Introduction to Comparatives

(Stechow 1984)

1. Four early approaches the semantics of Comparatives.

- It is assumed that gradable adjectives denote relations between individuals and degrees. E.g., in (1), ignoring the copula, *tall* is comparable to a transitive verb, except that its first argument must be of type d (for degree).

(1) Maribel is five feet tall.

(2) ⟦*tall*⟧ (⟦*five feet*⟧) (⟦*Maribel*⟧) (w) = 1 iff
Maribel is tall to degree 5' (at least/exactly) in w.

- The comparative in Russell (1905): definite descriptions.
Note that, for (3) to yield the intuitively right truth conditions, "x is large to d" should mean "x is large to exactly degree d".

(3) Your yacht is larger than my yacht.
a. The degree d [your yacht is d-large] is greater than the degree d [my yacht is d-large].
b. ιd(your yacht is large to d) > ιd(my yacht is large to d)

- The comparative in Seuren (1973): $\exists$ and negation.
["x is large to d" = "x is large to at least degree d"]

(4) Your yacht is larger than my yacht.
a. $\exists$d [your yacht is large to d & $\neg$(my yacht is large to d)]

- The comparative in Cresswell (1976): λ.
["x is large to d" = "x is large to at least degree d"]

(5) Your yacht is larger than my yacht.
a. λd [your yacht is d-large] *er than* λd [my yacht is d-large]
b. Every degree d such that your yacht is d-large is greater than any degree d' such that my yacht is d'-large. (See Stechow p. 9)
c. The set of degrees d such that your yacht is d-large is greater / is a proper superset of the set of degrees d' such that my yacht is d'-large. (Caveat: my reinterpretation)

- The comparative in Hellan (1981): the differential degree.
["x is large to d" = "x is large to exactly degree d"]

(6) Your yacht is larger than my yacht.
a. $\exists d_1,d_2,d_3$ [your yacht is large to d_1 & my yacht is large to d_2 & $d_1=d_2+d_3$ & $d_3>0$]

2. Russell's ambiguity: a matter of scope (over the matrix clause)?

- The aforementioned analyses obtain the sensible reading of (7) by giving the *than*-clause and the comparative *–er* scope over the attitude verb *thought*.

(7) I thought your yacht was larger than it is.

(8) Russell:
a. ιd(I thought your yacht is large to d) > ιd(your yacht is large to d)
b. # I thought (ιd(your yacht is large to d) > ιd(your yacht is large to d))

(9) Seuren:
a. $\exists$d [I thought your yacht is large to d & $\neg$(your yacht is large to d)]
b. # I thought ($\exists$d [your yacht is large to d & $\neg$(your yacht is large to d)])

(10) Cresswell:
a. λd[I thought your yacht is d-large] $\supset$ λd'[your yacht is d'-large]
b. # I thought: λd[your yacht is d-large] $\supset$ λd'[your yacht is d'-large]

(11) Hellan:
a. $\exists d_1,d_2,d_3$ [(I thought your yacht is large to d_1) & your yacht is large to d_2 & $d_1=d_2+d_3$ & $d_3>0$]
b. # I thought $\exists d_1,d_2,d_3$ [your yacht is large to d_1 & my yacht is large to d_2 & $d_1=d_2+d_3$ & $d_3>0$]

(12) Possible source LF:
[-er than it is]$_1$ [I thought that your yacht is t_1-large]

- Stechow's counter-argument (p. 18-19): (13) is intuitively false in w according to scenario S. However, the previous analyses predict that the sentence should be true in such scenario. I.e., they predict truth conditions that are too weak. This is illustrated for Hellan in (15).

(13) If you smoked more than you do, you would get a prize.

(14) Scenario S:
w_1, w_2, w_3 and w_4 are accessible to w.

	cigarretes smoked per day	prize
w	10	
w_1	11	no
w_2	15	no
w_3	20	yes
w_4	25	yes

(15) Hellan: ["you smoke to d" = "you smoke to exactly degree d"]

a. Intensional Logic:

$\exists d_1,d_2,d_3$ [(you smoke to d_1 $\square\!\!\rightarrow$ you get prize) & you smoke to d_2 & $d_1=d_2+d_3$ & $d_3>0$]

a'. Rendition spelling out world variables:[1]

$\lambda w.\ \exists d_1,d_2,d_3$ [$\forall w'$ACCw (you smoke to d_1 in w' $\rightarrow$ you get prize in w') & you smoke to d_2 in w & $d_1=d_2+d_3$ & $d_3>0$]

QUESTION 1: Calculate the truth conditions for (13) under Russell's approach and explain why they also yield the wrong result.

■ Stechow's solution using Intensional Logic: take Russell's basic analysis, where the *than*-clause is comparable to a definite description (they both translate as ι-expressions); scope out **only** the *than*-clause, as if it was an NP.

(16) If you smoked more than you do, you would get a prize.

(17) LF: [than you do smoke]$_1$ [if you smoked more t_1, you would get a prize]

(18) a. Intensional Logic:

$\lambda d.$[$\iota d''$(you smoke to d") > d $\square\!\!\rightarrow$ you get prize] ($\iota d'$(you smoke to d'))

a'. Rendition spelling out world variables:

$\lambda w.$ [$\lambda d.$[$\forall w'$ACCw [$\iota d''$(you smoke to d" in w') > d $\rightarrow$ you get prize in w']] ($\iota d'$(you smoke to d' in w))]

a". Consider the set of degrees d such that: if you had smoked more than d, then (automatically) you would have gotten a prize. The actual degree d' such that you smoked to d' belongs to that set.

