

1987

Compound Psych-Adjectives and the Ergative Hypothesis

Ian Roberts
Université de Genève

Follow this and additional works at: <https://scholarworks.umass.edu/nels>



Part of the [Linguistics Commons](#)

Recommended Citation

Roberts, Ian (1987) "Compound Psych-Adjectives and the Ergative Hypothesis," *North East Linguistics Society*. Vol. 18 , Article 25.

Available at: <https://scholarworks.umass.edu/nels/vol18/iss2/25>

This Article is brought to you for free and open access by the Graduate Linguistics Students Association (GLSA) at ScholarWorks@UMass Amherst. It has been accepted for inclusion in North East Linguistics Society by an authorized editor of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

COMPOUND PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

Ian Roberts

Université de Genève

1. Introduction: a class of adjectives

There exists in English a class of synthetic-compound adjectives consisting of the elements indicated in (1):

- (1) "body-part" (BP) Noun - Verb - ing

This class is productive; the following is a selection of typical examples:

- (2) awe-inspiring, breath-taking, ear-splitting,
gut-wrenching, heart-breaking, mind-boggling,
mouth-watering, spine-chilling.

Standard tests for adjectivehood show these compounds to be adjectival. In this respect, they are distinct from the prenominal modifiers in -ing of the type in (3), and similar to the adjectives derived from psych-verbs of the type in (4):

- (3) a crying child
a sleeping dog
the talking heads
- (4) a frightening thought
a depressing movie
an amusing story

IAN ROBERTS

The syntactic diagnostics for adjectivehood (as discussed, for example, by Wasow (1977)) group the -ing elements in (2) with those in (4), in contrast to those in (3). Consider:

(5) Postcopular position:

- a. The movie seems depressing.
- b. *The child seems sleeping.
- c. The book seems heart-breaking.

(6) Adjectival intensification:

- a. The movie is very depressing.
- b. *The child is very sleeping.
- c. The book is very heart-breaking.

On the basis of the data in (5) and (6), we conclude that these compounds are fully adjectival. We refer to them henceforth as compound psych-adjectives, and to adjectives like those in (4) as simple psych-adjectives. In what follows, we will show that the argument structure of these adjectives is of some theoretical interest in that they can show us three things about lexical structure: (i) that there are ergative adjectives; (ii) the internal structure of morphologically complex elements; (iii) that there are ergative nouns.

2. Ergative Adjectives

Our first task is thus to establish that compound psych-adjectives are ergative. One context in which we can see whether an adjective is capable of assigning an external θ -role is that where an adjective is in a predication relation with a subject NP, as in (7):

- (7) John left the room sad.

We assume, following Chomsky (1986a), that predication relations of the type which holds between sad and John here are established by the adjective assigning a θ -role to the subject. Therefore, any adjective which is unable to assign an external θ -role would be unable to establish a predication relation with the subject from this position.

Now, there exists a small class of raising adjectives in English. Like raising verbs, raising

PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

adjectives have no external argument. Given the reasoning in the above paragraph, we expect such adjectives to be unable to appear in the context of (7) and be construed as predicated with the subject. Control adjectives differ minimally from raising adjectives in having an external argument (both types of adjective have infinitival complements), and so we expect a minimal contrast between control and raising adjectives in predicative contexts. This is in fact what we find, as (8) shows:

- (8) John walked to the scaffold ready/*likely to die.

This contrast establishes, independently of any property of psych-adjectives, that predicative contexts are a diagnostic for whether an adjective can assign an external θ -role.

With this background, consider the adjectives derived from non-stative psych verbs of the type exemplified by amuse, depress, frighten, etc. There are two ways of forming adjectives from these verbs, either by affixation of -ed or by affixation of -ing. What we find is that the two kinds of derived adjective contrast minimally in predicative contexts:

- (9) a. John arrived home depressed/*depressing.
 b. We left the theatre amused/*amusing.
 c. We left the castle frightened/*frightening.

