Scalarity and additivity in natural language: (V) cross-linguistic siblings / cousins of *even* and how some of them are used in comparatives

Linmin Zhang (NYU Shanghai)
zhanglinmin@gmail.com

ESSLLI 2024
Day 5, August 2nd, 2024

Slides are available on lingbuzz.
Compiled at 16:41, Friday 2nd August, 2024

Recapitulation

- Day 4 and Day 5: *Even* and its cross-linguistic siblings
  - How a scalarity-based perspective improve our understanding of additivity-related phenomena?
- Yesterday: the case study of English *even*:
  - scalarity and scale-based additivity of *even*
  - degree QUD and maximal informativeness

Today

- Day 1: Basics of scales and degrees; how they are relevant to natural language
  - What are scales? What are their formal properties? What operators do they support?
- Day 2 and Day 3: Comparatives and *-er*/*more*
  - How an additivity-based perspective improve our understanding of scalarity-related phenomena?
  - What is additivity?
- Day 4 and Day 5: *Even* and its cross-linguistic siblings
  - How a scalarity-based perspective improve our understanding of additivity-related phenomena?
    featuring
    - ★ Chinese *gèng*
    - ★ Chinese *hái*
    - ★ ~~Chinese *dōu*~~
    - ★ ~~German *noch*~~
    - ★ and their use in comparatives

Outline

Translational equivalence at the sentence level: in Chinese

- What does English *even* correspond to in other languages?
  This question does not have a short answer.
- E.g., Chinese *gèng*, *hái*, and *dōu* can all be used in comparatives, leading to some translational equivalence with the use of English *even*

(1) (Mary is tall.) Lucy is even taller (than Mary is).

(2) 'Lucy is even taller than Mary.'

a. Lucy bǐ Mary gèng gāo.
   Lucy COMPARED-TO Mary EVEN_{CH1} tall/taller

b. Lucy bǐ Mary hái gāo.
   Lucy COMPARED-TO Mary EVEN_{CH2} tall/taller

c. Lucy bǐ Mary dōu gāo.
   Lucy COMPARED-TO Mary EVEN_{CH3} tall/taller

- There are subtle differences among these *even*-like particles wrt interpretations, intonation patterns (stress on the particle vs. on a focused item), dialectal differences (some are preferred in a dialect), etc.

Translational equivalence at the sentence level: in Chinese

- Chinese *gèng*, *hái*, and *dōu* can even be used together in the same sentence, (with a stress on the focused item, Mary).

(3) 'Lucy is even taller than Mary.'

Lucy bǐ	Mary$_F$	dōu	hái	gèng	gāo.
Lucy COMPARED-TO	Mary	EVEN$_{CH3}$	EVEN$_{CH2}$	EVEN$_{CH1}$	tall/taller

Translational equivalence at the sentence level: in German

(4) (Adam is taller than Chris.)

Berta ist noch größer als Adam.
Berta be.3SG EVEN$_{GE}$ tall-er than Adam

'Berta is even taller than Adam.' (*noch*: stressed: see Umbach 2009)

Cross-linguistic family of additive particles

- **English**: *-er/more*, *another*, *other*, *even*, *also*, *too*, *again*, *furthermore*, *moreover*, *still*, *and*, ...
  - the family of *even*: *even if*, *even though*, '*even* + a minimal value' (NPI)
- **Chinese**: *gèng* ('more, even'), *hái* ('still, even'), *dōu* ('all, even'), *yě* ('also'), *yòu* ('again'), *zài* ('again'), *ér* ('and, but'), *hé* ('and, with'), *lìng-wài* ('other'), *qí-tā* ('other'), ...
  - the family of *gèng*: *gèng-jià*, *gèng-hé-kuàng*
  - the family of *hái*: *hái-yǒu*, *hái-shì*, *hái-yào*
- **German**: *mehr* ('more'), *auch* ('also'), *noch* ('still, even'), *wieder* ('again'), *weiter* ('further'), *und* ('and'), ...
- **French**: *plus* ('more'), *aussi* ('also'), *encore* ('still'), *autre* ('other'), *et* ('and'), ...
- **Korean**: *te* ('more, even'), *te-uk* ('more'), *ta* ('all, even'), *to* ('also, too, and, even'), *tto* ('again'), *hako* ('and'), ...
- **Japanese**: *to* ('and, too, also'), *motto* ('more, even'), *moo*, *ato* ...
- ...(anti-additive particles: *just*, *only*, *simply*, ...)

