ON THE STRUCTURE OF PSYCH-VERB CONSTRUCTIONS

Thomas S. Stroik

Morehead State University

One of the recent challenges to the Government-Binding framework has been to explain the reversal properties of psych-verbs like "worry," "terrify," and "concern." Two GB-type explanations for the reversal properties of psych-verbs have been proposed: one claims that the reversal properties arise because psych-verbs are unaccusative verbs (Belletti and Rizzi (1988) and Kim and Larson (1989)) and the other claims that the reversals arise because psych-verbs have reversed argument structures (Stroik (1988)).

In this paper, I will provide some additional support for Stroik's analysis. I will demonstrate that although both the unaccusative analysis and the backward-S analysis can account for anaphoric reversal (a D-structure phenomenon) and scopal reversal (a Logical Form phenomenon), only Stroik's backward-S analysis can explain all the reversals at Logical Form and any of the reversals at S-structure.[1]

1. Two Analyses of Psych-Verbs Reversals

The reversal property of psych-verbs that has received the most attention from GB theorists has been anaphoric reversal (see Hermon (1985) and Pesetsky (1987)). As is illustrated in (1), psych-verbs have the property of permitting subject-contained anaphors--a property not shared by non-psych-verbs (see (2)).

> (1)a Rumors about themselves embarrass the men
>   b Each other's health concerns those women
>
> (2)a *Rumors about themselves forced the men to leave
>   b *Each other's parents invited the students to dinner

Within GB theory, an anaphor must be locally bound by some antecedent. Given that a V-object does not c-command the subject, and therefore cannot bind anything within the subject, the ungrammaticality of the sentences in (2) follows from the fact that the subject-contained anaphors in (2) are unbound. To disallow sentences like (2), while not ruling out the sentences in (1), Belletti and Rizzi make two crucial assumptions, one about anaphor binding and one about the structure of psych-verb constructions. First, they assume that anaphors can be bound at any of the three syntactic levels (D-structure, S-structure, or

LF). Second, they assume that psych-verbs are unaccusative verbs
that take two internal arguments at D-structure but no external
arguments. Under the latter assumption, the psych-verb in (1a)
has D-structure (3a).

>   (3)a [$_s$ e [$_{VP}$ embarrass [rumors about themselves$_2$]
>   the men$_2$]]

Appealing to their first assumption, Belletti and Rizzi account
for the binding of the subject-contained anaphor in (1b) by
permitting the anaphor to be bound in D-structure (3a), where the
antecedent "the men" does c-command (hence, bind) the anaphor.
Since the anaphor needs to be bound only at a single syntactic
level, once the internal argument "rumors about themselves"
raises to subject position (for Case theoretic reasons), the
subject-contained anaphor remains properly bound at S-structure
(3b).

>   (3)b [$_s$ [rumors about themselves$_2$]$_3$ [$_{VP}$ embarrass t$_3$
>   the men$_2$]]

Stroik (1988) argues that Belletti-Rizzi type analyses,
although capable of explaining anaphor reversal, are inadequate
because they cannot account for scopal reversal. According to
Stroik, if we apply May's (1985) structural theory of scopal
relations, which derives scopal relations from S-structure, to
psych-verb constructions, we would predict that the S-structure
subjects and objects in psych-verb constructions should
participate in exactly the same scopal relations as do the
S-structure subjects and objects in non-psych-verb constructions.
However, the scopal relations in psych-verbs constructions (see
(4)) reverse the relations of non-psych-verb constructions (see
(5)).

>   (4)a What most annoys everyone here (ambiguous)
>   b Who does everything annoy   (unambiguous)
>
>   (5)a Who read everything   (unambiguous)
>   b What did everyone read   (ambiguous)

Assuming that the logical relations are mapped off the
S-structures for (4)-(5) in the same way (via Quantifier
Raising), Stroik concludes that the scopal reversal in (4) is a
consequence of the fact that psych-verbs have a reversed
S-structure (i.e., the apparent subjects in (4) are internal
arguments of the verbs and the apparent objects are external
arguments of the verbs at S-structure). He gives psych-verb
constructions such as (1) the S-structure (and D-structure)
stated in (6).

(6)   [$_s$ [$_{vr}$ NP$_1$ V] NP$_2$]

In (6), NP$_2$ c-commands NP$_1$ (and anything in NP$_1$); consequently
NP$_2$ can bind anaphors contained in NP$_1$, as in (1), and NP$_2$'s
structural superiority over NP$_1$ at S-structure accounts for the
scopal relations in (4).

Kim and Larson, who look at data similar to (4)-(5), come to
a different conclusion than Stroik does. They contend that the
scopal differences in (4)-(5) result not from different
S-structures, but from different rules that map S-structure to
Logical Form. According to Kim and Larson, the rule that derives
the logical relations in (5) is Quantifier Raising and the rule
that derives those relations in (4) is Quantifier Lowering (a
rule that restricts the logical domain of a quantifier to the
maximal projection that immediately dominates the D-structure
position of the quantifier). So, it is the effect of Quantifier
Lowering on the unaccusative D-structure of psych-verbs that
explains the scopal reversal effects: for example, the quantified
subject in (4b) engages in the same scopal relations as does the
quantified object in (5a) because under the unaccusative analysis
the subject is a raised object and Quantifier Lowering reverses
the raising effects by assigning the subject the logical domain
of an object.