In light of our account of the contrast in (8), these contrasts indicate that the -ed adjectives can assign an external θ -role, while the -ing adjectives cannot. The -ed adjectives pattern with control adjectives in being able to appear in the predication context, and the -ing adjectives pattern like raising adjectives in being banned from this context. If -ed adjectives assign an external θ -role while -ing adjectives do not, the reason in both cases is the same: adjectives with no external argument cannot establish a predication relation with the subject.

We assume, following Belletti & Rizzi (1988), that psych-Verbs of the class in question have an ergative argument structure of the type shown in (10):

- (10) [[V cause] exp]

IAN ROBERTS

For Case-theoretic reasons, the inanimate Cause argument raises to subject position in the derivation, as a regular instance of NP-movement.

If (10) represents the argument structure of the verb from which the adjectives are derived, the natural conclusion is that the -ed adjectival form is derived by a process which involves externalization of the Experiencer argument and the deletion of the Cause argument. On the other hand, since (9) shows that -ing psych-adjectives have no external argument, there is no reason to suppose that attaching -ing to form an adjective effects any change in the argument structure of the verb. This means that -ing psych-adjectives have the argument structure shown in (10). The only differences between the verbs and the -ing adjectives are, first, that the adjectives mark their Experiencer argument dative (indicated by to or for), while the verbs mark them accusative, as shown in (11):

- (11) a. That movie depressed (*to) me.
 b. That movie seemed depressing *(for) me.

We take it that this difference in Case-assigning properties is related to the general fact that verbs in general assign structural Case (accusative), while adjectives in general assign non-structural Case (dative). If so, then the contrasts in (11) are simply a consequence of the change in category from verb to adjective, and have no direct connection to argument structure. (A second difference is that the Experiencer argument appears to be optional with the adjectives, but not with the verbs; this may also be Case-related if non-structural Case is not obligatorily assigned).

Just like the corresponding verb, the derived adjective in (11b) does not assign Case to its direct argument, the bearer of the Cause role. So this argument undergoes NP-movement and appears as the surface subject, with an associated trace in object position, giving representations like the following:

- (12) a. John is amusing t (to the children).
 b. That movie was depressing t (for all of us).

PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

The above paragraphs show that simple psych-adjectives are ergative. We will now show that the same is true of compound psych-adjectives.

If we apply the predication test discussed and illustrated in (7-9) we find that compound psych-adjectives lack an external argument (note that the -ed adjective mind-boggled may not in fact exist, but it could be coined and it would be grammatical, unlike the attested mind-boggling in this context):

- (13) a. John arrived home heart-broken/*heart-breaking.
 b. We left the class ?mind-boggled/*mind-boggling.
 c. We entered the castle ??spine-chilled/*spine-chilling.

By parity of reasoning with the above paragraphs, then, we should say that an adjective like heart-breaking has the argument structure in (10). So compound psych-adjectives must also be ergative.

Moreover, compound psych-adjectives have the same Case properties as their simple counterparts; they assign dative Case to the indirect internal argument (where this is present) and no Case to the direct one. Thus the direct internal argument undergoes NP-movement to subject position, giving a representation like the following:

- (14) a. This story was heart-breaking t (to all of us).
 b. That movie was spine-chilling t (for the children).

In this section we have seen evidence that both kinds of -ing psych adjectives are ergative based on their inability to appear in predicative contexts. (There is a further argument for the ergative nature of these adjectives based on the distribution of dative reflexives; however, the argument requires a number of technical assumptions, and so we will not present it here for reasons of space).

IAN ROBERTS

3. Affixes, Arguments and Adjunction

The conclusion that psych adjectives in -ing are ergative has several consequences.

First, as we mentioned earlier, it means that the proposal made by Levin & Rappaport (1986) that adjectives must have external arguments is false. This in turn means that the proposal for the mechanism of externalization in adjectival-passive formation made by these authors cannot be correct as it stands. In this we concur with Cinque (forthcoming).

