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

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# 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 <u>gèng</u>    gāo.
             Lucy COMPARED-TO Mary $\text{EVEN}_{\text{CH1}}$ tall/taller

    b.    Lucy bǐ            Mary <u>hái</u>     gāo.
             Lucy COMPARED-TO Mary $\text{EVEN}_{\text{CH2}}$ tall/taller

    c.    Lucy bǐ            Mary <u>dōu</u>    gāo.
             Lucy COMPARED-TO Mary $\text{EVEN}_{\text{CH3}}$ 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   <u>noch</u>   größer als   Adam.
Berta be.3SG EVEN<sub>GE</sub> tall-er than Adam

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

- Umbach's comment: the counterpart of *even* in German is *sogar*; *noch* is like *still*, *further*.

# 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: *gèng*

- 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)
  - ‣ reminiscent of English implicit comparison
  - ‣ *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.  $[\![$Lucy is POS tall$]\!] \Leftrightarrow$ HEIGHT(Lucy)$\geq d^c{}_{\text{POS}}$

**Positive use**

b.  $[\![$Lucy is $5'8''$ inches tall$]\!] \Leftrightarrow$ HEIGHT(Lucy)$\geq 5'8''$ **Measure**

c.  $[\![$how tall is Lucy$]\!] \Leftrightarrow \lambda d.$HEIGHT(Lucy)$\geq d$ **Degree Q.**

d.  $[\![$Lucy is as tall as Bill (is)$]\!] \Leftrightarrow$ HEIGHT(Lucy)$\geq$HEIGHT(Bill)

**Equative**

e.  $[\![$Lucy is taller than Mary (is)$]\!] \Leftrightarrow$ HEIGHT(L)$>$HEIGHT(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. <u>Lucy is tall.</u>     $\leadsto$ HEIGHT(Lucy) $\geq d^c{}_{POS}$
      b.   Mary is not tall. <u>Lucy is taller.</u>    $\leadsto$ HEIGHT(L) $\geq$ HEIGHT(M)

(12)  a.   Compared to Mary, <u>Lucy is tall.</u>      **Implicit comparison**
        $\leadsto$ HEIGHT(Lucy) $\geq d^c{}_{POS}$ (which is above HEIGHT(M), HEIGHT(M) contributes to establish the threshold here)
      b.   Compared to Mary, <u>Lucy is taller.</u>      **Explicit comparison**
                       $\leadsto$ HEIGHT(L) $\geq$ HEIGHT(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*; see Sawada 2009 on implicit comparison)

# English comparatives vs. Chinese comparatives

(13)  a.  Lucy is **tall**er than Mary is.                    HEIGHT(L)>HEIGHT(M)
      b.  Lèlè bǐ     Mǐmǐ **gāo**.
          Lèlè STDD Mǐmǐ taller
          'Lèlè is taller than Mǐmǐ.'                         HEIGHT(L)>HEIGHT(M)

(14)  a.  ⟦Lucy is POS tall⟧ ⇔ HEIGHT(Lucy)$\geq d^c_{POS}$
                                                              **Positive use**
      b.  ⟦Lucy is $5'8''$ inches tall⟧ ⇔ HEIGHT(Lucy)$\geq 5'8''$   **Measure**
      c.  ⟦how tall is Lucy⟧ ⇔ $\lambda d$.HEIGHT(Lucy)$\geq d$    **Degree Q.**
      d.  ⟦Lucy is as tall as Bill (is)⟧ ⇔ HEIGHT(Lucy)$\geq$HEIGHT(Bill)
                                                              **Equative**
      e.  ⟦Lucy is taller than Mary (is)⟧ ⇔ HEIGHT(L)>HEIGHT(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*
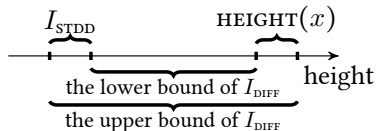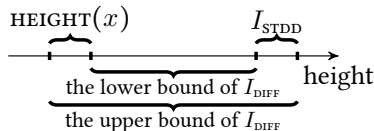


The meaning of *tall/gāo*          The meaning of *short/ǎi*

(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

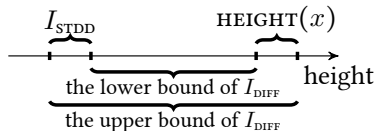(i.e., the height of $x$ reaches the comparison standard, $I_{\text{STDD}}$.
$\rightsquigarrow$ the difference between them, $I_{\text{DIFF}}$, is non-negative)

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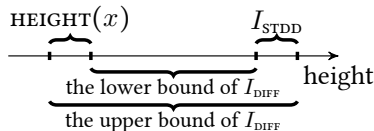
(i.e., the height of $x$ exceeds the comparison standard, $I_{\text{STDD}}$.
$\rightsquigarrow$ the difference between them, $I_{\text{DIFF}}$, is positive)

# Lexical semantics of gradable adjective *short*/*ǎi*



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

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

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

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

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

# The positive use of gradable adjectives

- In the positive use, neither $I_{\text{STDD}}$ nor $I_{\text{DIFF}}$ is overtly uttered (though $I_{\text{DIFF}}$ 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) ⟦Lucy is POS tall⟧         English

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

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

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

(20) ⟦Lucy hěn POS gāo⟧         Chinese

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

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

(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 $I_{\text{DIFF}}$, leading to the same truth conditions for these sentences in English and Chinese.

