Equatives Are Not All Equal:
A Correlative Analysis of Scalar Equatives in Mandarin

Qiongpeng Luo[1] (Nanjing University[1])
Yuzhen Cao[2] (Southeast University[2])

I. Background Recent research has documented remarkable variability in the expression of comparison (Beck et al. 2004; Kennedy 2009; Bhatt & Takahashi 2011, a.o.). There are two driving questions: (i) whether a case of apparent surface variability in making comparison reflects variability in grammar, and (ii) which component of grammar (if any) can a case of variability in comparison be reduced to. This study investigates the cross-linguistic variation in scalar equatives between English (*Mr. Darcy is as rich as Mr. Bingley is*) and Mandarin. A typical scalar equative in Mandarin, exemplified in (1), comprises three components: (a) a target of comparison, (b) a standard of comparison, introduced by *xiang* (lit. 'like'), and (c) a predicate of comparison (gradable adjectives such as *gao* 'tall', *zhong* 'heavy', etc.):

(1) *[Zhangsan]Target [xiang Lisi *(yiyang/name)]Standard [gao]Predicate*.
     ZS   like LS   equally /that   tall   'ZS is as equally tall as LS.'

II. Cross-linguistic variation In the standard degree semantics, scalar equatives have the same LF as that of comparatives, and their semantics differs only minimally, viz. the former means 'Adj-ness (x) $\geq$ Adj-ness (y)', while the latter means 'Adj-ness (x) >/< Adj-ness (y)' , i.e., they have a common semantics based on linear ordering of degrees (Cresswell 1976; von Stechow 1984; Kennedy & McNally 2005, a.o.):

(2) a. Darcy is as rich as Bingley is.   b. [as [1[Bingley is t_1 tall]]] [Darcy is t_1 tall]

(3) a. $[[as]] = \lambda D_{2<d, t>}\lambda D_{1<d, t>}$. MAX$(D_1)\geq$MAX$(D_2)$

   b. MAX$(\lambda d_1$. Mr. Darcy is d_1 tall) $\geq$ MAX$(\lambda d_2$. Mr. Bingley is d_2 tall)

However, this standard semantics runs into difficulty when facing Mandarin data, whose morpho-syntax differs from that that of English ones in a variety of ways. (i) (Non-)NPI licensing: as shown in (3b), the standard semantics involves an inbuilt maximality operator (MAX(D) $\Leftrightarrow$ ιd. $D(d)\wedge\forall d'[D(d')\rightarrow d'\leq d]$), which makes the standard of equatives a downward entailing (DE) context (Proof: $D_{2'}\subseteq D_2$; MAX$(D_1)\geq$MAX(D_2) $\Rightarrow$ MAX$(D_1)\geq$MAX$(D_{2'})$). As predicted, negative polarity items (NPIs) are licensed in the standard of equatives in English (4); however, NPIs are prohibited in Mandarin equatives (5):

(4) Jim is as competent as anyone here could possibly be. (Alrenga 2010)

(5) *Zhangsan xiang renhe/shenme ren yiyang gao*.
     ZS   like any/what   person equally tall   'ZS is as equally tall as anybody else.'

 (ii) Demonstrative Requirement: in Mandarin, a demonstrative-turned degree pronoun (*name* 'such-that' or *yiyang* 'the same/equally') are obligatory in the standard of equatives, while the insertion of such items in the standard of English equatives is at most marginal:

(6) a. *Zhangsan xiang Lisi *(name/yiyang) gao*.   b.??/* John is as that tall as Mary is.
     ZS   like LS   that   equally tall

(iii) (Non-)permission of differentials: English equatives permit differentials that express multiplication (7a), which is banned in Mandarin ones (7b):

(7) a. The curtain is twice as wide as the window. (Beck 2012)

   b. *Chuanglian xiang chuanghu   liang-bei yiyang kuan*.
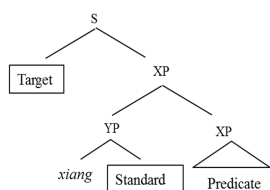   the curtain   like the-window   twice   equally wide

Mandarin is NOT alone in exhibiting these properties. German equatives, for instance, do not license NPIs in the standard phrases either (Penka 2017); in many Slavic languages, a demonstrative pronoun is employed in equatives:

(8) a. *taki pies jak ten*   b. t*ak wygoki jak Clyde*   (Polish, Anderson & Morzycki 2015)
       such dog WH this   such tall   WH Clyde

Two questions remain unresolved: (i) how to properly account for the behaviors of Mandarin equatives, and (ii) how Mandarin differs from English in making comparison of equality.

