



### 3. Ellipsis analyses of phrasal comparatives

- It has been argued that English phrasal comparatives are derived by reduction of clausal comparatives (Lechner 2004, Bhatt and Takahashi 2011).
- An ellipsis analysis clearly could in principle generate the reading (c) reading:

$$(8) \llbracket \text{er} \rrbracket = \lambda P_{\text{dt}}. \lambda Q_{\text{dt}}. \max(Q) > \max(P)$$

$$(9) \llbracket \text{er} [\text{than } [\text{Op}_1 [\text{OJS's lawyer } [\beta \text{ defended OJS } [t_1 \text{ skillfully}]]]]] \rrbracket \\ \llbracket \lambda_2 [\text{John } [\alpha \text{ defended himself } [t_2 \text{ skillfully}]]] \rrbracket$$

- But the ellipsis operation involved would certainly have to be much less constrained than VP ellipsis — as (3)–(4) demonstrate — and arguably have to be less constrained than the ellipsis operations typically assumed in ellipsis analyses of phrasal comparatives (e.g. Lechner 2004).
- This theoretical issue aside, there are three empirical issues that arise if we attempt to derive the (c) reading via ellipsis.

#### Problem 1: restrictions on choice of adverb

- The (c) reading is available only for some choices of adverb.
  - Unclear how ellipsis analysis could explain or enforce this restriction.
- (10) John defended himself in court more **frequently** than OJ Simpson's lawyer.  
\*‘John defended himself in court more frequently than OJS's lawyer defended OJS in court.’
- (11) The general revised his military strategy more **frequently** than a chess grandmaster.  
\*‘The general revised his military strategy more frequently than a chess grandmaster revises the chess grandmaster's chess strategy.’

#### Problem 2: multiple standards

- Phrasal comparatives in English may have multiple standards. This is easily accounted for via ellipsis:
- (12) John was happier in Venice than Jane in Rome.
- (13)  $\llbracket \text{er } [\lambda_1 [\text{than Jane was } [t_1 \text{ happy}]] \text{ in Rome}] \rrbracket$   
 $\llbracket \lambda_2 [\text{John was } [t_2 \text{ happy}]] \text{ in Venice} \rrbracket$

- The (c) reading goes away in the presence of multiple standards:

(14) John defended himself more skillfully in the tribunal than OJ Simpson's lawyer in court.

\*‘John defended himself more skillfully in the tribunal than OJS's lawyer defended OJS in court.’

(15) The general revised his military strategy using a paper and pencil more skillfully than a chess grandmaster using a computer.

\*‘The general revised his military strategy using a paper and pencil more skillfully than a chess grandmaster revises his chess strategy using a computer.’

- As phrasal comparatives with multiple standards are often considered to be derivable only via ellipsis (Bhatt and Takahashi 2011), this suggests that forcing an ellipsis derivation makes the (c) reading go away.
- This would follow if the (c) readings have only a non-ellipsis derivation.

#### Problem 3: ellipsis likely not available in all languages

- Japanese translations of the troublesome examples have the same range of available readings.
- Bhatt and Takahashi (2011) conclude that phrasal comparatives in Japanese do not have an ellipsis analysis (except in instances where there is clear surface syntactic evidence for the presence of a reduced clause, e.g. multiple standards).
- Sudo (2015) argues that Japanese has only phrasal comparatives, so that all apparently clausal comparatives in Japanese have a phrasal source.

(16) John-wa hootei-de OJ Simpson-no bengoshi-yori umaku zibun-o  
John-TOP court-in OJ Simpson-GEN lawyer-than well self-ACC  
bengoshita  
defended

‘John defended himself in court better than OJ Simpson's lawyer.’

[same range of interpretations as English translation]

### 4. Individuals to degrees

- In a comparative such as (17), one of the arguments to the comparative morpheme is simply a degree-denoting expression:

(17) The kite flew higher than 50 feet.

