Tanya Reinhart

SYNTACTIC REALIZATION OF VERBAL CONCEPTS: REFLEXIVES AND UNACCUSATIVES $^{^{1}}$

1. Introduction: Operations on lexical entries

As is well known, what appears to be the same verb, may often show up in very different syntactic realizations, as in the following examples.

1	a) b) c)	Max washed the child (Transit The child was washed. (Pa The child washed. (Re	ive) ssive) flexive)
2	a) b) c)	Max peeled potatoes Potatoes were peeled. Potatoes peel easily.	(Middle)
3	a) b) c)	Lucie rolled the ball. The ball was rolled. The ball rolled.	(Unaccusative)
4 5	a) b) a) b)	The coming exam worries Max. Max worries. Jouw gedrag verbaast hem. (Your behavior surprised him) Hij verbaast zich	(Experiencing)

(He surprises SE = He is surprised) (Experiencing)

In addressing such phenomena (or lexical structure in general), two distinct questions have been at times conflated: One is the question of the mapping (linking) from the lexicon (thematic structure) to syntactic structure, namely, which theta role should realize in which argument position. This is addressed bv principles like the Theta criterion, Baker's (1988) UTAH, or Grimshaw's (1990) mapping of argument-structure to syntactic structure, as well as many other linking proposals. I will not be concerned here with this question. The other question is the structure of the lexicon itself, e.g. do the verbs in each group which appear to have different thematic structure, above, correspond to one or more lexical entries. From the perspective of the first question, there is no problem in assuming massive ambiguities (homonyms) in the lexicon, and all that is required is

¹For extensive discussion and comments I would like to thank Peter Ackema, Martin Everaert, Eric Reuland, Eddy Ruys, Tom Roeper and Tali Siloni.

that the mapping rules associate each item correctly with а syntactic structure. In many respects, the situation here resembles that found in phonology: The lexicon is finite, so conceptually it seems possible to assume that no particular theory is needed for it, and it can be viewed as a large, possibly idiosyncratic, list of concepts. E.g. the three verb realizations in (1) could correspond to three lexical entries, differing in their thematic structure, and the independently needed mapping conditions would determine the syntactic structuers in which each can occur. Nevertheless, in practice, work on the lexicon is guided by the perception that there are generalizations relating apparently distinct items, which could not be just an accident. Thus, it is taken for granted the lexical entry underlying all three realizations of <u>wash</u> in (1) is the two place verb - <u>wash</u> (è1, è2). (Since I do not address here the mapping generalizations, I follow the notation proposed in Williams (1981), where the mapping is built into the lexical entry: \dot{e}_1 stands for the external argument, and \dot{e}_2 for the internal (patient/theme) argument.)

Let me tentatively state one such generalization, in its strongest form, which could serve as a theoretical hope, or initial heuristic, when analyzing the lexicon. As I just mentioned, I believe that (6) only states an implicitly assumed principle which guides, anyway, the research of lexical structure.

6) <u>Lexicon Uniformity Principle</u>.

Each verb-concept corresponds to one lexical entry with one thematic structure. ---> The various thematic forms of a given verb are derived by lexicon-operations from one thematic structure.

(6) assumes that each verb is associated with one and only thematic structure, from which other thematic forms can be derived by a limited set of lexicon operations. Obviously, this is only an initial statement. In any case, if it is impossible, empirically, to derive all different thematic forms of what appears as one verb, (6) leaves the option of arguing that these are, indeed, two verbal concepts, accidentally, or historically, related (homonyms)².

²Note that (3) is stated here only for the verb-category. It has been argued that category shifting may alter the thematic structure. E.g. Grimshaw (1990) argues that result nominals do not have an argument (theta) structure at all. Probably, adjectival passives (unlike verbal passives) also do not have the same thematic structure as their verbal form. Possibly, such category shifts could be reduced to general lexicon operations as well, but I will leave this open here, and concentrate on operations within the verb-category.

For (6) to be feasible at all, the set of possible lexicon operations should be fully defined. In practice, various such operations on thematic roles are widely assumed, under various formulations, most notably, in the work of Williams (1985) and Grimshaw (1990). I believe that the various operations can be reduced to just two, which we may label 'saturation' and 'reduction'. Their most obvious instance is passivization, for the first, and intrinsic reflexivization, for the second, (the operations which Grimshaw (1990) labels 'suppression' and 'lexical binding', respectively). Their semantic effects are best analyzed and in Chierchia (1989): The operation of saturation closes existentially one of the verb's arguments. Thus, it is realized semantically, though it does not project as a syntactic argument. Some (well known) tests for the semantic availability of saturated roles will be mentioned shortly. A reduction operation applies to a two place relation, identifies two argument, and reduces the relation to a property. The two operations are schematically illustrated in (7).

- 7) Operations on è roles.
 - a. wash \dot{e}_1 , \dot{e}_2
 - b. Saturation: \$x (wash (xè₂))
 Max was washed <---> Ex (x washed Max)
 - c. Reduction: $\underline{R(wash)} \dot{e}_1$ Max $R(washed) <--> Max \ddot{e}x(x wash x)$

When saturation applies, the interpretation always corresponds to that with two of the arguments being syntactically filled. E.g., with saturation applying to \dot{e}_1 , and <u>Max</u> selected for \dot{e}_2 , we get the passive structure, which is interpreted as in (7b). Reduction creates intransitive entry, with one role to fill an syntactically. The output (schematically) in (7c). For a always syntactically. is interpreted as For more precise analysis of the semantics, see Chierchia (1989).

The lexicon operations may require a morphological marking in syntax, or not. E.g. in Dutch, intrinsic reflexivization still marks the original argument (<u>Hij wascht zich</u>), while in English, it does not (<u>He washed</u>). There may also be further conditions effecting acceptability of the operation, but there is no reason not to assume that these operations, in and of themselves, apply in a uniform way.

Reduction is much more restricted than saturation. Reinhart and Siloni (forthcoming) argue that it can apply only to a pair of roles one of which is the external role. (I return to this point, as well as to the interaction of reduction and saturation in section 2.2.) Saturation, on the other hand, is a broad operation, and it can apply either to the external role, or to the internal one³. I discuss here only instances relevant to the subsequent discussion. Many other can be found in Williams and Grimshaw's work.

An instance where both external and internal saturation can apply is impersonal passives in Dutch. It is possible for transitive verbs to occur in such structures, with the object realized, as in (8). Saturation applies here to the external argument, and following the standard interpretation of saturation, these are interpreted as given in (8).

- 8 a) Er werd een Vals gedansd. **\$**x (x danced a vals) (There/It) was a Waltz danced.
 - b) Er werd een kind gewaschen. \$x (x washed a child) (It) was a child washed.
- 9 a) Er werd gedansd. \$x\$y (x danced y) (It) was dansed.
 - b) Er werd gewaschen. \$x \$y (x washed y)
 (It) was washed.

But the internal argument can also be just saturated, rather than syntactically realized, as in (9). We then have an instance of saturation applying to both arguments, interpreted as given in (9).

Though this has been extensively debated, I assume that middles are also an instance of saturation of the external role, i.e. the middle <u>peel</u> in (2c), like the passive in (2b), is derived in the lexicon from the transitive entry (2a), though middles differ from

i) Max is reading Ex (Max is reading x).

With external arguments, the lexicon operation has a morphological marking (passive), and is quite free. With internal arguments, it is restricted. (While <u>Plt is Max who hit first</u>, is possible, with stretching, in the right context, <u>*lt's Max who threw first</u> seems less so.) Further work on the lexicon may attempt to define the restrictions on saturation that would explain that. Another question which needs to be addressed before this can be maintained is what happens with the accusative case in such structures.

³Chierchia and others suggest that the optionality of the internal argument of many verbs (what used to be called indefinite object deletion) may turn out to be an instance of saturation of this role, as in (i).

passives on other aspects.⁴. If true, this role should be available semantically, though it is not realized syntactically. The clearest test for an available agent role is the occupance of an instrument role, which requires the (not necessarily overt) presence of an agent. Indeed, this is possible as in (10). For comparison, the unaccusative verbs in (11), which clearly lack an external role cannot occur with an instrument⁵.

- 10 a) Potatoes peel easily with our new knife.
 - b) Hair combs better with a golden comb.
- 11 a) *The ice defrosted with a hair-fan.
 b) *The machine stopped wita stick.

Next, in both passive and middle the saturated role can control <u>oneself</u>, as in (12), or PRO, as in (13).

12	a)	Passive:	Asparagus	should	never	be cooke	ed for	just
	b)	<u>Middle</u> A	sparagus ne	ever coo	ks well	for (jus	st) on	eself.
		It defini	itely requi	res compa	any.			
13	a)	<u>Passive</u> : them.	The potato	es will	be peel	ed after	PRO b	oiling
	b)	<u>Middle</u> :	The potato	es will	peel eas	ily after	PRO b	oiling
	,			c .	/.	C .		

c) <u>Unaccusative:</u> Babies often roll/turn after PRO putting

⁴Among the range of options proposed for the analysis of middles, one finds the idea that the external argument is realized as PRO, and the opposite, that it is absent altogether. Though space disallows going into the problems with these approaches, the analysis I follow is consistent with Roberts (1985), Ackema and Schoorlemmer (1995) and Ackema (1995), where these problems are discussed in detail. On this analysis, the external role is saturated, however, unlike in passive, the internal (patient) role is realized directly in external position, with no movement. Chierchia (1989) assumes a special kind of saturation for impersonal sentences, with a variable he defines as ARB(itrary). Possibly, similar semantics is involved in the saturation of the middle external role. There are many remaining problems to solve with middles, which I will not enter here.

⁵The well known by-phrase test for implicit agent roles is inapplicable here for independent reasons - by-phrases are not possible with arbitrary or generic agents, as in (i).

i) *The door should be opened by oneself.

Control into purpose-clause (in order to PRO) is also independently problematic, for reasons that will be mentioned briefly later. Roberts (1985) argues that generally such control is possible in middles with adverbial clauses, as in (11), (and that in Spanish and French middles, it is also possible with purpose clause).

them in bed.

In both (13a,b) it is not necessarily the case that the peeler and the boiler are the same person, but it is a possible interpretation. Again, this is impossible in the unaccusative (13c), which cannot mean that the children are rolled by those who put them in bed. Typically, such control is possible only if the original role still exists, as with saturation.

This still leaves unexplained the unaccusative and experiencing alternations, illustrated in (3) -(5). Semantically, it may appear that <u>The ball rolled</u> is equivalent to something like <u>Someone or</u> <u>something rolled the ball</u>, and <u>Max worries</u> to <u>Something worries</u> <u>Max</u>. These readings could be derived if the external role of the transitive entry is saturated, as in middles. However, there is ample evidence that this cannot be true. All tests clearly indicate that there is no residue of an external role in unaccusative and experiencing verbs. For the first, this was illustrated in (11) and (13c), but the same is known for the second as well. As widely observed, these verbs also cannot occur in the impersonal passive structures above, which require the existence of an external role to saturate.

The standard view (until recently) has been, therefore, that unaccusative entries, and one-place experiencing verbs are listed as independent entries. If a transitive entry for what appears to be the same verb also exists, this is just an accident. Thus, the verb <u>break</u> has in English the two separate entries, in (14)

14 a. <u>break</u> $\langle \dot{e}_1, \dot{e}_2 \rangle$: Lucie broke the plate. b. <u>break</u> \dot{e}_2 : The plate broke.

If so, then such entries violate the uniformity principle (6) (which is why (6) has not, indeed, been explicitly assumed so far as a committal principle.)

However, I will argue that unaccusative and (one-place) experiencing entries do originate as two place predicates, and they are derived from their transitive alternate by the reduction operation, rather than saturation (as proposed, for the first, by Chierchia (1989). For unaccusatives, I will do that in detail, and then turn briefly to experiencing alternations in section 4.

2. The unaccusative problems.

2.1. The questions:

Two apparently independent questions arise in the standard view

that unaccusatives are listed individually in the lexicon (as verbs selecting an internal \dot{e} - argument only). Ideally, we would like the answer to both to follow from the same analysis:

a. <u>How is the set of unaccusatives defined and acquired?</u> As pointed out in Levin and Rappaport (1992), and Borer (1994), if the set of unaccusative verbs is just an arbitrary list in the lexicon, this poses a certain learnability problem. This is particularly noticeable in a language like English, where there is no morphological marking of unaccusativity, and very little syntactic evidence for movement in unaccusative structures. The child has to learn that the sentences in, e.g. (15), have completely different syntactic structures.

15 a) She danced. b) She moved t

If in activating the lexicon, the English speaking child has to determine individually for each one-place verb if it is unaccusative or not, it is not obvious what he could base his decisions on. This problem would be avoided if the set under consideration could be defined, namely there would be a certain semantic or lexical property which the child can use to identify a verbal concept as corresponding to an unaccusative verb.

We should note that the learnability problem here does not have the formal properties of that problem in syntax. Since the lexicon is finite, nothing excludes formally the option that the full information on lexical insertion (the mapping) is genetically coded for each verbal concept, and as soon as a verbal concept is activated, this information is available. The problem is more analogous to that of word-level phonology, where it took some effort to prove that it is not learnt and stored as an arbitrary list, although the number of words in each language is finite.

b. What explains the morphological similarity between unaccusatives and reflexives? It has been widely observed that in many cases unaccusative and reflexive verbs have the same morphology. In Italian many unaccusative verbs occur with the reflexive clitic <u>si</u>, as in the examples in (16).

16) *Italian* romper-si =break scontrar-si =collide

In Hebrew, intrinsic reflexivity, as well as most other lexical processes, is coded in the verb morphology. There are several verbal- morphology forms ('binian's) an unaccusative verb can take, but many occur in the same form of intrinsic reflexive verbs - the so called 'hitpael' verbal form.