Cross-linguistic family of additive particles

- How to make sense of all these words?
  - Translational equivalence is just a starting point.
  - Contextual information is crucial in understanding their felicity.
- Which additive particles patterns with which additive particles in which ways?
  - e.g., used in which domains? (e.g., entities, events, scalar values)
  - e.g., whether additive meaning leads to an end point (or maximal informativeness)
    - ★ Sigrid Beck, Mingming Liu: *měi+dōu* ('every + even/all')
    - ★ Yael Greenberg: *even*
    - ★ Osamu Sawada: *ato* vs. *moo*
    - ★ Guillaume Thomas: typology on 'Comparison – Incrementality – Continuation'
    - ★ Carla Umbach: *noch*
    - ★ Linmin Zhang: *even*, maximality in cumulative reading
  - ...
- Why natural language has additive particles?
  - to enhance discourse coherence: helping with information integration (see e.g., David Hume, Roberts 1996/2012, Kehler 2002)

Case study of today's lecture

- What is *gèng*?
  (In which domain can it be used? With vs. without an end point?)
  - ≈ English *even*? (see Chen 2023)
  - ≈ English *even more*? (see Liu 2010)
- What's the role of *gèng* in comparatives? Is it obligatory?
  - Does Chinese require the presence of an additive morpheme like *-er*/*more* in comparatives?
  - If not, how is comparison performed?
- What do various *even*-like particles do in a comparative?

Take-home messages

- What is *gèng*?
  (In which domain can it be used? With vs. without an end point?)
  - ~~≈ English *even*?~~ (see Chen 2023)
  - ~~≈ English *even more*?~~ (see Liu 2010)
  - ≈ English *moreover*, *still*, *more*
    gèng can be used in domains of entities and scalar values; no end point involved in additivity
- What's the role of *gèng* in comparatives? Is it obligatory?
  - *gèng* can optionally appear in a comparative; and in some cases, its presence is strongly preferred / obligatory
  - but comparison is not performed by *gèng*, but by gradable adjectives, which encode a comparison with a direction
  - *gèng* marks an update of the threshold for the positive use of a gradable adjective
- What do various *even*-like particles do in a comparative?
  - *gèng* vs. *hái* (vs. German *noch*)

Outline

Languages with morphemes like *-er*/*more*

- Many languages (e.g., English, French) require the use of a comparative / additive morpheme in the comparative use of gradable adjectives:

(5) a. Lucy is tall. **Positive**: tall
b. Lucy is taller than Mary is. **Comparative**: taller

(6) a. Lucy has many books. **Positive**: many
b. Lucy has more books than Mary does. **Comp.**: more

(7) **French data**

a. Jean est grand.
John be.3SG tall
'John is tall.' **Positive**: grand 'tall'

b. Jean est plus grand que Pierre.
John be.3SG more tall what Peter.
'John is taller than Peter.' **Comp.**: plus+grand 'taller'

Languages without morphemes like *-er/more*

- However, many other languages (e.g., Chinese, Japanese, Korean) don't have this requirement, i.e., there is no morphological distinction between the comparative vs. non-comparative form:

(8) **Chinese data**

a. Lèlè gāo ma?
Lèlè tall Q
'Is Lèlè tall?' **Positive**: gāo 'tall'

b. Lèlè bǐ Mǐmǐ gāo ma?
Lèlè STDD Mǐmǐ taller Q
'Is Lèlè taller than Mǐmǐ?' **Comp.**: gāo 'taller'

(9) **Japanese data**

a. Rika-wa (se-ga) taka-i.
Rika-TOP back-NOM tall-PRES
'Rika is tall.' **Positive**: taka- 'tall'

b. Rika-wa Makoto-yori (se-ga) taka-i.
Rika-TOP Makoto-STDD back-NOM tall-PRES
'Rika is taller than Makoto.' **Comp.**: taka- 'taller'

Evidence for the view that comparison is performed by gradable adjectives

- All uses of gradable adjectives involve comparison (i.e., *-er*/*more* is not a necessary component of comparison):