$\llbracket \text{er } [\text{than } 50 \text{ feet}] \rrbracket [\lambda_1 [\text{the kite flew } [t_1 \text{ high}]]]$

(18)  $\llbracket \text{er} \rrbracket = \lambda d. \lambda P_{\text{dt}}. \max(P) > d$

- There are similar examples where the degree of comparison appears to be specified indirectly via an individual. For example, the most felicitous reading of (19) is not (19a) but (19b):

- (19) The kite flew higher than the tallest building.
- #‘The kite flew higher than the tallest building flew.’
  - ‘The kite flew higher than  $d$ .  
[where  $d$  is the maximum degree to which the tallest building is high]’

- What seems to be happening here is that instead of being fed a height, the comparative morpheme is being fed an individual (the individual denoted by ‘the tallest building’). The height of this individual is then used as the standard.
- A simple analysis along these lines is sketched in (20)–(22). The value of F is contextually determined, or perhaps recovered via a more general semantic ellipsis resolution mechanism (Gawron 1995).

$$(20) \llbracket \text{er} \rrbracket = \lambda f_{\text{ed}}. \lambda P_{\text{dt}}. \lambda x_e. \max\{P\} > f(x)$$

$$(21) \llbracket \text{er}_F \text{ [than [the tallest building]]} \rrbracket [\lambda_1 \text{ [the kite flew [} t_1 \text{ high]]}]$$

$$(22) \llbracket \text{F} \rrbracket = \lambda x_e. \max\{d \mid x \text{ is } d \text{ high}\}$$

- This analysis is appealing as it offers a unified treatment of ordinary phrasal comparatives (as shown in (23)), comparatives such as (19) (as shown in (24)), and the original problematic case in (1) (as shown in (25)):

- (23) a. John is taller than Bill.  
b.  $\llbracket \text{F} \rrbracket = \lambda x_e. \max\{d \mid x \text{ is } d \text{ tall}\}$

- (24) a. The kite flew higher than the tallest building.  
b.  $\llbracket \text{F} \rrbracket = \lambda x_e. \max\{d \mid x \text{ is } d \text{ tall}\}$

- (25) a. John defended himself in court more skillfully than OJS’s lawyer.  
b.  $\llbracket \text{F} \rrbracket = \lambda x_e. \max\{d \mid x \text{ was } d \text{ skillful at defending OJS in court}\}$

- Unfortunately it is difficult to sufficiently constrain the choice of F. Gawron (1995) makes a very interesting attempt to do so using the analysis of ellipsis as higher-order unification in Dalrymple, Sheiber, and Pereira (1991), but Kennedy (1999) notes that the proposed system still overgenerates in some instances:

- (26) The table is wider than the rug; the rug is longer than the desk.  
The table is  $\llbracket \text{er}_{F_1} \text{ [than the rug]} \rrbracket$  wide]; the rug is  $\llbracket \text{er}_{F_2} \text{ [than the desk]} \rrbracket$  long].  
 $\llbracket \text{F}_1 \rrbracket = \lambda x_e. \max\{d \mid x \text{ is } d \text{ wide}\}$   
 $\llbracket \text{F}_2 \rrbracket = \lambda x_e. \max\{d \mid x \text{ is } d \text{ wide}\}$   
\*‘The table is wider than the rug; the rug is longer than the desk is wide.’

- Moreover, if the choice of F is free enough to deal with examples such as (25)–??, it is difficult to see how we can still rule out examples such as (10) above:

- (27) a. John defended himself in court more frequently than OJS’s lawyer.  
b.  $\llbracket \text{F} \rrbracket = \lambda x_e. \max\{d \mid x \text{ defended OJS in court } d \text{ frequently}\}$   
\*‘J defended himself more frequently than OJS’s lawyer defended OJS.’

## 5. Constraining the $e \rightarrow d$ mapping using complex degrees

### 5.1. Previous work using complex degrees

- By a ‘complex degree’, we mean a degree that has an internal structure which makes it possible to interrogate the degree as to what it is a degree of.
- There is a long history of analyses where *er* retrieves information about the scale from degree values themselves (Cresswell 1976).
- In the recent literature: Rett (2008), Schwarzschild (2013). These build on Bartsch and Vennemann (1972), Cresswell (1973, 1976).

...[in] our approach the terms of **er than** supply the comparison scale:  $\langle \alpha, \text{er than}, \beta \rangle$  essentially means that the degree of  $\alpha$  is higher than the degree of  $\beta$  on the scale that is common to the meaning of  $\alpha$  and  $\beta$ .