17) Hebrew:

a.	Reflexive verbs:							
	hitraxec,	hitlabesh	, hitgaleax, histarek					
	wash,	dress,	shave,	comb				

b. <u>Unaccusative verbs</u>: hitgalgel, hitmotet, hitalef, hitkamet roll, collapse, faint, wrinkle

In German and in Dutch, the common form of the unaccusative is just bare verb (similar to the standard unergative intransitive). But we nevertheless find verbs of the unaccusative family which occur obligatorily in the reflexive form. Thus while <u>break</u>, in German, looks like a standard unaccusative, in (18b), <u>open</u> has only the reflexive form (18a).

- 18) German a. Die Tur offnete sich /The door opened,
 - b. Die Tur zerbroch / The door broke

There are also cases where both a reflexive and an unaccusative form are allowed for the same verb, as in (19).

- 19 Dutch
 - a) De suiker is opgelost (onmiddelijk op in de thee). The sugar BE dissolved The sugar dissolved (immediately in the tea.)
 - b) De suiker heeft zich opgelost.The sugar HAVE dissolved SE (itself)The sugar dissolved.

The reflexive form of unaccusatives is much rarer in Germanic than in Romance. Still, if the two are unrelated, it is not clear why we should find any intersection at all.

We should add another system of marking a reflexive process - the null-marking system of English. Though this may appear trivial, it still remains the case that in English, therefore, unaccusatives and reflexives end up having precisely the same form (Max shaved, The stone rolled).

In sum, a lexical reflexive process can be marked: i. On the inflection system (Italian <u>si</u>). ii. On the argument (Dutch <u>zich</u>) iii. On the verb morphology (Hebrew) iv. Nowhere (English). The same marking is found in these languages also with unaccusatives, (though not necessarily in all unaccusative verbs). The question is why this should be so.

Both questions A and B have been widely addressed. Let me, first, take the time to argue that, nevertheless, neither is answered.

2.2. Question A: Can it be Aspect?.

There is a very lively line of research which attempts to define the set of unaccusative predicates by their aspectual properties (van Valin (1990), Borer (1994), van Hout (//), to mention just a few)°. Borer and van Hout argue that unaccusatives are those oneplace predicates which denote events (accomplishments or achievements)'. The strongest motivation comes from the case of directional predicates, like run to the park. In Dutch and Italian, such predicates select the auxiliary be, and show other syntactic properties characteristic of unaccusative derivations. This contrasts with, say, run in the park, which is unergative and Since the directional <u>run</u> is (aspectually) selects have. an event, and the other is a state, the aspectual definition of unaccusative verb predicts that the first is unaccusative, while the second is unergative.

If correct, the aspect approach would provide a satisfactory answer to question A above. The literature on the semantics of unaccusative predicates is ripe with <u>ad-hoc</u> semantic distinctions, which never got defined (in termof truth conditions), hence are hardly useful. (It is always possible to provide an apparent explanation for everything, if one is free to invent one's informal semantics for each new problem.) This is not the case with the aspectual distinctions, which on the one hand, are known to be a real linguistic phenomenon, with a substantial role in determining the truth conditions of sentences, and on the other, they form one of the better understood areas in formal semantics. Let me review briefly some of the basics.⁸

Over the years it was discovered that the semantically relevant distinction is just between two classes (rather than the four of

⁶This was also the line first taken by Levin and Rappaport (1992), but they retracted in their (1995) book.

⁷To be precise, van Hout argues only that event one-place verbs are always unaccusative. This weaker claim may be true, but then no answer is actually given, in her approach, to the question which one-place verbs are unaccusatives.

⁸An excellent summary of the semantic literature can be found in chapter 2 of Hinrichs (1985).

Vendler (1967)). Following Bach (1982), **states** include both (Vendler' and activities; statives states) events include accomplishments and achievements. Vendler's subdistinctions have no truth-conditional effects. As already stated by Vendler, the crucial semantic property distinguishing states and events is homogeneity, the same property that distinguishes mass-nouns from count-nouns. States and mass nouns are homogeneous, events and count nouns are not. The most useful analysis of temporal homogeneity, in my view, is still that based on ideas in Bennet and Partee (1972)⁹: Events denote temporally only one interval i.e. they do not have sub-intervals, while states do: If an eventsentence E is true in a given interval i, then there is no subinterval of i, in which E is true. State-sentences true in i, are true also at some subinterval of i. Let us see this with an example.

- 20 a) Max lived in Chicago between 1928 and 1931.b) Max drove his car between 8 and 12.
- a) Max wrote two novels between 1928 and 1931.

If (the stative) (20a) is true, then there must also be some time unit shorter than the given 3 years, in which it is true that he lived in Chicago. Similarly, if (the activity) (20b) is true, then there must also be some time unit, shorter than 4 hours, between 8 and 12 in which he drove his car (even if he made many coffee stops). Thus, both sentences in (20) are states. But if the event (21) is true, then there is no possible entailment that at any time shorter than the relevant three years Max wrote two novels.

Abstracting away from intervals, the same distinction is found between mass and count terms. Given a piece of gold, there must be some subpart of it which is also gold. While there is no subpart of a man or a table, which is also man or table. As is always the case with significant semantic generalizations, there are many semantic properties of sentences (entailments) that follow directly from this definition of states and events. For brevity, I will illustrate these later, together with my next point.

I should mention that along with the formal-semantics approach to aspect, there is another tradition, stemming from descriptive philology and discourse studies, whose key notions for defining events are 'end-points' 'delimitation' or 'measurements of events', under various formulations. (Foundational studies in this framework are Smith (/), Tenny (/) and Verkuyl (/).) The drive behind this work is a real shortcoming of the formal semantics

⁹They do not necessarily state it precisely this way. This is the interpretation of Bennet and Partee proposed in Reinhart (1986).

theory of aspect, namely, that it has not formulated so far the compositional derivation of aspectual properties: While it is known that aspect is a property of predicates (or propositions), which is determined by the interaction of the semantics of the verb, its complements, and various types of adverbs, there is no satisfactory theory of how this happens. However, the notions used solve this problem in the 'measurement' framework to are undefined, and are, probably, undefinable. The reason is that these may denote properties of situations in the world, but not of predicates, propositions, or intervals. E.g. in both examples of (20a) and (21), the reported states of affairs are equally delimited, measured, or have specified endpoints (They happened between 1928 and 1931). Let us assume further that Max lived elsewhere before 1928, and died in 1931, so there is no doubt that the state of affairs reported in (20a) could not stretch beyond these delimiting years. Still, this does not make (20a) an event in any linguistically relevant sense. Specifically, it does not have any effect on the entailments we observed, or the others to be mentioned. The same is true for the activity-predicate in (20b). Though the motivation is a real problem, and research in these directions has found many important facts, no real progress on this problem can come from replacing whatever is understood already with undefined notions.

Assuming, then, the defined notion of 'event', we may return to the question whether unaccusative predicates are events. If we leave aside for the moment the problem with directional predicates, we can see that this claim is incorrect (See also Ackema, 1995, IV). Looking at the sample set of verbs normally classified as unaccusative, in (22), we find both events and states (activities).¹⁰

22) **Events:** freeze, melt, blush, wither, wrinkle, open, break,

¹⁰That the state-verbs are indeed unaccusative was tested for Dutch. One of the tests is the prenominal position of past participle, which is allowed only with unaccusatives. Thus, grow patterns with fall in (i), as opposed to the unergative in (ii). (Examples are from Ackema, 1995: 177-178.) All activity verbs in (22) behave as in (i).

- i a) de jarelang gegroeide tegenzin (/toegenomen) the for-years grown dislike (/increased) h) de gevallen/gestorven nianist
 - b) de gevallen/gestorven pianist the fallen/ died
- ii) *de gewerkte/ gelopen pianist the worked /walked

drown, die, arrive, fall.
States: grow, develop, increase; blur, worsen; move,
drift, slide; spin, swing.

As I mentioned, there are various entailments depending on the state-event distinction. We may observe them now, for the groups in (22). The conjunction in (23a) entails that the events reported are temporally ordered. If we reverse the order of the conjunction, as in (23b), we get the reverse temporal-order entailment. So, (23a) and (23b) are not equivalent. Same with (24). This is not a general property of conjunctions. Those in (25) do not have this entailment: (25a, b) are equivalent. Same with (26).

- 23 a) The door opened and broke.b) The door broke and opened.
- 24 a) The leaves withered and dropped.b) The leaves dropped and withered.
- 25 a) The vaccum cleaner spanned and movedb) The vaccum-cleaner moved and spanned.
- 26 a) The child grew and developed.b) The child developed and grew.

This is not a matter of some vague world-knowledge effects. A well established generalization (Kamp (1979), Partee (1984)) is that a temporal sequence is obtained when both conjuncts denote an event, as in (23), (or, at least one of them does, under certain circumstances). But when both are states, as in (25-26), no temporal entailment holds.

Another set of entailments (discussed in Reinhart (1986) has to do with termination. While past tense events entail (loosely) that the event has ended, a past tense state does not:

27	a)	The	vase	broke	>	The	vase	is	no	longer	(in	the
		proc	ess of	E) breal	king.							

- b) The apple dropped --> The apple is no longer dropping.
- 28) a) The tree grew ~---> the tree is no longer growing.
 - b) He drifted (away) ~ --> He is no longer drifting.

Both the termination and the sequence entailments follow from the semantic definition of states and events above (and its interaction with reference-time). The way this works was outlined in Reinhart (1986) and Hatav (1989, 1991), though space does not permit showing this here.

The only remaining motivation for the aspect approach, then, is that when an unergative verb occurs with a directional PP (like <u>run to the park</u>) it shows clear syntactic properties of unaccusatives¹¹. However, a convincing alternative account for why this should be so, independently of aspect, is proposed by Neeleman (1994) and Ackema (1995). Very roughly, they argue that the thematic (predicative) properties of directional PPs enforce complex predicate formation, requiring that the PP subject must be identical to the matrix subject. This requirement can be best satisfied if the subject is generated in the internal position, and a chain is formed.

In conclusion, given the clear contrast in the entailments of the state and events unaccusative predicates above, there seems nothing to be gained by grouping unaccusatives into one vaguely defined aspectual class. Question (a) - what are the semantic properties that defines the set of unaccusatives and enable the child to identify them - remains unsolved.

2.3. Question B: Reflexives are not unaccusative.

Turning to the second question - why do we find, often, reflexive morphology ounaccusatives - an available answer is that it is, in fact, the other way around: Reflexive derivations are themselves unaccusative. Hence it could be argued that the morphology at question is unaccusative morphology, which is found also on reflexives, or in any case, that there is nothing surprising about their morphological similarity, given their syntactic identity. To judge by the list of its defenders, this appears to be the dominant hypothesis regarding the structure of reflexives. (-Marantz 1984; Grimshaw 1982, 1990; Bouchard 1984; Kayne 1988; Pesetsky 1995; Sportiche 1998 and others.). The starting point of these studies is reflexive clitics in Romance, as in (29b). What initiated this line was not so much the question of the morphological similarity of reflexives and unaccusatives, but the fact that the BE auxiliary shows up in Romance both in unaccusative and reflexive structures.

- 29 a) Jean l_i 'a tue t_i Jean him_a has killed
 - b) Jean s'est tue

¹¹It has also been suggested that directional run is not unaccusative, but auxiliary selection is, independently, determined by aspect, with events selecting be. However, many arguments against associating auxiliary selection with aspect are pointed out in Everaert (1994) (and see also references cited there). There is also additional evidence that unergatives with a directional PP do indeed have unaccusative syntax. (Neeleman and Ackema, below).

Jean SE₁ is killed /Jean killed himself.

c) <u>Movement analysis:</u> Jean, s'est tue t,.

Despite the superficial similarity of the pronominal and the reflexive clitics in (29), Kayne (1975) has shown unequivocally that the movement analysis standardly assumed for the first, is impossible for the second. So the clitic must be base-generated in its overt position. (Cinque (1988), argues that Italian si always resides in the head position of some I projection.) While that much, I believe, is shared by all approaches to clitics, the unaccusative approach assumes further that the subject in (29b) is base generated as object, and moves to its overt position, as in (2b9c). Regarding execution, there are two schools: On one, the external è-role is absorbed in the lexicon, or is otherwise not there (Grimshaw, Bouchard, Marantz). On the other, the reflexive clitic itself realizes the external argument (Kayne, Pesetsky, Sportiche).

Though these studies are based on evidence from Romance clitics, most assume that the analysis extends universally to all forms of reflexives across languages. Thus, they argue against the more traditional assumption of section 1, that the reflexive entry is derived from the transitive one by a reduction operation that reduces the internal role¹².

Reinhart and Siloni (forthcoming) defend the traditional reduction-view of reflexives. Here I will only summarize some of the points. Let us first look at the two major arguments brought up against it and in favor of the unaccusative approach.

The strongest argument against the reduction view is Marantz' (1984) examination of reflexivization into small clauses, as in (30b). (Marantz illustrates this in Icelandic (his 4.76). But the same point can be made for French:)

- 30) a) Jean, le, croit [t, intelligent] (Jean, believes/considers him, intelligent)
 - b) Jean se croit [intelligent]. (Jean believes/considers himself intelligent.)

31) <u>Marantz' analysis of (30b)</u>

¹²Grimshaw's (1990) execution, is still compatible with the reduction operation, except that she assumes that it is the external role which is reduced (bound in the lexicon to the second è-role, in her terminology.) She assumes that the reflexive clitic is a valency reducing morpheme which signals the process of lexical binding (reduction). Her analysis would not, therefore, handle the (Marantz) problem in (30) below.

- a. DS: e se-croit [Jean intelligent]
- b. SS: Jean, se-croit [t, intelligent].

With the pronominal clitic of (30a), no problem arises, since the clitic originates as the subject of the small clause and moves. However, as I mentioned, this was independently shown to be an impossible analysis for the reflexive clitic in (30b). Now, the reduction view would appear to work for (29b), assuming that a reduction operation took place in the lexicon, and <u>se</u> just marks that it took place. But it cannot work for (30b), since the two arguments it needs to operate on are not coarguments of the verb <u>croit</u>, and the complex predicate <u>croit intelligent</u> cannot possibly be listed as a lexical entry. By contrast, the unaccusative analysis assumes that the external role of <u>croit</u> is missing, as in (31a), and the sentence is derived as in (31b).