(21)  ⟦Lucy is 5 feet 8 inches tall⟧  <span style="float:right">English</span>
$\Leftrightarrow \text{HEIGHT}(\text{Lucy}) \subseteq \iota I[I - [0,0] = [5'8'', +\infty) \cap [0, +\infty)]$
$\Leftrightarrow \text{HEIGHT}(\text{Lucy}) \subseteq [5'8'', +\infty)$

(22)  ⟦Lucy (yǒu) 1.7272 m gāo⟧  <span style="float:right">Chinese</span>
$\Leftrightarrow \text{HEIGHT}(\text{Lucy}) \subseteq \iota I[I - [0,0] = [1.7272m + \infty) \cap (0, +\infty)]$
$\Leftrightarrow \text{HEIGHT}(\text{Lucy}) \subseteq [1.7272m, +\infty)$

# Comparatives

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

(23)  $[\![$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)  $[\![$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 $I_{\text{DIFF}}$, 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 $I_{\text{DIFF}}$, 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*
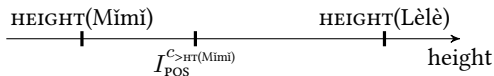


$[\![$ Lèlè bǐ Mǐmǐ gèng gāo $]\!]$: Compared to Mǐmǐ, Lèlè is tall.

(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**
           $\rightsquigarrow$ Lèlè's height reaches a threshold that Mǐmǐ's height doesn't.

- The use of *gèng* in a comparative is reminiscent of implicit comparison, involving an update of the threshold for the positive use (see Barker 2002). With the use of *gèng*, a gradable adjective has 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.*

# Proposal: the semantic contribution of *gèng*



PRICE(friendship) ... $I_{\text{POS}}^{c > \text{PRICE(friendship)}}$ ... PRICE(love) ... price

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 / out-of-context threshold becomes obsolete anyway.
  - a standard with positive inference requires / prefers the presence of *gèng*
    An update of the threshold (to a higher 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.' ⤳ 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 Mǐmǐ.'

# Chinese *gèng* vs. Chinese *hái*
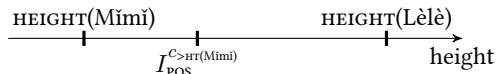


$[\![$Lèlè bǐ Mǐmǐ gèng gāo$]\!]$: Compared to Mǐmǐ, Lèlè is tall.
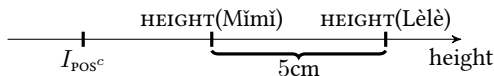


$[\![$Lèlè bǐ Mǐmǐ hái gāo (5cm)$]\!]$: Lèlè is even (5 cm) taller than Mǐmǐ.

(39)  Lèlè bǐ       Mǐmǐ$_F$ <u>hái</u>   <u>gèng</u>  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.'

       a.     With the use of *gèng*, there is a series of updates of thresholds.
       b.     With the use of *hài*, there is a series of increases.

# Outline

# Summary of today's discussion

- Additive particles like Chinese *gèng* and *hái* are often translated as English *even*, but these particles are not exactly the same.

| | *even* | *gèng* | *hái* |
|---|---|---|---|
| involving a comparative or a positive use? | comp | positive | comp |
| compatible with numerical differentials? | (yes) | no | yes |
| positive inference for the comparison standard or not? | yes | no | yes |
| involving a contextually salient scale for an additive use? | yes | yes | yes |
| involving a temporal scale for a temporal use? | no | no | yes |
| involving an end point? | yes | no | no |
| ... | | | |

- *even*: signaling maximal informativeness (with a degree exceeding the positive threshold) in addressing a contextual degree QUD
  - invoking a contextually salient scale (wrt the degree QUD)
- *hái*: marking an increase that leads to a higher level of informativeness
  - increases are in the domains of entities, events, differences along a scale
- *gèng*: marking an update of the threshold (above alternatives)
  - working with an explicit gradable expression or invoking a scale

# 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: English *even*, Chinese *gèng*, Chinese *hái*

# 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.
    ⤳ 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://lingbuzz.net/lingbuzz/008312

# Questions and puzzles cannot be more welcome!

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