Explaining a restriction on the scope of the comparative operator

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Various recent discussions of comparatives (Hackl 2000, Heim 2001) note an unexplained restriction on the scope of the comparative operator, which Takahashi 2006 dubs the *Heim-Kennedy constraint.*

(HK) *A quantificational DP cannot intervene between a degree operator and its trace.*

As an example, *Every girl is less tall than Jim is* ((1) on the following page) does not have the full range of expected readings. If gradable adjectives like *tall* are functions from individuals to degrees, we should be able to intersect the heights of all the girls, and then take the maximum of this set. This should yield a reading equivalent to "The shortest girl is less tall than Jim". This reading is not available: that is, it is not possible for *less* to have wider scope than *every*.

Interestingly, the same facts hold with respect to certain types of weak islands. Amount *wh*-questions such as (2) *How tall is every player?* have a family-of-questions reading in which *every* scopes above *how*, but lack the *how* > *every* reading (2b), which should mean "How tall is the shortest player?".

My modest purpose here is to show that the semantic account of weak islands of Szabolcsi & Zwarts (1993, S&Z) explains the restriction in **HK** without further ado. This account does not answer all questions about scope restrictions on the comparative operator, but it is a promising beginning.

S&Z argue that weak islands are a semantic rather than a syntactic phenomenon. In their theory expressions denoting individuals, manners, numerals, and amounts denote Boolean objects of various types, and scopal restrictions on these expressions are (partly) explained by the operations that are defined on these structures. For instance, they propose that numerals denote in a one-dimensional scale (3a), while amounts denote in the more complex Boolean structure (3b), a *join semilattice*.

On this account, the impossibility of *every* > *how* scope in (2) is a result of this difference. In this model existential quantification is equivalent to taking *joins* (the Boolean counterpart of union), while universal quantification involves taking *meets* (counterpart of intersection). The important difference between (3a) and (3b) is that (3a) is closed under both meet and join, while (3b) is closed only under meet, and join is undefined (unless the amounts happen to be identical). S&Z claim that this explains the unavailability of the reading in (4b) since the heights of the various students cannot be intersected.

Note that this is not a claim about *wh*-questions, but about the representation of amounts. Thus it predicts that amount-denoting expressions should show these restrictions wherever they appear in natural language, and not only in wh-expressions. The similarities between amount-denoting wh-expressions and comparatives, then, are explained in a straightforward way: certain operations are not defined with amounts because of their algebraic structure, regardless of the other details of the expressions they are embedded in. In the case at hand, the scoping *less* > *every girl* > *d-tall* is not available in (1b) because the intersection of all the girls' heights – $max(\lambda d.\ \forall x[girl(x) \rightarrow tall(x)(d)])$ – is undefined.

Unlike (**HK),** this theory predicts that the existential quantifier should be an acceptable intervener. This prediction cannot be tested because ∃ and *–er/less* are commutative (Takahashi 2006).

Several issues remain to be addressed. First, degree operators and weak island-sensitive expressions show similar behavior in a wide range of contexts (Rullmann 1994 gives a detailed typology). Similar explanations may prove fruitful in these domains. For instance, Rullmann's account of negative islands with numerical and amount expressions is replicated because (3a) and (3b) are not closed under complementation (negation). It remains to be seen whether the various semantic accounts of weak islands in the literature (e.g., Abrusan 2007) can be extended to comparative scope restrictions of all stripes.

Second, it remains unexplained why certain modals and intensional verbs *are* able to intervene between a degree operator and its trace both in amount comparatives and amount questions, as in (4) and (5). On the assumption that *must* and *require* involve universal quantification over accessible worlds, this should not be possible. S&Z suggest that these operators are acceptable interveners because they are not Boolean in nature. This is perhaps too drastic a step, but a detailed investigation is needed to account for the complicated and subtle data involved, including the fact that some modals and intensional verbs involving universal quantification can intervene while others cannot (cf. Heim 2001).

To sum up, the traditional approach on which amounts are arranged on a scale of degrees (cf. (3a)) fails to explain why the constraint **HK** should hold. However, S&Z's semantic account of weak islands predicts the existence of this constraint.

(1) Every girl is less tall than Jim is.

a. Direct scope: *every girl > less > d-tall*

$\forall x$ [girl (x) → [max (λd. tall(x)(d))] < max (λd.tall(Jim)(d))]

"For every girl x, Jim's max height is greater than x's max height."

b. Scope-splitting: *less > every girl > d-tall*

max(λd. $\forall x$[girl(x) → tall(x)(d)]) < max (λd. tall(Jim)(d)))

* "Jim's max height is greater than the max degree to which every girl is tall [i.e., he is taller than the shortest girl]"

(2) How tall is every player?

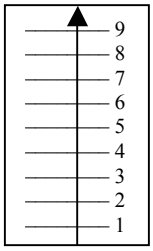
a. *every player > how tall > d-tall*

'for every player, tell me: what is that player's max height?'

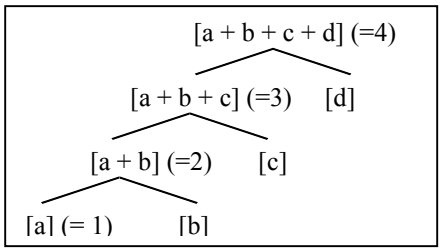
b. *how tall > every player > d-tall*

* 'what is the max degree d s.t. every player is d-tall, i.e. how tall is the shortest player?'

(3) a. Lattice



b. Join semilattice



(4) (This draft is 10 pages.) The paper is required to be exactly 5 pages longer than that.

a. *required > exactly 5 pages -er > that-long*

$\forall w \varepsilon$ Acc: max{d: $long_w$ (paper,d) = 15pp}

'In every world, the paper is exactly 15 pages long'

b. *exactly 5 pages -er > required > that-long*

max {d: $\forall w \varepsilon$ Acc: $long_w$(paper,d)} = 15pp

'The paper's length in the world in which it is shortest is 15 pages'

(5) How long is the paper required to be?

a. *required > how long > that-long*

'What is the length s.t. in every world, the paper is exactly that long?'

b. *how long > required > that-long*

'What is the length of the paper in in the world in which it is shortest?'

References

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