(10)
a. $[\![\text{Lucy is POS tall}]\!] \Leftrightarrow \textsc{height}(\text{Lucy}) \geq d^{c}_{\text{POS}}$ **Positive use**

b. $[\![\text{Lucy is } 5'8'' \text{ inches tall}]\!] \Leftrightarrow \textsc{height}(\text{Lucy}) \geq 5'8''$ **Measure**

c. $[\![\text{how tall is Lucy}]\!] \Leftrightarrow \lambda d.\textsc{height}(\text{Lucy}) \geq d$ **Degree Q.**

d. $[\![\text{Lucy is as tall as Bill (is)}]\!] \Leftrightarrow \textsc{height}(\text{Lucy}) \geq \textsc{height}(\text{Bill})$ **Equative**

e. $[\![\text{Lucy is taller than Mary (is)}]\!] \Leftrightarrow \textsc{height}(\text{L}) > \textsc{height}(\text{M})$ **Comparative**

More evidence: minimal pairs; antonyms

- Minimal pairs indicate that the use of *-er*/*more* does not bring comparison, but rather affects (i) what constitutes the comparison standard and/or (ii) the size of the differential.

(11) a. Mary is not tall. Lucy is tall. $\rightsquigarrow \textsc{height}(\text{Lucy}) \geq d^{c}{}_{\text{POS}}$

b. Mary is not tall. Lucy is taller. $\rightsquigarrow \textsc{height}(\text{L}) \geq \textsc{height}(\text{M})$

(12) a. Compared to Mary, Lucy is tall. **Implicit comparison**

$\rightsquigarrow \textsc{height}(\text{Lucy}) \geq d^{c}{}_{\text{POS}}$

b. Compared to Mary, Lucy is taller. **Explicit comparison**

$\rightsquigarrow \textsc{height}(\text{L}) \geq \textsc{height}(\text{M})$

- Antonyms encode inequalities of different directions: e.g., *tall* vs. *short*.

(See Kennedy 2007 on crisp judgment; see Li 2023 on the felicity requirement in using *-er*/*more*)

English comparatives vs. Chinese comparatives

(13) a. Lucy is taller than Mary is. $\textsc{height}(\text{L}) > \textsc{height}(\text{M})$

b. Lèlè bǐ Mǐmǐ gāo.
Lèlè STDD Mǐmǐ taller
'Lèlè is taller than Mǐmǐ.' $\textsc{height}(\text{L}) > \textsc{height}(\text{M})$

(14) a. $[\![\text{Lucy is POS tall}]\!] \Leftrightarrow \textsc{height}(\text{Lucy}) \geq d^{c}_{\text{POS}}$ **Positive use**

b. $[\![\text{Lucy is } 5'8'' \text{ inches tall}]\!] \Leftrightarrow \textsc{height}(\text{Lucy}) \geq 5'8''$ **Measure**

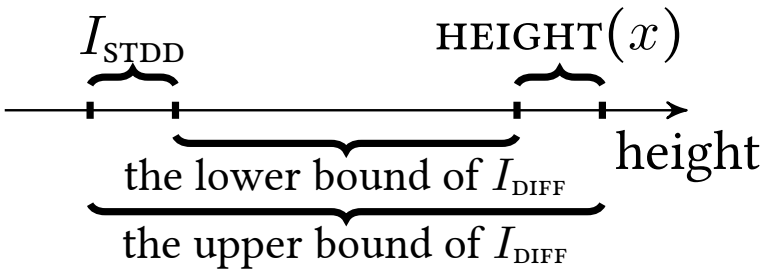
c. $[\![\text{how tall is Lucy}]\!] \Leftrightarrow \lambda d.\textsc{height}(\text{Lucy}) \geq d$ **Degree Q.**

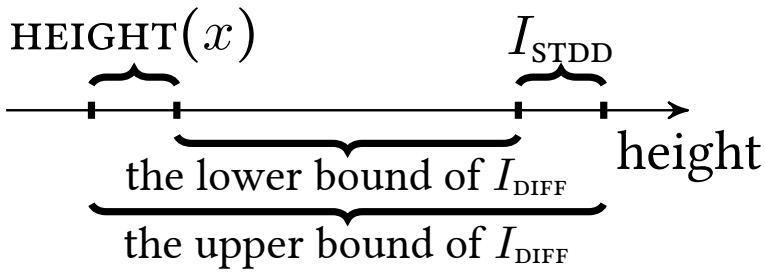
d. $[\![\text{Lucy is as tall as Bill (is)}]\!] \Leftrightarrow \textsc{height}(\text{Lucy}) \geq \textsc{height}(\text{Bill})$ **Equative**

e. $[\![\text{Lucy is taller than Mary (is)}]\!] \Leftrightarrow \textsc{height}(\text{L}) > \textsc{height}(\text{M})$ **Comparative**

- Zhang and Zhang (2024): **comparison is always performed by gradable adjectives**
  - English gradable adjectives encode a non-strict inequality, and with the use of *-er*/*more*, comparatives express a strict inequality.
  - Chinese gradable adjectives directly encode a strict inequality.

