Jensen, C. (1984) *O Desenvolvimento Historico da Língua Way-ampi*, Master's thesis, Universidade Estadual de Campinas, Campinas, Brazil.

McCarthy, J. (1982) "Prosodic Templates, Morphemic Templates, and Morphemic Tiers," in H. van der Hulst and N. Smith, eds., *The Structure of Phonological Representations*, Foris, Dordrecht, 191–224.

Marantz, A. (1982) "Re Reduplication," *Linguistic Inquiry* 13, 435–482.

Rodrigues, A. (1953) "Morfologia do Verbo Tupí," *Letras* 1, 121–152. Curitiba.

Rodrigues, A. (1981) "Estrutura do Tupinambá," ms., Universidade Estadual de Campinas, Campinas, Brazil.

Weiss, H. (1972) "Kayabi Verbs," ms., Summer Institute of Linguistics, Brasília.

SCOPE AMBIGUITY WITH TENSE
AND QUANTIFIERS
Francis Jeffry Pelletier,
University of Alberta

Ejerhed (1980) sets out to prove three claims: (I) past and future tense induce opacity, (II) in addition to NPs, tensed *that*-clauses can be nonreferential ("opaque"), and (III) the different "readings"—opaque vs. transparent—of tensed sentences cannot be represented by differences in scope among the relevant operators. To be fully explicit in discussing these issues, one should carefully delineate such problematic notions as "opaque," "transparent," "reading," "scope," etc. But I shall forego this here, trusting that for present purposes these terms are clear enough, since I wish to discuss Ejerhed's argument for claim (III).

Ejerhed's discussion of claim (III) centers around (1), which she claims is ambiguous between the readings (2a) and (2b).

(1) Everyone unemployed Jan. 1, 1980 is on the list.
(2) a. Everyone who is still in existence and was unemployed (1.1.80) is on the list (now).
    b. Everyone who was in existence (1.1.80) and who was unemployed (1.1.80) is on the list (now).

According to Ejerhed, the ambiguity can be explicated by asking whether the *everyone* of (1) means 'all of the people now alive who were unemployed then' or 'all of the people who were then alive and unemployed'. This is, it would seem, the kind of ambiguity to be accounted for by assigning different relative scopes to a past tense operator (P) and the universal quantifier ($\forall$). Thus, we should be able to get a (2a)-type reading by in-

terpreting the quantifier as having wide scope over the tense operator, and a (2b)-type reading by interpreting the tense operator as having wide scope over the quantifier. The intuition here is that a quantifier *in* the scope of a tense operator restricts its domain to those objects that exist at the moment (in the past) under evaluation, whereas a quantifier not in the scope of a tense operator restricts its domain to those objects that exist at the present time. Thus, we expect (3)

(3) $(\forall x)(\mathbf{P}[\ldots x \ldots] \ldots x \ldots)$

to talk about those x's that now exist, saying of them that they did something in the past, and (4)

(4) $\mathbf{P}[(\forall x)(\ldots x \ldots)]$

to talk about the past, saying of all those entities that existed then that they did something.

However, this intuition is frustrated, for the consequent of the conditional of (1) is present tense. We can indeed represent the (1a) reading as (5),

(5) $(\forall x)(\mathbf{P}[\text{Unemployed}(x)] \rightarrow \text{Listed}(x))$

that is, 'Of everyone who now exists, if they were unemployed, they are (now) listed'. But such representations as (6)

(6) $\mathbf{P}[(\forall x)(\text{Unemployed}(x) \rightarrow \text{Listed}(x))]$

incorrectly say 'In the past, all those people who existed then and were unemployed then, were listed (then)'. As Ejerhed remarks, there is no way to include the quantifier in the scope of the tense operator, include *Listed* in the scope of the quantifier, and yet exclude *Listed* from the scope of the tense operator.

From this example Ejerhed concludes that opacity/transparency due to tense cannot be represented as a matter of relative scope of operators and quantifiers. But, as Ejerhed also remarks, there is no other account of the opaque/transparent distinction available (yet). So perhaps we should reexamine her argument. In fact I think that, far from establishing her claim (III), it shows that Prior's (1967) intuition upon which it is based is false and that Montague's (1970) view is to be preferred.

One way to subvert the argument is to introduce a 'Now' operator. Such an operator, when applied to any formula, always forces its evaluation to be made at the present, regardless of how far it is embedded into other tense operators. Thus, for the troublesome formula (6), we would instead have (7):

(7) $\mathbf{P}[(\forall x)(\text{Unemployed}(x) \rightarrow \text{Now}[\text{Listed}(x)])]$

Various formal devices can be employed to make this apparent violation of semantic compositionality be only apparent (Kamp (1971)), but I shall not investigate this further, since I intend to show that Ejerhed's puzzle is due to an incorrect view of quan-

tification, not an incorrect view of how many tense operators there are.

The fact that so many of the transparent/opaque ambiguities, the interplay of quantifier readings, the interplay of logical connective ambiguities, the quantifier/negation readings, and so on, can adequately be accounted for by relative scope of the operators involved suggests that relative scope of operators is a powerful tool for representing a wide range of phenomena. It is furthermore so well understood (compared to its competitors) that it behooves us to try doubly hard to show that it can account for the puzzle raised by Ejerhed.