(Cresswell 1976, 268)

### 5.2. Assumptions regarding scales and degrees

- A scale  $\psi$  is a set of points together with a dimension  $\psi_D$  (e.g. HEIGHT) and a relation  $\leq_\psi$  that totally orders this set of points.
- For every dimension  $D$  there is a measure function  $M(D)$  that maps individuals to points (Bartsch and Vennemann 1972).
- Every degree value is associated with exactly one scale.

### 5.3. Concrete implementation of these assumptions

(28) A degree is a pair  $\langle p, \psi \rangle$ , where  $p$  is a point on the scale  $\psi$ .

$$(29) \mathcal{P}(\langle p, \psi \rangle) = p$$

$$(30) \mathcal{S}(\langle p, \psi \rangle) = \psi$$

$$(31) \mathcal{M}(\langle p, \psi \rangle) = M(\psi_D)$$

$$(32) \leq_{\langle p, \psi \rangle} = \leq_\psi$$

## 5.4. Analysis

$$(33) \llbracket \text{high} \rrbracket = \lambda d \lambda x . 1 \text{ iff } \mathcal{P}(d) \leq_{\text{HEIGHT}} M(\text{HEIGHT})(x)$$

$$(34) \max(P) = \iota d . \forall d' [P(d') \rightarrow [S(d) = S(d') \wedge \mathcal{P}(d') \leq_d \mathcal{P}(d)]]$$

$$(35) \llbracket \text{er} \rrbracket = \lambda x_e . \lambda P_{dt} . \mathcal{P}(d) \leq_d \mathcal{M}(d)(x) \text{ where } d = \max(P)$$

$$(36) \llbracket \text{er [than the tallest building]} \rrbracket [\lambda_1 \llbracket \text{the kite flew [} t_1 \text{ high]} \rrbracket]]$$

- The analysis explains the absence of the (c) reading with adverbs such as *frequently*, since in general there is no way sensible to measure the frequency of an individual such as John.

## 5.5. Problems

- The analysis in §5.4 cannot extend to simple phrasal comparatives such as (37), so we must assume that either the direct analysis or some kind of ellipsis analysis is also available.

$$(37) \text{ John talks more frequently than Bill.}$$

- This gives rise to a spurious-seeming ambiguity in the case of sentences such as ‘John is taller than Bill’, since more or less the same interpretation can be derived either using the direct analysis or the analysis exemplified in (33)–(36).
- The packing and unpacking of  $\langle p, \psi \rangle$  pairs is rather clumsy.

## 6. Adverbial comparatives as event modifiers

- **Hypothesis:** A sentence such as (38) can be interpreted as a comparison between the degree of skill of the defending event and OJS’s lawyer’s degree of skill:

$$(38) \text{ John defended himself more skillfully than OJS’s lawyer.}$$

- We’ll assume, very roughly following Schäfer (2008), that manner adverbs such as *skillfully* do not modify events directly, but rather modify manners.
- Manners are connected to events via the relation **manner**( $m, e$ ).
- We’ll assume that manners are individuals (type  $e$ ). This is convenient because it means that the same predicate of degrees and individuals can be applied both to an individual such as Bill and to a manner.<sup>2</sup>
- The  $\llbracket \text{ly} \rrbracket$  suffix converts a predicate of individuals to a predicate of events by existentially quantifying over manners:

$$(39) \llbracket \text{ly} \rrbracket = \lambda P_{et} . \lambda e_v . \exists m_e [\mathbf{manner}(m, e) \wedge P(m)]$$

- In a sentence such as ‘John played skillfully’, *skillful* combines with a contextually-supplied degree and then with *ly* to create a predicate of events:

$$(40) \llbracket \text{skillful} \rrbracket = \lambda d . \lambda x_e . x \text{ is } d \text{ skillful}$$

$$(41) \llbracket \text{skillfully} \rrbracket = \llbracket \text{ly} \rrbracket (\llbracket \text{skillful} \rrbracket)(d) = \lambda e_v . \exists m_e [\mathbf{manner}(m, e) \wedge \llbracket \text{skillful} \rrbracket(d)(m)]$$