Our second conclusion, on the other hand, appears at first sight to pose a problem for the proposal made by Cinque (pp. 39-40) for deriving the externalization property of adjectival passives. Cinque proposes that it is the attachment of an affix which triggers externalization; categories must be in a strict sisterhood relation with their direct internal arguments in order to θ -mark them, but the presence of an affix will block this relation. Therefore the stem externalizes its internal argument. Cinque says:

A quite general prediction follows from this analysis. Should there be other morphological processes deriving adjectives from ergative/passive verbal forms, they should also yield unergative adjectives, since the change in category would bring with it a consequent change in the θ -grid of the input.

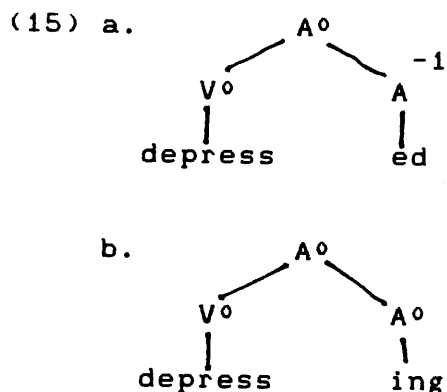
(40, emphasis his).

It seems that the evidence regarding psych adjectives that we have seen in this section goes against this prediction as here we have a clear case of an ergative adjective being derived from an ergative verb by affixation.

We will briefly sketch what we see as a possible solution to this problem. The solution requires two things: (i) the theory of adjunction of May (1985), adopted by Chomsky in Barriers, (ii) a strict adherence to the idea that internal θ -roles, at least, may only be assigned in a relation of sisterhood (recall that α and β are sisters iff all and only those nodes which dominate α also dominate β).

PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

Extending May's proposals for adjunction below the word-level, we propose that stems are adjoined to -ing, but are sisters to affixes like -ed (presumably as a consequence of some kind of morphological selection operating in the lexicon; cf. Rizzi & Roberts (to appear) on morphological selection). The two kinds of affix thus give rise to derived words with rather different morphological structures, as follows:



In (15a), the verb cannot assign an internal θ -role for precisely the reason Cinque suggests: the affix blocks the required sisterhood relation. Hence the verb's θ -grid must be manipulated in order to allow its argument structure to be realized properly (in the case of psych verbs, these manipulations are quite complex as the verbs have two internal arguments to begin with). In (15b), on the other hand, the verb is able to assign its θ -roles as normal, as, given the definition of sisterhood above, A^0 does not dominate it. Therefore an NP which is sister to A^0 will also be sister to V^0 , and thus can be assigned a θ -role directly by V^0 . So we see that the fundamental difference between -ing and -ed is not that the former does not change argument structure but the latter does, but rather that the former has stems adjoin to it while the latter selects stems as sisters.

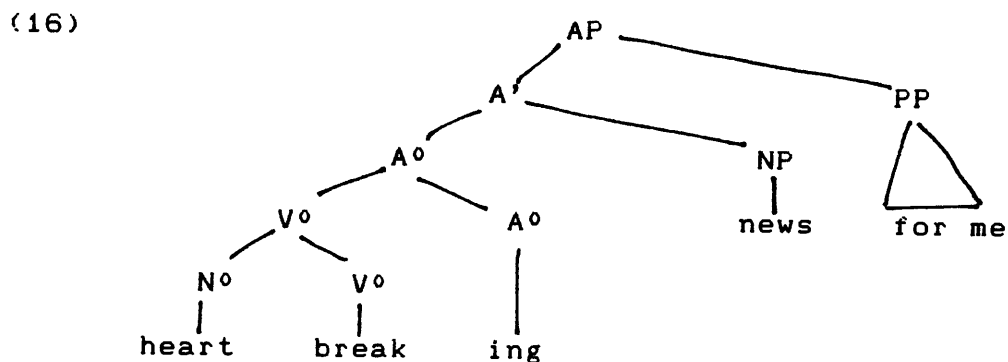
4. Ergative Nouns

The third consequence of the fact that -ing psych adjectives are ergative concerns the properties of BP nouns. We saw earlier that compound psych-adjectives are ergative, in that they have an argument structure like that of verbs like depress, amuse, etc. and the -ing adjectives derived from

IAN ROBERTS

those verbs. In this section we will argue that BP nouns are also ergative: they assign an Experiencer θ -role to an internal argument, and have no external argument. The ergative argument structure of BP nouns interacts with the internal structure of the compound to explain the observed properties of the compound.

