

## Reduced and unreduced phrasal comparatives

Rajesh Bhatt · Shoichi Takahashi

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**Abstract** Degree heads combine with individual (*John is taller than [Mary]*) as well as clausal arguments (*John is taller than [Mary is]*). Does the degree head have the same meaning in these two argument structures? Two kinds of answers have been proposed in the literature: I. there is a single meaning where the 2-place degree head combines with a degree predicate, with a reduction operation that derives the DP argument from a degree predicate denoting clausal argument, and II. there are distinct meanings for each argument structure, one combining with an individual denoting DP (3-place degree head) and the other with a degree predicate denoting clause (2-place degree head). We show that languages vary in which of these answers they choose: English goes for option I and Hindi-Urdu and Japanese for versions of option II. Our account of this variation assumes that the crosslinguistic distribution of 2-place

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R. Bhatt (✉)

South College, Department of Linguistics, 150 Hicks Way, University of Massachusetts at Amherst, Amherst, MA 01003-9274, USA  
e-mail: [bhatt@linguist.umass.edu](mailto:bhatt@linguist.umass.edu)

S. Takahashi

General Education, College of Engineering, Nihon University, 1 Nakagawara Tokusada, Tamura-machi Koriyama-shi, Fukushima-ken 963-8642, Japan  
e-mail: [s\\_takahashi@alum.mit.edu](mailto:s_takahashi@alum.mit.edu)

and 3-place degree heads is not in itself subject to crosslinguistic parametrization; they are just syntactic projections of the basic meaning of comparison. We advance a specific proposal which derives the differences between the languages from the morphosyntactic properties of ‘than’ and a preference for minimal structure.

**Keywords** Crosslinguistic variation in comparatives · Phrasal comparatives · Clausal comparatives · 2 vs. 3-place degree operators · Direct Analysis · Reduction Analysis · Hindi-Urdu · Japanese

## 1 Multiple routes to a single meaning

Natural languages often provide instances where two distinct structures map to the same meaning. The much-studied operation of passivization could be taken to provide an instance of two structures, the active and the passive, mapping to the same meaning. In this paper we are interested in examining a similar pair from the domain of comparative constructions. Many languages allow comparative meanings to be expressed by means of a clausal comparative (1a) and a phrasal comparative (1b). These seem to have the same meaning but differ in the category of the constituent that ‘than’ combines with. In the case of a clausal comparative, ‘than’ combines with a clause that has undergone some reduction operation and in the case of a phrasal comparative, ‘than’ combines with a DP. If we believe that the surface structures in (1) are directly the input to interpretation, we are led to the conclusion that the comparative degree head has a distinct semantic entry in the clausal comparative and the phrasal comparative. More specifically, if we assume following von Stechow (1984) that the clausal complement of ‘than’ denotes a degree description, then the degree head in a clausal comparative combines with a degree description while the degree head in a phrasal comparative combines with an individual.

### (1) Comparison:

#### a. Clausal Comparative:

John is taller than [Bill is].

– a degree head that combines with a clause

2-place degree head: 2 arguments—the extent of John’s tallness, the extent of Bill’s tallness

#### b. Phrasal Comparative:

John is taller than [Bill].

– a degree head that combines with an individual

3-place degree head: 3 arguments—Bill, John, the property of tallness

Further assumptions, to be made explicit in this paper, lead to the observation that clausal comparatives involve a 2-place degree head, which combines with two degree descriptions, while phrasal comparatives involve a 3-place degree head, which combines with two individual arguments and a predicate of degrees and individuals.<sup>1</sup>

<sup>1</sup>This paper consistently refers to the two degree heads as 2-place and 3-place ‘-er’. This arity distinction follows from syntactic assumptions we make concerning how the degree head combines with the

The question that arises at this point is whether we need both kinds of degree heads within and across languages. An initial observation that could be taken to argue against having both kinds of degree heads is that while there are many languages which have both phrasal and clausal comparatives, there do not seem to be any languages where morphologically distinct degree heads are used for the two kinds of comparatives. Nevertheless we show that languages do make use of both kinds of degree heads. This raises the question of the crosslinguistic and intralinguistic distribution of the different kinds of degree heads. Here a number of factors come into play and our paper is an attempt to tease these apart.

The simplest kind of solution to the distribution question, namely that clausal comparatives use the 2-place head and phrasal comparatives use the 3-place head, is shown to be incorrect. While clausal comparatives always involve a 2-place head, the situation with phrasal comparatives is more involved. Whether a phrasal comparative in a given language uses a 2-place head or a 3-place head depends in part on the availability of reduction operations within the ‘than’-complement in that language. In certain cases, because of the applicability of reduction operations, the ‘than’-phrase in a phrasal comparative could be a reduced clause and a 3-place degree head that combines with an individual might not be necessary. This seems to be the case with English and German (see Lechner 2001, 2004). In cases where reduction operations are unavailable, a 3-place ‘-er’ is forced, as argued for Hindi-Urdu in Bhatt and Takahashi (2007).

But reduction operations do not fully determine the availability of 3-place ‘-er’. We show that in Japanese, reduction operations are available but 3-place ‘-er’ is still attested. Certain phrases that could be treated as reduced clauses are not treated as such. What then determines the distribution of a particular degree head in a particular language? We suggest that the answer to this question comes from a complex interaction between the morphosyntactic properties of comparative markers like ‘than’ and a preference for minimal structure. Ultimately there is no crosslinguistic variation in the distribution of 2-place and 3-place degree heads. They are merely different projections of the same meaning and if a language has one, it has the other. This is why no language realizes the two distinctly. But languages differ in the environments where one or the other degree head may be used, leading to the observed crosslinguistic differences.

### 1.1 2-place ‘-er’ and clausal comparatives

Let us begin with an introduction to clausal comparatives and the 2-place degree head that goes with them. In English clausal comparatives (see (2a)), the *than*-phrase combines with a clause which denotes a degree expression. We assume that there is a silent degree predicate inside the *Bill is* clause. This silent degree predicate is overt in (2b), the Hindi-Urdu counterpart of (2a). Here the comparative marker *-se*

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‘than’-phrase and how the resulting degree phrase (DegP) combines with the rest of the clause. But these assumptions (and the resulting arity distinctions) are not crucial for our proposal. Our proposal would also be consistent, for example, with analyses where the Deg head does not form a constituent with the degree clause (Kennedy 1999). The difference that is crucial is the semantic type of the ‘than’-phrase: a degree description for 2-place ‘-er’ and an individual for 3-place ‘-er’.

‘than’ combines with a degree denoting pronoun which refers to the correlative degree clause ‘how tall Bill is’. In both cases, the degree head ‘-er’ combines with a degree description.

(2) Clausal:

a. John is taller than [Bill is].

b. Hindi-Urdu:

[Bill jitnaa lambaa hai] [John us-se zyaadaa lambaa hai].

Bill how tall is John that-than more tall is

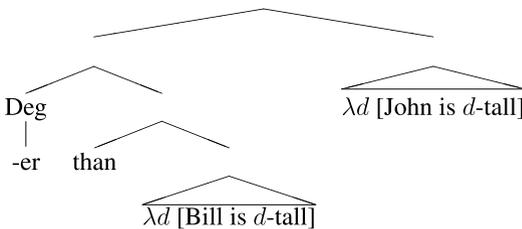
‘John is taller than Bill is.’

Given the syntax we assume below where the degree head forms a constituent with the ‘than’-clause, this yields a 2-place predicate.

(3) P, Q are degree predicates (sets of degrees)

a.  $-er(P)(Q) \leftrightarrow \exists d [Q(d) \wedge \neg P(d)]^2$

b.  $-er [\lambda d. \text{Bill is } d\text{-tall}] [\lambda d. \text{John is } d\text{-tall}]$



The 2-place ‘-er’ is also useful for handling cases where the complement of ‘than’ directly names a degree.

(4) a. John is taller than six feet.

b. Hindi-Urdu:

Atif-ne tiin-se zyaadaa kitaabē khariid-ii thī:

Atif-Erg three-than more books.f buy-Pfv.f be.Pst.FPI.

‘Atif bought more than three books.’

In general, if a language allows ‘than’ to combine directly with a degree name, we can assume that it has a 2-place degree head. These cases also reveal that 2-place degree heads are not limited to clausal comparatives. Clausal comparatives always require a 2-place degree head but so do ostensibly phrasal comparatives like (4).

<sup>2</sup>We assume a widely-assumed semantics for adjectives which treats an adjective as a relation between an individual and a degree argument. Even though we systematically use the semantics presented for ‘-er’ in (3a), everything in this paper is compatible with the more commonly adopted maximality based semantics (= (ia)) as well as a subsethood semantics (= (ib)). This point also holds for the semantics of the 3-place ‘-er’ in (7).

(i) a.  $[-er] = \lambda P \lambda Q [\max(Q) > \max(P)]$   
 b.  $[-er] = \lambda P \lambda Q [P \subset Q]$

## 1.2 3-place ‘-er’ and phrasal comparatives

On the surface, ‘-er’ in phrasal comparatives combines with an individual, not a degree description. We refer to the complement of the ‘than’-phrase in a phrasal comparative as the standard and to the constituent in the main clause that is contrasted with the standard as the associate. Thus in (5a), *Bill* is the standard and *John* is the associate.

- (5) Phrasal:
- a. John is taller **than Bill**.
  - b. Hindi-Urdu:  
 John **Bill-se** zyaadaa lambaa hai.  
 John **Bill-than** more tall is  
 ‘John is taller than Bill.’

This aspect of phrasal comparatives leads to two kinds of analyses. The first kind of analyses can be dubbed Reduction Analyses because they assume that the complement of ‘than’ is derived via reduction from a larger clausal constituent which stands for a degree description much like in clausal comparatives.

- (6) a. John is taller [than [Bill ~~is tall~~]].  
 b. More students ate apples [than [~~students ate~~ bananas]].

Once such a reduction operation is assumed, the need for a distinct 3-place ‘-er’ that combines with individuals disappears and we can limit ourselves to one ‘-er’ which takes two degree descriptions as arguments. Particular instantiations of the Reduction Analysis differ on exactly what reduction operation is relevant (Gapping, Conjunction Reduction: Lechner 2001, 2004; TP-ellipsis, Stripping: Merchant 2009) and what the size of the reduced object is (Pancheva 2006, 2007).

The second kind of analyses can be dubbed Direct Analyses as they do not assume a reduction operation and as a result the degree head combines directly with the overt complement of the ‘than’-phrase (see Heim 1985). This complement denotes an individual, not a degree argument. This necessitates a new lexical entry for the degree head: a 3-place ‘-er’ that combines with two individual arguments and a predicate of individuals and degrees.

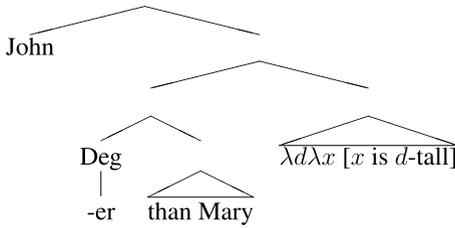
- (7)  $-er(x)(P)(y) \leftrightarrow \exists d[P(y, d) \wedge \neg P(x, d)]$

The predicate of individuals and degrees is created by movement of the associate and the degree phrase. We assume the following steps. First the associate moves creating a predicate of individuals. Next the degree phrase moves and targets the predicate of individuals created by the movement of the associate.<sup>3</sup> This is an instance of ‘parasitic scope’—a case where a movement operation targets a position created by a preceding

<sup>3</sup>The Deg head presumably combines with the ‘than’-phrase via Late Merge as in Bhatt and Pancheva (2004), Takahashi and Hulsey (2009) but this is not crucial.

movement (see Sauerland 1998; Beck and Sauerland 2000; Nissenbaum 2000; Barker 2007; Kennedy and Stanley 2008).

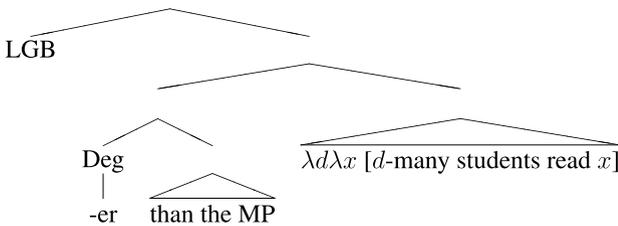
(8) John is taller than Mary.



$$\exists d [\text{tall}(j,d) \wedge \neg \text{tall}(m,d)]$$

The clearest motivation for the movement of the associate comes from cases like (9), where the relevant predicate of individuals and degrees does not exist on the surface. Movement of the associate is necessary to create such a predicate.