This is indeed a decisive argument against lexical reduction, but note that it holds only for clitic languages. We do not find, e.g. anything like (32a) in Hebrew, which reflexive-marks the verb, or (33a) in English, which uses no marking (as should be the case if reflexives are universally unaccusative). In these languages, a SELF-anaphor must be used here, as in (b).

- 32 a) *Jean mitxashev inteligenti Jean self-considers intelligent
 - b) Jean maxshiv [et acmo inteligenti] Jean considers [himself inteligent]
- 33 a) *Jean considers intelligent.b) Jean considers [himself inteligent]

Reinhart and Siloni argue that a reduction operation can take place either in the lexicon, or in the syntax. In Hebrew, Dutch and English (my sample systems here), it is a lexicon operation, but when a cliic is available (to absorb case), as in the Romancelanguages, it is a syntactic operation. This confirms Reinhart and Reuland's (1993) claim that clitics in Romance are not instances of intrinsic reflexivization (lexicon-reduction, in the current terminology). It also correlates with the fact that in clitic languages, reflexivization is a productive process, while in languages with a lexical process it is restricted to a fixed set of lexical items¹³.

a) *Jan hoorde zich /Jan heard SE

i

b) Jan hoorde (zich zingen) / Jean heard (SE sing)

¹³Note that the Dutch zich is not a clitic (as argued in Reinhart and Reuland (1993), but it occurs in an argument position. It is never sufficient to reflexivize a verb, as seen in (ia). In (iib), it functions just as a standard SE anaphor, observing their condition B.

Nevertheless, Reinhart and Siloni argue that the reduction operations (whose full scope will be explored in the subsequent sections) obey precisely the same constraints when they apply in the lexicon and in the syntax. In any case, if reduction is a syntactic process in French, then (30b) does not constitute any evidence that the external role is the one which got reduced, namely that (30b) has unaccusative structure.

Another popular argument in favor of the unaccusative analysis is the incompatibility of reflexive clitics with verbs lacking an external argument, as in the (b) cases below. (Bouchard 1984, Grimshaw 1990, Pesetsky 1995, Sportiche 1998.)

34 Passive

- a) Gianni gli e stato affidato. Gianni to him was entrusted.
- b) *Gianni si e stato affidato. (Gianni was entrusted to himself)

35 Raising

- a) Jean leur semble etre intelligent Jean to them seems to be intelligent
- b) *Jean se semble etre intelligent (Jean seems to himself to be intelligent)

This would follow particularly well from the view that the reflexive clitic always realizes, itself, the external role. Since in passive and in raising there is no external role, there is nothing that the clitic can attach itself to, so the sentences cannot be derived.

However, the same generalization easily follows also from the reduction view: Reduction (whether lexical or syntactic) can only apply if two free roles are available (one of which is external). In the raising case (35b), there are no two available roles, to begin with. In the passive (34b), the role is there, but it has been saturated (-it is not free).

Furthermore, there are cases where the unaccusativity generalization fails, while the reduction generalization works: With all due respect to the claim that the unaccusative analysis of reflexives is universal, Dutch must be an exception. Dutch <u>zich</u> is not a clitic. Like other languages where reflexivization is lexical, it can occur only with restricted (lexically reflexivized) verbs, as in (36b) (Reinhart and Reuland 1993). Nevertheless, it surfaces in object position. So it would be extremely hard to explain how it gets there, if it originates in subject, or I position, and if the overt subject is also generated in that same object position. (Also, reflexives in Dutch, unlike its unaccusatives, take the auxiliary <u>have</u>. See example (19).) The only realistic assumption is that the subject in (36a) originates in the external position (as in the reduction analysis) and <u>zich</u> is the residue of the reduced internal argument. (I return to this in section 5.) So if <u>zich</u> is still excluded in passive, this could not follow from a requirement that it is realized externally. This is indeed the case:

- 36) a) *Jan haat zich
 - Jan hates SE b) Jan wast zich Jan washed SE (Jan washed himself)
- 8 b) Er werd een kind gewaschen / **\$**x (x washed a child) There was a child washed.
- 9 b) Er werd gewaschen. / \$x \$y (x washed y) There was washed.
- 37) *Er werd zich gewaschen / \$x (wash (x,x))
 (there was self-washing)

Impersonal passives in Dutch can saturate one or two arguments, as we saw in (8b, 9b), repeated. However, this is impossible when the verb is reflexive, as in (37). Given the reduction generalization, this follows the same way that the Italian passive (35b) did: Since there is no free external role, reduction cannot apply.

So far, then, there does not seem to be evidence for the unaccusativity hypothesis for reflexives. The next obvious move is to check whether reflexives have indeed the syntactic characteristics of unaccusatives (which was, surprisingly, not done in most of the literature cited above). The famous test for unaccusativity in Romance is <u>ne/en</u> cliticization:

- 38 a) Sono arrivati tre ragazzi are arrived three boys /three boys arrivedb) Ne sono arrivati tre
 - (of them arrived three)
 - c) Si sono vestiti tre ragazzi si are dressed three boys / three boys dressed
 d) (*)Si ne sono vestiti tre.
 - (of them dressed three)
- 39 a) Il s'en est casse trois. b) *Il s'en est lave trois.

Three of them broke /*washed

While unaccusatives clearly allow this cliticization, as in (38b) and (39a), with reflexives things are less clear. Italian speakers seem divided on (38d), with some categorically ruling it out, and others ruling it in^{14} . Though I cannot explain this variation of judgment, such results cannot be interpreted as showing that reflexives and unaccusatives are syntactically alike. At the moment, this is an equally unsolved problem for both the unaccusativity and the reduction analyses. (Other tests for Romance are discussed in Reinhart and Siloni, where complications regarding (39) are also further explored.)

But in languages with lexical reflexivization, it can be observed decisively that reflexives behave syntactically like unergatives, and not like unaccusatives. In English, it is known that unergative verbs can form <u>er</u> nominalizations, as in (40), but unaccusative verbs cannot, as in (41) - Only verbs with an external argument allow this nominalization. As we see in (42), reflexives are possible here, i.e. they pattern with the unergative, and not with unaccusatives.

- 40 She runs so fast because she is an <u>experienced runner</u>.
- 41 a) *She moves so gracefully because she is an experienced mover.
 - b) *He is a rapid grower.
- 42 a) She dresses slowly because she is an elegant dresser.b) He shaves slowly because he is not an experienced shaver.

A crucial point about unaccusatives with reflexive morphology in Hebrew is that they still show all the syntactic traits of unaccusativity. But the reflexives with the same morphology behave as unergative verbs. The most striking trait of unaccusatives in Hebrew, as in Italian, is that the argument can remain in internal position overtly.

Still it bears subject properties: It is the DP that the verb agrees with, and it is nominative, rather than accusative. Post verbal subjects can be derived in two ways in Hebrew and Italian:

¹⁴Grimshaw (1990) mentions, as a problem, in footnote 3, p. 184, that Cinque informed her that they are out. Correspondingly, my informants are split the same way on word-order tests.

- i) a) E' rotolata una pietra / rolled a stone.
 - b) PSi e' vestita una donna / dressed a woman

While everyone accepts the unaccusative (ia), those rejecting the reflexive (38d), also reject (ib).

The one is via the so called 'stylistic inversion' which is believed to be verb -raising out of the S-V structure, yielding [V-S-t], (as argued e.g. in Friedemann and Siloni (1993)). But in the other, found only with unaccusative verbs, the subject argument which is generated in internal position, just stays there. I.e. the movement of the subject of unaccusative (and passive) structures to external position is 'optional', and the order [V-S] is obtained for them when no movement applies¹⁵. The distinction between these two options of obtaining V-S order in Hebrew and Italian is not always easy, since in both unaccusative and unergative structures, the V-S order is preferred when the subject needs to be stressed for interface reasons. But it is more easily observable in embedded clauses: The operation of Vraising is extremely marked there, while arguments generated post verbally may easily remain in situ. Using this diagnostics, we see in (43) that the reflexive verbs cannot occur with the subject in post verbal position. But the unaccusative verbs with the same form can, as in (44).

- 43 ani xoshev she /I think that
 - a) *hitraxec mishehu /washed someone
 - b) *mitlabeshet isha /dresses a woman
- 44 ani xoshev she /I think that
 - a) hitalef mishehu /fainted someone
 - b) hitgalgel sela /rolled a stone

Another diagnostics distinguishing unaccusative and unergative structures in Hebrew is that unaccusative allows possessive datives, as in (45a), which can generally modify only the internal argument (Borer and Grodzinsky (1986). Indeed, reflexives pattern here with unergatives, as in (45b).

- 45 a) ha-simla hitkamta le-dina. the dress wrinkled to Dina (Roughly, Dina's dress wrinkled)
 - b) *ha-yeled hitraxec le-dina. the child washed to Dina

¹⁵As have often been observed, this optionality is associated with pro-drop languages, where it may be argued that a null expletive is present when the subject does not move. Within the framework of the minimalist program, where checking of EPP features is separated from checking of case features, the most readily available way to explain this is to assume that the different derivations depend on whether a (null) expletive is selected in the numeration or not. If there is no expletive, the internal DP must move to check the EPP features. If an expletive is available, then it would be inserted in the checking position for the EPP (like the overt expletive there in English). The nominative features of the internal argument are checked covertly (again as with there sentences in English).

(Dina's child washed)

In conclusion, we saw that the unaccusative analysis of reflexives cannot be true for Dutch, English and Hebrew. The syntax of reflexives in these languages is unergative, as entailed by the reduction analysis. Whether the unaccusative analysis is feasible for Romance or not, we saw that the same facts follow also under the reduction analysis. We are left with the question of auxiliary selection, to which I return in section 5. Assuming that this question can be answered (and, in fact, even if it cannot), the linguistic facts do not justify abandoning the traditional unified analysis of reflexivization and assuming, instead, two so radically different syntactic systems across languages.

But this leaves us back where we started, with the morphology question B open: We have just established that unaccusatives and reflexives do not belong to the same syntactic class, showing as substantial a difference as that between unergatives and unaccusatives. If so, why can they have the same morphology?

Our goal, then is an analysis that answers both open questions A and B.

3. Answers - A reduction analysis of unaccusatives.

3.1. Question B: Unaccusative-reduction.

As we saw in section 1, the standard view has been that the two entries in (14), repeated, are listed separately in the lexicon, which goes against the lexical uniformity hypothesis (6).

- 14 a) <u>break</u> $\langle \dot{e}_1, \dot{e}_2 \rangle$: Lucie broke the plate.
 - b) <u>break</u> \dot{e}_2 : The plate broke.

To maintain (6), two lines are in principle available: One, proposed most notably in Pesetsky (1995), which I will address in section 3.2.3, is that (14a) is derived by some causativization operation from (14b). The other, which I follow, is the other way around.

In a seminal paper, Chierchia (1989) argues that the morphological similarity between reflexives and unaccusatives would be explained if unaccusatives are also derived from a two place verb, by some sort of reduction. That is, reflexive morphology is found when reduction takes place. The actual reduction operation Chierchia proposes is very different than reflexive reduction, and rather complex. (It applies, in fact, to an invisible CAUSE verb, assumed in lexical semantics). However, technical details aside, his basic insight, that (14b) is derived from (14a) by reduction, provides

the clue for the solution of the unaccusative problem, as well as to maintaining the lexical uniformity hypothesis in (6).

Let us assume (unlike Chierchia) that there is just one reduction operation, which derives a one place predicate (a property) from a two place predicate. It operates on a pair of external and internal role and reduces either one. This is stated, schematically, in (46a), where the remaining argument (\dot{e}_n) can be either \dot{e}_1 , or \dot{e}_2 . I postpone the discussion of the semantics of this operation until section 3.4. For now, this is just an operation of role-reduction.

46) Reduction: \underline{V} ($\hat{e}1$, $\hat{e}2$) ---> $\underline{R}(\underline{V})$ (\hat{e}_n)

When reduction applies to the internal role in (46a), the external role is syntactically realized, and the unergative reflexive structure is obtained, when the external role is reduced, the internal argument is syntactically realized, resulting in an <u>unaccusative</u> structure. Thus, <u>reflexive (unergative) entries are the output of reduction of the internal role; unaccusative entries are the output of reduction of the external role.</u>

The morphological realization of the transitive and the reduced alternates may vary. In Dutch, Italian, and English, the verb itself has the same morphology both. Hebrew, which has very rich verbal morphology, marks them differently. The same verbal stem occurs in two different verbal patterns ('binian's) in the transitive and the reduced form. (<u>kimet/hitkamet</u> -wrinkle; <u>heziz/zaz</u> -move; <u>patax/niftax</u> -open). I return to more specific questions of the morphological effects of the reduction operation in section 5.

The widely acknowledged pattern in (14) was assumed to hold only for a restricted set of verbs (probably those that allow it in English). However, if we look across languages, an overwhelming majority (possibly all) unaccusative verbs have, indeed, an active transitive alternate in some language or another. E.g. come and don't have alternates in English. However, the Hebrew verb die for <u>bring</u> is the transitive alternate of <u>come</u>, with the same stem but a different verbal morphology (<u>hevi</u> (brought)/ <u>ba</u> (come)). Same is true for <u>die</u> (<u>met</u> (died) /<u>hemit</u> (killed)). Chierchia notes that grow, which in English has both entries, has only the unaccusative alternate in Italian (<u>crescere</u>). The absence of a transitive alternate in a given language does not pose a serious problem for the analysis. We may assume, as proposed by Chierchia, that unaccusatives with no transitive alternate are derived from some abstract transitive verb, with the result frozen. It should not be too surprising to find that the lexicon contains some frozen forms. This is familiar from the area of intrinsic

reflexives. <u>zich-schamen</u> in Dutch (=be ashamed), or <u>behave</u> in both English and Dutch are frozen reflexives that cannot be used transitively. Levin and Rappaport (1995) claim that, nevertheless, some unaccusative verbs are not derived from a transitive verb. In section 2.2.3. I will argue that this claim is unfounded.

