l}\text{FIRST } \boxed{1} \\ \text{REST } \textit{list (index)}\end{array}\right] \end{array}\right]$$

b. intransitive verbs of Type 4

$${}_{\textit{argstr}}\left[\begin{array}{l} \text{EXTARG } \textit{elist} \\ \text{INTARG } \textit{elist} \\ \underset{\textit{nelist}}{\text{ARGS}} \left[\begin{array}{l}\text{FIRST } \boxed{1} \\ \text{REST } \textit{list (index)}\end{array}\right] \end{array}\right]$$

In all, we get a logically complete typology of the subject: The subject argument is token-identical (i) only to the value of EXTARG, (ii) or to the value of INTARG; It can also be token-identical (iii) to the value of EXTARG and INTARG simultaneously, or (iv) neither to the value of EXTARG nor to the value of INTARG.

3.3 Summary: Unaccusativity in HPSG

The discussion in the previous section allows one to draw a conclusion that argument structure of intransitive verbs can be classified into four different Types. On the basis of this conclusion, I propose the Quadripartitive Split Intransitivity Hypothesis (QSIH).

(20) The Quadripartitive Split Intransitivity Hypothesis (QSIH)
Intransitive verbs are sub-classified into four classes to the effect that they have one of the four types of argument structure: The least oblique argument is token-identical (i) only to the external argument, (ii) only to the internal argument, (iii) both to the external argument and the internal argument, or (iv) to neither the external argument nor the internal argument.

Based on this typology of the subject argument, I propose a theory of SI in which two kinds of unaccusativity can be explicitly distinguished: the primary and the secondary unaccusativity.

(21) a. the primary unaccusativity $=^{def}$
:$\sim$*word* $\wedge$ (ARGSTR INTARG FIRST $\approx$:ARGSTR ARGS FIRST)

b. the secondary unaccusativity $=^{def}$
:$\sim$*word* $\wedge$ (ARGSTR EXTARG FIRST $\approx$ ARGSTR INTARG FIRST $\approx$:ARGSTR ARGS FIRST)

4 Split Intransitivity and Unaccusative Mismatches Revisited

The proposed approach to SI crucially draws the distinction of the distributions of the subject argument in the argument structure, which are deduced from lexical implications of each verb. Since the status of the external argument and the internal argument plays a central role in the further formation of grammatical structures, the token-identity between the external and the internal argument in the definition of the secondary unaccusativity has many promising consequences. I will briefly suggest the analysis of SI phenomena in German using the sorts and the status of the subject argument in the argument structure.

First, the auxiliary selection *sein* (to be) must selected for the formation of perfect tense if the index of the least oblique argument of a verb is token-identical to the list-internal value of the feature INTARG.[4] According to this analysis, verbs of Type 4 such as weather verbs, verbs of emission, and verbs of natural process, etc. select *haben* (to have) for the formation of perfect tense, just as verbs of Type 1 do. Second, the passive is, in general, only possible with verbs if the index of the least oblique argument of them is token-identical to the list-internal value of the feature EXTARG. Thus, the impersonal passive is possible with verbs of Type 1 or Type 3. Third, the past participle of a verb can be used as a prenominal attribute if the index of the least oblique argument of a verb is token-identical to the list-internal value of the feature INTARG. Fourth, `Agent` nominalization of a verb is basically possible if the index of the least oblique argument of a verb is token-identical to the list-internal value of the feature EXTARG. The discussion in this section can be summarized as follows:

(22) split intransitivity phenomena (in German) and the types of intransitive verbs

SI phenomena	Type 1	Type 2	Type 3	Type 4
auxiliary selection	*haben*	*sein*	*sein*	*haben*
impersonal passive	yes	no	yes	no
prenominal attribute	no	yes	yes	no
`Agent` nominalization	yes	no	yes	no

To sum up, Type 1 corresponds to the unergative verb, Type 2 to the primary unaccusative verb, Type 3 to the secondary unaccusative verb, and Typ 4 to those verbs including impersonal verbs which have not previously received any detailed account in the context of unaccusativity literature.

Finally, it can be pointed out that my proposal has some advantages over the previous approaches. Advantages are obvious, at least in the following aspects: First, weather verbs, verbs of emission etc. receive a more natural explanation in my approach than in the previous approaches [Type 4]. Second, UMs can be accounted for more systemtically in my approach, since they can be attributed to the properties of Type 3 verbs. Third, the unaccusativity changing verbs such as verbs of movement with or without a definite change of location [cf. *laufen* (to run) ± directional PP, *tanzen* (to dance) ± directional PP, etc.], which is regarded as Type 1 and Type 3 depending on their lexical entailments. Fourth, unlike other approaches in HPSG, the proposal here is semantically well-grounded and independently motivated.

5 Conclusion

Pointing out some problems of the dichotomous distinction of intransitive verbs, I proposed a quadripartitive distinction of intransitive verbs and developed theoretical tools to model this quadripartitive distinction within a framework of HPSG. To conclude, I hope to have shown that the approach advanced on the basis of the quadripartitive distinction of intransitive verbs properly subsumes all the predictions and the explanatory power of UH, and gives a reasonable explanation for UMs. The proposal made in this paper, I believe, is highly suggestive for the analysis of SI and UMs in other languages. A cross-linguistic research in the context of this proposal will certainly be crucial to the account of the other two kinds of UMs which I do not deal with in this paper, namely the cross-linguistic unaccusative mismatches and the language-internal unaccusative mismatches.

Notes

[1] There are at least three kinds of UMs, which should be distinguished from each other: (i) cross-linguistic UMs, (ii) language-internal UMs, and finally (iii) unaccusative hypothesis mismatches. I am not concerned with the first two kinds of UMs in this paper. See Ryu (1996) for a detailed discussion and see also Rosen (1984) for a discussion in the framework of Relational Grammar.

[2] There are further verbs showing UMs in German, which for the lack of space I will not discuss in this paper. These verbs include aspectual verbs such as *dauern* (to last), *enden* (to end), etc. and further verbs such as *sein* (to be), *werden* (to be), *bleiben* (to remain). See Ryu (to appear, chap. 6) for the detailed discussions of these and other further verbs showing UMs.

[3] The following symbols are used in King's Speciate Re-entrant Logic (SRL). The symbol : is a term which precedes a chain of attributes, indicating the root point. The symbol $\sim$ indicates the sort assignment, and the symbol $\approx$ indicates the sort equation.

[4] This analysis is somewhat oversimplified, even though it covers the data shown in this paper. A more precise analysis will be that the auxiliary selection *sein* (to be) must be selected for the formation of perfect tense if the index of the subject is token-identical to the index of the least oblique argument of a verb, the corresponding sort of which is subsumed by the sort *change-of-location* or *affected* in the sort hierarchy of *qfpsoa* [see Ryu (to appear, chap. 6)]. Verbs showing the mismatch between the auxiliary selection and transitivity such as *durchgehen* (to go through), *eingehen* (to enter), *anlaufen* (to run through), *angehen* (to approach), etc. [section 2.1], I regard, are treated as normal transitive verbs, perhaps with an exceptional property that the subject of these verbs have a metaphorical entailment of *change-of-location*. The selection of *sein* (to be) of these verbs receives a natural explanation within the proposal made above, given the assumption that the subject argument of these verbs is subsumed by the sort *change-of-location* via some kind of morphological inheritance [see Kathol (1992)].

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