(9) More students read LGB than the MP.



$$\exists d [\exists x [\text{students}(x) \wedge \text{card}(x) = d \wedge \text{read}(x,\text{LGB})] \wedge \neg \exists x [\text{students}(x) \wedge \text{card}(x) = d \wedge \text{read}(x,\text{MP})]]$$

The data from Hindi-Urdu and Japanese phrasal comparatives provides evidence in support of associate movement. Unlike English where the postulated movement of the associate is a covert movement, in these languages the relevant movement has to be overt and is subject to the usual constraints on overt movement.

## 2 Binding and the Direct Analysis in English

The Reduction Analysis and the Direct Analysis differ in the predictions they make about the binding properties of the standard. In the Reduction Analysis, the standard is inside a larger clausal structure which is isomorphic in most ways to the matrix clause. In particular, the standard occupies a position within the reduced clause that is parallel to the position occupied by its associate in the matrix clause. This leads to the expectation that the binding properties of the standard will be related to the structural position of its associate. The Direct Analysis makes a very different prediction.

There is no reduced clause on the Direct Analysis. Moreover, since the standard does not form a constituent with the associate, we do not expect there to be any dependency between the binding properties of the standard and those of the associate. The standard has the external syntax of a PP and one would expect it to have the binding properties of a PP in the same structural location.

So what are the facts? What c-commands the standard? Building upon Lechner's (2004) observations, we present the following generalization:<sup>4</sup>

- (10) The standard is c-commanded by everything that c-commands the associate.

Consider for example (11a), (12a), and (13a), where we have a pronoun that c-commands the associate. We see that this pronoun cannot co-refer to an R-expression inside a standard. If the pronoun does not c-command the associate, as in (11, 12, 13b), then coreference is possible.

- (11) a. pronoun c-commands associate:  
 \*More people introduced him<sub>i</sub> **to Mary** than to John<sub>i</sub>'s mother.  
 (Control: More people introduced John<sub>i</sub> **to Mary** than to his<sub>i</sub> mother.)
- b. pronoun does not c-command associate:  
**Mary** introduced him<sub>i</sub> to more people than John<sub>i</sub>'s mother.  
 (Control: **Mary** introduced John<sub>i</sub> to more people than his<sub>i</sub> mother.)
- (12) a. pronoun c-commands associate:  
 \*More people talked to him<sub>i</sub> **about Sally** than about Peter<sub>i</sub>'s sister.  
 (Control: More people talked to Peter<sub>i</sub> **about Sally** than about his<sub>i</sub> sister.)
- b. pronoun does not c-command associate:  
 More people talked **to Sally** about him<sub>i</sub> than to Peter<sub>i</sub>'s sister.  
 (Control: More people talked **to Sally** about Peter<sub>i</sub> than to his<sub>i</sub> sister.)
- (13) (Context: Peter, Peter's sister, and Sally are taking part in a race. People are betting on their prospects.)
- a. pronoun c-commands associate:  
 \*More people expect him<sub>i</sub> to overtake **Sally** than Peter<sub>i</sub>'s sister.  
 (= \*More people expect him<sub>i</sub> to overtake Sally than expect him<sub>i</sub> to overtake Peter<sub>i</sub>'s sister.)  
 (Control: More people expect Peter<sub>i</sub> to overtake **Sally** than his<sub>i</sub> sister.  
 (= More people expect Peter<sub>i</sub> to overtake Sally than expect Peter<sub>i</sub> to overtake his<sub>i</sub> sister.)

<sup>4</sup>The English examples in this section are modeled on examples in Lechner (2004). Unless otherwise noted, the authors are responsible for the Hindi-Urdu and the Japanese data.

- b. pronoun does not c-command associate:<sup>5</sup>  
 (?)More people expect **Sally** to overtake him<sub>i</sub> than Peter<sub>i</sub>'s sister.  
 (= More people expect Sally to overtake him<sub>i</sub> than expect Peter<sub>i</sub>'s sister to overtake him<sub>i</sub>.)  
 (Control: More people expect **Sally** to overtake Peter<sub>i</sub> than his<sub>i</sub> sister.  
 (= More people expect Sally to overtake Peter<sub>i</sub> than expect his<sub>i</sub> sister to overtake Peter<sub>i</sub>.)

There is a clear contrast between (11, 12, 13b) and the ungrammatical (11, 12, 13a). It is crucial to note that internal arguments of the verb do not always c-command the standard. We have already seen this in (11, 12, 13b). This point is also made by the examples in (14).

- (14) a. **Mary** gave him<sub>i</sub> more presents than John<sub>i</sub>'s mother.  
 (= Mary gave him<sub>i</sub> more presents than John<sub>i</sub>'s mother gave him<sub>i</sub>.)  
 b. **Mary** gave more presents to him<sub>i</sub> than John<sub>i</sub>'s mother.  
 (= Mary gave more presents to him<sub>i</sub> than John<sub>i</sub>'s mother gave to him<sub>i</sub>.)

If the internal arguments of a verb always c-commanded the standard, (11, 12, 13b) and (14) would be ungrammatical. The relationship that we find is more indirect and is mediated by the associate.

The generalization above does not follow from the Direct Analysis straightforwardly. Under the Direct Analysis a standard can be merged with a degree head outside of the c-command domain of the base-generated position of an associate and there is no movement dependency between the LF position of the standard and the base-generated position of the associate. Thus, one would expect a situation in which a standard is not c-commanded by an item that c-commands an associate. This can be seen by examining the LF representations assigned by the Direct Analysis to (12a) and (12b) respectively.

- (15) a. \*More people talked to him<sub>i</sub> **about Sally** than about Peter<sub>i</sub>'s sister.  
 LF: [Sally [[-er [than Peter<sub>i</sub>'s sister]]  
 $\lambda d.\lambda x. [d\text{-many people talked to him}_i \text{ about } x]]]$   
 b. More people talked to **Sally** about him<sub>i</sub> than to Peter<sub>i</sub>'s sister.  
 LF: [Sally [[-er [than Peter<sub>i</sub>'s sister]]  
 $\lambda d.\lambda x. [d\text{-many people talked to } x \text{ about him}_i]]]$

In neither of the LF representations in (15) does the pronoun in the matrix clause c-command the standard. Therefore the Direct Analysis does not predict the contrast between (12a) and (12b).<sup>6</sup>

<sup>5</sup>We do not understand why (13b) is mildly deviant compared to (11, 12b) and (14). We speculate that there is a preference for choosing the matrix subject as an associate for a DP standard. This is, of course, impossible in (13b) but we believe that this contributes a mild deviance. In (12), the standards are PPs and so this factor is not relevant. In (11b, 14), the associate is in fact the matrix subject and so the preference is satisfied.

<sup>6</sup>Another place where the Direct Analysis and the Reduction Analysis diverge from each other is in cases where the associate is a pronoun. (10) is silent about such cases. The LFs assigned by the Direct Analysis

In contrast, the generalization in (10) can be captured under a Reduction Analysis because according to such an analysis, the complement of ‘than’ is a reduced clause that is isomorphic in most respects to the main clause. To a first approximation, the standard occupies the same position within the elided clause as its associate does in the matrix clause. Hence, everything that c-commands an associate c-commands a standard. Let us see how a Reduction Analysis could handle the contrast in (12).

- (16) a. \*More people talked to him<sub>i</sub> **about Sally** than about Peter<sub>i</sub>’s sister.

Underlying Structure:

\*More people talked to him<sub>i</sub> **about Sally**  
[than λ*d*. ~~λ many people talked to him<sub>i</sub>~~ about Peter<sub>i</sub>’s sister]

- b. More people talked to **Sally** about him<sub>i</sub> than to Peter<sub>i</sub>’s sister.

Underlying Structure:

More people talked to **Sally** about him<sub>i</sub>  
[than λ*d*. ~~λ many people talked to Peter<sub>i</sub>’s sister~~ **about him<sub>i</sub>**]

The structures in (16a/b) seem to involve ellipsis of non-constituents. There are empirical reasons to restrict ellipsis operations to constituents. This leads us to an analysis like Merchant (2009), where the standard moves out of the elided constituent prior to the ellipsis operation applying. Support for the claim that the standard undergoes movement comes from examples that look like putative counterexamples to (10).

- (17) a. More people introduced him<sub>i</sub> **to Sally** than to the popstar that Peter<sub>i</sub> actually wanted to meet. (Carl Pollard p.c.)  
b. More people introduced him<sub>i</sub> **to Sally** than to the woman that Peter<sub>i</sub> likes.

In (17a, b), the pronoun c-commands the associate and yet is able to corefer with an R-expression inside the standard, contradicting (10). But note that the offending R-expression in (17a, b) is contained within an adjunct, a relative clause. What we have here is an instance of the familiar adjunct-argument Condition C obviation asymmetry discussed in Freidin (1986), Lebeaux (1988, 2009), and Fox (1999) among others. The contrast in (18) supports this characterization.

- (18) a. \*More people told him<sub>i</sub> the rumor that Mary was a thief than the rumor that John<sub>i</sub> was a drug addict.  
b. More people told him<sub>i</sub> their day to day stories than the rumors that John<sub>i</sub> actually wanted to hear.

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lead us to expect that a pronominal associate should not be able to corefer with an R-expression contained in the standard. This is because under the Direct Analysis the associate c-commands the standard at LF. But coreference is allowed in such cases.

- (i) a. More people talked to Sally **about him<sub>i</sub>** than about Peter<sub>i</sub>’s sister.  
b. More people talked **to him<sub>i</sub>** about Sally than to Peter<sub>i</sub>’s sister.

The Reduction Analysis does not prohibit coreference in these cases. So these examples show that the Direct Analysis cannot be the only analysis available for English phrasal comparatives. But they do not show that the Direct Analysis is unavailable. For that we need the cases covered by (10).

In (18a), the R-expression is contained within a complement and there is no Condition C obviation. But in (18b), like in (17a, b), the R-expression is contained within a relative clause adjunct and Condition C is obviated. The existence of this asymmetry indicates that an analysis along the lines of (16) is incomplete. Other environments where this asymmetry is found involve overt movement of the maximal projection containing the R-expression. This suggests that the standard in phrasal comparatives also undergoes overt movement followed by elision of the remainder of the ‘than’-constituent as in Merchant (2009). With this modification, the facts in (17) and (18) no longer constitute a real counterexample to (10). The adjunct relative can be merged with the standard after the standard has moved out of the elided constituent and thus does not have to be in the c-command domain of a pronoun that c-commands the standard before movement as in Lebeaux (1988, 2009) and Fox (2002). Complements must be merged early and so an R-expression within a complement must be within the c-command domain of any pronoun that c-commands the standard before movement.

We take our analysis of the binding generalization in (10) to show that the Direct Analysis cannot be at work in English. If it was available, it would allow the unavailable coreference in (11, 12, 13a). Only the Reduction Analysis is available in English.<sup>7</sup> And in fact, as we will see, in languages where the Direct Analysis is available, we do not find evidence for the binding generalization.

### 3 Hindi-Urdu: a case for the Direct Analysis

We have argued that the Direct Analysis is not available in English. One could imagine that this language particular unavailability could follow from a more general crosslinguistic unavailability of the 3-place ‘-er’ assumed by the Direct Analysis. We now show that the 3-place ‘-er’ is in fact available in some languages. Hindi-Urdu is shown to be a language where the Reduction Analysis is infeasible. Instead the Direct Analysis, which requires a 3-place ‘-er’, can be seen to be at work. We begin with a basic introduction to the salient aspect of Hindi-Urdu phrasal comparatives.

#### 3.1 Basic description

Phrasal comparatives in Hindi-Urdu involve a degree head *zyaadaa* ‘more’ and a ‘than’-phrase, which is marked by the postposition *-se*. This postposition is also used

<sup>7</sup>That the Direct Analysis is not an option for English and that phrasal comparatives in English must receive a Reduction Analysis is a point that we take to have been made at length in Lechner (2001, 2004) and Pancheva (2007). For this reason, we do not address here in any detail the various challenges to a uniformly clausal treatment of English phrasal comparatives. But we note that many putative challenges (see Hankamer 1973; Brame 1983) to a reduced clausal analysis come from the incorrect assumption that the reduced clause has the same size as an unreduced finite clausal complement of *than*. For example, extraction is often considered a serious challenge for a Reduction Analysis (*Who<sub>i</sub> is John taller than  $t_i$ ?* vs. *\*Who<sub>i</sub> is John taller than  $t_i$  is?*). But in fact the full range of extraction facts support a Reduction Analysis. In languages with a Direct Analysis, any complement of ‘than’ can be questioned irrespective of its associate. In English, however, extraction of *than*-phrases with non-subject associates is severely degraded (*\*To whom<sub>i</sub> did John give more books to Mary than  $t_i$ ?*). It has been suggested to us that the pattern of extraction parallels extraction out of small clauses. Finally we note that cases like ‘more than *n*’ have also been argued to involve clausal structures; see Hackl (2001) for details.

to mark instruments and locative and temporal ‘from’. With most but not all adjectives, *zyaadaa* ‘more’ is optional. The optionality is independent of whether the adjective is predicative or attributive. With non-adjectival comparatives, *zyaadaa* is obligatory. We illustrate the point here with a nominal comparative but it is also true of comparatives on adverbs that are distinct from adjectives such as *aksar* ‘often’.<sup>8</sup>

- (19) a. adjectival comparative with optional *zyaadaa* ‘more’:

Atif **Boman-se** (*zyaadaa*) lambaa hai.  
 Atif.m Boman-than more tall be.Prs.Sg  
 ‘Atif is taller than Boman.’