Given this unified reduction operation, we may also expect to find other similarities between reflexive and unaccusative outputs, besides morphological marking. We noted, e.g. that in Dutch, the two lexical procedures of saturation and reduction exclude each other, as in the case of the impersonal passive, discussed in (37), repeated. As is well known, one-place unergative verbs can occur in this construction, as in (47), but unaccusative verbs cannot as in (48).

- 47 a) Er werd gesprongen there was jumping b) \$x (jump (x))
- 48 a) *Er werd gegroied. there was growing
 - b) **\$**x (grow (x,x))
- 37 a) *Er werd zich gewaschen there was self-washing)
 - b) x (wash (x,x))

Though widely discussed, it is not obvious to me what the contrast between (47) and (48) is supposed to follows from, if unaccusatives are just one-place predicates, listed as such in the lexicon. As we saw in (9), existential saturation can apply also to the internal argument, so why couldn't it apply to the internal argument of the unaccusative verb?. Under the present assumptions, this correlates with what we saw for reflexives in (37): In both reduction is excluded since it has no two free roles to operate on.

This, of course, is just the first step. What we have now is an extremely powerful mechanism that allows us to derive for all transitive verbs a corresponding reflexive and unaccusative entry, which is obviously not what we want. (The same is true if we assume two distinct reduction operations for reflexives and unaccusatives, as in Chierchia's analysis). The question is if it can be restricted to generate just the actual entries. Specifically, we need still to answer question A: what is the set of actual unaccusative verbs.

3.2. Question A: The unaccusative set.

Lexical-semantics work on unaccusatives searched the answer to question A in the properties of the unaccusative verbs themselves. In our terms, it looked at the output, rather than the input of the reduction operation. Due to this intensive research, it seems safe to conclude that the outputs of reduction do not have significant shared properties. Under our assumptions, question A is restated: We have, to look at the lexical properties of the set of transitive verbs which underlie the unaccusatives, and search for the generalization allowing the external role to be reduced in just this set.

3.2.1. Preliminaries: è-features.

Laying the grounds for answering question A, let us first digress into an independent problem of \dot{e} -selection, brought up in Reinhart (1991). The standard assumption about S-selection is that the lexical entry specifies not just the number, but also the type of thematic roles a verb selects. Some commonly assumed roles are agent, cause, experiencer, instrument, and theme (or patient), among others. This works nicely for many verbs, e.g. the verbs in (51) - (52) select an agent, and nothing else is compatible with the verb. However, there is also a very large set of transitive verbs which defy this system. Thus, open allows an agent as its external \dot{e} -role, as witnessed in (49a) by the purpose-control. But it also allows an instrument (49b) and a cause (49c). The same is true for the sample of verbs in (50).

- 49 a) Max opened the window (in order to enter).
 - b) The key opened the window (*in order to be used).
 - c) The storm opened the window (*in order to destroy us).
- 50 a) Max / the stick / the blast rolled the ball.
 - b) The painter / the brush / autumn reddened the leaves.
 - c) Max / the storm / the stone broke the window.
 - d) The enemy / the waves / the bomb drowned the boat
 - e) Max / the storm / the hammer enlarged the hole in the roof.
 - f) Max /exercises /bicycles developed his muscles.
- 51 a) The father/*the spoon/*hunger fed the baby.
 - b) Max / *the leash / *hunger walked the dog to his plate.
 - c) Max / ?the whip / *the rain galloped the horse to the stable..
- 52 a) The baby/ *the spoon /* hunger ate the soup.
 - b) Lucie/ *The razor/*the heat shaved Max.
 - b) Lucie/ *the snow/ *the desire to feel warm dressed Max

The verbs in (50) are sometimes described as causative, but this does not help us very much, since those in (51) are also causative. There is a lively literature on the lexical semantics of the verbs in (50), to which I will return, but the problem we are dealing with here is not a problem of lexical meaning, but of stating selectional restrictions (ruling (50) in, and (51-52) - out). If all we have, to account for è-selection, is what assumed so far, then a verb like <u>open</u> must be listed as three entries, each selecting a different external è-role.

Alternatively, we should take the step taken a long while ago in phonology (from phonemes to features) and search for a system of formal features that compose \dot{e} -roles, and define \dot{e} -selection. Let me define such (preliminary) a system, which will enable also the solution to the unaccusativity question.¹⁶

Let us abstract away from 'path roles' like source and goal which seem to fall under a separate system (Jackendoff's (1990) 'thematic tier'). What we are concerned with here is the linguistic coding of causal relationships (Jackendoff's 'actor' tier). Causality plays a crucial role in all discussions of thematic structure 17 . There is obviously an overlap between the role CAUSE and AGENT - if an argument is an agent of some change of state, it is also a cause for this change. We may label this feature [c] - cause change. The difference is that agency involves properties of volition and intentions, which we label [m] - mental state. The same property distinguishes the EXPERIENCER role from THEME or PATIENT. Note that (as is standard) [m] entails animacy, but not conversely. An animate patient of an event (say someone who got ridiculed) may have all kinds of mental-states associated with that event. But we are talking about linguistic features, and the linguistic coding does not consider these mental-states relevant for the argument structure. Assuming binary features, the familiar \dot{e} -roles are, then, defined in (53).

¹⁶The idea has been around, of course. In a way, this is what Jackendoff (e.g. 1987) has been assuming. Though the actual feature system I am using here is different than those proposed, I cannot dwell here on defending it in comparison to these others.

¹⁷Grimshaw (1990) assumes a different division of labor between the two systems is different than assumed here. She takes the thematic roles to include agent, experiencer, goal, source, location, and theme, while CAUSE is her major aspectual role. This is based on a common approach which attempts to reduce aspect to causal relations (or hidden causal predicates). Though space prevents discussing this here, I doubt that this is a useful approach to aspect. Aspect may interact with causal properties, but the latter are the basic defining properties of any thematic structure. Grimshaw's crucial argument for CAUSE as belonging to the aspectual system comes from experiencer alternations, on which, as well, I take a different line, in section 4.

53) [c] = cause change. [m] = mental state involved.

> AGENT CAUSE/instrument THEME(patient) EXPERIENCER [c] + + - - -[m] + - +

As we see, this system does not distinguish between the roles INSTRUMENT and CAUSE. There is, however, no reason to assume additional features for that, since there is a lexical generalhere:

54) A CAUSE role is an instrument iff an AGENT role is also realized, in the derivation. or inferred in the interpretation.

The area where it is less clear whether the system in (53) is sufficient, is within the THEME role. I leave open here whether and how we need to capture distinctions as those between PATIENT and THEME, or between affected and unaffected themes.

Since the features are binary, four more options are available: [+c], [-c], [+m], [-m]. For the last three, it is, again, an open question whether they are realized¹⁸. However, [+c] is the solution to the problem at hand.

The verbs in (50) select a [+c] external role, while those in (52) select [+c +m]. So their lexical entries are as illustrated in (55)

55 a) $\frac{\text{break}(\hat{e}_{1 [+c]}, \hat{e}_{2 [-c -m]})}{\text{b}} \qquad \frac{\text{shave/eat}}{(\hat{e}_{1 [+c +m]}, \hat{e}_{2 [-c -m]})}$

This means that the external role of (52a) can be realized as either as [+c +m], namely an agent, or [+c -m], namely a cause or an instrument (since it is not specified for [m]). But the external role of (52b) must be agent. (The verbs in (51) also appear to select [+c +m], but, as we shall note later, they are most likely derived from a one place verb, and the agency of their external argument should be determined uniformly by the operation deriving them.)

3.1.2. The unaccusative set.

¹⁸For some discussion, see Kremmers (1998), who also applies this system to Pesetsky's (1995) target/subject matter problem.

It turns out, now, that the set of transitive verbs selecting [+c] is (precisely) the set of transitive alternates of unaccusative verbs. All the verbs in (50) have an unaccusative alternate (roll, redden, break, drown, enlarge, develop), and none of the verbs in (51-52) do. There are hardly exceptions to the claim that if an unaccusative has an active transitive alternate, that transitive can occur with both agent and cause as external roles. (The only exception I know of in English is the verb grow¹⁹. No doubt there are more exceptions, but the correlation is overwhelming.) As I will argue, the complement is also true: If we look across languages, there is hardly any unaccusative verb that does not have, in some language, a transitive alternate selecting [+c]. In any case, there are no unaccusative verbs whose transitive alternate select another e-feature, like [+c +m] (agent). Agent transitive sources allow only reflexive reduction, as with shave and wash of (52), for reasons I will return to.

With this, then, we can pursue the strongest (iff) definition of the unaccusative set, as follows: 20

56 A verb is unaccusative iff its verbal concept includes a [+c] role, and this role is reduced (is not realized).

In conformity with (6), each verbal concept corresponds to one lexical entry. Upon encountering, say, a sentence like <u>She moved</u>, the child, (having activated the concept underlying <u>move</u>) knows that this concept includes a [+c] participant. Since it is not realized, the child knows (by (56)) that the verb must be unaccusative, namely the overt subject must originate as the internal argument. With (56), we solved the learnability problem. (Though there are still some other problems to address.)

3.1.3. Alternative views.

3.1.3.1. For a lexical semanticist, the definition (56) (which was proposed more loosely in Reinhart (1991) may seem bothersome, since it is stated in terms of formal features, and does not give the air of being about meaning. Levin and Rappaport (1994, 1995) provide what they label 'a semantic account' for the set of unaccusative verbs. They accept the assumption of Chierchia

¹⁹E.g. (i) is incomparably worse than the standard with unaccusative alternates.

i) ??The weather condition in Southern France grow good grapes.

²⁰Obviously, the strongest the commitment, the more falsifiable the claim is, which is how it should be. But (56) does not entail that we cannot find sporadic exceptions in the lexicon of a given language. Since we are talking here about universal innate verbal concepts, only systematic exceptions across languages count. (1989), and Reinhart (1991), that when there is a transitive alternate, it is the basic form, but for cases which do not fit their semantic definition, they argue that they are not derived, but listed as unaccusative in the lexicon.

As in the discourse approach to aspect (e.g. Smith 1990, and others mentioned in section 2), the point of departure is not the verbs, but the eventualities which they denote (p.91). The oneplace verbs which are unaccusatives derived from transitive entries are those which denote 'externally caused' eventualities, while all other one-place verbs denote 'internally caused' eventualities. (L&R acknowledge Smith (1970) for the basic spirit of the distinction.) In the later, "some property inherent to the argument of the verb is 'responsible' for bringing about the eventuality "(p.91). With agentive verbs, this is the will of the agent, with others, like <u>shudder</u>, the internal cause is also some inherent properties of the shudderer "typically an emotional reaction", and with "emission" verbs like glow or buzz it is other internal properties of the participant like being able to reflect light or generate noise.

So far, this seems unobjectionable, since, no doubt, in all eventualities there is some participant whose inherent properties enable it/him to either generate or undergo the eventuality. (This is the enable of section 3.4. below) The crucial task is to exclude from this universal set the verbs denoting external causation, like <u>break</u>. L&R acknowledge the difficulty: "Although it is true that an entity must have certain properties in order for it to be breakable. Although it might be possible to conceive of something as breaking spontaneously, even so, it is most natural to describe such a situation by a sentence like <u>The vase</u> broke by itself... In contrast, internally caused verbs such as glow, cannot appear with the phrase by itself" (p. 92). I actually do not share L&R's feeling that if I look at the top shelve and discover that my favorite vase is broken, though no one could possibly have touched it, my most natural way to report this would by the vase broke by itself. Nor would I use the boat sank by itself to report that I saw a boat sinking in a calm lake, with no one around. I would actually only use such sentences if I (or someone I care to defend) was just accused for being responsible for these events, or if someone suggests an implausible natural cause for the relevant event. Nevertheless, the linguistic fact remains that such sentences are possible, while The amber glowed by itself is extremely odd.

But what do such linguistic facts tell us? As far as the world is concerned, there is always some set of physical circumstances that lead to a broken vase, though we don't always know what they are. But the same way, a piece of amber cannot just glow, without some source of light - the 'external cause' of the glowing. Though the physical relations are identical, we can still use <u>by itself</u> with the one, and not with the other. This can only serve to show that the distinction at issue is not between situations in the world, but between lexical entries -concepts coded in language. While L&M set out to define eventualities, they end up providing a gold-mine of linguistic tests and manifestations of a distinction which is indeed linguistically real, namely the distinction between verbal concepts which require a [+c] argument, and verbal concepts which require other arguments. (When the concept includes a cause argument, we can refer to it, even if we selected a lexical representation which does not realize it.) The moral here is precisely the same as observed for aspectual distinctions in section 2: It is impossible to define properties of the human language by defining properties of the world it can be used to describe.

The issue here is not just conceptual, but also empirical. Levin and Rappaport encounter a set of unaccusative verb that could not be possibly described as 'externally caused', even in the most impressionistic way. This is their group of "existence and appearance" with verbs such as <u>exist</u>, <u>come</u>, <u>remain</u>, <u>exit</u>, <u>arise</u>. they decide that we need two types For this reason, of unaccusative verbs: one which indeed derives from a transitive entry, and one which originates as unaccusative. To substantiate this, they have to rule out Chierchia's suggestion that when no alternate is available in a given language, this is because the entry is frozen in the lexicon in its reduced form. Their argument is based on the claim that the same set of verbs lacks а transitive alternate universally (and it is not reasonable that all languages freeze the same entries). However, in Hebrew, these verbs do hava causative alternate. L&R argue (p. 124) that this does not count because the alternation is not in the 'pieelhitpael' pattern (which is the morphologically reflexive form), but in 'paal-nifal' (maca / nimca - (find/exist)), or paal-hif'il (<u>yaca/hoci - (exit/take out), nish'ar/hish'ir (remain/leave</u> something)). However, this only confirms what we knew all along that unaccusatives, can, but do not all have to occur in the reflexive morphology (as, e.g. in Romance). Many of the most basic verbs in L&R's alternating ("externally caused") class occur in shavar/nishbar precisely the same pattern as these verbs: (break), nafal/hipil (fall/drop). Furthermore, some verbs of this group do occur in the reflexive pattern (hitpael), like romem, <u>herim / hitromem - (lift (abstract, concrete) /arise.</u>

The crucial fact, from the present perspective, is that the transitive alternates of the 'existence-appearance' set do not only exist, but also show the same [+c] selection²¹:

²¹As always, L&R have probably managed, nevertheless, to isolate a group of verbs which share properties distinct from the others, though not on the question of unaccusativity. Eg., as they

- 57 a) ha-hatkafa /lucie mac'a oto lo muxan The attack /Lucie found him unprepared.
 - b) Ha-hitragshut /lucie hocia oto me-hamita. The excitement /Lucie got him out of bed.