We proposed earlier that -ing triggers adjunction of stems, as in (15b). Now consider the structure of a compound psych adjective. The internal structure of synthetic compounds is a matter of controversy as these compounds frequently give rise to "bracketing paradoxes" (cf. Roeper & Siegel (1978), Lieber (1980, 1983), Pesetsky (1985), Roeper (1987)). We will assume that the "paradoxical" structure gives the right representation of the thematic structure of these compounds (for reasons that concern the -ed compounds which we cannot go into here). Thus we suppose, as shown in (16), that heart is adjoined to break and the compound verb heart-break is adjoined to -ing. Moreover, compound psych-adjectives have an argument structure exactly like that of simple psych-adjectives like depressing. This means that the compound psych-adjectives appear in predicates with the overall structure shown in (16):

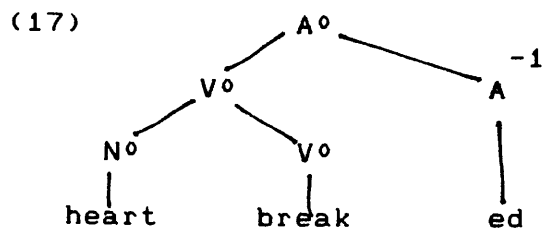


Where does this argument structure come from? We have up to now seen no reason to assume that the argument structure of a morphologically complex element comes from anywhere other than its component parts. In fact, we have seen that the node dominating a morphologically complex structure does not itself have an argument structure but permits various kinds of θ -role assignment by the component morphemes owing to properties of its internal structure. Continuing with this kind of reasoning, we ascribe no thematic

PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

properties at all to -ing and assign to break the argument structure of a transitive, which we note as <Cause, Patient>. It is fairly clear that the Patient role is assigned to heart internally to the compound, while the Cause role is assigned to the direct argument of the entire compound. Both of these assignments take place under sisterhood, given that the internal structure of the compound involves successive adjunctions.

This leaves open the question of the optional dative argument. Since the verb stems in most of these compounds are clearly not psych-verbs or verbs with any kind of indirect internal argument (break is a typical example), a process of elimination leads us to the conclusion that it is the BP noun of these compounds which introduces the dative argument. A similar argument can be based on the -ed compounds. In a form like heart-broken, it is clear that the argument which is externalized is the Experiencer argument of heart, not the external argument of break (compare heart-broken with broken in this respect). We can obtain this result if we assign the following structure to heart-broken:



In this structure, break assigns its Patient role to heart, the Cause role is unassigned (or it may be assigned to an at-phrase) and the Experiencer role is externalized. The only reasonable source for this role is heart, since both of break's roles are accounted for.

Suppose, then, that the defining characteristic of a BP noun is that it has an Experiencer argument, which denotes the creature of which the noun denotes a part. The Experiencer role is assigned under the same conditions as the Experiencer role of simple psych adjectives: it is assigned to a dative-marked argument which is the sister of A', the PP of (16).

Examples like (18) give clear semantic evidence that BP nouns assign the θ -role IPoss to the dative

IAN ROBERTS

argument:

- (18) a. The news was heart-breaking for John.
 b. The scenery was breath-taking for all of us.

The dative argument must be interpreted as the possessor of the body-part in question: in (18a) it is John's heart that is broken; this sentence cannot be interpreted as meaning that the news had such an effect on John that it broke somebody else's heart, or that the news seemed to John as though it might break other people's hearts, etc. Similarly, (18b) can only be interpreted such that it is the referent of "our" whose breath is taken away.