- b. adjectival comparative that requires *zyaadaa* ‘more’:

is project-ke-baare-me Atif **Boman-se** \*(*zyaadaa*) utsuk  
 this project-about Atif.m Boman-than more eager  
 hai.  
 be.Prs.Sg

‘Atif is more eager about this project than Boman.’

- c. non-adjectival comparatives always require *zyaadaa* ‘more’:

Atif-ne **Boman-se** *zyaadaa* kitaabẽ parh-ĩ:  
 Atif-Erg Boman-than more books.f read-Pfv.FPI.  
 ‘Atif read more books than Boman.’

In all the examples in (19), the ‘than’-phrase precedes *zyaadaa* ‘more’. This is actually a requirement. If the ‘than’-phrase follows the degree head, we end up with ungrammaticality irrespective of whether the degree head is realized by *zyaadaa* or not.

- (20) ‘more’ > standard: \*

a. \*Atif (*zyaadaa*) lambaa **Boman-se** hai.  
 Atif.m more tall Boman-than be.Prs.Sg  
 ‘Atif is taller than Boman.’

b. \*Atif-ne *zyaadaa* kitaabẽ **Boman-se** parh-ĩ:  
 Atif-Erg more books Boman-than read-Pfv.FPI.  
 ‘Atif read more books than Boman.’

As long as the ‘than’-phrase precedes ‘more’, no further restrictions are imposed on the relative order of the associate and the ‘than’-phrase: the ‘than’-phrase may

<sup>8</sup>The adjective versus non-adjective distinction can be seen as parallel to the English pattern by which only adjectives combine directly with ‘-er’. Non-adjectives require ‘more’, which has been analyzed as the comparative form of an adjectival *many/much* that is required for the ‘-er’ to combine with a non-adjective. Why some adjectives in Hindi-Urdu require an overt *zyaadaa* ‘more’ is parallel to the fact that not all adjectives in English combine directly with *-er*. In general, Hindi-Urdu adjectives which take internal arguments (e.g. *utsuk* ‘eager about’, *paas* ‘near’, *gussaa* ‘angry at’) require an overt *zyaadaa*, while adjectives that measure physical attributes such height and weight do not. Adjectives that measure abstract attributes such as intelligence and kindness fall in an in-between zone.

precede the associate and there may be material between the associate and the ‘than’-phrase.

This precedence restriction between the ‘more’ and the ‘than’-phrase makes sense once we note that the ‘than’-phrase is an argument of ‘more’ and arguments precede their heads in Hindi-Urdu. This is in fact a typological property of head-final languages. We assume that in its merge configuration, the ‘than’-phrase precedes the degree head. From here the ‘than’-phrase can undergo further scrambling to the left leading to configurations where it might be discontinuous from the degree head.<sup>9</sup> An explicit discussion of these steps is presented in Sect. 3.5.

### 3.2 Conditions on associates and standards

The associate can be a PP or a DP and have any grammatical function but the standard can only be a bare DP which is marked by ‘than’, which is realized by the postpositional *-se*.

- (21) a. associate = nominative subject

**John** Bill-*se* (zyaadaa) lambaa hai.  
John.m Bill-*than* more tall.MSG be.Prs.Sg  
‘John is taller than Bill.’

- b. associate = ergative subject

**Atif-ne** Boman-*se* zyaadaa kitaabē parh-ī:  
Atif-Erg Boman-*than* more books.f read-Pfv.FPI.  
‘Atif read more books than Boman.’

- c. associate = dative IO:

Atif-*ne* **Mina-ko** Tina-*se* zyaadaa tohfe diye.  
Atif-Erg Mina-Dat Tina-*than* more presents.m give.Pfv.MPI  
‘Atif gave more presents to Mina than to Tina.’

<sup>9</sup>Anoop Mahajan (p.c.) has pointed out to us that the precedence restriction is lifted when the ‘than’-phrase is moved to the right of verb.

- (i) **zyaadaa** kitaabē parh-ī: thī: Atif-*ne* **Boman-*se***.  
more books.f read-Pfv.FPI be.Pst.FPI Atif-Erg Boman-*than*  
‘Atif had read more books than Boman.’ (sentence is emphatic, could be used to refute a claim that Boman had read more books than Atif.)

We do not attempt an analysis of this intriguing fact because we are not certain about how to analyze rightward movement. If we were to assume that rightward movement is merely movement of DPs to the right, then the acceptability of (i) would follow. (i) would just involve a scrambling of the ‘than’-phrase to the right and we independently know that ‘than’-phrases can be scrambled out of the AP. But much work on rightward movement (Kayne 1994; Mahajan 1997; Bhatt and Dayal 2007 i.a.) has concluded that apparent cases of rightward movement should not be analyzed as rightward movement of DPs. Hopefully the issue raised by (i) will receive an explanation under the proper analysis of rightward movement.

d. associate = locative PP

**Amrika-me** Rus-se zyaadaa log rah-te haiN  
 America-in Russia-than more people stay-Hab.MSg be.Prs.PI  
 ‘More people live in America than in Russia.’

The absence of case-marking on the standard can lead to ambiguity—(21c), for example, can also be interpreted with the subject as an associate.

The facts in (21) fit well with a Direct Analysis, where the standard XP is directly a complement of *-se* ‘than’. *-se* is postpositional and can only combine with DPs. As a result cases with PP or adverbial standards are severely ungrammatical. Furthermore phrasal comparatives in Hindi-Urdu only allow for a single standard. In clear contrast to English, multiple standards are completely impossible. We refer to this fact as the Single Standard Restriction.

- (22) a. Tina read more books today than **Pim yesterday**.  
 b. \*Tina-ne aaj [**Pim kal-se**] zyaadaa kitaabẽ parh-ĩ:  
 Tina-Erg today Pim yesterday-than more books.f read-Pfv.FPI.  
 intended: ‘Tina read more books today than Pim yesterday.’

To convey this meaning, a clausal structure, which is realized by a correlative, must be used.

- (23) [**Pim-ne kal** jitnii kitaabẽ parh-ĩ:] [Tina-ne aaj  
 Pim-Erg yesterday how.many.f books.f read-Pfv.FPI Tina-Erg today  
 us-se zyaadaa kitaabẽ parh-ĩ].  
 that-than more books read-Pfv.FPI  
 Literally: ‘How many books Pim read yesterday, Tina read more books than that today.’

Lechner’s Reduction Analysis offers a uniform treatment of comparatives with multiple standards like (22a) and cases with a single standard. But under such an analysis the Single Standard Restriction found in Hindi-Urdu is unexpected.

The Direct Analysis, however, predicts the Single Standard Restriction. This is because there is no straightforward way to generalize the 3-place ‘-er’ to handle cases with multiple standards. One could imagine extending a 3-place ‘-er’ which takes two individual arguments and a predicate with one individual and one degree argument to a 5-place ‘-er’ which takes four individual arguments and a predicate of one degree and two individual arguments. But this 5-place ‘-er’ does not fit what the syntax gives us. The two XPs form a constituent that combines with ‘than’ and ‘-er’ cannot look into this constituent and extract its arguments. More generally cases with multiple standards constitute a clear case where the ‘than’-phrase cannot be taken to be combining with an individual.

The absence of multiple standards shows that a Direct Analysis is a viable option for phrasal comparatives in Hindi-Urdu and that a Reduction Analysis of the sort proposed by Lechner is not viable for the Hindi-Urdu data.<sup>10</sup>

<sup>10</sup>An alternative Reduction Analysis proposed in Merchant (2009) is in fact able to capture the Single Standard Restriction. Merchant assumes that the standard in Greek phrasal (*apo*) comparatives moves out

A Reduction Analysis is ruled out for Hindi-Urdu because of a language particular interaction between the Hindi-Urdu ‘than’, *-se*, and finite clauses. The relevant reduction processes that could yield the Reduction Analysis, such as Sluicing and Gapping, seem to be restricted to finite clauses in this language. However, finite clauses can never appear as complements of *-se*, or for that matter any postpositional element in Hindi-Urdu. This prohibition on postpositions combining with finite clauses has significant consequences for the syntax of Hindi-Urdu. Thus Hindi-Urdu systematically lacks any environment where a P-like element directly combines with a finite clause such as ‘since’ and ‘until’-clauses.<sup>11</sup>

- (24) a. John has been happy [since [Mary arrived]].  
 b. \*John [Mary aa-ii hai]-se khush hai  
 John Mary come-Pfv.f be.Prs.Sg-from happy be.Prs.Sg

To achieve this meaning, a correlative construction must be used where the finite clause complement of the postposition appears as a correlative which is associated with a pronoun that is the complement of the postposition.

- (25) [jab-se Mary aa-ii hai] [tab-se John khush hai].  
 when-from Mary come-Pfv.f be.Prs.Sg then-from John happy be.Prs.Sg  
 ‘John has been happy since Mary arrived.’

### 3.3 A precedence constraint

An important aspect of the Direct Analysis is that it assumes that there is a configuration in which ‘-er’ combines with its two individual arguments and a predicate of individuals and degrees.

- (26) [Associate [[Standard -er] [ $\lambda d.\lambda x.$  Pred(x,d)]]]

When the associate is the subject, it is already in the right place to combine with ‘-er’.

- (27) John [[[than Mary] -er] [ $\lambda d.\lambda x.$  [tall(x,d)]]]

But when the associate is not the subject, it must undergo movement to appear as an argument of ‘-er’ and thereby create the compared predicate. If English had access to a Direct Analysis, this movement would be an instance of covert QR.

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of the comparative clause into the domain of *apo* ‘from/than’ and thus becomes for all intents and purposes an object of *apo*. The Single Standard Restriction is taken to follow from the assumption that exactly one DP may appear in the domain of a preposition. Merchant’s analysis for Greek *apo* comparatives involves ellipsis of the comparative clause and parallels analyses of Sluicing. In particular, we find that Greek disallows PP associates in *apo* comparatives because the derivation of such comparatives would involve movement of a DP out of the complement of a preposition in the comparative clause. Greek does not allow P-stranding and therefore the analysis correctly predicts the impossibility of PP-associates. Unfortunately this proposal does not carry over to Hindi-Urdu. Hindi-Urdu, like Greek, does not allow P-stranding. Yet PP associates are grammatical as shown in (21d).

<sup>11</sup>This inability of postpositions in Hindi-Urdu to combine with finite clauses is plausibly related to the fact that Hindi-Urdu has head-initial finite complementizers. As a result, the relevant configurations run afoul of Holmberg’s (2000)/Biberauer et al.’s (2007) Final Over Final Constraint (FOFC) by which a head-initial XP cannot be immediately dominated by a head-final phrase.

- (28) More people read LGB than the MP.  
 LGB [[[than the MP] -er] [ $\lambda d.\lambda x$ . [read( $d$ -many people,  $x$ )]]]

We therefore expect that surface structures like (28) will be deviant in languages where covert scope shifting operations are not freely available. Hindi-Urdu is such a language. Sentences in the base order do not display scope ambiguity in contrast to the corresponding structures in English. Only surface scope is available. To get the inverse scope reading, overt scrambling is necessary (see Nevins and Anand 2003 for some qualifications).

- (29) a. some > all, unavailable: all > some  
 kisi laṛke-ne har ṭīcar-se aashirvaad liyaa.  
 some boy-Erg every teacher-from blessing.m take.Pfv.MSg  
 ‘Some boy took blessings from every teacher.’
- b. all > some, also available: some > all  
 har ṭīcar-se kisi laṛke-ne aashirvaad liyaa.  
 every teacher-from some boy-Erg blessing.m take.Pfv.MSg  
 ‘Some boy took blessings from every teacher.’

(30a) shows that the prediction about the deviance of surface structures like (28) in Hindi-Urdu is borne out. (30b) shows that scrambling of the associate allows the associate to be in a position where it can combine with ‘-er’, ameliorating the deviance found in (30a).