So these verbs confirm the unaccusativity definition in (56).

3.2.3.2. Our next question is whether the generalization underlying (56) cannot be captured the other way around, namely the transitive entries are derived from the unaccusative entries, as proposed by Pesetsky (1995). He argues that unaccusatives and reflexives are the underlying forms, and an affix CAUS enables deriving from them the transitive entry. Although he does not discuss the selection problem of section 3.2.1 above, it would be trivial to establish that the new role enforced by CAUS should be [+c]. Although I did not discuss this here, there exists a lexical operation which causativises a verb, adding a role. So it is reasonable to ask whether this may not be an instance of this operation.

The major problem is that it is not a general condition on the causativization operation that it enforces a [+c] role. In (51), repeated, we find classical examples of causativization. In English this is visible only for (51b,c), which are derived from the unergative <u>walk</u> and <u>gallop</u>, but in Hebrew, the verb for <u>feed</u> (heexil) is derived from <u>eat (axal)</u>, in precisely the same way as with the other two verbs (<u>dahar/hidhir (gallop</u>).)

- 51 a) The father/*the spoon/*hunger fed the baby.
 - b) Max / *the leash / *hunger walked the dog to his plate.
 - c) Max / ?the whip / *the rain galloped the horse to the stable..

These verbs strictly select an agent. Most likely, the lexical causativization operation either always selects an agent, or duplicates an existing role. If the transitive alternates of unacccusatives are also derived by this causativization operation, it is hard to see how the different selectional restrictions could

observe, the transitive alternate, just like the unaccusative, selects two complements. (Possibly leave in English is a verb with similar properties.)

Note also that not all of these verbs allow an instrument. ((57b) does, (57a)) does not). This could mean that the relevant verbs are specified for [+c -m]. If so, then even when they take an animate subject, it is not an agent. Since instruments are only possible with an implied agent, they are ruled out.

be captured. (More differences between the causativization in (51) and the unaccusative alternation are pointed out in Levin and Rappaport (1995, 3.2.5))

Other than that, this approach just leaves us with the same problems we started with. First, we saw already that reflexives cannot originate as unaccusatives, so the causativisation analysis is only conceivable for unaccusatives. But if reflexives and unaccusatives have such dramatically different derivational histories, why do they happen to have the same morphology? Next, while the set of verbs selecting [+c] is strictly defined, the unaccusative set is not, as we saw. So, under this view, the unaccusative property must be, again, listed individually for each relevant one-place verb.

3.3. The full picture.

Having determined the set we want to derive (the set of unaccusatives, as defined in (56)), we still have to derive it. We also have to guarantee that we capture the full range of the syntactic distinction between reflexive and unaccusative derivations, discussed in section 2.2.

3.3.1. A constraint on role reduction.

So far, we assumed the free reduction operation in (46) which applies to a pair of an external and an internal role, and can reduce either the external or the internal one, thus generating both unaccusative and reflexives lexical entries. Recall that in our terms a reflexive entry is simply an unergative entry (since the internal role is reduced).

46) Reduction: \underline{V} ($\dot{e}1$, $\dot{e}2$) ---> $\underline{R}(\underline{V})$ (\dot{e}_n)

So far this operation generates for each transitive entry, both an unaccusative and an unergative (- reflexive) entry, as in (58-59).

58)	a.	<u>roll</u> $\langle \dot{e}_1, \dot{e}_2 \rangle$: Lucie rolled the stone
	b.	$R(\underline{roll}) \dot{e}_2$: The stone rolled
	C.	$R(\underline{roll}) \dot{e}_1$: Lucie rolled.
59)	a. b.	<u>wash</u> $\langle \dot{e}_1, \dot{e}_2 \rangle$: Max washed the dishes $R(\underline{wash})$ (\dot{e}_1) : Max washed

c. *R(wash) (\dot{e}_2)

For (58), it has been often argued that, indeed, the unergative

entry exists. or at least that it is in principle possible for unaccusative verbs to have also an unergative derivation. More worrisome, however, is that we also generate the unaccusative entry (59c) for verbs like <u>wash</u>. (It will not be defined by (56) as unaccusative, but (56) is what we want to derive.) As we saw, in section 2.2. <u>Max washed</u> can only have a reflexive (unergative) derivation, but not an unaccusative one. Ruling this unaccusative derivation out is the heart of the matter, since, as we saw, whether the external or the internal argument is reduced has substantial syntactic effect. This is what distinguishes, e.g. (60a, b) in Hebrew (previously illustrated in (44)-(45).

- 60) a. ...hitgalgel yeled /Rolled a boy
 - b. *..hitraxec yeled /washed a boy -
- 61) a. Max wast zich /Max washed himself
 - b. *Max wast
 - c. De suiker loste /The sugar dissolved.

The problem is most easily noticeable in Dutch: Reflexive reduction is always marked with a <u>zich</u>, which fills the position of the internal role. Unaccusative reduction, by contrast, cannot realize a <u>zich</u> (since that position is occupied by the remaining argument) Unaccusative reduction, then, has in Dutch the same form as in English - just the bare verb, as in (61c). If (59b) was allowed, we should expect (61b) to be allowed, which is strictly not the case.

Recall that the external role of the transitive alternates of reflexive verbs (wash, dress, shave) is specified for [+c +m] (agent), and not for [+c] (see (50)). The generalization appears to be that an agent role cannot be reduced (which is hardly a surprising finding). However, as we shall see in the discussion of experiencers, this generalization as well, holds for è-features, and not for è-roles. Let us state this as the constraint on the reduction operation, in (62). (62) still entails that agents cannot be reduced (since one of their features is [+m].)

62) <u>Constraint on role-reduction:</u> A thematic role specified as [+m] cannot be reduced.

We continue to assume that reduction is a free operation, that can apply either to the external or the internal role, subject only to (62). With this, all the facts summarized in (59)-(61) are derived, as well as the fact that the unaccusative set can only be as defined in (56). If the external role is [+m], then only a reflexive (unergative) entry can be derived, as in (59b). Hence, the unaccusative derivations (60b) and (61b) cannot be generated. To be generated, the external role would have to be reduced). On the other hand, (60a) and (61c) can be generated, since the external role of their transitive source is ([+c]) and not [+m]. (So (62) does not prohibit its reduction.) As far as I know, external roles of transitive verbs are always specified for some combination of either [+m], or [+c]. Since [+m] roles cannot be reduced, it follows, more generally, that only if the external role is [+c](or [+c -m]), it can be reduced.²² Hence only such verbs allow an unaccusative entry, which is what the definition of the set in (56) states.

On the other hand, the system poses no restrictions on reducing internal roles (which are not [+m].) Hence, nothing excludes deriving also an unergative entry for a transitive verb like <u>roll</u>. We saw already that it is indeed not impossible for a [+c] verb to have both an unaccusative and a reflexive entry, as in (19), repeated.

19 Dutch

- a) De suikeis opgelost (onmiddelijk op in de thee). The sugar BE dissolved The sugar dissolved (immediately in the tea.)
- b) De suiker heeft zich opgelost. The sugar HAVE dissolved SE (itself) The sugar dissolved.

Reflexive-unaccusative alternates are also possible when no reflexive morphology is present. Thus, it has often been claimed that many unaccusative verbs across languages have also an unergative alternate. In our terms, this unergative alternate is just the reflexive alternate obtained by reducing the internal rather than the external role. E.g. Borer (1994) noted Hebrew alternations like (63).

- 63 a) hayeled nishar li ba-park the-child remained cl(to me) in the park =(roughly) My child remained in the park
 - b) hayeled nishar lo ba-park the-child remained cl(to him) in the park.

As mentioned, the possessive dative-clitic \underline{li} of (63a) is possible only with internal arguments. The dative-clitic of (63b) usually associates with external roles. In (63) we see that the same verb can occur with both clitics, So, it must have two entries. This follows now, since the unaccusative entry (63a) is derived by

²²The entailment of the system is that if there is a transitive verb which selects a role which is neither [+c] nor [+m], it also can be reduced, yielding an unaccusative structure. Possibly I am not aware of such verbs.

reduction of the external role of the transitive input (<u>hish'ir</u> - left), while the unergative entry, in (63b), is what we get if the internal argument is reduced.

Nevertheless, internal role reduction deserves more attention.

3.3.2. Reduction of the internal role.

It is often assumed that unaccusative verbs are rather free with their unergative alternates. Chierchia (1989) and Levin and Rappaport (1990, 1995) argued that this is always an option with animate arguments, which can either realize as the theme, in an unaccusative derivation, or as the agent, in an unergative one: That the subject in (64) can be an agent is witnessed by the agenthood tests.

- 64 a) Lucie rolled in order to impress us
 - b) Lucie rolled on purpose.
- 65) a) *Lucie rolde zich om indruk op ons te maken / opzettelijk Lucie rolled zich in order to impress us/ on purpose
 - b) Lucie rolde om indruk op ons te maken / opzettelijk

But if this is true, we run into a problem easily noticed in Dutch. As noted, a verb with a reduced internal argument is necessarily marked in Dutch with a <u>zich</u>. If an unaccusative verb can freely have a reflexive entry, we should expect to find (38a), which is, in fact, strictly out. Only the unaccusative entry in (65b) is possible.

On the other hand, the puzzle posed by (65b) is how a standard unaccusative can show these agentive properties, given that it lacks an external argument. Lasnik (1988) (following the spirit of Williams regarding implicit arguments) argued that many cases which appear to involve agent control, are, in fact, instances of event control. The value of PRO in (66) is not the agent (the one who broke the vase), but the event of breaking the vase. So the <u>in</u> <u>order to</u> phrase means something like (66b).

- 66 a) The vase was broken in order to hurt us.
 - b) (In order for) the breaking of the vase to hurt us.

The reason why volition seems to be involved in such cases, is because the adverbials (<u>in order to</u>, <u>on purpose</u>) imply the existence of an agent. Such adverbials, then, can be used also if an implicit agent can be semantically implied, rather than syntactically realized. (So the structure ends up meaning something like 'someone has generated the event e, on purpose / in order for e to hurt us). We may leave open here the question whether in passive structures, a standard agent control is also possible, along with event-control (given that under our assumptions a variable with agent role exists in the semantic representation of these sentence)²³. In any case, in the unaccusative structures under consideration, there is no available agent role, so sentences like (65) could only be accounted for as instances of event-control. It is the event of rolling that was on purpose, or in order to impress us. Since an animate participant is involved, agency and volition could be implied implicitly and license the volitional adverbials.

This view of control in unaccusatives can be further checked, based on thematic features. Since the value of PRO is an event, rather than an agent, the verb predicated of PRO must be of the type that selects [+c], but not [+m] or agent ([+c +m]). This seems on the right track:

- 67) a) Lucie fell (to the pool) in order to attract attention
 - b) */?Lucie fell (to the pool) in order to swim.
 - c) Lucie undressed in order to swim.
- 68 a) *Lucie fainted in order to rest.
 - b) Lucie washed in order to rest.

Verbs like <u>swim</u> or <u>rest</u> require an animate (agent) subject, Since in reflexive predicates the agent role is syntactically realized, it can control the PRO of such verbs, as in (67c) and (68b). But given that no such argument exist in the unaccusative cases, (67b) and (67c) are impossible.

So, there is no independent (control) reason to assume massive availability of an unergative alternate for unaccusative verbs. Nevertheless, the fact remains that with no further assumptions added, it is generated by our system. Furthermore, it does not matter at all whether the argument is animate. Reduction can generate an unergative entry also for <u>The stone rolled</u>, <u>The sugar dissolved</u>, or <u>The door opened</u>. The fact of the matter is that this entry exists indeed in Dutch, for <u>dissolve</u>, in German for <u>open</u> and in none of them for <u>roll</u>. This ties in with the fact I mentioned

²³Lasnik argues that passive allows only event-control. He uses sentences like (i) to show that no agent is available.

i) *The structure of DNA was investigated in order PRO to be awarded the Nobel Prize.

The reason the sentence is out is that the agent (investigator) is unavailable, and the value of the PRO must be the event (of investigating the DNA), and events cannot be awarded prizes. Roeper (1987) argues that arguments satisfied in the lexicon (saturated in our terms) must be available to control, and (i) is out because of the passive in the in order to clause.

already that, in languages where the reduction operation is lexical, reflexive reduction is a much more restricted operation than unaccusative reduction. It is not the case, e.g. that if a transitive verb takes an agent it automatically allows reflexive reduction. There is a fixed set of verbs that have a reflexive entry in many languages. The set of unergative alternates of unaccusative verbs is probably even more restricted and idiosyncratic. The reflexive-marked unaccusatives in Dutch and German (like <u>Die Tur offnete sich</u>) is sufficiently restricted to assume it is frozen in the lexicon, and the alternations like (63), in Hebrew are also not productive.

In conclusion, the system as we have it allows freely both the reduction of an external [+c] role, and the reduction of internal roles (which are not [+m]). In the first case, this seems extremely productive - It is difficult to find [+c] transitive verbs that do not have an unaccusative alternate across languages. In the second it is much more restricted. In languages with syntactic reflexive reduction, like Romance, this operation is completely free. But where reduction is lexical, only a restricted set of verbs allow it universally, and there is also much idiosyncracy across languages regarding which verbs allow both external and internal reduction. Finding the generalization lurking behind internal-role reduction must remain a future project.

3.4. What does it mean?

It is common in lexical semantics to assume that capturing lexical meaning requires abstract semantic representations which contain predicates invisible in the overt structure. Thus, both Chierchia (1989) and Levin and Rappaport (1995), assume, in different styles, in the tradition of Dowty (1979), that transitive <u>break</u> has a semantic representation like (69). (Chierchia's unaccusative reduction is stated to be applicable, in fact, only to the abstract representation in (69).)