All of this means that an NP like my heart, John's leg, etc., has the following structure:

- (19) [my heart t]
 NP

NP-movement of the Experiencer NP is forced for Case reasons; this NP cannot receive Case in its base position, and so raises to the Specifier position, where it is marked with genitive case. This gives the result that Experiencer arguments of N⁰ have the same superficial properties as alienably possessed NPs.

There are two independent pieces of evidence in favour of the structure in (19). First, in many languages NPs with the Experiencer role are marked dative rather than genitive. This is true for example in French (and other Romance languages), where we find sentences of the following kind:

- (20) a. La nouvelle lui a brisé le coeur.
 "The news broke to him the heart."
 The news broke his heart.
 b. La beauté du paysage nous a coupé le souffle.
 "The beauty of the landscape cut the breath to us."
 The beauty of the landscape took our breath away.

We attribute this difference to a difference in the abstract Case systems of the two languages: French nouns are able to assign inherent dative case, while their English counterparts are not. Hence NP-

PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

movement of Experiencer NPs is obligatory in English, and sentences corresponding to the glosses in (20) are ruled out by the Case Filter. The fact that inalienably possessed NPs are often dative rather than genitive cross-linguistically can be captured very naturally if a structure like (19) is adopted.

The second piece of evidence emerges from a consideration of the nouns derived from psych-verbs of the amuse class. These nouns have a number of unusual properties, as has often been noted (cf. Zubizarreta (1987) for discussion and analysis). The striking fact is that only the Experiencer argument, never the Cause argument, can appear as the subject of such nominals:

- (21) a. John's amusement at the stories
 b. *the stories' amusement of John
 c. ?*the amusement of John at the stories

What interests us here is not the explanation for this paradigm, but rather the fact that there is at least one BP noun with two arguments which has exactly the properties of the nouns derived from psych verbs. The noun in question is awe (as in awe-inspiring). The relevant paradigm is:

- (22) a. John's awe at the scenery
 b. *the scenery's awe of John
 c. ?*the awe of John at the scenery

This shows that BP nouns have the same argument structure as derived psych nouns. Since derived psych nouns are ergative, BP nouns must be ergative too.

We conclude that BP nouns assign an Experiencer θ -role to the dative argument. In ordinary nominals, the Experiencer NP must raise to the specifier position of NP for Case reasons. Compound psych adjectives have the structure in (16), where both the verb and the noun have their usual thematic properties and assign their θ -roles in the normal way, unimpeded by the fact that they are constituents of a complex word, because this word is built up by successive adjunctions.

One question remains concerning the structure in (16). Why is there no verb heart-break, formed by adjunction of heart to break? Such a verb should

IAN ROBERTS

have exactly the argument structure of the psych-verb depress. However, sentences like (23) are clearly non-existent:

- (23) a. *The news heart-broke me.
 b. *The movie spine-chilled the audience.

A plausible answer to this question comes from Case theory. In all compound psych adjectives, the verb-stem has a transitive argument structure (even in cases like break where there exists an intransitive counterpart). Suppose that the verb therefore also assigns a Case to its Patient argument, the noun-stem. This means that the verb heart-break has no Case to assign externally to the compound, and therefore that the examples in (23) are ruled out by the Case Filter.

5. Conclusion

We have made two related points: that psych-adjectives in general, both simple and compound, have an ergative argument structure, and that BP nouns have an ergative argument structure. An important related claim is that affixes differ in that some trigger adjunction of a stem, like -ing, while others trigger substitution of a stem into a subcategorized slot, like -ed.

6. Appendix: Animacy and the Thematic Hierarchy.

An important facet of the foregoing claims is the status of the θ -role Experiencer. In order to fully account for the properties of psych-adjectives, in particular compound psych-adjectives, we need to state that this θ -role must be projected onto a "higher" structural position than the role we have identified as inanimate Cause. The goal of this brief Appendix is to discuss in more detail the implications of our analysis of ergative adjectives and BP nouns for the theory of thematic relations. The implications concern two aspects of the theory: the inventory of θ -roles and the conditions mapping the roles onto syntactic configurations, the thematic hierarchy.