Lexical semantics of gradable adjective *tall*/*gāo*





The meaning of *tall*/*gāo* The meaning of *short*/*ǎi*

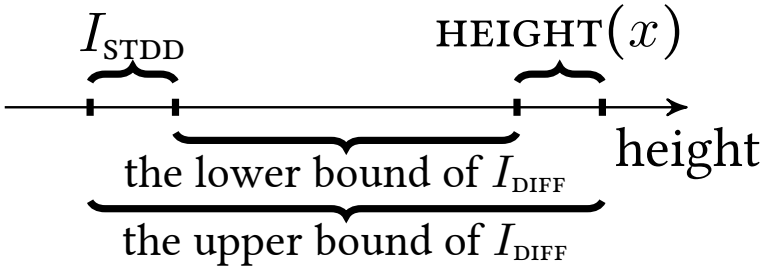
(15) $[\![\text{tall}]\!] \stackrel{\text{def}}{=} \lambda I_{\text{DIFF}}.\lambda I_{\text{STDD}}.\lambda x.\underbrace{I_{\text{DIFF}} \subseteq [0, +\infty)}_{\text{non-negative presup.}}.\ \text{HEIGHT}(x) \subseteq \iota I[I - I_{\text{STDD}} = I_{\text{DIFF}}]$ English

(i.e., the height of x reaches the comparison standard, I_{STDD}.
$\rightsquigarrow$ the difference between them, I_{DIFF}, is non-negative)

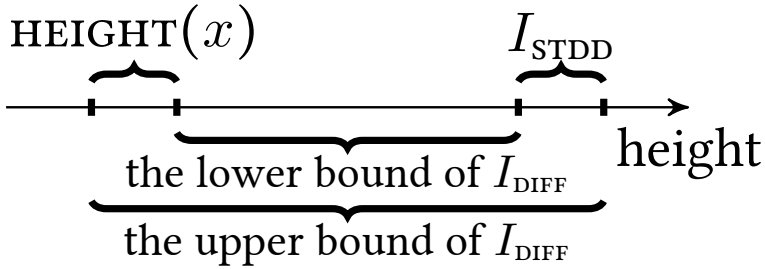
(16) $[\![\text{gāo}]\!] \stackrel{\text{def}}{=} \lambda I_{\text{DIFF}}.\lambda I_{\text{STDD}}.\lambda x.\underbrace{I_{\text{DIFF}} \subseteq (0, +\infty)}_{\text{positive presup.}}.\ \text{HEIGHT}(x) \subseteq \iota I[I - I_{\text{STDD}} = I_{\text{DIFF}}]$ Chinese

(i.e., the height of x exceeds the comparison standard, I_{STDD}.
$\rightsquigarrow$ the difference between them, I_{DIFF}, is positive)

Lexical semantics of gradable adjective *short/ǎi*



The meaning of *tall/gāo*



The meaning of *short/ǎi*

(17) $[\![\text{short}]\!] \stackrel{\text{def}}{=} \lambda I_{\text{DIFF}}.\lambda I_{\text{STDD}}.\lambda x.\underbrace{I_{\text{DIFF}} \subseteq [0, +\infty)}_{\text{non-negative presup.}}.\ \text{HGHT}(x) \subseteq \iota I[I_{\text{STDD}} - I = I_{\text{DIFF}}]$ English

(i.e., the height of x does not exceed the comparison standard, I_{STDD}.
$\rightsquigarrow$ the difference between them, I_{DIFF}, is non-negative)

(18) $[\![\text{ǎi}]\!] \stackrel{\text{def}}{=} \lambda I_{\text{DIFF}}.\lambda I_{\text{STDD}}.\lambda x.\underbrace{I_{\text{DIFF}} \subseteq (0, +\infty)}_{\text{positive presup.}}.\ \text{HEIGHT}(x) \subseteq \iota I[I_{\text{STDD}} - I = I_{\text{DIFF}}]$ Chinese

(i.e., the height of x is below / does not reach the comparison standard, I_{STDD}.
$\rightsquigarrow$ the difference between them, I_{DIFF}, is positive)

The positive use of gradable adjectives

- In the positive use, neither I_{STDD} nor I_{DIFF} is overtly uttered (though I_{DIFF} can be restricted by degree modifiers like *very*, *quite*, *a bit*, *extremely*). Thus the subtle truth-conditional difference between 'reaching a threshold' and 'exceeding a threshold' cannot be explicitly detected.