- 69) break:
 - a) [[x do something] CAUSE [y become BROKEN]] (L&R)
 - b) ëx ëy \$b [CAUSE (_b(y), _BROKEN(x))]
 (Some action b of y caused BROKEN (x)) (Chierchia)

We should note, however, that despite the formal appearance of (69b), this is not a formal logical formula. As is well known, <u>cause</u> is not a logical relation, hence no actual truth conditions (entailments) can be associated with (69b).

Causal relations are imposed by humans on the input from the world, and the linguist's task is to understand what it is about language that enables speakers to use it to describe their causal perception. Translating English sentences into more complicated English sentences provides very little help on that. An alternative to the search in the realm of invisible abstract structures, is to look at the bstones that we know already that sentences are composed of. The è-roles associated with verbal concept are such block stones. We know they are included in the minimum necessary to relate verbal concepts to syntactic derivations, hence to sound. (This is what is captured by whatever version of the è-criterion). So we may ask what other work they do in relating derivations to the cognitive systems.

First we need some approximation of what causal perception is. (Note that now I am, indeed, talking about perception of eventualities in the world and not about language.) Miller and Johnson-Laird (1976) define three causal relations that humans use to organize their perception of events: The relation enable holds when one event is a necessary condition for the occurrence of the second. In (the events reported in) (70), Max could not have drowned unless he had entered the swimming pool. But it is not a sufficient condition, since many people enter swimming pools without drowning. The relation <u>cause</u> holds when the first event is conceived as a sufficient condition for the second. The glass falling in (71) is sufficient condition for it to break, (keeping in mind that this is a perception-driven, and not the logical, sufficient condition), but it is not a necessary condition, since there are other ways a glass could break. <u>Cause</u> holds also when one event is both a necessary and a sufficient condition for another.

- 70) Max entered the swimming pool and drowned.
- 71) The glass fell on the floor and broke.
- 73) Max was depressed, so he jumped from the roof.

The relation <u>motivate</u> holds when either <u>enable</u> or <u>cause</u> hold, and in addition, a mental state mediates the events. In (73), being depressed is a sufficient condition for suicide (<u>cause</u>), but it is a mental-state condition.

We may note now that there is a certain correlation between these relations and the è- relations we have been assuming: Suppose I want to peel an apple. The availability of an apple is a necessary condition for the execution, but not a sufficient one (the enable relation). The availability of a knife, on the other hand, is a sufficient condition (the cause relation). But the fact that I am, say, in the park at the time of my desire, and that it is morning, sufficient conditions neither necessary, nor for the are execution. Now let us look at the sentence She peeled an apple with a knife in the park. In our feature system, the instrument argument is [+c]. Generally, this (loose) correspondence holds between cause and all arguments specified [+c]. The theme argument (apple) is [-c -m]. Enable is the broadest relation: All internal arguments of the verb are associated with necessary conditions for the denoted event to take place, so they all have the feature [c]. The locative has no features, and is not part of the argument structure. As I mentioned in section 3.2., the present system can cannot draw further distinctions between internal [-c -m] arguments (like 'affectedness'), and I left it open whether and what more is needed. The relation of the participant denoted by she to the reported eventuality is the closest we find to <u>motivate</u>: Combined with a knife, her existence is a sufficient

condition for the apple being peeled, and, unlike the knife, her mental state determined that this should also happen. The agent argument <u>she</u> is specified [+c +m].

Obviously, this all is far from formal. But lexical semantics is dealing precisely with the non-logical aspects of meaning. So, returning to <u>break</u>, I cannot see what information is provided by the CAUSE predicate (69), beyond the direct interpretation of the [+c] feature as (what is perceived by human users of the sentence to be) the sufficient condition for the event that took place. And unlike abstract predicates, the è-features system is visibly at work in generating sentences, namely, there are other things, except for causal relations, that are determined by these features, as I tried to show.

In what follows, I will use the names <u>initiate</u>, as a shortcut for the relations that [+c +m] and [+c] bear to the reported events, and <u>undergo</u> for the relation of [-c -m] arguments, (These have no other status but shortcuts for whatever little I stated about what these relations are.)

We may turn, now, to the outputs of reduction. We assumed just the one operation in (46). So, so far what we get, applying it to <u>break</u> and <u>wash</u>, are lexical entries like (74).

- 46) Reduction: \underline{V} ($\dot{e}1$, $\dot{e}2$) ---> $\underline{R}(\underline{V})$ (\dot{e}_n)
- 74) a) $R(\underline{break} (\dot{e}_{2 [-c -m]}))$ b) $R(\underline{wash} (\dot{e}_{1 [+c +m]}))$

We do not know yet what the semantics of R is, hence, what the verbs in (74) denote, but we do know their relation to their remaining argument, so the glass R(broke) now states that the glass underwent R(break). <u>Max R(washed)</u> states that Max initiated R(wash). Now the question is what is R. For the reflexive operation, as stated in (7b), R(V) was defined as denoting a property which is, semantically, indistinguishable from the two place relation $\frac{ex}{ex}(V(x.x))$. Let us call this R the SELF function, and describe it with the funny notation in (75), where e stands for the argument that will realize, eventually, this e-role.

75) SELF(V) (è) <---> è (ëx (V (x,x)))

Now <u>Max washed</u> states that Max initiated SELF(wash) (and it entails <u>Max ($\ddot{e}x(x washed x)$)</u>. Can R be the same function in unaccusative reduction like (74a)? One potential objection, discussed in Chierchia (1989), appears to be the following: (76a), with a lexical reflexives is equivalent to the non reduced version (76b). But the unaccusative (77a) does not seem equivalent to (77b), and is, furthermore funny, implicating agenthood of the door.

- 76 a) Lucie dressed. b) Lucie dressed herself.
- 77 a) The door opened.
 - b) The door opened itself.
 - c) The door ex (x opened x).

This, however, is far less surprising, once the è-causal relations are considered. In both (76a) and (76b), Lucie is the [+c +m]argument. So using our shortcuts, (76a) states that Lucie initiated SELF- (dress(ing)) and (76b), that Lucie initiated dress(ing) herself. But in (77) the door bear different roles. In (77a), the output of unaccusative reduction it is the [-c -m]argument, while in the transitive (77b) it realizes the [+c]external argument. So (77a) states that the door underwent SELFopening, while (77b) states that the door initiated opening itself. In terms of causal relations, these is no reason to expect that they should mean the same thing. (The reason why (77) is funny is that it depicts the door as an initiating factor, i.e. as a sufficient condition for opening a door.)

The crucial question, however, is whether (77a) entails (77c). Since if R is defined as in (75), this is an entailment independent of causal relations, namely of the question whether the door underwent or initiated the self-opening described in (77c). (It is important however, to read (77c) as a formula and not as an English predication with an external argument.)

In reinhart (1996), I argued that nothing, in fact, rules out accepting this as an entailment. Causal chains leading to an open door can be long and complex. At their tail, however, we find a slight movement of the door, that led to the next, that led, eventually, to the door being open. This last stage, then, is the entailment we are considering. Suppose we are sitting in the room and the door opens. Our knowledge of the world tells us that such an event could not initiate itself. There must be someone at the door who did that, or the wind, or some cosmic vibrations. We could choose to be precise about causality matters and say Something or someone opened the door, or more efficiently, we could keep the external causer in the picture by choosing the passive The door got opened. But alternatively, we can abstract away from all these and describe just this last causal chain, where the initial state was a door closed, and the final is a door open. Stated this way, choosing an unaccusative form (applying reduction) means that we select out of the causal chain only these last steps in which the event did cause itself. This is probably the intuition Chierchia had, when, although awareof the apparently wrong entailment (77c), he described (77a) as some property of the door causing it to open (which has precisely the same entailment).

These, however, are delicate matters. I would like to point out that another account is available, albeit more complex. We need to assume two reduction operations (both turning a two place relation into a property, one for the external role, and one for the internal role, with different interpretations: (78a) is what we assumed so far, but now it needs to be restricted to apply (to a pair of free external and internal roles, as before and) reduce only the internal one (which is, essentially, what Chierchia assumes for this operation). For this operator, R_s is the SELF-function, with the semantics of (75), repeated in (78b). (78), thus, derives the reflexive entries.

- 78 <u>Internal role reduction -SELF-function</u> a) $V(\dot{e}_1, \dot{e}_2) \xrightarrow{-->} \underline{R}_s(V)(\dot{e}_1)$ b) $R_s(\dot{e}) \xrightarrow{--->} \dot{e} (\ddot{e}x (V(x,x)))$
- 79 <u>External role reduction Expletivization.</u>
 - a) V $(\dot{e}_1, \dot{e}_2) \longrightarrow \underline{R}_{e}(V)$ (\dot{e}_2)
 - b) $\underline{R}_{e}(\underline{V})$ $(\dot{e}_{2}) < --- > V(\dot{e}_{2})$
- 62) <u>Constraint on role-reduction:</u> A thematic role specified as [+m] cannot be reduced.

The external reduction (79), which derives unaccusative entries, eliminates the role altogether. It does not require any non-trivial semantic definition – Its output will denote just the property corresponding to $V(\grave{e}_2)$ (V(x)). So, it is semantically null. I borrow Chierchia's name 'expletivization' for it, though (79) is not his expletivization operation²⁴. Both reduction

Chierchia's expletivization operation is an altogether different function from propositions to properties. It is independently needed for seem type verbs. The VP seems that Max sneezed

 $^{^{24}}$ Chierchia assumes two reduction operations: One is (78), which he calls R, the other- $R_{\rm i}$ - reduces the internal role, as in (79), thus generating unaccusatives. However, Chierchia still assumes the same semantics for the two operations. i.e. both his R and $R_{\rm i}$ are SELF-functions. Further, unlike R, the unaccusative $R_{\rm i}$ applies to the complex CAUSE predicate. At least the way I read him, the reason why he finds necessary to do this is the semantic problem we discussed in (76)-(77). (Note that at the time the semantic problem was more serious, since, without the semantic spellout of è-roles introduced here, (77a, b) do end up indistinguishable. However, as I mentioned, this move does not solve the problem.)

operations are subject to the constraint on role reduction (69). Since both operations reduce a role, this still is the basis for an account of their morphological similarity.

Unaccusatives - the outputs of (79) - end up resembling that of the verb <u>seem</u>. The syntactic effects of this operation will be that either the remaining DP has to move to satisfy the EPP, or an expletive is inserted, as with <u>seem</u>. As mentioned already, this later option is realized, indeed, in pro-drop languages, like Hebrew or Italian, which have phonologically null expletive. In Hebrew, e.g. both <u>seem</u> and unaccusatives can occur in this form, as in (80), where the subject is a null expletive.

- 80 a) nir'ee li she-hu lo codek. seems to-me that he not right (It seems to me that he is not right.)
 b) higia shaliax
 - b) higia shaliax arrived messenger (A messenger arrived.)

As stated, the reduction operations still entail that reduction of the internal argument is reflexive. This means that the unergative alternates of unaccusative verbs discussed in section 3.3.2 are still derived by the (78),the same way we assumed before. If one finds the semantic consequences bothersome for

denotes, semantically, a proposition (since it contains no variables, or open properties). If we assume that predication (function application) must apply to combine it with the expletive subject, this is disabled, since the VP is not the right type. So expletivization applies to turn it into a property which can be predicated of the dummy expletive argument. (Chierchia assumes that this operation also introduces the expletive (a dummy semantic element), since in Italian it is not overtly available. This leads to some complicated assumptions that predication is required in the semantics, independently of syntactic requirements like the EPP. However, as we saw in pro-drop languages, there is a null expletive, so no further semantic justification is needed, beyond compositionality: Do not leave visible parts of the derivation uninterpreted.)

Now, after unaccusative reduction Rⁱ applies, the same situation is obtained: If the DP does not move, the VP sank the boat (in Italian) ends up denoting a full (saturated) proposition. So to enable function application, expletivization applies and turn it into a property. When the unaccusative DP moves, this is not necessary, since the VP remains a property (due to the trace), so function application applies it to the moved subject in the standard way.

It is obvious therefore that Chierchia's expletivization is not a lexical operation, but a type-shifting operation applying to syntactic derivations, to enable function-application. The reduction expletivization R_{\circ} I defined in (79), is a lexical operation with no semantic content. At the syntactic derivation, if the subject does not move, Chierchia's expletivization will apply the same way. I nevertheless find using the same name attractive, since R_{\circ} 'generates' the expletive, in the sense that it enforces a selection of an expletive (or movement of the DP).

this set, no technical problem will arise if we allow (79) to operate freely on any role, so the internal role could be reduced either expletivization (unergative alternates bv of unaccusatives), or by reflexivization (reflexives). However, as we saw there, internal-role reduction is highly restricted, and in the case of unergative-alternates, it is also language specific (frozen entries), while external role reduction seems completely free. So we might as well take advantage of the more complicated machinery just introduced, and restrict the problem of overgeneration to just reflexivization - (78), which anyway requires further restrictions.

4. Experiencer alternation.

Much attention has been paid to the different behavior of the experiencer argument in the two types of verbs in (48) (Belletti and Rizzi (1988), Pesetsky (1987) and Grimshaw (1990)).

49 a) Max hates / admires/ likes / fears thundersb) Thunders /surprise / worry / excite /frighten Max.

Under a common assumption, in both structures Max bears the experiencer role, and <u>thunders</u> the theme role. If this is so, it is puzzling that the syntactic position of the role can be reversed in the two structures. For some historical reason, the verb <u>fear</u> has been taken to be the prototypical member of the (a) (which is sometimes labelled the <u>fear</u> group). Perhaps qroup because this is the only (acknowledged) verb that happens to have a correlate in the (b) group (frighten). In fact, fear is the exception. The verbs of type (b) generally do not have an alternate of the form (a). To the extent that they can occur with the experiencer in external role, the second role would surface as a (demoted) PP. In Hebrew, all verbs of (b) have active alternates of this form, and <u>fear</u> behaves, indeed, precisely as an alternate of frighten with a demoted PP^{25} .