Belletti & Rizzi (1988) introduce the notion of a thematic hierarchy in the following terms:

PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

These principles guide the shaping of syntactic structures on the basis of the substantive thematic information in lexical entries. In this sense they can be regarded as the substantive component of the Projection Principle. These principles have the effect of arranging in specific configurations the structural positions projected from the members of a θ -grid: they can be seen as encoding intrinsic thematic prominence into configurational prominence.

(p. 344)

Belletti & Rizzi's principal proposal is that predicates assigning both an Experiencer and a Theme role must project the Experiencer role onto a position which asymmetrically c-commands the position occupied by the category bearing the Theme (inanimate Cause, or Patient) role. Moreover, they suggest (following Williams (1981)) that Agents must always be mapped onto the external-argument position. These proposals amount to the following partial thematic hierarchy:

(24) Agent > Experiencer > > Patient

Here "x > y" means "x is projected onto a position which asymmetrically c-commands y." In fact, we will see directly that Inanimate Cause is higher than Patient on the hierarchy.

We accept the leading idea that the mapping of θ -grids onto syntax is subject to a thematically-determined hierarchy. However, we will now argue that the hierarchy must be made sensitive to a further substantive lexico-semantic property: that of animacy. We will go on to suggest that taking this feature into account allows a considerable simplification of the inventory of θ -roles.

Our basic suggestion is that Experiencer and Locative roles should be assimilated. If this is so, we can regard the two arguments of psych predicates, Experiencer and Cause, as analogous to the two arguments of ergative spray/load (ESL) verbs such as swarm, Location and Material respectively. In terms of θ -roles, then, the following sentences would be analogous:

IAN ROBERTS

- (25) a. Bees were swarming in the garden.
 b. The news depressed me.

In both sentences, the Exp/Loc argument is realized indirectly, and the Cause/Material argument is realized directly. (There is, of course, a difference with respect to Case-assignment in that depress can Case-mark its Exp argument, while swarm cannot directly Case-mark its Loc argument; this is not relevant to this discussion, though).

However, the similarity does not at first sight extend very far. In particular, ESL verbs, like other spray/load verbs, show an alternation in the realization of their two internal arguments. So, alongside (25a), we find a structure in which the Loc argument is realized directly and the Material argument indirectly:

- (26) The garden swarmed with bees.

However, we do not find the comparable structure with simple psych verbs:

- (27) *I depressed with/at the news (that)

We can retain the idea that that Experiencers are animate Locations and simultaneously account for the absence of examples like (27) by assuming that the thematic hierarchy is sensitive to the feature of animacy. We thus treat Experiencers and Locations both as types of L(ocation)-role, and assume that the thematic hierarchy requires animate L-arguments to be projected onto higher positions than Material or Cause roles, but imposes no particular requirement on inanimate L-arguments. So inanimate L-arguments are able to participate in spray/load alternations while Experiencers, i.e. animate L-arguments, are not.

Notice in this connection that the elements of the compound psych-adjective appear to participate in spray/load-like alternation:

- (28) a. The news broke my heart.
 b. My heart broke at the news.

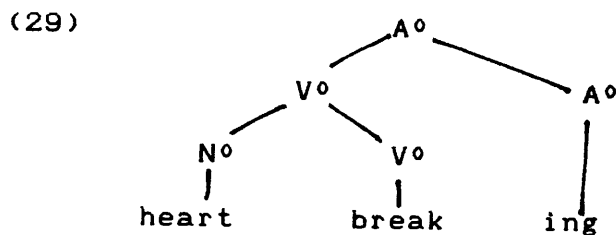
This alternation is predicted by what we have said up to now: in (28a) break is transitive, assigning the Cause role to the news and the Patient role to my heart. Heart assigns an animate L-role (IPoss) to

PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

my. This assignment of θ -roles does not violate the hierarchy in (24), despite the fact that the animate L-argument does not asymmetrically c-command the other arguments, both of which are lower on the hierarchy. The reason for this is that the thematic hierarchy must be relativized to the θ -assignment domains of predicates. Since break and heart are separate predicates in (28a), the hierarchy does not require the animate L-argument of heart to be in a particular structural relation with the arguments of break.