Consider again what is wrong with (6): the ($\forall x$) quantifier, being in the scope of a past tense operator, does not refer to those people now in existence, but rather has as its domain only those people alive at some moment in the past. Why not just drop this? Why not let quantifiers range over all those objects that ever existed, exist now, or will exist? Of course, if we do this we shall want to have the ability to restrict, sometimes, the domain of quantification to some specific period of time. Thus, if a sentence explicitly tells us to consider only those people living now—as (2a) does, for example—then we shall want some predicate that allows such a restriction. A predicate such as "$E: x$ exists" will do for this; it is evaluated in the normal way by looking to the tense operator in which it is embedded, just like any other predicate. With this understanding of the quantifier domain and this new predicate, the tense logic representation of (2a) would be (8),

(8) ($\forall x$)(E(x)&P[Unemployed(x)] $\rightarrow$ Listed(x))

that is, 'Of all the people who ever existed/exist/will exist, if they exist now and were then unemployed, they are listed (now)'. The representation of the troublesome (2b) would be (9),

(9) ($\forall x$)(P[E(x)&Unemployed(x)] $\rightarrow$ Listed(x))

that is, 'Of all the people who ever existed/exist/will exist, if they existed then and were unemployed then, they are listed (now)'.

This solution to Ejerhed's puzzle locates the ambiguity of (1) in the scope of the past tense operator with respect to the predicate E. If we now look at Ejerhed's explanation of the ambiguity (as reported above), we discover that this is precisely where even she says the ambiguity lies.

We may then ask why Ejerhed does not adopt the solution of considering the quantifiers to be omnitemporal in their domain and account for the relevant ambiguities by the relative scope of P and E. I submit that it is because she agrees with Prior (1967) that quantifiers should be temporalized rather than

with Montague (1970), who thinks they should be omnitemporal. Prior (1967, 144) states his case thus:

> When a quantifier is governed by, say, a tense operator, it is natural to think of it as ranging over such objects as there may be at the time to which the tense operator takes us; for example, 'It will be that something φs' is most naturally read as 'It will be, at some future time, that something *then* existing φs'. On the other hand, a quantifier preceding any such operator is naturally taken to be governed by the 'It is the case that' which is prefixable to everything we say, and therefore to range over what *now* exists. And where these ranges do not coincide—as is bound to be the case when we are considering what is now but once was not, or (in the case of modal logic) what in fact is, but need not have been—we have to tread carefully.

And Montague (1970, 124) puts his case as follows:

> . . . an individual constant denotes a *possible* individual, and a one-place predicate constant a set of *possible* individuals, with respect to a given point of reference. To see that it would be overly restrictive to demand that the respective denotations be an individual that exists with respect to the given point of reference or a set of such individuals, suppose that the points of reference are instants of time, and consider the individual constant 'the previous Pope' and the predicate constant 'is remembered by someone'.

Who is right? In addition to the fact that it seems impossible to account for Montague's example within Prior's framework, the fact that one is driven to Ejerhed's conclusion (pp. 249–250), namely that

> [t]here is no way—adhering to standard representational formalism—of representing the ambiguity of [(1)] as a scope ambiguity. . . . The recognition of the ambiguities in [(1)] . . . creates an impasse for the commonly held view that intensional ambiguities should be accounted for by scope variation. One way out of the impasse would be to deny that sentences like [(1)] have distinct readings, a solution which is not particularly attractive,

by adopting Prior's analysis, constitutes what appears to be a *reductio* of the view advocated.

In closing, I might note that there is a certain asymmetry between the case of tense and that of possibility. For one thing, although the two cases might be formally identical, most theorists have an aversion to quantifying over all possibilia (whether or not actual) that they do not feel to quantifying over all temporalia (whether or not currently existing). Perhaps this is because the temporalia at least once existed (or will exist), whereas most possibilia do not (ever) exist. But whatever the reason, the feeling is further strengthened by trying to construct a modal version of Ejerhed's puzzle.

(10) Everyone who might be unemployed is on the list.

If (10) were ambiguous in the same way as (1), we should expect the readings (11a) and (11b).

(11) a. Everyone who actually exists and might be un-employed is on the list.
b. Everyone who might exist and be unemployed is on the list.

But it seems quite clear that (10) does not have the reading (11b), thus supporting the hypothesis that quantifiers are not con-strued as ranging over all possibilia. Instead, I have suggested that they are best construed as ranging over all temporalia. As the previous quotations indicate, both Montague and Prior see no distinction between times and possible worlds as points of reference. It seems to me, on the contrary, that these types of examples demonstrate that there is an important distinction to be made in the realm of quantifier domains.

References

Ejerhed, E. (1980) "Tense as a Source of Intensional Ambi-guity," in F. Heny, ed., *Ambiguities in Intensional Con-texts*, Reidel, Dordrecht.

Kamp, H. (1971) "Formal Properties of 'Now'," *Theoria* 37, 227–273.

Montague, R. (1970) "Pragmatics and Intensional Logic," *Synthèse* 22, 68–94. Page references are to the reprint in R. Thomason, ed. (1974) *Formal Philosophy*, Yale Uni-versity Press, New Haven, Connecticut, 119–147.

Prior, A. (1967) *Past, Present and Future*, Oxford University Press, Oxford.