(19) $[\![\text{Lucy is POS tall}]\!]$ English

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq \iota I[I - \underbrace{[d^c_{\text{POS}}, d^c_{\text{POS}}]}_{I_{\text{STDD}}} = \underbrace{[0, +\infty)}_{I_{\text{DIFF}}}]$

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq [d^c_{\text{POS}}, +\infty)$

(i.e., the height of Lucy reaches the contextual threshold of being tall)

(20) $[\![\text{Lucy hěn POS gāo}]\!]$ Chinese

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq \iota I[I - \underbrace{[d^c_{\text{POS}}, d^c_{\text{POS}}]}_{I_{\text{STDD}}} = \underbrace{(0, +\infty)}_{I_{\text{DIFF}}}]$

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq (d^c_{\text{POS}}, +\infty)$

(i.e., the height of Lucy exceeds the contextual threshold of being tall)

Measurement sentences

- In measurement sentences, there is always a numerical expression specifying I_{DIFF}, leading to the same truth conditions for these sentences in English and Chinese.

(21) $[\![\text{Lucy is 5 feet 8 inches tall}]\!]$ English

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq \iota I[I - [0,0] = [5'8'', +\infty) \cap [0, +\infty)]$

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq [5'8'', +\infty)$

(22) $[\![\text{Lucy (yǒu) 1.7272 m gāo}]\!]$ Chinese

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq \iota I[I - [0,0] = [1.7272m + \infty) \cap (0, +\infty)]$

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq [1.7272m, +\infty)$

Comparatives

- English comparatives need the use of *-er*/*more* to turn a non-negative I_{DIFF} into a positive one, while in Chinese, I_{DIFF} is already positive by default.

(23) $[\![\text{Lucy is tall } \underbrace{\text{er}}_{(0,+\infty)} \underbrace{\text{than Mary is}}_{I_{\text{STDD}}}]\!]$

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq \iota I[I - \textsc{height}(\text{Mary}) = \underbrace{(0,+\infty)}_{[\![\text{er}]\!]} \cap [0,+\infty)]$

$\Leftrightarrow \textsc{height}(\text{Lucy}) \subseteq \iota I[I - \textsc{height}(\text{Mary}) = (0,+\infty)]$

(24) $[\![\text{Lèlè bǐ Mǐmǐ gāo}]\!]$

$\Leftrightarrow \textsc{height}(\text{Lèlè}) \subseteq \iota I[I - \textsc{height}(\text{Mǐmǐ}) = (0,+\infty)]$

Comparison in English vs. Chinese

- Within our proposed view,
  - For languages that require the use of *-er* in comparatives (e.g., English): gradable adjectives encode a non-strict inequality
    - ★ In terms of I_{DIFF}, there is a non-negative requirement
  - For languages that use the same form for the comparative and non-comparative uses (e.g., Chinese): gradable adjectives encode a strict inequality
    - ★ In terms of I_{DIFF}, there is a positive requirement

Outline

Observation 1: The optional presence of *gèng* in Chinese *bǐ* comparatives

(25) Lèlè bǐ Mǐmǐ (**gèng**) gāo.
Lèlè STDD Mǐmǐ tall
'Lèlè is taller than Mǐmǐ.'

- The presence of *gèng* is optional.
  - Some scholars (Liu 2010, Chen 2023) claim that the semantic contribution of *gèng* is similar to English *even*, and the above sentence means that Lèlè is even taller than Mǐmǐ, indicating that Mǐmǐ is already tall.
  - Others (e.g., Guo 2022) claim that there is no obvious meaning distinction between the sentence with vs. without *gèng*.

Observation 2: The obligatory vs. optional presence of *gèng* in comparatives without a *bǐ*-phrase

(26) Mǐmǐ hěn gāo. Lèlè **gèng** gāo.
Mǐmǐ very tall Lèlè tall
'Mǐmǐ is tall. Lèlè is taller.' the use of *gèng* is required.

(Some scholars (Liu 2010, Chen 2023) claim that the semantic contribution of *gèng* is similar to English *even*)

(27) Mǐmǐ bù gāo. Lèlè (**gèng**) gāo (yī-diǎn).
Mǐmǐ not tall Lèlè tall (a bit)
'Mǐmǐ is not tall. Lèlè is (a bit) taller.' the use of *gèng* is optional.