- (30) a. standard > more > associate  
 \*MP-se zyaadaa logō-ne LGB paṛh-ii.  
 MP-than more people-Erg LGB.f read-Pfv.f  
 ‘More people read LGB than the MP.’ (intended, but unavailable)  
 (available reading: People read LGB to a greater extent than they read the MP.)<sup>12</sup>  
 LF: \*[[ -er than the MP] [ $\lambda d$ . [ $d$ -many people read LGB]]]
- b. associate > standard > more  
 LGB MP-se zyaadaa logō-ne paṛh-ii.  
 LGB.f MP-than more people-Erg read-Pfv.f  
 ‘More people read LGB than the MP.’  
 LF: [LGB [[-er than the MP] [ $\lambda d.\lambda x$ . [ $d$ -many people read  $x$ ]]]]

<sup>12</sup>This sentence is grammatical but only with a distinctive prosody which groups together *MP-se* ‘MP-than’ and *zyaadaa* ‘more’ and puts a pause between *zyaadaa* and *logō-ne* ‘people-Erg’. The interpretation seems to work off a structure where the *zyaadaa* ‘more’ does not form a constituent with the subject or quantify over a degree argument associated with the subject. Support for this comes from the fact that the relevant interpretation is available even when the subject *logō-ne* ‘people-Erg’ is replaced by a non-degree-quantifiable proper name subject. We speculate that the *MP-se zyaadaa* degree quantifies over a low covert extent modifier that undergoes scrambling in a manner very similar to the one illustrated in footnote 13.

The precedence requirement provides support for the Direct Analysis.<sup>13</sup>

One implication of the precedence constraint is that associates need to overtly move to the position where ‘-er’ takes scope. As a result, the locality constraints in Hindi-Urdu phrasal comparatives are just locality constraints on overt movement. This is shown in (31). Relative clauses are islands for overt movement in Hindi-Urdu and an associate cannot move out of a relative clause island to combine with a degree head.

- (31) a. Movement out of a Relative Clause: \*

\***Arundhati-ne<sub>i</sub>** mē vo kitaab [jo t<sub>i</sub> likh-ii hai]  
 Arundhati-Erg I that book Rel write-Pfv.f be.Prs.Sg  
 parh-ū:gaa.  
 read-Fut.1MSg

Intended: ‘I’ll read the book that Arundhati wrote.’

- b. Movement of Associate out of a Relative Clause: \*

\*[**Arundhati-ne<sub>i</sub>**]<sub>i</sub> Vikram-se zyaadaa log [vo kitaab [jo t<sub>i</sub>  
 Arundhati-Erg Vikram-than more people that book Rel  
 likh-ii hai]] parh-ē:ge.  
 write-Pfv.f be.Prs.Sg read-Fut.3MPI

Intended: ‘More people will read the book that Arundhati wrote than (the book that) Vikram (wrote).’

### 3.4 Binding effects

An important piece of evidence against the availability of the Direct Analysis in English came from the binding properties of the *than*-phrase. What we found there was the following generalization: the standard seemed to be c-commanded by whatever its associate was c-commanded by. This generalization followed under a Reduction Analysis but not under a Direct Analysis. The data from Hindi-Urdu supports a different generalization. The binding properties of the standard are wholly independent of the binding properties of the associate. They are exactly the binding properties of garden variety PPs determined to a significant extent by considerations of word order. This is what we expect under the Direct Analysis where the standard is a PP associated with the matrix clause.

The binding properties of PPs in Hindi-Urdu are as follows:

<sup>13</sup> Junko Shimoyama (p.c.) has pointed out to us that the constraint under discussion is not a constraint on surface representations. It is a constraint on ‘-er’ getting all of its arguments. It is just that in the cases under discussion overt scrambling of the associate is needed to bring it into a place where it can combine with ‘-er’. If there is an earlier point in the derivation where the associate takes scope over ‘-er’, then it is not required to overtly precede ‘-er’.

- (i) [Boman-se zyaadaa kitaabē]<sub>i</sub> Atif-ne t<sub>i</sub> parh-ii thī:  
 Boman-than more books.f Atif-Erg read-Pfv.F be.Pst.FPl.  
 ‘Atif read more books than Boman.’

- (32) a. They pattern with arguments with respect to Principle B.  
 b. Subjects can bind reflexives and reflexive possessors. Pronominal possessors cannot be coreferent with the subject.  
 c. Co-arguments that precede the PP c-command it and the PP (and the DP immediately inside the PP) c-commands co-arguments that follow it.

The ‘than’-phrase in Hindi-Urdu has exactly the binding properties outlined above. We demonstrate some of these properties here. Pronominal ‘than’-phrases as well as pronominal possessors inside ‘than’-phrases display obviation with respect to the subject. To achieve binding with the subject, an anaphor must be used.

- (33) a. Anaphoric binding, pronominal obviation by subject:  
 koi-bhii<sub>i</sub> apne aap-se<sub>i</sub>/us-se<sub>j/\*i</sub> lambaa nahī: ho sak-taa.  
 anyone self’s self-than/him-than tall Neg be can-Hab.MSg  
 ‘No one<sub>i</sub> can be taller than himself<sub>i</sub>/him<sub>j/\*i</sub>.’  
 b. Anaphoric binding, pronominal obviation of possessors by subject:  
 Atif<sub>i</sub> apnii<sub>i</sub>/us-kii<sub>j/\*i</sub> behen-se lambaa hai.  
 Atif self.f/he-Gen.f sister-than tall be.Prs.Sg  
 ‘Atif<sub>i</sub> is taller than self<sub>i</sub>’s sister/his<sub>j/\*i</sub> sister.’

Note that the binding behavior of the ‘than’-phrases follows directly from its surface syntax. We do not need to postulate covert clausal structure to explain its binding properties. Very simply, modulo the conditions enumerated in (32), if a matrix pronoun precedes a standard it cannot refer to an R-expression in it. Otherwise it can.

- (34) a. ...[than **Peter**’s<sub>i</sub> sister’s photograph]...**pron**<sub>i</sub>... : coreference is ok  
 Sally-kii foto [**Peter-kii**<sub>i</sub> behen-kii foto-se] zyaadaa  
 Sally-Gen.f photo Peter-Gen.f sister-Gen.f photo-than more  
 logō-ne **us-ko**<sub>i/j</sub> dii.  
 people-Erg he-Dat give.Pfv.f  
 ‘\*More people gave him<sub>i</sub> a picture of Sally than a picture of Peter<sub>i</sub>’s sister.’  
 (ungrammatical in English, good in Hindi-Urdu)  
 b. ...**pron**<sub>i</sub>...[than **Peter**’s<sub>i</sub> sister’s photograph]... : coreference is not ok  
**us-ko**<sub>i</sub> Sally-kii foto [**Peter-kii**<sub>j/\*i</sub> behen-kii foto-se] zyaadaa  
 he-Dat Sally-Gen.f photo Peter-Gen.f sister-Gen.f photo-than more  
 logō-ne dii.  
 people-Erg give.Pfv.f  
 ‘\*More people gave him<sub>i</sub> a picture of Sally than a picture of Peter<sub>i</sub>’s sister.’

As mentioned earlier, the ‘pronoun c-commands the standard if it c-commands the associate’ generalization does not hold for Hindi-Urdu. A matrix pronoun can either precede or follow the standard. If it precedes the standard, then from a general fact about Hindi-Urdu syntax, it c-commands the standard. We therefore need to look at

cases where the relevant pronoun follows the standard but precedes the associate (and hence *c*-commands it). In such cases, the English generalization would predict that the pronoun cannot refer to an *R*-expression inside the standard. As the following example shows, this prediction is incorrect.

- (35) [*standard*...**R-Exp**...]<sub>*j*</sub> **Pron**<sub>*i*</sub> Associate [<sub>*t<sub>j</sub>*</sub> more]...  
 Atif-ne [**Ravi-kii**<sub>*i*</sub> behen-kii foto]-se<sub>*j*</sub> **us-ko**<sub>*i*</sub> [Mohan-kii behen-kii  
 Atif-Erg Ravi-Gen sister-Gen picture-than he-Dat Mohan-Gen sister  
 foto] [<sub>*t<sub>j</sub>*</sub> zyaadaa baar] dikhaa-ii  
 picture more times show-Pfv.f  
 ‘Atif showed Mohan’s sister’s picture to him<sub>*i*</sub> more times than Ravi’s<sub>*i*</sub> sister’s  
 picture.’

What does all this tell us? It tells us that the Direct Analysis is available in Hindi-Urdu. It also tells us that there is no binding theoretic evidence for the Reduction Analysis. We have seen some initial evidence against the availability of the Reduction Analysis in Sect. 3.2 and Sect. 3.3. The arguments from scope in Sect. 4 will provide further evidence against the availability of the Reduction Analysis in Hindi-Urdu.

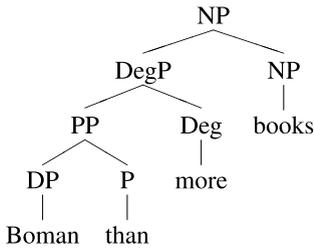
### 3.5 Syntactic derivations

In this section, we present explicit derivations of the basic cases of Hindi-Urdu phrasal comparatives and their interaction with scrambling. We want to account for their basic word order and the fact that the ‘than’-phrase must precede ‘more’ but does not need to immediately precede it. We also want to derive the precedence constraints that hold between the associate and ‘more’.

We begin with a phrasal comparative where the associate is a subject. The derivation starts with the assembly of the object DP, which contains the DegP, which in turn contains the ‘than’-phrase. The verb is merged next followed by the merger of the subject/associate. The associate moves creating a predicate which is targeted by the movement of the degree phrase—this is an instance of parasitic scope. An important assumption here is that the movement of the degree phrase pied-pipes the containing XP, the DP ‘[Boman-*se* more] books’ in this case. The pied-piped container DP is, however, interpreted in its base position like other cases of pied-piping.

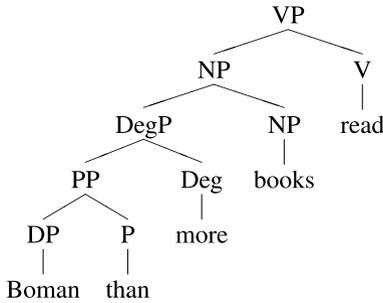
- (36) Atif-ne Boman-se zyaadaa kitaabẽ parh-ĩ:  
 Atif-Erg Boman-than more books.f read-Pfv.FPI.  
 ‘Atif read more books than Boman.’

a. Step 1: Generate ‘Boman-*se* more books’



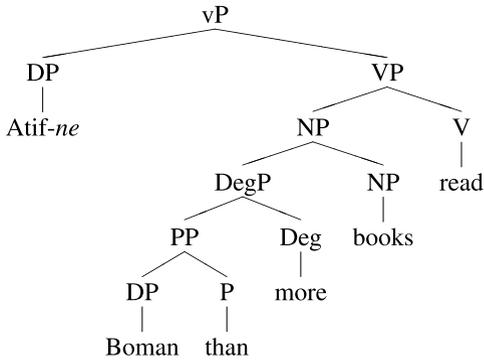
b. Step 2: Merge ‘read’:

[[Boman-*se* more] books] read

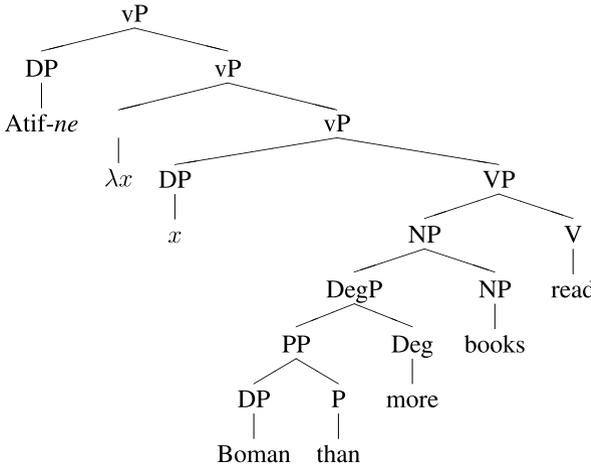


c. Step 3: Merge subject ‘Atif-*ne*’:

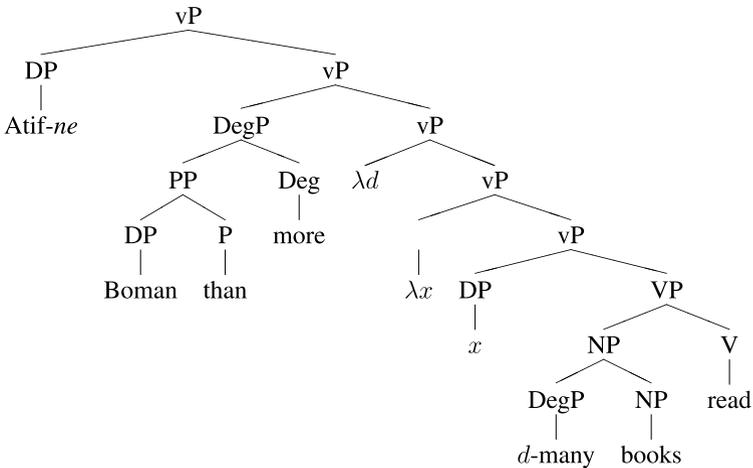
Atif-*ne* [[Boman-*se* more] books] read



- d. Step 4: Move ‘Atif-*ne*’:  
 Atif-*ne*  $\lambda x. [x \text{ [[Boman-*se* more] books] read}]$



- e. Step 5: Move DegP, which pied-pipes containing DP in overt syntax:  
 LF: Atif-*ne* [[Boman-*se* -er]  $\lambda d. \lambda x. [x [d\text{-many books}] \text{read}]]$   
 Pronunciation: Atif-*ne* [[Boman-*se* more] books] read



Deriving a case where the ‘than’-phrase precedes but is discontinuous from ‘more’ requires an additional step of scrambling.