(where  $d$  is supplied contextually)

- This predicate of events can then combine with a VP via Predicate Modification.
- Phrases such as ‘more skillfully than OJS’s lawyer’ can also be interpreted as predicates of events.
- The trick is to use the denotation for *er* from the direct analysis of comparatives — repeated in (42) — and then attach *ly* above *er*, as in (44):

$$(42) \llbracket \text{er} \rrbracket = \lambda x_e . \lambda P_{d,et} . \lambda y_e . \max\{d \mid P(d, y)\} > \max\{d \mid P(d, x)\} \quad [= (6)]$$

$$(43) \llbracket \llbracket \text{er [than OJS’s lawyer]} \rrbracket \text{ skillful} \rrbracket \rrbracket = \lambda x_e . x \text{ is more skillful than OJS’s lawyer}$$

$$(44) \llbracket \llbracket \text{ly [er [than OJS’s lawyer]} \rrbracket \text{ skillful} \rrbracket \rrbracket \rrbracket = \lambda e_v . \exists m_e [\mathbf{manner}(m, e) \wedge m \text{ is more skillful than OJS’s lawyer}]$$

- The (c) reading of (45) can be derived from the LF in (46):

$$(45) \text{ John defended himself more skillfully than OJS’s lawyer.}$$

$$(46) \text{ John } [\text{VP } [\text{VP defended himself}]]$$

$$[\text{ly } [\llbracket \text{er [than OJS’s lawyer]} \rrbracket \text{ skillful} \rrbracket]]$$

- The denotation of  $\llbracket \text{ly} \dots \rrbracket$ , given in (44), combines via Predicate Modification with the denotation of  $[\text{VP defended himself}]$ , shown in (47). For simplicity we assume that the reflexive is coreferential with *John* and not bound by it.

$$(47) \llbracket [\text{VP defended himself}] \rrbracket = \lambda e_v . \mathbf{defend}(\mathbf{John}, e)$$

- Following the introduction of the agent, the resulting interpretation can be paraphrased as follows:

$$(48) \text{ There was a defending event } e, \text{ John was the agent and patient of } e, \text{ and a manner of } e \text{ was more skillful than OJS’s lawyer is skillful.}$$

- The (c) reading can be derived only if the predicate of individuals constructed by *er* is suitable as a predicate of manners.
- Thus, adverbs such as *frequently* cannot trigger the (c) reading as  $\text{frequent}(m)$  is undefined for any manner  $m$ .

<sup>2</sup>We could assign manners a separate type at the price of adding some form of subtyping to the type system (Alexeyenko 2012, 207fn2).

## 6.1. Covert conversion to a predicate of events

- In the case of most English adverbs, we can associate the operation which converts a predicate of individuals to a predicate of events with the overt *ly* morphology.
- However, if the preceding analysis is to be maintained, we must assume that this conversion can occur without any overt morphological trigger.
- For example, we must assume that e.g. *high(er)* in (19) can be converted to a predicate of events without any overt morphological trigger.
- The same goes for adverbial PPs:

(49) John defended himself with more skill than OJS's lawyer.  
[compatible with (c) reading]

(50) [PP with [[er [than OJS's lawyer]] skill]]]  
[er [than OJS's lawyer]] [ $\lambda_1$  [PP with [ $t_1$  skill]]]]  
↑  
[ly [er [than OJS's lawyer]] [ $\lambda_1$  [PP with [ $t_1$  skill]]]]]  
John [<sub>VP</sub> [<sub>VP</sub> defended himself]  
[ly [er [than OJS's lawyer]] [ $\lambda_1$  [PP with [ $t_1$  skill]]]]]]]

- We won't specify an analysis for adverbial PPs like [PP with skill]. We'll just assume that a degree argument is present somewhere within them and that they are predicates of individuals, so that the addition of a degree abstractor yields a predicate of degrees and individuals:

(51)  $\llbracket [\lambda_1 \text{ [PP with } t_1 \text{ skill]}] \rrbracket = \lambda d. \lambda x_e. x \text{ has degree } d \text{ of skill}$

- The denotation of (49) is computed as shown in (52). For simplicity we assume that the reflexive is coreferential with *John* and not bound by it.