Others (e.g., Guo 2022) claim that there is no obvious meaning distinction between the sentence with vs. without *gèng*.

(28) a. Mary is tall. Lucy is (even) taller. (*even* is optional)
b. Mary is not tall. Lucy is *(even) taller. (*even* is forbidden)

The obligatory vs. optional presence of additive particles

- There might be other factors on the obligatory/optional presence of additive particles: e.g., wrt 'maximizing presupposition' (Heim 1991), different languages and different items in a language can vary.

(29) **English: *(an)other* is obligatorily required; *also* is optional**

a. *A girl came. A girl also came.
b. A girl came. Another girl (also) came. (*also*: optional)

(30) **Chinese: *(an)other* is optional; *again* is obligatory**

lái-le yí-gè rén, yòu lái-le (lìng)-yí-gè rén.
come-ASP one-CL person again come-ASP (other)-one-CL person

'A person came. Another person also came.'

- the obligatory absence of *even* in (28b) vs. the optional presence of *gèng* in (27))
  - *even* requires positive inference; the existence of positive inference does not require the presence of *even*
  - *gèng* does not require positive inference; a standard with positive inference requires the presence of *gèng*

Observation 3: The use of *gèng* is incompatible with numerical differentials

- The use of *gèng* is incompatible with numerical differentials (see Ma 2019, Zhang 2023).

(31) * Lèlè bǐ Mǐmǐ **gèng** gāo wǔ límǐ.
Lèlè STDD Mǐmǐ taller five cm
Intended: 'Lèlè is 5 cm taller than Mǐmǐ.'

(32) * (Mǐmǐ hěn gāo.) Lèlè **gèng** gāo wǔ límǐ.
Mǐmǐ very tall Lèlè tall
Intended: 'Mǐmǐ is tall. Lèlè is 5 cm taller.'

(33) * (Mǐmǐ bù gāo.) Lèlè **gèng** gāo wǔ límǐ.
Mǐmǐ not tall Lèlè tall (a bit)
Intended: 'Mǐmǐ is not tall. Lèlè is 5 cm taller.'

Observation 4: *gèng* also has an additive use

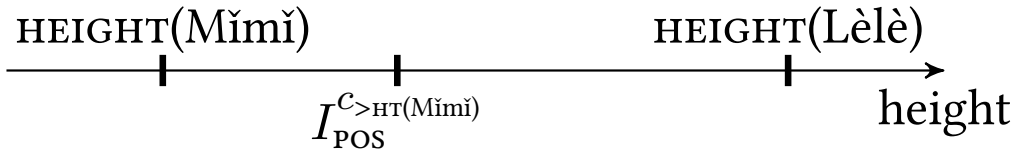
- *gèng* also has an additive use (see also Chen 2023):

(34) Jīnqián mǎi-bú-dào yǒu-yì, **gèng** mǎi-bú-dào àiqíng
money buy-NEG-get friendship MOREOVER buy-NEG-get love
'Money cannot buy friendship. Moreover, it cannot buy love.'

Summary of the empirical data

- The use of *gèng* in comparatives (Japanese *motto* is similar):
  - *gèng* does not require positive inference
  - a standard with positive inference requires / prefers the presence of *gèng*
  - The use of *gèng* is incompatible with numerical differentials.
- *gèng* also has an additive use.

Proposal: the semantic contribution of *gèng*



⟦Lèlè bǐ Mǐmǐ gèng gāo⟧: Compared to Mǐmǐ, Lèlè is tall.

- The use of *gèng* in a comparative is reminiscent of implicit comparison, involving an update of the threshold for the positive use.
- With the use of *gèng*, the use of a gradable adjective is a positive use.
- ⟦gèng⟧(p)
  - asserts the prejacent p
  - presupposes that the prejacent p and alternatives are associated with scalar values on a scale, and compared with alternatives, p exceeds a positive level that alternatives don't.

(35) a. Lèlè bǐ Mǐmǐ **gèng** gāo.
Lèlè STDD Mǐmǐ MOREOVER tall
'Lèlè is taller than Mǐmǐ.'

b. Compared to Mǐmǐ, Lèlè is tall. **Implicit comparison**
⇝ Lèlè's height reaches a threshold that Mǐmǐ's height doesn't.

Proposal: the semantic contribution of *gèng*

Compared to friendship, love is more precious.