- (37) Boman-*se*<sub>*i*</sub> Atif-*ne* *t<sub>i</sub>* zyaadaa kitaabē paṛh-ī:  
 Boman-*than* Atif-*Erg* more books.f read-Pfv.FPI.  
 ‘Atif read more books than Boman.’

Step 6: Scramble ‘Boman-*se*’ over subject:  
 LF: Boman-*se*  $\lambda y. \text{Atif-*ne* } [[y \text{ -er} ] \lambda d. \lambda x. [x [d\text{-many books}] \text{read}]]$   
 Pronunciation: Boman-*se*<sub>*i*</sub> Atif-*ne* [[*t<sub>i</sub>* more] books] read

We noted earlier that ‘than’-phrases need to precede ‘more’. This follows because ‘than’-phrases are arguments of ‘more’ and heads, in general, follow their complements in Hindi-Urdu.<sup>14</sup>

Finally we examine cases where overt scrambling of the associate is forced. In these cases, the associate is merged into a position lower than the DegP. Our explanation for the overt scrambling is that in the absence of scope shifting covert movement in Hindi-Urdu, the associate needs overt scrambling to move to a position where it can combine with the DegP. The derivation proceeds as follows.

- (38)  $MP_i$  LGB-*se* zyaadaa logō-ne  $t_i$  paṛh-ii.  
 MP.f LGB-*than* more people-Erg read-Pfv.f  
 ‘More people read the MP than LGB.’
- a. Step 1: Generate ‘MP read’
  - b. Step 2: Create subject: Merge ‘than’-phrase with ‘more’ and then merge ‘people’:  
 [[LGB-*se* more] people]
  - c. Step 3: Merge subject:  
 [[[LGB-*se* more] people] MP read]
  - d. **Step 3+**: Try to move DegP ([LGB-*se* more]):  
 – resulting movement would be semantically uninterpretable as DegP needs to target a predicate and combine with the associate!
  - e. Step 4: Scramble Associate in front of subject:  
 LF:  $MP \lambda x. [[[[LGB-*se* more] people] x read]$   
 Pronunciation:  $MP_i [[[[LGB-*se* more] people]  $t_i$  read]$
  - f. Step 5: DegP Movement targets predicate created by movement of Associate:  
 LF:  $MP [LGB-*se* -er] \lambda d. \lambda x. [[[d-many] people] x read]$   
 Pronunciation:  $MP_i [[LGB-*se* more] people]_j [t_j t_i read]$

The step right after Step 3 is important. If we attempt to move the DegP without scrambling the associate (Step 3+), we end up with a semantically illegitimate structure. DegP movement needs to target a predicate of individuals and take the associate as an argument. Neither requirement is met if we move the DegP and leave the associate in-situ. The convergent derivation involves first scrambling the associate and then having DegP movement target the predicate created by the movement of the associate. As before we assume that DegP movement pied-pipes its containing DP.

<sup>14</sup>This explanation as it stands is incomplete because heads can sometimes precede their complements in Hindi-Urdu. In particular, participles can be scrambled to the left of objects and the head of a possessed NP can be moved to the left of its possessor. So we also need to rule out the derivation in (i).

- (i) \* $[t_i zyaadaa kitaabē]_j$  Boman-*se* Atif-*ne*  $t_j$  paṛh-ī:  
 more books.f Boman-*than* Atif-Erg read-Pfv.FPI.  
 Intended Meaning: ‘Atif read more books than Boman.’

It is possible that the relevant scrambling shown in (i) is unavailable as a violation of Müller’s (1996) Principle of Unambiguous Domination and Fukui’s (1999) Feature-based A-over-A condition. But as a reviewer points out, we need to make sure that we do not end up blocking all instances of remnant movement. The right way of blocking the derivation in (i) is left for future work.

#### 4 Scope inside and outside ‘than’-phrases

The difference between Hindi-Urdu and English with respect to the availability of the Reduction Analysis and the Direct Analysis, respectively, is supported by the different interpretive possibilities available to ‘than’-phrase-internal quantifiers in the two languages.<sup>15</sup> English phrasal comparatives allow *-er* to take scope over a *than*-phrase-internal quantifier. This can be seen in (39).

- (39) More students read every syntax paper than every semantics paper.  
 (= More students read every syntax paper than read every semantics paper.)
- a. *than*-phrase-internal scope: *-er* > *every*  
 [-er [ $\lambda d$ . [ $d$ -many students read every semantics paper]]]  
 [ $\lambda d$ . [ $d$ -many students read every syntax paper]]  
 The number of students who read every syntax paper exceeds the number of students who read every semantics paper.
- b. *than*-phrase-external scope: *every* > *-er*: ???  
 [every syntax paper]  $\lambda x$ . [every semantics paper]  $\lambda y$ .  
 [[-er [ $\lambda d$ . [ $d$ -many students read  $y$ ]]]  
 [ $\lambda d$ . [ $d$ -many students read  $x$ ]]]  
 The least read syntax paper was still read by more people than any semantics paper. (paraphraseable as: every syntax paper was read by more students than every semantics paper.)  
 (Carl Pollard, p.c., paraphrase of (39b) suggested by Lisa Travis)

To bring these judgements out, let us consider two scenarios. It is the end of the semester and we assign our students a list of papers to read over winter break. Some of the papers are syntax papers and some of them are semantics papers. The winter break ends and the students report what they read. Now it could be that the reading list was for an exam in syntax and an exam in semantics. To write an exam in an area, students need to have read every assigned paper in that area. We decide that we will hold one exam—either in syntax or in semantics—depending upon which topic more students are ready for. It turns out that the number of students who read every syntax paper on the reading list exceeds the number of students who read every semantics paper. So we have a syntax exam. This scenario makes (39) true and corresponds to the representation in (39a). Note that (39a) is compatible with individual semantics papers all being more popular than the syntax papers.

The other interpretation that we are after corresponds to a pointwise comparison of papers. For each paper, we determine how many students read it. It turns out the syntax papers are all more popular than the semantics papers. Even the least read syntax paper was read by more students than the most read semantics paper. It is

<sup>15</sup>In this section, we refer to the two potential readings of (39/42) as *-er* > *every* vs. *every* > *-er*. This is merely a convenience. We do not assume that the quantifier actually QRs out of the comparative clause in English. Recent treatments of quantifiers inside comparative clauses such as Schwarzschild and Wilkinson (2002) and Heim (2006) derive what we call the *every* > *-er* reading without moving the quantifier out of the comparative clause.

not clear to us whether such an interpretation i.e. the reading indicated by (39b), is actually available for (39).

In Hindi-Urdu, the situation is exactly reversed. The Hindi-Urdu counterpart of (39) does not allow for the ‘than’-phrase-internal scope reading. The only interpretation available is the external scope reading—the missing reading of (39), which involves pointwise comparison between syntax papers and semantics papers.

- (40) [har syntax paper] [har semantics paper]-se zyaadaa logō-ne  
 every syntax paper every semantics paper-than more people-Erg  
 paṛh-aa.  
 read-Pfv  
 ‘More people read every syntax paper than every semantics paper.’  
*every > -er*: available; *-er > every*: unavailable

To get the ‘than’-phrase-internal scope, a clausal comparative must be used.

- (41) [jitne logō-ne har semantics paper paṛh-aa] [us-se zyaadaa  
 how.many people-Erg every semantics paper read-Pfv that-than more  
 logō-ne har syntax paper paṛh-aa].  
 people-Erg every syntax paper read-Pfv  
 ‘More people read every syntax paper than did every semantics paper.’

The apparent scoping-out behavior in (40) receives a very straightforward treatment within the Direct Analysis. The 3-place ‘-er’ involved in the Direct Analysis combines with individual arguments and so any quantificational expressions need to QR out. What is more revealing is the absence of the ‘than’-phrase-internal scope in Hindi-Urdu. ‘Than’-phrase-internal scope is easy for a Reduction Analysis to handle—under a Reduction Analysis, there is a clause and the quantifier can take scope within it. But not for a Direct Analysis, which forces any quantifiers to scope out. There is simply no other alternative.<sup>16</sup> We are now in a position to explain the contrast between the English (39) and its Hindi-Urdu counterpart (40). Given that we have argued that only the Direct Analysis and not the Reduction Analysis is available for phrasal comparatives in Hindi-Urdu, we predict that the judgements for the Hindi-Urdu counterpart of (39) will be the mirror image of the English (39) i.e. the scoping-in reading in (39a) will be unavailable and the scoping-out reading in (39b) will be available. As we have already seen, this is in fact the case.<sup>17</sup>

<sup>16</sup>An alternative would become available if we had a higher order *-er<sub>high</sub>* that combined with two quantifiers and a predicate of degrees and quantifiers.

(i)  $\llbracket -er_{high} \rrbracket = \lambda Q_{(et)t} . \lambda \mathcal{D}_{d((et)t)t} . \lambda P_{(et)t} . \exists d [\mathcal{D}(P, d) \wedge \neg \mathcal{D}(Q, d)]$ .

Such a higher order ‘-er’ would allow for a quantifier to take scope inside the ‘than’-phrase even with the Direct Analysis and would generate the desired meaning for (39). But this entry for ‘-er’ would also allow for a quantifier to take scope within the ‘than’-phrase in cases like (42). Since in Hindi-Urdu neither is a possibility, we must conclude that *-er<sub>high</sub>* is not available. We speculate that even if *-er<sub>high</sub>* were available, Beck’s (1996)/Fox’s (2000) constraint against higher order traces would make it unusable.

<sup>17</sup>Winfried Lechner (p.c.) notes that if we assume that parallel scope relations hold between the associate and the degree variable and the standard and the degree variable, then the requirement that associates in

Further support for our connection between the presence of a clause, reduced or unreduced, and the availability of ‘than’-phrase-internal scope comes from (41). Here the quantifier is in a clause and ‘than’-phrase-internal scope is available.

Now let us return to the missing reading of (39). In other environments in English such as (42), this reading (*every* > *-er*) seems to be quite freely available.

- (42) Mary, a first grader, is taller than every third grader in our school.
- a. unavailable: *-er* > *every*  
 $[[[-er [\lambda d. [\text{every third grader is } d\text{-tall}]]]] [\lambda d. [\text{Mary is } d\text{-tall}]]]$   
 ( $\approx$  Mary is taller than the shortest third grader. (assuming monotonicity))
  - b. available: *every* > *-er*  
 $[[[\text{every third grader}] [\lambda x. [[[-er [\lambda d. [x \text{ is } d\text{-tall}]]]] [\lambda d. [\text{Mary is } d\text{-tall}]]]]]]]$   
 ( $\approx$  For every third grader  $x$ , Mary is taller than  $x$ .)
- (see Gajewski 2008; Heim 2006; Larson 1988; Schwarzschild and Wilkinson 2002)

The availability of this reading does not argue for the availability of a Direct Analysis in English. This is because the interpretive restrictions noted for (42) also apply to *Mary is taller than every third grader in our school is*, a clausal comparative. Then whatever mechanism one uses to handle this clausal comparative can be used to handle (42) by a proponent of the Reduction Analysis. So when can a quantifier take scope inside a ‘than’-phrase and when must it (seem to) scope out? The generalization, which presupposes a Reduction Analysis, seems to be as follows.

- (43) If the base position of the quantifier in the ‘than’-phrase c-commands the degree trace inside the ‘than’-phrase, the quantifier must scope out. Otherwise the quantifier can take scope within the ‘than’-phrase.<sup>18</sup>
- a. base position of quantifier c-commands *than*-phrase-internal degree trace: quantifier must scope out  
 Craig assigned every first year student more papers than every second year student.  
 $[\text{than } \lambda d. [\text{Craig assigned every second year student } d\text{-many papers}]]$

Hindi-Urdu precede the degree variable could yield the wide-scope restriction found in (40) even with a Reduction Analysis. Hindi-Urdu does not provide us with evidence to distinguish between our proposal and Lechner’s suggestion. We address this concern in the context of Japanese where there is evidence against assuming that parallel scope relations hold between the associate and the degree variable and the standard and the degree variable. See (61) and associated discussion.