2. Testing the Analyses at LF

In this section, I will test the two analyses described above
by examining some of the other reversal properties of psych
verbs at LF.

Besides scopal reversal, psych-verbs have least two
additional logical reversal properties. For one, psych-verbs do
not show the weak crossover effects of non-psych-verbs--compare
(7) to (8).

        (7)a   His$_2$ first date generally terrifies every boy$_2$
           b   Who$_2$ did stories about her$_2$ mother bother most

        (8)a   *His$_2$ mother generally loves every boy$_2$
           b   *Who$_2$ did the man on her$_2$ team see

The ungrammaticality of the sentences in (8), under May's (1985)
theory of Logical Form, results from raising an operator in
object position at S-structure over a bound pronoun in subject
position. Now, given that, under the unaccusative analysis, the
S-structure for both psych-verbs and non-psych-verbs is the same,
we would expect the weak crossover effects to emerge in both
types of constructions. The fact that the sentences in (7) do

not show these effects is problematic for an unaccusative
analysis of psych-verbs. To explain the data in (7), a
Belletti-Rizzi type analysis would have to claim either that
pronouns can be bound at D-structure (an unlikely possibility in
the face of the ungrammaticality of "his$_2$ mother is believed by
everyone$_2$ to have been elected") or that some lowering rule
repositions the surface subjects in (7) so that the operators do
not crossover them (also an unlikelihood because we would have to
have a rule that lowers every subject that we have raised,
whether a quantifier or not, and this would serious question any
motivation for the original raising rule).

   Notice that the backward-S anlysis does not have any problem
with the data in (7). The absence of weak crossover effects in
(7) naturally follows from S-structure (6): the raised NP$_2$
operator is structurally superior to the pronoun in NP$_1$; so it
not only properly binds the pronoun, but also does not crossover
it.

   Another logical reversal property of psych-verbs can be seen
in multiple-wh constructions. Non-psych-verbs show
subject-object superiority effects, illustrated in (9).

        (9)a Who read what
           b *What did who read

It is generally assumed in GB that the superiority effects in (9)
arise because the S-structure subject cannot be moved into COMP
(a movement required of all wh-elements) without incurring an
Empty Category Principle (ECP) violation, while a wh-object,
which is properly bound by the verb that subcategorizes for it,
can be moved into COMP at LF without producing an ECP violation.[2]
If we assume, as does the unaccustive analysis of psych-verbs,
that all S-structures have the same subject-object asymmetries,
then we would expect psych-verbs to have the same superiority
effects as (9). However, as (10) demonstrates, psych-verbs
unexpectedly do not seem to allow any superiority effects.

        (10)a *What most interests/terrifies who
            b?*Who does what most interest/terrify

   The data in (10), which seeemingly resist an unaccusative
analysis of psych-verbs, can be explained by the backward-S
analysis. This analysis rules out both sentences in (10) as ECP
violations. Given the argument-relations expressed in (6), an
ECP violation arises in (10a) because the in-situ wh-element
("who") is an external argument (hence, one not lexically
governed), so when it moves into COMP at LF, its trace must be
antecedent governed by COMP to satisfy the ECP: however,
COMP--already indexed by the wh-NP$_1$ argument--is prohibited from

governing the trace. Similarly, an ECP violation emerges in
(10b) because the in-situ wh-element ("what"), although governed
by the verb, is not canonically governed by it; therefore the
trace of the in-situ element cannot be properly governed
lexically and since this trace cannot, for the reasons just
described in the discussion of (10a), be antecedent governed, it
violates the ECP. The fact that the backward-S analysis can
account for (10), while an unaccusative analysis cannot, seems to
favor the former analysis.

3. Testing the Analyses at S-structure

    Since the two analyses being considered here posit radically
different S-structures for psych-verbs, we can test these
analyses against not only the predictions that they make about LF
relations but more importantly the ones they make about
S-structure relations. The unaccusative analysis, which gives
psych-verbs the same S-structure subject-object relations that
non-psych-verbs exhibit, predicts that psych-verbs will not
possess any S-structure reversal properties. On the other hand,
the backward-S analysis predicts that psych-verbs, which reverse
the subject-object superiority relations of non-psych-verbs, will
have reversal properties at S-structure.