QUESTION 2: Think of the possible readings of (19) and (20). Does any of them present a problem for Stechow's solution? (from Hoeksema 1984, Heim 1985)

(19) We believed that every schoolboy$_1$ thought he$_1$ was brighter than he$_1$ is. (Hoeksema 1984)

(20) If [at least one member of the team]$_1$ was faster than he$_1$ is, we could win the game. (Heim 1985)

[1] The rendition of (15a) in (15b) is only approximate --see the definition of the counterfactual conditional operator $\square\!\!\rightarrow$ on p.13. The present argument does not hinge on the omitted details.

■ Rullmann's (1995:120) solution using a Ty2 language (basically, extension of Stechow's double indexing solution in Intensional Logic to Ty2):

If, instead of Intensional Logic, we have a Ty2 language with explicit quantification over possible worlds (as considered in Cresswell 1990), we can leave the *than*-phrase in situ and simply bind its world variable with any quantifer over worlds scoping over it.

(21) If you smoked more than you do, you would get a prize.

(22) LF: If you smoked more [than you do smoke], you would get a prize.

(23) Ty2 Lg:
λw. ∀w'ACCw [ιd"(you smoke to d" in w') > ιd'(you smoke to d' in **w**) → you get prize in w']

■ Conclusion:

Russell's ambiguity is not a scopal ambiguity, but a world-binding ambiguity.

However, *-er than IP* introduces operators that, in principle, one would expect would interact with other operators in the sentence. Do any such scopal ambiguities exist? We just saw that the first candidate –Russell's ambiguity— is not scopal. In the next days, we will examine other potential candidates.

3. Scopal elements inside the *than*-clause: connectives, quantifiers, etc.

■ It has been noticed that one reading of (24a) entails (24b), and similarly that (25a) entails (25b):

(24) a. Ede is wiser than Pericles *or* Socrates.
b. Ede is wiser than Pericles *and* he is wiser than Socrates.

(25) a. Ede is fatter than *anyone*$_{\exists}$ of us. (Anyone as NPI, as ∃)
b. *Each* x of us is such that Ede is fatter than x.

■ Hellan: truth conditions that are too weak.

(26) Ede is wiser than Pericles *or* Socrates.
a. $\exists d_1,d_2,d_3$ [Ede is wise to exactly d_1 & Pericles or Socrates are wise to exactly d_2 & $d_1=d_2+d_3$ & $d_3>0$]
➡ Too weak.

■ Seuren: ok for (27), but what about (28)?

(27) Ede is wiser than Pericles *or* Socrates.
a. ∃d [Ede is wise to at least d & ¬ (Pericles is wise to at least d ∨ Socrates is wise to at least d)] ⇔ (DeMorgan)
b. ∃d [Ede is wise to at least d & ¬ (Pericles is wise to at least d) ∧ ¬(Socrates is wise to at least d)] ⇔
c. ∃d [Ede is wise to at least d & ¬ (Pericles is wise to at least d)] ∧ ∃d [Ede is wise to at least d & ¬(Socrates is wise to at least d)]

QUESTION 3: Write down the truth conditions predicted by Seuren for (27) (without raising *Niko and Senta*). Are they intuitively correct?

(28) Ede is wiser than Niko and Senta.

■ Cresswell: ok for (29), but wrong result for (30). [But see Stechow's (98).]

(29) Ede is wiser than Pericles *or* Socrates.

a. λd [Ede is wise to at least d] $\supset$
λd' [Pericles is wise to at least d' $\vee$ Socrates is wise to at least d']
➡ "Ede is wiser than the wisest out of {Pericles, Socrates}."

b. λd [Ede is wise to at least d] $\supset$ λd' [Pericles is wise to at least d'] $\wedge$
λd [Ede is wise to at least d] $\supset$ λd' [Socrates is wise to at least d']

Hence, (24a) $\Rightarrow$ (24b).

(30) Ede is wiser than Niko and Senta.
λd [Ede is wise to at least d] $\supset$
λd' [Niko is wise to at least d' $\wedge$ Senta is wise to at least d']
➡ "Ede is wiser than the least wise out of {Niko, Senta}".

■ Russell'approach, modified by interpreting d-wise as "wise at least to degree d" and by adding maximality (at least) to the *than*-clause: ok for (32), but wrong result for (33):

(31) Let P be a set:
max(P) = ιd. P(d) & $\forall$d'[P(d') $\rightarrow$ d$\geq$d']

(32) Ede is wiser than Pericles *or* Socrates.

a. Original: ιd(Ede is wise to d) > ιd'(Pericles or Socrates is wise to d')

b. Modified:
$\exists$d [Ede is wise to at least d & d > max{d':Pericles or Socrates is wise to at least d'}]
➡ "Ede is wiser than the wisest out of {Pericles, Socrates}."
Hence, (24a) $\Rightarrow$ (24b).

(33) Ede is wiser than Niko and Senta.
$\exists$d [Ede is wise to at least d & d > max{d':Pericles and Socrates is wise to at least d'}]
➡ "Ede is wiser than the least wise of {Pericles, Socrates}."

■ Conclusion:
The distribution and interpretation of operators inside the *than*-clause is not a solved issue. We will see more of it later in the semester.

EXERCISE: In pp. 43-5, Stechow works out the semantics of multihead comparatives like (34) within Seuren's system. Do so yourself within the modified version of Russell's analysis.

(34) More dogs ate more rats than cats ate mice.