<sup>18</sup>Jason Merchant (p.c.) has pointed out to us that the scopal properties of a ‘than’-phrase-internal quantifier also seem to depend upon the associate of the ‘than’-phrase. When the associate of the ‘than’-phrase-internal quantifier is itself a quantifier—as is the case in most of our examples—the scoping-out reading seems to be unavailable. But when the associate is a non-quantificational DP, then both the scoping-out and the scoping-in readings are possible.

- (i) More people read ‘Lord of the Rings’ than every other book by Tolkien.

(i) can mean that ‘Lord of the Rings’ had more readers than every other Tolkien book pairwise (scoping-out) or that the number of ‘Lord of the Rings’ readers exceeds the number of people who have read all of the other Tolkien novels (scoping-in). We have to leave the derivation of this scoping generalization for future work.

- b. base position of quantifier does not c-command *than*-phrase-internal degree trace: *than*-phrase-internal scope ok  
 Craige assigned more students every paper by Hellan than every paper by Klein.  
 [than  $\lambda d$ . [~~Craige assigned  $d$  many students~~ every paper by Klein]]

This generalization tells us that the need/ability to scope out of a ‘than’-phrase is not reducible to a subject/non-subject asymmetry. This generalization makes reference to the base position of the quantifier and the hierarchical relationship between this base position and the degree trace. Under a Direct Analysis, there is no degree trace within the *than*-phrase. This by itself suggests the need for a Reduction Analysis in English and the unavailability of a Direct Analysis.

The scope facts thus provide additional support for our two claims. The first is that the Direct Analysis is available in Hindi-Urdu but not in English. This is why Hindi-Urdu requires ‘than’-phrase-internal quantifiers to always scope out but English does not. The second is that the Reduction Analysis is available in English but not in Hindi-Urdu. The differential availability of the Reduction Analysis explains why quantifiers can scope-in in the English (39a) but not in the Hindi-Urdu (40).

## 5 Japanese and the distribution of degree heads

### 5.1 The distribution of degree heads in English and Hindi-Urdu

We have seen for English that the binding data and the scope data rule out the Direct Analysis. Hence only a Reduction Analysis is viable and only the 2-place ‘-er’ is in use in English. In Hindi-Urdu, on the other hand, the binding data is compatible with the Direct Analysis. Moreover the precedence constraint, the Single Standard Restriction and the scope data argue against the Reduction Analysis. But we still need the 2-place ‘-er’ to handle the ‘more than  $n$ ’ cases and correlatives. This means that Hindi-Urdu is a language that has both the 2-place and the 3-place ‘-er’ but where only the Direct Analysis is in use.

The difference between Hindi-Urdu and English comes down to the following questions. Why does Hindi-Urdu lack the Reduction Analysis? and why does English lack a 3-place ‘-er’? The answer for the first question is easier to pin down. Reduction Analyses involve reduction operation that apply to the comparative clause. The relevant reduction operations apply to finite clauses in Hindi-Urdu but as discussed earlier finite clauses cannot appear as complements of postpositions in Hindi-Urdu. Consequently the structures where a Reduction Analysis might have applied are systematically ruled out. This brings us to the second question, which is much harder. Here is an initial attempt.

Our initial attempt starts with the idea that the 2-place ‘-er’ is semantically basic (see Kennedy 2009 for relevant discussion). Let’s assume that all languages that have an ‘-er’ have access to the 2-place ‘-er’ from the basic cognitive notion of comparison. The 2-place ‘-er’ also fits the more general quantificational schema where one of the arguments corresponds to a restrictor and the other to a nuclear scope. The 3-place ‘-er’ is only induced if there is evidence for it. In English, where the relevant

reduction operations are available, there is no evidence that forces the learner to assume a 3-place ‘-er’ (and a Direct Analysis to go with it). In Hindi-Urdu, however, the relevant reduction operations are unavailable in the complement of *-se/‘than’*, forcing the learner to assume a 3-place ‘-er’ (and a Direct Analysis).<sup>19</sup>

This initial proposal links the availability of 3-place ‘-er’ very directly to the unavailability of reduction operations in the complement of ‘than’. This works for Hindi-Urdu but as we see when we move to the data from Japanese, this is too strong a link. There is good evidence for the 3-place ‘-er’ in Japanese but also good evidence for reduction operations. We turn to the Japanese facts next.

## 5.2 A basic introduction to Japanese comparatives

### 5.2.1 *The role of yori*

Japanese comparatives are introduced by *yori(mo)*. In most comparative environments, *yori* and *yorimo* seem to be in free variation.

- (44) a. Taroo-wa [Hanako-yori(mo)] kasikoi.  
 Taro-Top Hanako-than smart  
 ‘Taro is smarter than Hanako.’
- b. Taroo-wa [Hanako-yori(mo)] ooku-no hon-o yonda.  
 Taro-Top Hanako-than many-Gen book-Acc read  
 ‘Taro read more books than Hanako.’

Note that there is no overt degree head—no ‘-er’, no ‘more’. Nevertheless like in Hindi-Urdu, the *yori*-phrase must precede the degree trace. The degree trace in (45) is in the object and therefore the *yori*-phrase must precede the object.

- (45) a. Taroo-wa [Hanako-yori] omosiroi hon-o yonda.  
 Taro-Top Hanako-than interesting book-Acc read  
 ‘Taro read a more interesting book than Hanako.’
- b. \*Taroo-wa omosiroi hon-o [Hanako-yori] yonda.  
 Taro-Top interesting book-Acc Hanako-than read  
 ‘Taro read a more interesting book than Hanako.’

<sup>19</sup>In this context, we can ask why we do not seem to find corresponding 3-place versions of quantifiers over individuals such as *every*. What would such a 3-place quantifier look like? Mechanically applying the process by which we get the 3-place ‘-er’ from the 2-place ‘-er’ to derive a 3-place *every* from the standard 2-place *every* yields the following:

(i)  $\llbracket \text{every}_3 \rrbracket = \lambda x. \lambda P_{\text{et}}. \lambda y. [P(x) \subseteq P(y)]$

Our response is that *every* does not generally combine with individuals and so the syntax does not provide support for the postulation of a 3-place *every*. There are marginal cases like *Every John likes pizza* but here it is plausible that proper names like *John* of type *e* can type-shift into an *et* meaning, allowing for us to retain the 2-place entry. This strategy cannot be used with phrasal comparatives where the corresponding type-shift would have to be from type *e* to type *dt*.

Like Hindi-Urdu *-se*, but unlike English *than*, *yorī* also functions as the directional postposition ‘from’. This is a crosslinguistically well-attested pattern, see Stassen (1985) for details.

- (46) *yorī* as a directional postposition:
- a. *watasi-wa Tokyo-yorī mairimasita.*  
I-Top Tokyo-from came  
‘I came from Tokyo.’
  - b. *watasi-wa Taroo-yorī tegami-o moraimasita.*  
I-Top Taro-from letter-Acc received  
‘I received a letter from Taro.’

### 5.2.2 Combinatorial properties of *yorī*

*Yorī* can combine with DPs but it can also combine with some case-marked phrases/PPs. As (47) shows, *yorī* can combine with dative marking as well as with the locative postposition. In both cases, the postposition/case-marker can be omitted.

- (47) a. DP-(Dat)-*yorī*: dative is optional  
John-wa [[Sue-(ni)]-*yorī*] Hanako-ni ooku-no hon-o ageta.  
John-Top Sue-Dat-than Hanako-Dat many-Gen book-Acc gave  
‘John gave more books to Hanako than (to) Sue.’
- b. DP-(Loc)-*yorī*: locative postposition is optional  
John-wa [[Kyoto-(de)]-*yorī*] Tokyo-de ooku-no hito-ni atta.  
John-Top Kyoto-in-than Tokyo-in many-Gen people-Dat met  
‘John met more people in Tokyo than (in) Kyoto.’

The DPs that combine with *yorī* cannot have the marking of a structural case: nominative (*-ga*) and accusative (*-o*) cannot appear immediately before *yorī*. *Yorī* can also combine with clauses.

- (48) a. Taroo-wa [Hanako-ga yonda-*yorī*] ooku-no hon-o yonda.  
Taro-Top Hanako-Nom read-than many-Gen book-Acc read  
‘Taro read more books than Hanako read.’
- b. Taroo-wa [Hanako-ga zassi-o katta-*yorī*] ooku-no  
Taro-Top Hanako-Nom magazine-Acc bought-than many-Gen  
syoosetu-o katta.  
novel-Acc bought  
‘Taro bought more novels than Hanako bought magazines.’

Multiple standards are possible with *yorī*.<sup>20</sup>

<sup>20</sup>There is some speaker variability here. For some speakers, the examples in (49) are slightly degraded. There is also some restriction on elements that are permitted to appear in the *yorī*-phrase. Yasutada Sudo (p.c.) has pointed out that elements that can appear in the *yorī*-phrase seem to be the same as those that are allowed to appear in the focus position in Japanese clefts.

- (49) a. [[Taroo-ga Tokyo-de]-yori] Jiroo-ga Kyoto-de ooku-no  
Taro-Nom Tokyo-in-than Jiro-Nom Kyoto-in many-Gen  
hito-ni atta.  
people-Dat met  
'Jiro met more people in Kyoto than Taro in Tokyo.'
- b. [[Taroo-ga Hanako-ni]-yori] Jiroo-ga Keiko-ni takai  
Taro-Nom Hanako-Dat-than Jiro-Nom Keiko-Dat expensive  
purezento-o ageta.  
present-Acc gave  
'Jiro gave a more expensive present to Keiko than Taro to Hanako.'

There are some constraints on the formation of comparatives with multiple standards in Japanese. The good cases of multiple standards all involve a Dative phrase/PP that appears immediately before *yori*. Cases where there is no Dative/PP or where the Dative/PP does not immediately precede *yori* are ungrammatical.

- (50) a. [nominative adverb]-'than': \*  
\*[[Taroo-ga kinoo]-yori] Jiroo-ga kyoo ooku-no hito-ni  
Taro-Nom yesterday-than Jiro-Nom today many-Gen people-Dat  
atta.  
met  
'Jiro met more people today than Taro yesterday.'
- b. [dative nominative]-'than': \*  
\*[[Hanako-ni Taroo-(ga)]-yori] Keiko-ni Jiroo-ga takai  
Hanako-Dat Taro-Nom-than Keiko-Dat Jiro-Nom expensive  
purezento-o ageta.  
present-Acc gave  
'Jiro gave a more expensive present to Keiko than Taro to Hanako.'

These constraints notwithstanding, it is clear that Japanese allows for reduction operations to apply in the complement of *yori*. In this respect, it is like English and not like Hindi-Urdu. In contrast to Japanese, multiple standards are sharply ungrammatical in Hindi-Urdu. Given the tentative proposal advanced at the beginning of this section, we expect to find that Japanese will pattern with English with respect to phrasal comparatives. But this is not what we find. Japanese phrasal comparatives pattern with Hindi-Urdu with respect to the scope and binding tests. It is these tests that we turn to next.

### 5.3 Evidence from binding and scope

We saw that there was no binding evidence for the Reduction Analysis in Hindi-Urdu because the binding properties of the 'than'-phrase did not depend upon the binding properties of its associate. A similar argument can also be made for Japanese. To set the stage, we first consider an ungrammatical clausal comparative in (51a). The ungrammaticality of this sentence receives a straightforward account. Because the

*yor*-phrase involves a clausal structure, the covert pronoun in subject position c-commands the relevant R-expression within that phrase, which induces a violation of Condition C, as illustrated in (51b).<sup>21</sup>

- (51) a. ?\*[Taro<sub>i</sub>-no hahaoya-ni setumeisita]-yori Hanako-ni kare<sub>i</sub>-ga  
 Taro-Gen mother-Dat explained-than Hanako-Dat he-Nom  
 nyuusu-o kuwasiku setumeisita.  
 news-Acc closely explained  
 ‘\*He<sub>i</sub> explained the news to Hanako more closely than he<sub>i</sub> explained  
 it to Taro’s<sub>i</sub> mother.’
- b. \* $[\lambda d. \text{pro}_i \text{ Taro}_i\text{'s mother the news } d\text{-much closely explained}]\text{-than}$

Let us now turn to the key fact that the phrasal comparative counterpart of (51a) given in (52) is grammatical.

- (52) ?[Taro<sub>i</sub>-no hahaoya]-yori Hanako-ni kare<sub>i</sub>-ga nyuusu-o kuwasiku  
 Taro-Gen mother-than Hanako-Dat he-Nom news-Acc closely  
 setumeisita.  
 explained  
 ‘\*He<sub>i</sub> explained the news to Hanako more closely than Taro’s<sub>i</sub> mother.’

The Direct Analysis successfully captures this fact because it assigns to (52) the representation in (53), where no Condition C violation is invoked.