In (28b) we see the ergative variant of break, which has a sole Patient argument as subject. This argument contains heart and that noun's animate L-argument. Tentatively, we treat the at-phrase as an adjunct, although this category clearly seems to bear the Cause role here. In any case, the grammaticality of (28b), in contrast to (27), is predicted by our proposals.

Returning to the compound psych-adjectives, we observe that the hierarchy of (24) is obeyed perfectly here. Consider again the internal structure of heart-breaking:



Here, break assigns its P-role to heart, which occupies a position which is asymmetrically c-commanded by the compound-external Cause argument. Generally, where break assigns two θ -roles, one of them is assigned externally. However, the presence of an animate L-argument induced by heart here forces the Cause argument to be V'-internal, since it must be asymmetrically c-commanded by the V'-external L-argument. Thus the thematic hierarchy induces the effect of internalization here, it seems.

In conclusion, we suggest two things. First, animacy should be taken into account by the thematic hierarchy; we have seen that animate L-arguments are projected to higher positions than their inanimate counterparts. The second, related, point is that the

IAN ROBERTS

inventory of θ -roles can be simplified once the animacy distinctions are abstracted out. This can be illustrated by the following sample lexical entries for some of the items that have figured prominently in our discussion (if animacy is not specified, there is assumed to be a choice):

- (30) a. depress: < L[+anim], C >
 b. break: < C, P >
 c. heart: < L[+anim] >
 d. swarm: < L[-anim], C >

While these proposals are necessarily tentative, we believe that they are on the right track. Whether this turns out to be true or not, it is clear from the above paragraphs that the study of compound psych-adjectives can be an aid to understanding lexical structure.

References

- Belletti, A. & L. Rizzi (1988) "Psych Verbs and θ -theory," Natural Language and Linguistic Theory 6, 291-352.
- Chomsky, N. (1986a) Knowledge of Language: Its Nature, Origins and Use, Praeger, New York.
- Chomsky, N. (1986b) Barriers, MIT Press, Cambridge, Mass.
- Cinque, G. (forthcoming) "Ergative Adjectives in Italian," to appear in Natural Language and Linguistic Theory, 7.4.
- Levin, B. & M. Rappaport (1986) "The Formation of Adjectival Passives," Linguistic Inquiry 17, 623-662.
- Lieber, R. (1980) On the Organization of the Lexicon, Doctoral Dissertation, M.I.T. Distributed by the Indiana University Linguistics Club, Bloomington, Indiana.
- Lieber, R. (1983) "Argument Linking and Compounds in English," Linguistic Inquiry 14, 251-286. \$

PSYCH-ADJECTIVES AND THE ERGATIVE HYPOTHESIS

May, R. (1985) Logical Form: Its Structure and Derivation, MIT Press, Cambridge, Mass.

Pesetsky, D. (1985) "Morphology and Logical Form," Linguistic Inquiry 16, 193-246.

Rizzi, L. & I. Roberts (to appear) "Complex Inversion in French," to appear in Probus, 1.1.

Roeper, T. (1987) "Implicit Arguments and the Head-Complement Relation," Linguistic Inquiry 18, 267-310.

Roeper, T. & M. Siegel (1978) "A Lexical Transformation for Verbal Compounds," Linguistic Inquiry 9, 199-260.

Sproat, R. (1985) On Deriving the Lexicon, Doctoral Dissertation, MIT.

Wasow, T. (1977) "Transformations and the Lexicon," in A. Akmajian, P. Culicover & T. Wasow (eds) Formal Syntax, Academic Press, New York, 327-360.

Williams, E. (1981) "Argument Structure and Morphology," The Linguistic Review 1, 81-114.

Zubizarreta, M.-L. (1987) Levels of Representation in the Lexicon and in the Syntax, Foris, Dordrecht.