- The additive use of *gèng* involves a contextually salient scale, and the prejacent and its alternatives are mapped onto this scale (see also the meaning of *even* in Greenberg 2018, Zhang 2022).

(36) a. Jīnqián mǎi-bú-dào yǒu-yì, **gèng** mǎi-bú-dào àiqíng
money buy-NEG-get friendship MOREOVER buy-NEG-get love
'Money cannot buy friendship. Moreover, it cannot buy love.'

b. Money cannot buy friendship. **Moreover**, it cannot buy love.
$\rightsquigarrow$ The preciousness of love reaches a threshold that the preciousness of friendship doesn't.

How the empirical data are accounted for

- The use of *gèng* in comparatives:
  With the use of *gèng*, the sentence is no longer a genuine comparative, but rather like an **implicit comparison** in English, i.e., a positive use
  - *gèng* does not require positive inference
    With an update of the threshold, a previous threshold becomes obsolete anyway.
  - a standard with positive inference requires / prefers the presence of *gèng*
    An update of the threshold relies on the presence of *gèng*
  - The use of *gèng* is incompatible with numerical differentials.
    A *gèng*-sentence is a positive use, not a genuine comparative.
- *gèng* also has an additive use.
  Just like in the use of *even*, the use of *gèng* maps entities / events onto a salient scale.

Outline

Contrast 1: metaphorical / hyperbolic use

- Only the use of *hái*, but not the use of *gèng*, is felicitous for a comparison with metaphorical or hyperbolic meaning.

(37) a. Lèlè bǐ shīzi **hái** yǒnggǎn.
Lèlè STDD lion STILL brave
'Lèlè is even braver than lions.'

b. #Lèlè bǐ shīzi **gèng** yǒnggǎn.
Lèlè STDD lion MOREOVER brave
Intended: 'Lèlè is braver than lions.'
(According to the proposal on *gèng*, this sentence means 'compared to lions, Lèlè is brave.' $\rightsquigarrow$ there is a threshold of courage such that Lèlè's courage reaches, but lions don't)

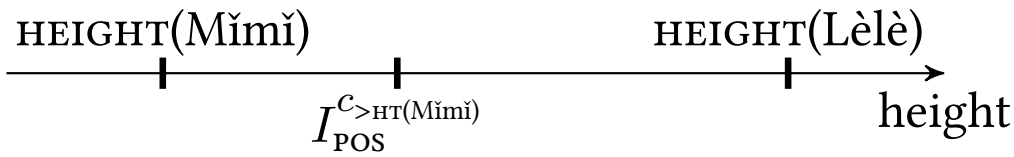
Contrast 2: the compatibility with a numerical differential in the comparison

- Only the use of *hái*, but not the use of *gèng*, is compatible with the presence of a numerical differential (Ma 2019).

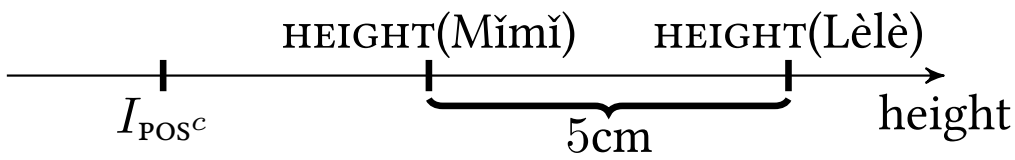
(38) a. Lèlè bǐ Mǐmǐ **hái** gāo wǔ límǐ.
Lèlè COMPARED-TO Mǐmǐ STILL tall five centemeter

b. * Lèlè bǐ Mǐmǐ **gèng** gāo wǔ límǐ.
Lèlè COMPARED-TO Mǐmǐ MOREOVER tall five centemeter
Intended: 'Lèlè is 5cm taller than Mimǐ.'

Chinese *gèng* vs. Chinese *hái*



⟦Lèlè bǐ Mǐmǐ gèng gāo⟧: Compared to Mǐmǐ, Lèlè is tall.



⟦Lèlè bǐ Mǐmǐ hái gāo (5cm)⟧: Lèlè is even (5 cm) taller than Mǐmǐ.

(39) Lèlè bǐ Mǐmǐ$_F$ hái gèng gāo.
Lèlè COMPARED-TO Mǐmǐ EVEN_{CH2} EVEN_{CH1} tall/taller
roughly meaning 'Even compared with Mǐmǐ, Lèlè is tall.'
(implicit comparison + the use of *even*)

Wrt whether there is an end point

- Neither *gèng* nor *hài* involves an end point.