- (53) [[[Taro<sub>i</sub>'s mother]-than]<sub>j</sub> [[to Hanako]<sub>k</sub> [he<sub>i</sub> t<sub>k</sub> the news [t<sub>j</sub> much closely] explained]]]

In contrast, the Reduction Analysis incorrectly predicts that Condition C is violated in (52) because the structure in (51b) is postulated for (52), as well. So the binding data does not provide support for the Reduction Analysis. Moreover, it shows that a Direct Analysis must be available for Japanese. But we do not yet have an argument that the Reduction Analysis is unavailable for Japanese phrasal comparatives. That argument comes from the scopal properties of quantificational *yor*-phrases in Japanese.

Japanese phrasal comparatives and Japanese clausal comparatives differ systematically with respect to the scopal properties of quantifiers in the complement of *yor*. Clausal comparatives in Japanese pattern with English in that scopal behavior of *yor*-phrase-internal quantifiers depends upon their structural configuration. If the *yor*-phrase-internal quantifier (QP) c-commands the comparative deletion site, which contains the degree variable, the quantifier seems to take scope outside the degree clause.

<sup>21</sup>It may well be the case that in (51a), the dative argument is scrambled to a position above the subject within the *yor*-phrase, as in the matrix clause. However, this possibility has no consequence for the current discussion because scrambling does not circumvent a Condition C violation in this context.

- (i) \*[Taro<sub>i</sub>-no hahaoya-ni]<sub>j</sub> kare<sub>i</sub>-ga t<sub>j</sub> nyuusu-o kuwasiku setumeisita.  
 Taro-Gen mother-Dat he-Nom news-Acc closely explained  
 ‘\*He<sub>i</sub> explained the news to Taro’s<sub>i</sub> mother closely.’

- (54) **QP** c-commands ‘\_\_\_’ (the comparative deletion site)/the degree trace:  
 → **QP** scopes out of *yor*i-clause

[**dono keizaigakusya-ga** \_\_\_ yonda-yori-mo] dono gengogakusya-mo  
 every economist-Nom read-than-mo every linguist-mo  
 ooku-no ronbun-o yonda.  
 many-Gen paper-Acc read

‘Every linguist read more papers than every economist read.’  
 (\*-er > every) (every > -er)

But when the *yor*i-phrase-internal quantifier does not c-command the degree variable, it seems to take scope inside the degree clause.

- (55) **QP** does not c-command ‘\_\_\_’ (the comparative deletion site)/the degree trace:  
 → **QP** scopes inside *yor*i-clause

[\_\_\_ **dono imiron-no ronbun-o** yonda-yori-mo] ooku-no  
 every semantics-Gen paper-Acc read-than-mo many-Gen  
 hito-ga dono toogoron-no ronbun-mo yonda.  
 people-Nom every syntax-Gen paper-mo read

‘More people read every syntax paper than read every semantics paper.’  
 (-er > every) (\*every > -er)

Multiple standard comparatives are similar to full clausal comparatives with respect to scopal judgements.<sup>22</sup> Japanese phrasal comparatives, on the other hand, pattern with Hindi-Urdu in that *yor*i-phrase internal quantifiers always scope out.

- (56) Japanese Phrasal Comparatives: quantifier always scopes out
- a. dono toogoron-no ronbun-mo [dono imiron-no ronbun-yori-mo]  
 every syntax-Gen paper-mo every semantics-Gen paper-than-mo  
 ooku-no hito-ga yonda.  
 many-Gen people-Nom read  
 ‘More people read every syntax paper than every semantics paper.’  
 (\*-er > every) (every > -er)
  - b. dono dansi gakusei-mo [dono zyosi gakusei-yori-mo] ooku-no  
 every male student-mo every female student-than-mo many-Gen  
 ronbun-o yonda.  
 paper-Acc read  
 ‘Every male student read more papers than every female student.’  
 (\*-er > every) (every > -er)

<sup>22</sup>It should be noted though that the judgements on quantifiers inside multiple standard comparatives are somewhat muddled by the fact that multiple standard comparatives have a mildly degraded status to begin with for many speakers.

Here is a way of interpreting the above facts. Let's begin with the assumption that 'than'-phrase-internal scope requires clausal structure. When there is no overt evidence for a clause, there is no clause. And when there is overt evidence in the form of an actual verb or multiple standards, there is a clause. Japanese comparatives, under this conception, would have a 'what you see is what you get' flavor to them. In this they would differ from English comparatives where we seem to have a clause even when all we see is a DP.

#### 5.4 The precedence restriction

Recall from Hindi-Urdu that if the merge site of the associate is lower than the degree head, the associate must move to a position where it overtly takes scope over the degree head.

- (57) a. \*: Standard 'more'  $\lambda d \dots d$  Associate  
 b. ok: Associate<sub>*i*</sub> Standard 'more'  $\lambda d \dots d \dots t_i$

We find this constraint to also be at work with phrasal comparatives in Japanese, which fits with the fact that like Hindi-Urdu, Japanese lacks covert QR.

- (58) a. Associate follows the degree variable (in overt syntax and LF):  
 \*MP-yori ooku-no hito-ga LGB-o yonda.  
 MP-than many-Gen people-Nom LGB-Acc read  
 'More people read LGB than the MP.'  
 b. Associate is fronted and now precedes the degree variable:  
 LGB-o<sub>*i*</sub> MP-yori ooku-no hito-ga t<sub>*i*</sub> yonda.  
 LGB-Acc MP-than many-Gen people-Nom read  
 'More people read LGB than the MP.'

This constraint is not operative when *yori* takes a clausal complement. It is also not operative when *yori* combines with multiple standards.

- (59) a. Associate follows the degree variable (in overt syntax and LF):  
 [MP-o yonda]-yori ooku-no hito-ga LGB-o yonda.  
 MP-Acc read-than many-Gen people-Nom LGB-Acc read  
 'More people read LGB than the MP.'  
 b. Associate is fronted and now precedes the degree variable:  
 LGB-o<sub>*i*</sub> [MP-o yonda]-yori ooku-no hito-ga t<sub>*i*</sub> yonda.  
 LGB-Acc MP-Acc read-than many-Gen people-Nom read  
 'More people read LGB than read the MP.'

This distinction between phrasal comparatives and clausal comparatives lends further support to our contention that phrasal comparatives in Japanese do not have a clausal source. If they did, we would expect them to behave like clausal comparatives and not have to obey the precedence constraint.<sup>23</sup>

<sup>23</sup>We saw earlier that *yori* can combine with both a bare DP as well as its case-marked/PP counterpart. The precedence constraint seems to apply only to the bare DP complement and not to the case-marked/PP counterpart.

At this point one could wonder whether the scope difference between English and Japanese/Hindi-Urdu phrasal comparatives could be related to the fact that the precedence constraint applies in Japanese/Hindi-Urdu, forcing overt scrambling of the associate. Japanese shows that scrambling of the associate does not affect the scopal properties of a ‘than’-phrase internal quantifier. First let us consider a clausal comparative where a putative associate follows the degree head. Since here, the ‘than’-phrase internal quantifier does not c-command the site of degree abstraction, we only get ‘than’-phrase internal scope.

- (60) [dono imiron-no ronbun-o yonda-yori-mo] ooku-no hito-ga  
 every semantics-Gen paper-Acc read-than-mo many-Gen people-Nom  
 dono toogoron-no ronbun-mo yonda.  
 every syntax-Gen paper-mo read  
 ‘More people read every syntax paper than read every semantics paper.’  
 (The number of people who read every syntax paper exceeds the number of  
 people who read every semantics paper.)  
 (-er > every) (\*every > -er)

Scrambling of ‘every syntax paper’ to a position preceding the gradable adjective does not change the scope of ‘every semantics paper’ with respect to ‘-er’.

- (61) [dono toogoron-no ronbun-mo] [dono imiron-no ronbun-o  
 every syntax-Gen paper-mo every semantics-Gen paper-Acc  
 yonda-yori-mo] ooku-no hito-ga yonda.  
 read-than-mo many-Gen people-Nom read  
 ‘More people read every syntax paper than read every semantics paper.’  
 (??The number of people who read every syntax paper exceeds the number  
 of people who read every semantics paper.)  
 (New Reading: For every syntax paper x, the number of people who read x  
 exceeds the number of people who read every semantics paper.)  
 within the ‘than’-clause: (-er > every) (\*every > -er)

- 
- (i) a. Case-marked standard: fronting not required:  
 [Kyoto-de]-yori ooku-no hito-ga Tokyo-de kono eiga-o mita.  
 Kyoto-in-than many-Gen people-Nom Tokyo-in this movie-Acc saw  
 ‘More people saw this movie in Tokyo than in Kyoto.’
- b. Bare standard: ungrammaticality without fronting  
 \*[Kyoto]-yori ooku-no hito-ga Tokyo-de kono eiga-o mita.  
 Kyoto-than many-Gen people-Nom Tokyo-in this movie-Acc saw  
 ‘More people saw this movie in Tokyo than Kyoto.’
- c. Bare standard: fronting saves the day  
 [Kyoto]-yori Tokyo-de ooku-no hito-ga kono eiga-o mita.  
 Kyoto-than Tokyo-in many-Gen people-Nom this movie-Acc saw  
 ‘More people saw this movie in Tokyo than Kyoto.’

The fact that case marked DP cases pattern with clauses with respect to the precedence restriction suggests a clausal source.

Scrambling of the associate has predictable scopal effects but crucially these scopal effects are confined to the matrix clause. The quantifier inside the ‘than’-clause can still only take scope under ‘-er’ and within the ‘than’-clause. Unlike clausal comparatives, with phrasal comparatives we find obligatory fronting of the associate.

- (62) dono toogoron-no ronbun-mo [dono imiron-no ronbun-yori-mo]  
 every syntax-Gen paper-mo every semantics-Gen paper-than-mo  
 ooku-no hito-ga yonda.  
 many-Gen people-Nom read  
 ‘More people read every syntax paper than every semantics paper.’  
 (\*-er > every) (every > -er)

As mentioned above, this in itself suggests that we do not have a hidden clause. If there was, we might have expected phrasal and clausal comparatives to behave alike with respect to fronting of the associate. Furthermore if scrambling of the associate was responsible for the ‘every > -er’ reading, we would expect (61) to have this reading. And if phrasal comparatives like the one in (62) had a covert clausal structure, we would expect it to allow for the ‘-er > every’ scopal relation on a parallel with (61). So while (62) involves scrambling of the associate, scrambling does not by itself yield the ‘every > -er’ scopal relation and the difference between English and Japanese does not reduce to the fact that Japanese associates have to be obligatorily scrambled to a position before a gradable adjective.

### 5.5 The distribution of degree heads in Japanese

*Yori* in Japanese can take a clausal complement. This means that Japanese uses the 2-place degree head. The existence of comparatives where *yori* combines with multiple standards shows that reduction operations can apply to the clausal complement of *yori*. Given this, we would expect that comparatives where *yori* combines with a DP on the surface have a clausal analysis where the DP-complement of *yori* is actually the remnant of reduction operations that have applied to a clausal complement of *yori*.

And yet, the evidence from binding, scope and precedence shows us that DP complements of *yori* do not involve a clausal source. Instead they use the 3-place degree head. In other words Japanese is like Hindi-Urdu in employing both a 2-place and a 3-place degree head. But unlike Hindi-Urdu, Japanese does have reduction operations that can apply to the complement of *yori* making it mysterious why a Reduction Analysis that uses a 2-place degree head is unavailable for Japanese phrasal comparatives. The questions we need to answer are why Japanese allows a 3-place degree head and why it blocks a Reduction Analysis for simple phrasal comparatives.

## 6 The crosslinguistic distribution of degree heads

What we have found for Japanese is that reduction operations can seemingly apply to comparative clauses to yield multiple standards but not to yield a single standard.

Why might this be? A very simple answer could come from the properties of the reduction operation. If we had a reduction operation that could only apply if the output of the operation left more than one remnant XP, we would be done. Simple phrasal comparatives could no longer have a clausal source and a 3-place ‘-er’ would be induced to handle them. Unfortunately we do not know of a reduction operation with these properties. Reduction operations seem to be sensitive to the syntactic object that they apply to and not to the number of XPs, they leave behind. For example, Right Node Raising/Gapping in Japanese, which are plausibly the operations behind the derivation of multiple standards, are permitted in a one remnant configuration.

Instead of deriving the differences between English and Japanese phrasal comparatives from the properties of the reduction operation, we derive these differences from the different properties of the comparative markers (*than/yori*) in these languages. We begin by turning around a question that we have been asking: why do Hindi-Urdu and Japanese allow 3-place ‘-er’? This question assumes that the 2-place ‘-er’ is somehow basic and that we need to do something special to induce 3-place ‘-er’. The real question to ask, we suggest, is why 3-place ‘-er’ seems to be unavailable in English. In fact, we go one step further and make the following proposal:

- (63) a. Both 2-place and 3-place entries of ‘-er’ are available crosslinguistically.  
 b. However, the syntactic environments where these entries may be used are restricted crosslinguistically by the subcategorizational properties of *than/yori/-se*.