(52)  $\llbracket [\text{er [than OJS's lawyer]}] [\lambda_1 \text{ [PP with } t_1 \text{ skill]}] \rrbracket \rrbracket$   
 $= \lambda x_e. \max\{d \mid x \text{ has degree } d \text{ of skill}\} >$   
 $\max\{d \mid \text{OJS's lawyer has degree } d \text{ of skill}\}$   
 $\llbracket [\text{ly [er [than OJS's lawyer]}] [\lambda_1 \text{ [PP with } t_1 \text{ skill]}] \rrbracket \rrbracket \rrbracket$   
 $= \lambda e_v. \exists m_e [\mathbf{manner}(m, e) \wedge$   
 $\max\{d \mid m \text{ has degree } d \text{ of skill}\} >$   
 $\max\{d \mid \text{OJS's lawyer has degree } d \text{ of skill}\}]$   
 $\llbracket [\text{VP defended himself}] \rrbracket = \lambda e_v. \mathbf{defend}(\mathbf{John}, e)$   
 $\llbracket [\text{VP [VP ...]}] \rrbracket = \lambda e_v. \mathbf{defend}(\mathbf{John}, e) \wedge$   
 $\exists m_e [\mathbf{manner}(m, e) \wedge$   
 $\max\{d \mid m \text{ has degree } d \text{ of skill}\} >$   
 $\max\{d \mid \text{OJS's lawyer has degree } d \text{ of skill}\}]$

## 6.2. Restrictions on wide scope

- (53) John claimed to defend himself in court more skillfully than OJ Simpson's lawyer.
- John claimed that the max  $d$  such that John defended himself  $d$ -skillfully was greater than the max  $d$  such that OJS's lawyer defended OJS  $d$ -skillfully.
  - \*The max  $d$  such that John claimed to defend himself in court  $d$ -skillfully is greater than the max  $d$  such that OJS's lawyer claimed to defend OJS  $d$ -skillfully.
- (54) John [<sub>VP</sub> claimed to [<sub>VP</sub> [<sub>VP</sub> defend himself in court]  
[ly [[er [than OJS's lawyer]] skillful]]]] **reading (a)**
- (55) [er [than OJS's lawyer]] [ $\lambda_1$  [John [<sub>VP</sub> claimed to [<sub>VP</sub> [<sub>VP</sub> defend himself in court]  
[ly [ $t_1$  skillful]]]]]]] **type mismatch**
- (56) John [[er [than OJS's lawyer]] [ $\lambda_2$  [ $\lambda_1$  [<sub>VP</sub>  $t_1$  claimed to [<sub>VP</sub> [<sub>VP</sub> defend himself in court]  
[ly [ $t_2$  skillful]]]]]]]]] **NOT reading (b)**

## 6.3. A final puzzle

- (57) The plane was flown higher than the tallest building.
- #The plane was flown higher than the tallest building was flown.
  - The plane was flown higher than  $d$  (= max degree to which TB is high).
- (58) The plane was flown more skillfully than Bill.
- #The plane was flown more skillfully than Bill was flown.
  - \*The plane was flown more skillfully than  $d$  (= max degree to which Bill is skillful).

- **Generalization:** Analysis of [ly [[er [than X]] Adj] as a predicate of events is impossible for agent-oriented manner adverbs in passives.

## 7. Conclusion

- The (c) reading is not derived via ellipsis.
- The (c) reading can be derived by allowing the individual-denoting standard to be freely mapped to a degree, but the resulting theory overgenerates.
- The mapping from individuals to degrees be constrained using complex degree values, but at the price of introducing spurious-seeming ambiguities.
- The most promising approach is to analyze the relevant comparatives as event modifiers.
- **The event modifier analysis imposes two key constraints:**
  - **The (c) reading is derived from a predicate of individuals formed via the comparative (*er*) morpheme. Only the variant of *er* used for phrasal comparatives can construct such a predicate (in contrast to the variant (8) used in clausal comparatives).**
  - **The aforementioned predicate of individuals must be suitable as a predicate of manners. This limits the range of adverbials that can give rise to the (c) reading.**
- The puzzle in §6.3 remains.

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