Abstracting away from <u>fear</u>, the verbs in (49a, b) do not, in fact have the same thematic entry, under the assumptions of section 5. While in both, <u>Max</u> is indeed the experiencer (-cause-change, [+m]), <u>thunders</u> is CAUSE ([+c]) in (49b), but it is <-cause-

²⁵Some relevant examples are:

- i) reamim madiigim / meragshim / mafxidim et Max Thunders worry /excite / frighten (acc) Max
- ii) Max doeg / mitragesh / mefaxed/poxed mi reamim Max worries /(is) excited/ fears from thunders.

change, -mental-state> in (49a) (i.e. theme). That verbs like <u>frighten</u> select only [+c] (which is non controversial for the work mentioned above in this area) can be witnessed by the fact that it allows the different realizations of this role in (50).

50) Lucie / the noise / the gun that Lucie was pointing at him frightened Max.

Based on thematic relations alone, there is no reason, therefore, to assume that the structures in group (b) could be derived from anything like the structures of type (a). There is also no independent è-motivation to distinguish these verbs structurally from all other verbs which select only [+c], i.e. from the transitive alternates of unaccusatives. Of course, the major motivation for assuming that the external argument in the (b) case is generated in some VP internal position has been anaphora, rather than thematic structure. So, I will leave open here the movement analysis question whether such is motivated independently²⁶.

However, an immediate entailment of the system proposed in section 5, is that the class of verbs in (48b) should allow lexical-reduction of the [+c] role, just as the transitive alternates of unaccusatives do. In English, this operation is hard to observe, since the reduced alternates occur only in adjectival forms, as in (51a). There are only a few cases, where the same relation is found with verbs, as in (51b) and (possibly) (52b).

- 51 a) Max is / excited / afraid. b) Max worries.
- 52 a) The alarm reminded Max that..
 - b) Max remembered that ...

However, in Hebrew, such verbal alternates exist, and they often occur in the same morphology of reduced verbs we observed for reflexives and some unaccusatives ('hitpael): <u>hitbalbel</u>,/ got confused, <u>hitragesh</u> /got excited <u>hitbayesh</u> /got ashamed <u>hictaer</u> /got sorry. Though, as in the case of unaccusatives, it can also occur in other forms: <u>daag</u> /worried; <u>nivhal</u>/got scared.

In Dutch, such alternations are found as well, and the reduced alternates always occur in the reflexive form, as in the <u>surprise</u> alternation in (53). Other verbs that allow this alternation are

²⁶One line to explore is whether, if such movement analysis is motivated, it does not apply the same way also in the full class of verbs selecting +cause change. If so, it can be argued that the reason why backwards anaphora is so much easier with experiencing verbs is that the antecedent in this case is animate.

listed in (54).

- 53 a) Jouw gedrag verbaast hem your behavior surprises him
 - b) Hij verbaast zich He surprises se /(=He is surprised)
- 54) <u>vervelen/zich vervelen</u> =bore/ SE-bore; <u>amuseren/zich amuseren</u> = amuse/SE-amuse; <u>vermaken/zich vermaken</u> = amuse/SE amuse; <u>opwinden/zich opwinden</u>
- 55) Fred/Freds gedrag/de discussie/de storm verbaasde hem Fred/Fred's behavior/the discussion/the storm surprised him

Given our analysis, the relevant reduction here must be of the type of accusative reduction. Recall that (62), repeated, allows reduction only of arguments not specified as [+m]. So the experiencer argument cannot be reduced. Furthermore, what the transitive alternates share with the unaccusative alternates is that the external role they select is specified only for +causing-change, as illustrated again for Dutch in (55).

62) <u>Constraint on role-reduction:</u> A thematic role specified as [<u>+m</u>] cannot be reduced.

However, while they share lexical properties with unaccusatives, these reduced verbs, can only occur in the reflexive structure (i.e. with the subject base generated externally). In Dutch they require $\underline{\operatorname{zich}}$, as we just saw. In Hebrew, they do not allow (neutral) post verbal subjects, as in (56), nor can they take possessive datives, as in (57). So, it may appear like we get the wrong syntactic predictionhere.

- 56 a) *hitragshu kama yeladim. got excited some children
 - b) *mitbayeshet isha. is ashamed a woman.
- 57) a) *hayeled hitragesh lax hayom
 - the child got excited to you today (=your child...)
 b) *hakelev nivhal li
 the dog got scared to me (=my dog...)

A question I left open in section 5.3. is the mapping between the lexical è properties of arguments, and the syntactic position they project in. As mentioned there, it is not realistic, in the long run to assume that this is captured individually for each verb in its lexical entry (by marking the syntactic position on the role). In practice, several generalizations have been assumed for the mapping from lexical entries to syntactic positions. One of them is what I assumed already in section 5.3, namely (58).

- 58) An argument bearing the AGENT role must be realized in the external position.
- 59) An argument bearing a [+m] role must be realized in the external position.

For the purpose of capturing the syntactic properties of intrinsic reflexives, (58) was all we needed. Since in these verbs the argument left by reduction is always an agent, it must be generated with the reflexive (external argument) structure. In the experiencer cases under consideration, the argument is not an agent. At first glance, it seems trivial to modify (58) to give the right result here, as in (59). Since experiencer arguments are also [+m], (59) determines that they must realize externally. Let me summarize how this works:

60 a) <u>Transitive alternate</u>: worry (è_[+c], è_{-cause-change, +mental state}) b) <u>Output of reduction</u>: worry (è_{-cause-change, +mental state})

The transitive entry is specified as in (60a). Lexical reduction can only yield (68b). (Given the constraint in (62), it cannot reduce the experiencer role.) What enters the numeration, then, is the entry (60b). The position in which the argument will be merged is not determined in the verb entry, but is governed by mapping generalizations. If (59) is assumed, the only DP in the numeration must be merged in the external position.

Of course, as I mentioned in section 5.3. it is still a long way before we have anything like precise and full mapping generalizations. So, let me just point out here the problem with leaving (59) as such. In the transitive entry (60a), (59), with nothing added, entails incorrectly, that we should generate (61b), rather than (61a). Assuming that the CAUSE argument in (61a) is generated externally and does not move (which as I mentioned has been debated independently of our problem), this derivation violates the generalization (59).

61) a) Thunders worry Max
b) *Max worries thunders.

To address such cases, a more complex statement of the mapping generalization is needed, which assumes a hierarchy of projectionprominence. (This, in fact, is a common practice in studies of the mapping from lexical entries to syntactic derivations. See, e.g. Grimshaw (1990), among many others). The portion of the hierarchy relevant here is given in (62). 62) $[+c] > [+m] \dots$

This means that when CAUSE role exists it must be projected externally. Similarly, when an agent role exists, since it is [+c]. ((62), thus, entails (58).) But when neither of these exist and a [+m] is present it is the one which must be realized. This last option is witnessed in reduced experiencer verbs (<u>Max</u> <u>worries</u>), and in the verbs of type (48a) (<u>Max hates thunders</u>). In fact, there is nothing disturbing about these three results, which, at the descriptive level, are largely assumed to hold.

5. Syntactic effects of the lexical operations.

The question posed in section 1 is now answered: The reason why reflexives and unaccusative predicates can, in principle, bear the same morphology is that they are derived by the same lexical operation of reduction (though we have not examined yet how this effects morphological marking). The reason why they nevertheless have such different syntactic structures is that in reflexive verbs, the argument that survives reduction must be realized externally. With this assumed, we can turn now to the effects that lexical operation entail for the syntactic derivation, and to the question what is the function of the morphological marking in the four languages under consideration.

5.1. Lexical operations and case.

Let us, first, examine the relations between thematic relations and case. We are concerned here with two place (transitive) verbs, of the type (43a), which form the input to the lexical operations. It is not uncommon to view the accusative case as a valency marker indicating that the verb takes two syntactic arguments. So verbs of this lexical form are associated with an ACC feature that must be checked. Verbs of this type enter the numeration, then, with the ACC(usative assigning) feature.

43 a) $V(\dot{e}_1, \dot{e}_2)$ b) <u>Numeration:</u> {... $I_{D(EPP)}$... $V_{ACC}(\dot{e}_1, \dot{e}_2), \{DP_i\}, \{DP_i\}, \}$

The CS determines, independently of the specific thematic properties of a given verb, that at some point of the syntactic derivation the D - EPP (Extended Projection Principle) features must be checked. I.e. there should be an argument, of the relevant category, which checks the D features of (some) I head, and, thus, serves as a subject. The subset of the numeration relevant for the present discussion, is represented schematically in (43b) (Obviously, actual numerations contain words and not V's or DP's). A standard Verb entry of this type, then, is associated with two roles, and two functional features that need to be checked for the derivation to converge. If two (relevant) DPs are included in the numeration, as in (43b), a derivation based on this numeration has good chances to converge. Now let us check how applying a lexicon operation may effect the functional features. It should be obvious that no such operation can touch the EPP feature, since this is not a feature of the verb, to begin with, and (on conceptual grounds) since it is a crucial stone-block in all derivations - what eventually defines the predication relation, so it cannot be eliminated. This leaves us, then, only with the option of checking what happens with the ACC feature.

Given our assumptions here, the operation of saturation (applying in passivization) cannot effect the ACC in the lexicon: Saturation does not eliminate a role: the verb remains a two place verb, with the \dot{e}_1 role an existentially bound variable (which is not syntactically realized, i.e. it does not enter the numeration). So, if ACC is a valency marker, the valency of the predicate remains the same. This means that the numeration contains the elements of (43b), but only one DP. Let us, for convenience, represent the relevant parts of the numeration as in (44).

44) <u>Passive Numeration:</u> {... $I_{D(EPP)}$... $[\$x(\dot{e}_1(x) \& (V_{ACC} (x, \dot{e}_2)], {DP_i}]$ }

The only DP of (44) will have to check the EPP feature, so something should be done about the accusative case in the syntactic derivation. I assume that, as in Chomsky (1981), the passive absorbs (or checks) the accusative case (rather than relating to the missing \dot{e}_1 role).²⁷ If the relevant morphology does not enter the numeration, the derivation will crash (-the accusative feature remaining unchecked). Since (passive) saturation cannot cancel accusative case, it is entailed that all languages should mark passive morphologically somehow, which appears to be the case. Even the morphologically poor English, which, as we shall see, does not mark reduction operations, marks its passive operation.²⁸

²⁷The alternative view which has been around is that passive morphology absorbs the external è role. Baker, Johnson and Roberts (1989) argue even that it is actually a clitic type argument, which gets the external role (in I), while also checking the ACC. Under the present system, which follows Williams and Grimshaw on that matter, this role cannot be either satisfied or absorbed, since it is there.

²⁸There must be, however, some other means available to deal with the accusative left by other instances of saturation. I have assumed here that middles and impersonal structures (In Italian) are also derived via some process of lexical saturation, but there is no morphological marking of the accusative there. It could, perhaps be argued that the adverb or negation, which are necessary in middles is doing that. Or that the generic air of such structures indicates that another type of lexical operation is involved. If 'indefinite object deletion' is also an instance of saturation, it is also not clear what takes care of the accusative case.

Now let ut us look at the effect of reduction. Note, first, that the potential effect of both types of reduction (unaccusative and reflexive) is precisely the same: They can only effect the fate of the accusative case.

- 45 a) <u>Reflexive-reduction numeration:</u> {... $I_{D(EPP)}$... $R(V_{ACC??}(\dot{e}_1)), \{DP_i\}\}$
 - b) <u>Unaccusative reduction numeration</u>: {... $I_{D(EPP)}$... $R(V_{ACC??}(\dot{e}_2)), \{DP_i\}$ }

The one DP (that could meet the è requirements at the interface) must check the EPP features. So whichever lexical reduction operation applies, we are left with the accusative case to be addressed. The difference between saturation and reduction is that, reduction does, in fact, reduce valency of the verb. So, in principle, it is possible for the accusative case to be eliminated in the lexical entry, before even entering the numeration. Hence the question mark on the accusative in (45), and I address this question directly.

What we saw, then, is that as far as the syntactic derivation is concerned, all lexical operations have a unified effect of disabling the checking of a case by a DP, and in the languages we are examining, the relevant case is always the accusative. We may broadly refer to this process as the elimination of the accusative case, though technically, this can be obtained by actual elimination in the lexicon, or by checking the accusative residue by some other morphological means. We thus get something very close to Burzio's generalization, in (49).

- 46) <u>Burzio's generalization:</u> If the verb does not assign an external role, it does not assign accusative case.
- 47) <u>Mapping generalization for Lexical-operations:</u> If a lexical operation applies to a two place verb, one (accusative) case must be eliminated.

Burzio (1986), (1994) assumed that the lack of accusative is directly associated with the lack of an external è role, which appears to be true for most cases. However, we saw that it does not matter which role of a two place predicate is absent from the numeration, due to a lexical operation. In reflexives, the external role is assigned, and still accusative is eliminated. His basic insight can, then, be stated as in (47).

While in the languages we examine here (of the Nominative-Accusative type) (47) effects the accusative (V-internal) case, in the framework of the minimalist program, there is no conceptual reason why this should be the only option available for UG. Once EPP features are separated from case features, there is no principled reason why both case-features cannot originate on the verb, as valency markers (assuming e.g. that the external case can be checked covertly in the given language). It is thus possible that a lexically internal argument ends up checking the EPP feature on the one hand, and the internal case on the other. An account for the ergative-absolutive languages can be sought along these lines, as pointed out, under a different execution, in Burzio (1994). As he argues, in principle, it could also be possible to find a nominative - accusative language that nevertheless allows the single DP to check the accusative, rather the nominative case, as appears to be the case in Icelandic.²⁹

With this assumed, we can turn to the way the languages under consideration realize the generalization in (47), in the case of lexical-reduction operations.

5.2. <u>Reduction-marking</u>.

As I just mentioned, when a reduction operation applies in the lexicon, the valency of the verb is reduced. In principle, it is possible that this operation itself eliminates the accusative feature of the verb, so no accusative feature enters the numeration. This, indeed, is the case in English, which just does not show a morphological, or any other trace of the original (lexical) accusative feature in either reflexive or unaccusative structures (Lucie rolled, Lucie washed).