Let us apply this proposal to the languages under discussion, starting with the easiest case, Hindi-Urdu. We saw that the Hindi-Urdu comparative marker *-se* only combines with DPs. A DP complement of *-se* may denote an individual and when it does so, the 3-place ‘-er’, which takes individual arguments, must be used. A DP may also denote a degree and in this case, the 2-place ‘-er’ must be used. This is what happens with correlatives and the ‘more than *n*’ cases. Note that a Reduction Analysis is never an option in Hindi-Urdu because *-se* can only combine with DPs, never with clauses.

Discriminating between English and Japanese phrasal comparatives is harder because both *yori* and *than* take clausal complements and here the discussion is more speculative. The following is a proposal that derives the desired distinctions. We commence by noting two important distinctions between *than* and *yori*. The first is that *yori* has, as noted earlier, a non-comparative postpositional use where it means ‘from’. *Than*, however, has only a comparative usage. This has important consequences for their respective subcategorizations. On the surface, *than* takes a variety of complements, clausal and non-clausal. Since the non-clausal complements can be analyzed as reduced clauses, a single clausal subcategorization is assumed for *than*. This accords well with the decidedly non-prepositional historical source of modern *than*; it is related to the Old English *than(ne)*, *thon(ne)*, *thaen(ne)* and in the Middle English period is even spelled as *then*. A principle of ‘lexical uniformity’ which militates against unnecessary subcategorizations might be behind a single subcategorization. Since *yori* has a (non-comparative) postpositional usage as ‘from’, it requires a DP subcategorization. *Yori* also combines with clauses. Therefore, unlike English *than*, a single subcategorization is not possible for *yori*. Instead *yori* subcategorizes

for DPs and CPs. The second distinction between *yorī* and *than* has to do with the headedness of the Deg head in English and Japanese. In English, the Deg head always precedes the *than*-phrase while in Japanese, the *yorī*-phrase precedes the Deg head.

Since English *than* only has a CP subcategorization, a CP is always postulated as its complement, even when its overt complement is a DP. Comparative clause CPs only denote degree descriptions, not individuals. As a result only the 2-place ‘-er’, which combines with degree descriptions, can be used. The 3-place ‘-er’ combines with individuals and is therefore unusable with *than*-phrases.

In Japanese, the complement of *yorī* could be a DP, a clausal structure, or multiple standards. In the latter two cases, the complement can only be analyzed as a CP i.e. *yorī* takes a CP complement and as a result the 2-place degree head must be used. If the complement of *yorī* on the surface is a DP, there are in principle two options: *yorī* takes a DP complement or else it takes a reduced clause whose only remnant is the DP. All our diagnostics tell us that the former option is chosen by the language. When the complement of *yorī* looks like a clause, it is a clause and when it looks like a DP, it is a DP. So what blocks the reduction option, which we have argued plays a role in English?

The reduction operation in Japanese is blocked by an economy constraint that prefers Minimal Structure (see Bošković 1996; Grimshaw 1993; Law 1991 and Speas 1994 for articulations of this constraint). This constraint prefers a DP complement to a CP complement. The constraint can be implemented as a parsing constraint and does not require a transderivational statement.<sup>24</sup> We have the following implementation in mind. Consider a string where *yorī* follows a DP. When *yorī* is encountered, we have access to its subcategorization which allows it to combine with a DP or a CP. The economy constraint prefers the DP subcategorization. Consequently when *yorī* gets a DP complement on the surface, *yorī* actually has a DP complement underlyingly too and therefore only the 3-place degree head may be used. This is how the ‘what you see is what you get’ property of Japanese comparatives is derived.

According to our proposal, there is no parametrization with respect to the arity of degree heads. All languages that have degree heads have 2-place and 3-place degree heads. But the usability of a particular head in a particular language is influenced by factors such as the properties of comparative markers (*than*, *yorī*, *-se*), headedness of degree heads, a preference for minimal structure and a preference for a single subcategorization. The following is a summary. *-se* is simply unable to combine with finite clauses blocking the Reduction Analysis and making the 2-place ‘-er’ unavailable (for the most part) in Hindi-Urdu. The 2-place ‘-er’ in Hindi-Urdu is limited to the cases where the complement of *-se* is a degree denoting DP. *Than* combines only with CPs. Therefore all phrasal comparatives in English involve reduction; the

<sup>24</sup>It seems to us that a transderivational statement of this constraint faces the following challenge. Transderivational economy constraints are always stated upon a comparison class. The comparison class could be defined in terms of the numeration or in terms of the meaning. The numerations of phrasal and clausal comparatives are clearly distinct so the meaning direction seems more promising. But now recall that phrasal comparatives in Japanese force quantifiers to scope out in contrast to clausal comparatives which do not. This means that a reduction structure and a direct structure where the complement of *yorī* was a quantifier would have distinct meanings and the economy constraint would not block the reduction structure, contrary to fact.

complement of *than* is always a degree-denoting clause, reduced or unreduced, and only the 2-place *-er* is available in English. Finally *yor*i can combine with both DPs and CPs. When it combines with something that is a CP on the surface, the 2-place ‘-er’ comes into play. Its subcategorization also allows for it to combine with DPs bringing in the 3-place ‘-er’; the preference for minimal structure blocks an analysis where the DP complement is the remnant of a reduced CP complement.<sup>25</sup>

We conclude this paper with discussion of the following components of our proposal for deriving the crosslinguistic distribution of degree heads: the role of directionality and the preference for a single subcategorization. But before that we turn to a brief review of a possibility not explored by us in this paper, namely that Japanese has no degree abstraction in the complement of *yor*i.

### 6.1 Crosslinguistic variation in degree quantification

We have seen that the *yor*i-phrase in Japanese exhibits a ‘what you see is what you get’ property. More specifically, when *yor*i takes a phrasal DP complement on the surface, it indeed combines with a phrasal DP, not with a constituent that looks phrasal by virtue of reduction processes. Consequently, we argued that the *yor*i-phrase can denote an individual (as with most DPs) as well as a degree description (with clauses).

One important alternative approach to Japanese comparatives, advocated by Beck et al. (2004), argues that *yor*i always combines with an individual denoting element, no matter what kind of constituent *yor*i superficially combines with. Under this approach, it follows that *yor*i takes an individual denoting element not only in (64a), but also in (64b), where *yor*i appears to combine with a clausal constituent. To make this claim possible, Beck et al. argue that the complement of *yor*i in (64b) should be analyzed as a relative clause of some sort.<sup>26</sup>

- (64) a. Taro-wa [Hanako]-yor*i* ooku-no hon-o yonda.  
 Taro-Top Hanako-than many-Gen book-Acc read  
 ‘Taro read more books than Hanako.’
- b. Taro-wa [Hanako-ga yonda]-yor*i* ooku-no hon-o yonda.  
 Taro-Top Hanako-Nom read-than many-Gen book-Acc read  
 ‘Taro read more books than Hanako read.’

Recently, Kennedy (2009) pursues an approach similar to Beck et al. in certain respects and he also argues that the complement of *yor*i always denotes an individual under the assumption that a seemingly clausal complement of *yor*i should be analyzed as an individual denoting element. Furthermore, both Beck et al. and Kennedy

<sup>25</sup>A reviewer worries that our proposal relies on insufficiently understood properties of the lexicon (lexical uniformity), acquisition strategies, and the influence of processing in grammar (the role of directionality). We do not think that this is in itself an objection but we would like to note that the empirical contribution of the paper in Sects. 1–5 is independent of these potentially worrisome details of our final proposal. Our assumptions about lexical uniformity and the role of directionality primarily affect our analysis of Japanese and they could in principle be replaced by an exclusively syntactic or semantic explanation without changing the overall point.

<sup>26</sup>Sudo (2009) proposes that the complement of *yor*i in (64b) should be analyzed as a relative clause headed by a covert element that denotes a degree, which is different from Beck et al.’s claim.

claim that in contrast to the *yori*-phrase, the *than*-phrase in English can denote a degree description. From this cross-linguistic variation, they derive some intriguing differences between English and Japanese comparatives that we did not investigate in this paper. However, various challenges have also been pointed out for the idea that the *yori*-phrase must denote an individual. See Hayashishita (2009) and Shimoyama (2011) for relevant facts and discussion.

A full comparison between Beck et al.'s and Kennedy's approaches and ours requires more space than we can devote to it here. Here we limit ourselves to enumerating the relevant issues. Beck et al. and Kennedy consider the impossibility of subcomparatives to be a strong argument for the claim that the *yori*-phrase cannot denote a degree description. For our approach, it is necessary to explain this fact without resort to their claim about the *yori*-phrase. Likewise, it is essential to consider what can be said under Beck et al.'s and Kennedy's approaches about the scope facts and the possibility of comparatives with multiple standards, both of which have been taken as evidence for our claim that the *yori*-phrase can denote a degree description.

## 6.2 The role of directionality

We have argued that the fact that *yori*-phrases precede the degree head in Japanese is one of the factors that plays a role in determining the properties of phrasal comparatives in that language. The grammar of Japanese exploits a local ambiguity in subcategorization created by the fact that *yori* functions both as a comparative marker and the postposition 'from'. Since the *yori*-phrase precedes the degree head, at the point *yori* is encountered, we do not know which *yori* we have and then the minimal structure constraint argues against the postulation of a reduced clause. One could wonder why the appeal to directionality is needed. Would the fact that *yori* functions as 'from' not be enough?

The appeal to directionality is motivated by two kinds of data. The first concerns Hebrew phrasal comparatives. Like Japanese, the Hebrew comparative marker *mi*-also functions as 'from'. But Hebrew phrasal comparatives pattern with English with respect to binding and scope (Eytan Zweig p.c.). There is an important difference between Hebrew and Japanese though—*mi*-phrases in Hebrew follow the degree head while Japanese *yori*-phrases precede the degree head. Because of this difference, there is no local ambiguity at the point at which *mi*- is encountered in Hebrew and only the reduced CP analysis, which involves the 2-place head, is available.

The second kind of data that points to the role of directionality comes from English. We have worked with the idea that English *than* always takes a CP complement and while this is true for comparatives, there are some domains where it is hard to postulate a clausal analysis for the DP complement of *than*:<sup>27</sup>

- (65) a. Crimes other than murder are widespread in Bessarabia.  
b. I met with a student other than Jon.

<sup>27</sup>Also relevant are the cases of DP-internal subcomparatives such *More professors than [students] attended the talk* discussed by Keenan (1987) and Pancheva (2009).

We do not have a full explanation for why the apparent DP taking properties of *than* in *other than* do not permit *than* in general to have a DP subcategorization in contrast to Japanese. But directionality seems to play a role here. Comparative *yoru*-phrases in Japanese precede the abstract degree head. As a result, when *yoru* is encountered, it is locally ambiguous between a locative and a comparative usage. In English, *than* follows its licenser, be it *more* or *other*. Consequently it is not locally ambiguous.

### 6.3 Lexical uniformity: the preference for a single subcategorization

The motivation for our proposal that ‘than’ only takes a CP complement underlyingly can also be questioned. English *than* certainly has a non-prepositional origin; as we noted earlier, it is related to the Old English *than(ne)*, *thon(ne)*, *thaen(ne)* and in the Middle English period is spelled as *then*. But certainly now and in fact, even going back to the Middle English period, the complement of *than* did not have to match its associate in case.

(66) John is taller than me<sub>normal/|formal/uncommon/|marked</sub>.

(67) Middle English (Beatrice Santorini p.c.)

a. Case(Associate) = Case(standard) = Nominative

i. for **they** are stronger **then** **we**. (AUTHOLD-E2-H,XIII,20N.911)

ii. but heare you my maisters, though mistresse Winchcomb goe in her hood, **I** am as good as **shee**, (DELONEY-E2-H,79.330)

b. Case(Associate) = Nominative ≠ Case(standard) = Oblique

i. my care & tender love to yu is Great hoping God will make y=u= a comfort to me in my old age & y=t= y=u= will be better advised **then them** y=t= have bin a grieffe of heart to me & a ruin to themselves & would consume y=t= before o=r= faces w=ch= their friendes have bin carefull to get for them. (JOPINNEY-E3-P2,48.9)

ii. Lory. Here comes a Head, Sir, [**who/that - BES**] would contrive it better **than us** both, if he wou'd but joyn in the Confederacy. (VANBR-E3-P2,29.195)

In Middle English (and more reliably in Modern German), the case matching between the standard and the associate can be taken to provide evidence for a reduced clause. By the time we come to Modern English, this kind of evidence is essentially gone. But if we are right, the grammar continues to analyze *than* as taking CP complements. Pending a deeper explanation, we have to conclude that the economy considerations that favor a single subcategorization for *than* are not sensitive/dependent on surface evidence of this sort.

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