(40) yì shān **gèng/hái** bǐ yì shān gāo.
one mountain MOREOVER/STILL STDD one mountain tall
'For every mountain, there is a taller one.'

Outline

Summary of today's discussion

- Cross-linguistically, additive particles like Chinese *gèng* and *hái* are often translated as English *even*, they are actually different from *even*.

What we have done in this course

- Conceptually,
  - What are scales?
    What are their formal properties?
    What mathematical operations do they support?
  - What is additivity?
- Empirically,
  - How does an additivity-based perspective improve our understanding of scalarity-related phenomena (e.g., comparatives)?
  - How does a scalarity-based perspective improve our understanding of additivity-related phenomena (e.g., *even* and other additive particles)?
- Featured empirical phenomena:
  - Various uses of gradable adjectives
  - Variations of comparatives
  - *-er*/*more* and additive particles like *another*
  - *Even*-like particles

Take-home messages of this course

- Scalarity and additivity are highly related and should be studied together.
  - QUD provides a unified perspective on scalarity and additivity.
    $\rightsquigarrow$ towards a higher value / informativeness along a scale (in addressing a degree QUD)
- There is a large family of cross-linguistic phenomena worth further investigation.
  - To account for cross-linguistic variation, we need to consider parameters both at the language level and at a more fine-grained construction level.

Thank you!

For the slides of this ESSLLI course, please see

https://ling.auf.net/lingbuzz/008297
https://ling.auf.net/lingbuzz/008301
https://ling.auf.net/lingbuzz/008302
https://ling.auf.net/lingbuzz/008305
https://ling.auf.net/lingbuzz/

Questions and puzzles cannot be more welcome!

zhanglinmin@gmail.com

Selected references I

Chen, Zhuang. 2023. Associating with covert focus. In *The Workshop on Theoretical East Asian Linguistics*, volume 13. https://sites.google.com/ntnueng.tw/teal13/program/program-day-2.

Greenberg, Yael. 2018. A revised, gradability-based semantics for even. *Natural Language Semantics* 26:51–83. https://doi.org/10.1007/s11050-017-9140-0.

Guo, Rui. 2022. The semantic analysis of adverbs "HAI" and "DOU" in Chinese comparative constructions. *Journal of Shanxi University (Philosophy & Social Science)* 45:62–72. https://doi.org/10.13451/j.cnki.shanxi.univ(phil.soc.).2022.05.007.

Heim, Irene. 1991. Artikel und definitheit. In *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, ed. Arnim von Stechow and Dieter Wunderlich, 487–535. de Gruyter. https://doi.org/10.1515/9783110126969.

Kehler, Andrew. 2002. *Coherence, reference, and the theory of grammar*. CSLI publications Stanford, CA.

Kennedy, Christopher. 2007. Modes of comparison. In *Chicago Linguistic Society*, volume 43, 139–163. https://semantics.uchicago.edu/kennedy/classes/w11/comparatives/docs/kennedy07.pdf.

Li, Ang. 2023. Comparing alternatives. Doctoral Dissertation, Rutgers University. https://doi.org/10.7282/t3-gkqz-6152.

Liu, Chen-Sheng Luther. 2010. The Chinese *geng* clausal comparative. *Lingua* 120:1579–1606. https://doi.org/10.1016/j.lingua.2009.09.005.

Ma, Zhen. 2019. *20 lectures on function words in Modern Chinese*. Shanghai: The Commercial Press.

Roberts, Craige. 1996/2012. Information structure: Towards an integrated formal theory of pragmatics. *Semantics and pragmatics* 5:6:1–69. https://doi.org/10.3765/sp.5.6.

Selected references II

Umbach, Carla. 2009. Comparatives combined with additive particles: The case of German *noch*. In *Sinn und Bedeutung*, volume 13(2), 543–558. https://doi.org/10.18148/sub/2009.v13i2.571.

Zhang, Linmin. 2022. The presupposition of *even*. In *Semantics and Linguistic Theory*, volume 32, 249–269. https://doi.org/10.3765/salt.v1i0.5355.

Zhang, Linmin. 2023. Degree expressions in Chinese. In *Oxford research encyclopedia of linguistics*. Oxford University Press. https://doi.org/10.1093/acrefore/9780199384655.013.906.

Zhang, Linmin, and Florence Zhang. 2024. Comparative morphemes are additive particles: English *-er*/*more* vs. Chinese *gèng*. https://ling.auf.net/lingbuzz/008122, manuscript.