III. Proposal Inspired by recent advancement in the study of gradability and comparison (Anderson & Morzycki 2015), we propose that Mandarin equatives are correlatives in disguise. Specifically, the [target+predicate] forms the matrix clause, and the [xiang+standard] is a reduced clause, which adjoins to the matrix clause. An adjunction analysis for equatives is adopted (Kennedy 1999; Lin 2009). Correlatives compose of a left-adjoined relative clause and a main clause. The left adjoined clause is referentially linked to a nominal correlate, which always takes the form of a demonstrative pronoun (known as the 'Demonstrative Requirement') (Lipták 2009). Equatives pattern with correlatives, albeit in the domain of degrees, with the degree pronoun *name*/*yiyang* resumptively refers to the degree of the comparee:

(9) *[Jo laRkii khaRii hai]* **vo** *lambii hai.* (Hindi-Urdu, Srivastav 1991)

   wh girl   standing is   that tall   is   ([[**vo**]] = the girl who is standing)

(10) *ZS [[xiang [LS ~~gao~~]] yiyang] gao.*   [[**yiyang**]] = the height of Lisi

Treating equatives on a par with correlatives, the 'Demonstrative Requirement' of equatives receives a natural explanation. In addition to this 'Demonstrative Requirement', there are several more independent pieces of evidence supporting that the [xiang+standard] is a constituent adjoining to the [target+predicate]: (i) the [xiang+standard] can be questioned and used alone (11); (ii) like other relative clauses in Mandarin, the relativizer/modification marker *de* can be inserted between the standard phrase and the main predicate (12):

(11) A: *Zhangsan duo gao?*   B: *Xiang Lisi yiyang (gao).*

      'How tall is ZS?'   'As tall as Lisi.'

(12) *Zhangsan [[xiang Lisi yiyang] de] gao.*

IV. The syntax and semantics The underlying structure for (1) is provided below (assuming an AP-internal subject hypothesis). The semantic composition is straightforward. Following Anderson & Morzycki (2015), we introduce two semantic types into the model: state argument *s*, and kind argument *k*. '**tall** (*s*, *j*)' means *s* instantiates a property of degrees of John's tallness. Since *xiang* 'like' takes a kind as its argument, we introduce Chierchia's (1998) 'up' operator $^\cup$, which applies to a kind and returns the property from which it was built:
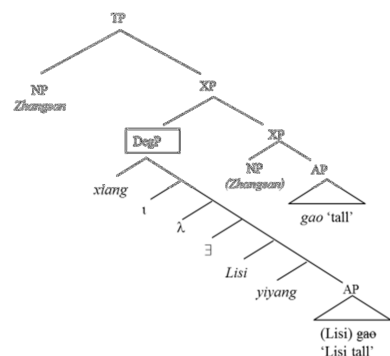
(13) [[*xiang*]] = λkλs.$^\cup$k(s)

Semantically, the [xiang+standard] ('DegP') composes with the [target+predicate] via intersection (Predicate Modification in the sense of Heim & Kratzer 1998). The step-by-step semantic composition is given in (14):

(14) i.   [[*gao*]] = λxλs'. **tall** (s',x)

    ii. [[*Zhangsan gao*]] = λs'. **tall** (s',ZS)

    iii. [[*Lisi gao*]] = λs. **tall** (s', LS)

    iv. [[*yiyang*]] = λs. $^\cup$k(s)

    v. [[*yiyang Lisi gao*]] = λs. $^\cup$k(s) ∧ **tall** (s, LS)

    vi. ∃-Closure: ∃s. $^\cup$k(s) ∧ **tall** (s, LS)

    vii. λ-abstraction: λk[∃s. $^\cup$k(s) ∧ **tall** (s, LS)]

    viii. ι-shift: [[[*Lisi ~~gao~~] yiyang*]] = ιk[∃s[$^\cup$k(s) ∧ **tall** (s, LS)]]

    ix. [[*xiang Lisi yiyang gao*]] = λs'.$^\cup$ιk[∃s[$^\cup$k(s) ∧ **tall** (s, LS)]](s')

(15) [[*ZS xiang Lisi yiyang gao*]] = λs'.$^\cup$ιk[∃s[$^\cup$k(s) ∧ **tall** (s, LS)]])(s')∧ **tall** (s', ZS)

In prose, the first conjunct of (15) says *s'* is a realization of the state that LS's tallness instantiates, and the second conjunct says that this *s'* also instantiates ZS's tallness.

V. Discussion & Analysis First, on this account, the standard phrase is a definite description,

and not a DE context. As expected, NPIs are not licensed, just like correlative free relatives (*I can read whatever Bill ever read*. Jacobson 1995)(Caponigro 2004). Second, the comparison is not based on linear ordering of degrees, so differentials that express multiplication are not allowed, as expected. Third, the demonstrative requirement receives a motivated account. Demonstrative pronouns like *name/yiyang* pick up the degree of the compared individual, just like the demonstrative pronoun picking up the referent denoted by the adjoined relative clause in correlatives. Without such anaphors, referential relationship that is essential for correlatives would have no means to be established.

VI. Conclusion Cross-linguistically, there are two strategies for making comparison of equality. In one type of strategy, comparison is based on (asymmetrical) linear ordering (English), while in the other type of strategy, comparison is based on sameness of properties. The latter strategy involves an intersective semantics, viz. if x has the same degree as y with respect to some comparable property, then there is some degree d (or state s) which instantiates some property of x also instantiate some property of y. The morphosyntactic properties of Mandarin equatives (e.g, non-licensing of NPIs, demonstrative requirement, non-permission of differentials, etc.) are natural consequences of this semantic requirement.

Selected references:
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