However, the three other languages under consideration all have some morphological or other marking of reduction lexicalprocesses. There are two ways these various ways of marking could be viewed: One is that case in these languages is more resistant to lexical operations. So, the accusative feature is not fully reduced, but some 'trace' or some residue of the original accusative feature is left. This residue is weaker than the original accusative left in passive, which requires special morphology. But it nevertheless needs to be addressed in the numeration and the syntactic derivation. The other option is that

²⁹A common assumption about ergative-absolutive languages is that the absolutive case appears always on the subject of unergative verbs. However, Burzio (1994) argues (based on previous literature) that, in fact, only unaccusative subjects occur obligatorily with the absolutive case, (while unergative subjects may have any of the two cases). This is consistent with the view of lexical reduction as forcing the elimination of the external, rather than the internal case in these languages. Burzio also argues that a similar process (coached under a different terminology) explains the Icelandic data. These issues are extensively discussed in Chomsky (1994), chapters 3, 4.

what the morphology marks in such languages is not the residue of case, but the residue of the thematic-role. Namely, the morphology marks that a lexical operation took place. It is, in principle, possible that some languages marks the one and others mark the other, or some languages mark both. I do not have sufficient evidence to decide between these options in the languages under consideration. So I will just outline briefly the types of marking found in these languages, leaving the two options open.

Hebrew, as mentioned in section 1, marks all lexical processes on the verb morphology. (Reflexive verbs occur generally in one pattern (<u>hitpael</u>); unaccusative verbs can occur in the same pattern, but also in others.) There is no evidence or reason to assume that this verbal morphology is related to case in any way. It seems more likely that the morphology marks the lexical Italian uses the clitic <u>si</u>. As in Hebrew, this process itself. clitic is obligatory in the case of a reflexive operation, but can occur with all other lexical operations. A detailed analysis of how si is generated is offered in Cinque (1988). He argues that it always originates on the AGR's head (though in his system it can be coindexed with an argument). Here again, it seems more likely that <u>si</u> marks a lexical process, rather than dealing with case, i.e. it stands as some residue of a reduced role (as, essentially, suggested in Grimshaw (1990)). Since it originates in I, and not in any argument position, it can actually be associated with any role effected by a lexical operation.

The more interesting question arises in the case of Auxiliary selection. As is well known, Italian uses the auxiliary <u>be</u> (<u>essere</u>) with both reflexives and unaccusatives. (In fact, this holds not just for reduction, but for all lexical operations, including middle and impersonal structures. Dutch uses obligatorily the auxiliary <u>be</u>, with unaccusatives, but not with reflexives. Reflexive reduction occurs with <u>zich</u>.

As in the case of the passive morpheme, there are two lines available on AUX selection in unaccusatives: It either marks the missing external role, or the missing accusative case. (That Aux selection is sensitive to case considerations, rather than to \dot{e} roles, is argued in Everaert (1994).³⁰.) Given our assumptions, a \dot{e} -account cannot be restricted to marking the external role. In Italian, reflexive verbs select <u>be</u> as well. As noted in section 1, there seems to be some evidence that, nevertheless, their subjects must be generated externally, though I had to leave the decision open, in view of the conflicting judgments. However, if the \dot{e} -account is viewed as the marking of a lexical process, <u>be</u>

³⁰There is also a family of accounts attempting to explain it independently of either of these, in terms of aspect. Arguments against this line can also be found in Everaert (1994).

could be viewed as signalling that some argument is reduced or not realized syntactically. Under the case view, the verb still carries an accusative residue. We may assume that this residue is handled in (some) inflection projection. Some checking element must always be present there, although it is witnessed overtly only when an auxiliary is present: An accusative residue in the derivation requires the Aux $\underline{be.}^{31}$

The obvious question (for both views), then, is why Dutch (and German) differ from Italian in this respect: Why do reflexive, unlike unaccusative verbs in Dutch always select have? I suggest that the difference lies in the lexical inventory of the two Dutch has an anaphoric argument <u>zich</u>. As argued in languages. Reinhart and Reuland (1993), zich has, on the one hand, some (weak) inherent case, which is why it can occur in a syntactic argument position at all, but on the other hand, it lacks full specification of phi-features, which is why it does not induce a chain-violation when it forms a chain with a co-argument³². This distinguishes <u>zich</u> from the Italian <u>si</u>, which, as mentioned, is not an argument, but a clitic originating on I (- AGR). Under the case view, the availability of a semi-case argument, enables Dutch to use it to check the accusative residue left by reduction. In a reflexive structure, the external argument is merged on the Vexternal position. Hence, the V-internal position is available, and can be occupied by the zich. The external argument checks the EPP, while the pale case-feature of <u>zich</u> checks the pale accusative-residue on the verb. However, in the unaccusative structure the DP must be merged in V-internal position. When it move, then, to check the EPP, the accusative residue remains unattended. For such derivations to eventually converge, the same

³²Reuland (1996) argues that what makes anaphors of this type referentially defective is (possibly universally) the absence of the plural feature.

³¹Several lines attempt to relate the fact that be is itself unaccusative, to its obligatory selection in the case of unaccusative verbs, again, along the two lines of theta or case. An interesting èbased account is offered in Ackema (1995), who assumes that have has an external role to assign (via merging with the verb), hence it cannot be used when such a role is lacking. An alternative case-based direction, also discussed by Ackema, is that be selection correlates with the fact that have has full accusative case to assign (via merging with the verb), hence it cannot be selected with an unaccusative, while be has no case, or in our terms, its case is reduced just as the verb's.

Since zich occurs in a syntactic argument position, it would violate reflexivity condition B if coindexed with the subject with no reflexive marking (as in <u>"Jan haat zich</u>). However, in the cases under consideration (like Jan wast zich), a reflexive reduction operation applied. Hence, the verb is appropriately reflexive marked, and neither condition B nor the Chain condition are violated.

Inflection device as in Italian must be introduced in the numeration. Its existence will be, again, overtly noticeable when AUX is present, forcing a <u>be</u> rather than <u>have</u>.³³.

Alternatively (under the view that what is marked in these languages is \dot{e} -role reduction, rather than case), it can be argued that while \underline{si} can mark any argument, due to its position, \underline{zich} , which must occur in an argument position, can only mark a missing argument in whose position it can be generated. For independent reasons (of case and EPP) it can only be generated in the internal role position, hence it can only marked a reduced internal role.

I should mention that although I find the case account for AUX selection more appealing, the reason why I am hesitating to suggest it for Italian is that <u>be</u>, just like <u>si</u> can occur there also when the accusative case is fully realized. This arises in the case of impersonal structures, such as (48), from Cinque (1988, (43a) and (72b)). We may assume that impersonals of this sort involve some sort of lexical saturation of the external role. (as made explicit in Chierchia (1989), (1995).) The EPP feature is possibly checked with an empty expletive. The result is that the accusative argument of a transitive verb may remain intact. Still, both <u>si</u> and <u>be</u> occur. In (48a) <u>be</u> is selected although a full internal argument remains. In (48b) this internal argument is an accusative clitic. For an approach relating both <u>si</u> and <u>be</u> to the effect of lexical operations on è-roles, rather than on case, this is the predicted result.

³³This view of the case-functioning of zich sheds light on a long standing mystery (not addressed by Reinhart and Reuland (1993)). The binding domain of zich is that of SE anaphors, namely, it can be bound from inside a small clause, by a matrix argument, as in (ii). Still, it cannot occur in an accusative position of a small clause, as in (i), and it must be embedded in a PP.

- i) *Jan: hoorde (Lucie zich: critiseren) *Jan: heard (Lucie criticise SE)
- ii) Jan: hoorde (Lucie tegen zich: argumenteren) Jan: heard (Lucie argue against SE:)

No binding account exists for this contrast, and it does not also follow from the agreementmovement analysis of SE anaphors, assumed in R&R and many others. (Nothing known could make SE movement to matrix AGR easier out of the PP in (ii) then in (i).) But under the assumptions here, it may be concluded that zich's pale case features are sufficient to check the accusative residue (left by a reduction operation), but not a full-fledged accusative feature, as in (i). In the PP case (ii), the case is inherent, hence the pale zich features are sufficient.

- 48 a) Oggi, a Beirut, si e ucciso un innocente Today in Beirut, [one] si <u>be</u> killed an innocent.
 - b) Qui, li si mangia specco Here si often eats them (acc).

References:

Ackema, P. (1995), Syntax below zero, OTS publications, University of Utrecht Ackema, P. and M. Schoorlemmer (1995), "Middles and movement" Linguistic Inquiry 26.2 p. 173-197. Baker, M. K. Johnson and I. Roberts (1989) "Passive arguments raised" Linguistic Inquiry 20, p. 219-252 Belletti, A., and L. Rizzi (1988) "Psych-verbs and è theory" Natural Language and Linguistic Theory 6, p. 291-352. Borer, H. (1994), "The projection of arguments" in E. Benedicto & J. Runner (eds) <u>Functional Projections</u> GLSA: Amherst p. 19-47. Burzio, L. (1986) Italian syntax: a government and binding approach, Reidel: Dordrecht. Burzio, L. (1994) "Case uniformity", ms. John Hopkins University, (Burzio@mail.cog.jhu.edu) Chierchia, G. (1989), "A semantics for unaccusatives and its syntactic consequences", ms. Cornell University (University of Milan). Chierchia, G. (1995) "The variability of impersonal subjects" in E. Bach, E. Jelinek, A. Kratzer and B. Partee (eds), Quantification in Natural Languages, Kluwer Academic Press. Chomsky, N. (1981), Lectures on Government and Binding, Foris, Dordrecht. Chomsky, N. (1995) The minimalist program, MIT Press, Cambridge, Mass Cinque, G. (1988), "On Si constructions and the theory of Arb" Linguistic Inquiry 19.4 p. 521-581 Everaert, M. (1994), "The encoding of the lexical semantic structure of verbs: The case of Auxiliary selection in Idioms", in. E.W. Weigand and R. Hundsnurscher (eds) Lexical Structures and Language <u>Use</u>, Proceeding of the international conference on Lexicology and Lexical Semantics in Munster, 1994. Max Niemer Verlag, Tubingen, 1996. Friedemann, and T. Siloni (1993), AGR(object) is not M-A. <u>AGR(participle</u>, to appear in <u>The Linguistic Review</u>, 14. Grimshaw, J. (1982), "On the lexical representation of Romance reflexive clitics" in J. Bresnan (ed) The mental representation of grammatical relations, MIT Press, Cambridge, Mass Grimshaw, J. (1990) Argument Structure, Mit Press, Cambridge, Mass. Higginbotham, J. (1985), "On semantics" Linguistic INquiry 16, p. 547-594. E. <u>A compositional semantics for Aktionsarten andNP</u> Hinrichs, reference, PhD dissertation, Ohio State University. Jackendoff, R. (1987), "The status of Thematic relations in linguistic theory", <u>Linguistic Inquiry</u>, 19, p. 369-411.

Jackendoff, R. (1990) <u>Semantic Structures</u>, MIT press, Cambridge, Mass Lasnik, H. (1988), "Subjects and the Theta criterion" <u>Natural</u> <u>Languageage and Linguistic Theory</u>, 6, p. 1-17.

Levin, M. and B. Rappaport (1992), "Unaccusativity at the syntaxsemantics interface" ms. Northwestern University and Bar-Ilan University.

Marantz, A. (1984) <u>On the nature of grammatical relations</u>. Cambridge, Mass: MIT press.

Pesetsky, D. (1987) "Binding problems with experiencer verbs" <u>Linguistic Inquiry</u> 18, p. 126-140.

Pinto, M. (1996), "Information focus: Between core and periphery", ms. OTS, university of Utrecht, to appear in the Proceedings of LSRL, 1996.

Reinhart, T. (forthcoming) <u>Interface strategies</u>, to appear in MIT Press, Cambridge, Mass.

Reinhart, T. and E. Reuland (1993) "Reflexivity" Linguistic Inquiry 24.4 p. 26183-321.

Reuland, E. (1996) "Primitives of binding", ms. OTS, University of Utrecht (presented at GLOW, Tromso).

Roberts, I. (1985), <u>Implicit and dethematized subjects</u>, PhD dissertation, University of Southern California.

Roeper, T. (1987), "Implicit arguments and the head-complement relation" <u>Linguistic Inquiry</u> 18, P. 267-310.

Shlonsky, U. (1987) Null and displaced subjects, PhD dissertation, MIT.

- Williams, E. (1981), "Argument structure and morphology" <u>Linguistic</u> <u>Review</u>, 1. p. 81-114.
- Williams, E. (1985), "Pro and subject of NP" <u>Natural Language and</u> <u>Linguistic Theory</u> 3, p. 297-315.

==== Baker's (1988) UTAH, or Grimshaw's (1990)

van Hout (//) -dissertation
Hinrichs (1985).) dissertation
Vendler (1967).
Bach (1982),
Bennet and Partee (1972)
Reinhart, T. (1986) "States, events and reference time"

given at the MIT Lexicon project (Handout). Smith, C.S.1991 The Parameter of Aspect. Kluer, Dordrecht

Smith (1970) (Levin and R)

Tenny (/) and Verkuyl (/) - earlier book.)

Neeleman (1994)

Reinhart and Siloni (forthcoming) Against the unaccusative analysis of reflexives. in Hatav (1989)

Lecture

Hatav 91

Parsons (1990)

Dowty 1991 Dowty 1979

Miller, G. and P.N Johnson-Laird (1976) <u>Language and Perception</u> Hrvard University Press, Cambridge, Mass Borer, H. and Y. Grodzinsky (1986) "Syntactic vs. Lexical Cliticizatoin: The case of Hebrew Dative Clitics, in H Borer (ed) The syntax of pronominal Clitics, 175-217, Academic Press, San Francisco Kremers, J. "Theta role mapping" ms. University of Utrecht Levin and Rappaport (1994) A Preliminary analysis of (De) causative verbs in English" <u>Lingua</u>, 92:35-77