    One grammmatical relationship that is determined at
S-structure is Principle C binding (to satisfy Binding Principle
C, a R(eferential)-expression must be free). The two analyses
make differing predictions about Principle C binding in
psych-verb constructions. The backward-S analysis predicts that
Principle C violations will arise in psych-verb construction that
have subject-contained R-expressions coindexed with the object;
the unaccusative analysis predicts that no such violation will
emerge in those constructions. Evidence that tests the
predictions is given in (11).[3]

        (11)a *Each other$_2$'s mother's stories about those bankers$_2$
                  annoyed them$_2$
            cp Each other$_2$'s mother's stories about them$_2$ annoyed
                  those bankers$_2$
            b *That each other$_2$'s health worries the Smiths$_2$
                  concerns the fools$_2$
            cp That each other$_2$'s health worries them$_2$ concerns
                  the fools$_2$

    In the above examples, notice that whenever an R-expression
such as "those bankers" or "the Smiths" is within the apparent
subject and the R-expression is coindexed with the object
argument, then the construction is ungrammatical. The
ungrammaticality of (11a-b), which seem unexpected in the

unaccusative analysis since the object would not bind the
subject-contained R-expression under this analysis, follows
naturally from the reversed argument relations stated in (6), a
S-structure that allows the NP_2 argument to bind anything within
the apparent subject--the NP_1 argument.

Another grammatical phenomenon determined at S-structure is
the parasitic gap construction. According to Chomsky (1982), one
of the principal characteristics of parasitic gap constructions
is that the filler gap and the parasitic gap cannot c-command one
another at S-structure. Given this characteristic, we would
predict that a parasitic gap contained within a subject could be
licensed by a wh-movement from an object position. The data in
(12) confirm our prediction.

> (12)a??Who_2 were those rumors about e_2 being told to t_2
> b??Who_2 won't any pictures of e_2 be shown to t_2

Now if psych-verbs participate in the same subject-object
relations at S-structure that non-psych-verbs do, then we would
expect to find psych-verb constructions parallel to (12).
However, as is demonstrated in (13), no such parallel
constructions exist.

> (13)a *Who_2 did those rumors about e_2 interest t_2
> b *Who_2 don't any pictures of e_2 amuse t_2

Needless to say, the grammaticality differences between (12)
and (13) are surprising for an unaccusative analysis of
psych-verbs. ' But these differences are not unexpected for the
backward-S analysis: they follow from (6)--a structure that
permits the trace t_2 to ungrammatically c-command the parasitic
gap e_2 in an S-structure representation of (13).

The final S-structure relations I will examine in this paper
involves "each...the other" constructions. These constructions
require "each" to c-command "the other" at S-structure. Again,
the analyses we have been considering make very different
predictions about these constructions. The unaccusative analysis
predicts that "each" can lie only within the apparent subject of
psych-verbs; and the backward-S analysis predicts that "each"
must lie within the apparent object position. These predictions
can be tested by the data in (14).

> (14)a [The other's problems] usually interest [each of the
> men]
> b?*[each of the men] usually interests [the other's
> employer]

The evidence in (14) demonstrates that the backward-S analysis

can explain "each...the other" constructions with psych-verbs,
while the unaccusative analysis cannot.

3. Some Conclusions

I have tried to show in this paper that the reversal
properties of psych-verbs are far more wide-ranging than
previously thought. And I have argued that to account for the
various reversal properties we must assign psych-verbs reversed
argument structures. If my analysis of psch-verbs is correct,
then theories of phrase structure will have to be altered.
Phrase structure relations such as head-argument directionality
will not be able to be set language-specifically; rather it will
have to be set construction-specifically within a given language
(this setting will permit constructions with psych-verbs to
reverse argument relations, taking left-branching internal
arguments, as in (6)). Although the construction-specific
parameterization of phrase structure currently stands outside the
prevailing theories of parameterization, there is one theory of
parameters compatible with my analysis. Wexler and Manzini
(1987) argue that Binding Theory must have its parameters set
construction-specifically, rather than language-specifically.
Importantly, they argue that not only Binding Theory, but all the
sub-theories of GB must be lexically parameterized (their Lexical
Parameterization Hypothesis); however, they do not extend their
analysis, showing how lexical parameterization surfaces in
sub-theories other than Binding Theory. My analysis does extend
their claim for the Lexical Parameterization Hypothesis. I show
that, like Binding Theory, X-bar Theory (the GB theory of phrase
structure) must parameterize its argument structure lexically.

NOTES

[1]This paper follows up on arguments made in Stroik (1988).
Consequently, it will not address several of the concerns already
discussed in Stroik (1988), such as how backward-S analysis can
explain Case marking or S-V agreement in psych-verb
constructions. For arguments that address such issues, see
Stroik (1988).

[2]The Empty Category Principle requires all empty categories
to be properly governed. For all definitions relevant to the
concept of proper government, see Chomsky (1986).

[3]Stroik (1990) discusses the reasons why examples like
"John's job annoys him" are not counterexamples to the backward-S
analysis of Principle C violations in psych-verb constructions.
His explanation attributes the grammaticality of the above

sentence to the fact that, unlike "true" psych-verbs--which are
stative predicates, it has an eventive predicate and therefore
has the argument structure of non-psych-verbs. For relevant
details, see Stroik (1990).

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