

Comparative morphemes are additive particles: English *-er/more* vs. Chinese *gèng*

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Incremental constructions within and across languages
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For the manuscript of this project, please see
<https://ling.auf.net/lingbuzz/008122>

What are morphemes like English *-er/more* doing?

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

- (1) a. Lucy is **tall**. Positive: **tall**
b. Lucy is **taller** than Mary is. Comparative: **taller**
- (2) a. Lucy has **many** books. Positive: **many**
b. Lucy has **more** books than Mary does. Comp.: **more**
- (3) **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'

What are morphemes like English *-er/more* doing?

- However, many other languages (e.g., Chinese, Japanese) don't make a distinction between the comparative vs. non-comparative use:

(4) 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'

(5) 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'

Research questions

- Does the meaning of comparison hinge on morphemes like *-er/more*?
- If not,
 - What lexical items are responsible for comparison?
 - Then what does *-er/more* do?
- How about languages like Chinese and Japanese?

Take-home messages

- Does the meaning of comparison hinge on morphemes like *-er/more*?
 - No.
- What lexical items are responsible for comparison?
 - Gradable adjectives, which encode (strict or non-strict) inequalities
- What does *-er/more* do?
 - They are additive particles like *another*, denoting an increase anaphoric to a contextually salient base item.
- How about languages like Chinese and Japanese?
 - In these languages, gradable adjectives encode inequalities in a strict way, making the use of an *-er*-like morpheme unnecessary.
 - These languages have optional morphemes:
Chinese *gèng* and Japanese *motto* work like additive particle *moreover*, indicating a threshold with enhanced positiveness for the positive use of gradable adjectives.

Outline

- 1 Comparison and the meaning of gradable adjectives
- 2 Comparisons in English vs. Chinese
- 3 English *-er/more*
- 4 Chinese *gèng*
- 5 Concluding remarks

Canonical analysis: *-er/more* performs comparison

- A gradable adjective relates a degree and an entity.

(6) $\llbracket \text{tall} \rrbracket_{\langle d, et \rangle} \stackrel{\text{def}}{=} \lambda d. \lambda x. \text{HEIGHT}(x) \geq d$ a relation between d and x
 \leadsto the height of x reaches the degree d , i.e., x is tall to degree d

- Major non-comparative uses of gradable adjectives:

(7) $\llbracket \text{Lucy is POS tall} \rrbracket \Leftrightarrow \text{HEIGHT}(\text{Lucy}) \geq d_{\text{POS}}^c$ Positive use
(i.e., the height of Lucy reaches the contextual threshold of being tall.)

(8) $\llbracket \text{Lucy is 5 feet 8 inches tall} \rrbracket \Leftrightarrow \text{HEIGHT}(\text{Lucy}) \geq 5'8''$ Measure

(9) $\llbracket \text{how tall is Lucy} \rrbracket \Leftrightarrow \lambda d. \text{HEIGHT}(\text{Lucy}) \geq d$ Degree question

(e.g., Cresswell 1976, Hellan 1981, von Stechow 1984, Heim 1985, Kennedy 1999, Beck 2011)

Canonical analysis: *-er/more* performs comparison

- **Comparative morpheme** *-er/more* performs comparison by expressing the relation ‘>’ between two degrees.

(10) a. $\llbracket \text{-er} \rrbracket_{\langle \langle dt \rangle, \langle dt, t \rangle \rangle} \stackrel{\text{def}}{=} \lambda D_1. \lambda D_2. \text{MAX}(D_2) > \text{MAX}(D_1)$
($\text{MAX} \stackrel{\text{def}}{=} \lambda D. \lambda d [d \in D \wedge \forall d' [d' \in D \rightarrow d' \leq d]]$)
(see e.g., Beck 2011)

b. $\llbracket \text{-er} \rrbracket_{\langle \langle dt \rangle, \langle dt, t \rangle \rangle} \stackrel{\text{def}}{=} \lambda D_1. \lambda D_2. \exists d [d \in D_2 \wedge d \notin D_1]$
(see e.g., Schwarzschild 2008)

(11) $\llbracket \text{Lucy is taller than Mary is tall} \rrbracket \Leftrightarrow \text{HEIGHT}(L) > \text{HEIGHT}(M)$
 $\underbrace{\hspace{10em}}$
comparison standard

LF: $[\text{-er} [\lambda d. \text{Mary is } d\text{-tall}]] [\lambda d'. \text{Lucy is } d'\text{-tall}]$

(i.e., lambda abstraction happens at both the matrix and the *than*-clause, leading to two sets of degrees)

- However, there are empirical challenges ...

The use of *-er/more* is not always required for comparison

- All uses of gradable adjectives involve comparison, but the use of *-er/more* is not always required.

I.e., *-er/more* is not a necessary component of comparison.

(12) a. $\llbracket \text{Lucy is POS tall} \rrbracket \Leftrightarrow \text{HEIGHT}(\text{Lucy}) \geq d^c_{\text{POS}}$

Positive use

b. $\llbracket \text{Lucy is 5'8'' inches tall} \rrbracket \Leftrightarrow \text{HEIGHT}(\text{Lucy}) \geq 5'8''$ **Measure**

c. $\llbracket \text{how tall is Lucy} \rrbracket \Leftrightarrow \lambda d. \text{HEIGHT}(\text{Lucy}) \geq d$ **Degree Q.**

d. $\llbracket \text{Lucy is as tall as Bill (is)} \rrbracket \Leftrightarrow \text{HEIGHT}(\text{Lucy}) \geq \text{HEIGHT}(\text{Bill})$
Equative

e. $\llbracket \text{Lucy is taller than Mary (is)} \rrbracket \Leftrightarrow \text{HEIGHT}(\text{L}) > \text{HEIGHT}(\text{M})$
Comparative

Minimal pairs

- 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.

- (13) a. Mary is not tall. Lucy is POS tall. $\leadsto \text{HEIGHT}(\text{Lucy}) \geq d_{\text{POS}}^c$
b. Mary is not tall. Lucy is taller. $\leadsto \text{HEIGHT}(L) \geq \text{HEIGHT}(M)$
- (14) a. Compared to Mary, Lucy is tall. **Implicit comparison**
 $\leadsto \text{HEIGHT}(\text{Lucy}) \geq d_{\text{POS}}^c$
(i) Compared to 2-year-old toddlers, Lucy is tall.
(ii) (Even) compared to professional basketball players, Lucy is tall.
- b. Compared to Mary, Lucy is taller. **Explicit comparison**
 $\leadsto \text{HEIGHT}(L) \geq \text{HEIGHT}(M)$

(See Kennedy 2007 on crisp judgment)

Antonyms

- The lexical meaning of gradable adjectives includes already inequalities, and antonyms encode inequalities of different directions.

- (15) a. $\llbracket \text{tall} \rrbracket_{\langle d, et \rangle} \stackrel{\text{def}}{=} \lambda d. \lambda x. \text{HEIGHT}(x) \geq d$
b. $\llbracket \text{short} \rrbracket_{\langle d, et \rangle} \stackrel{\text{def}}{=} \lambda d. \lambda x. \text{HEIGHT}(x) \leq d$

Interim summary

- The essence of comparison is to establish inequalities.
- The lexical semantics of gradable adjectives already contains inequalities.
- Naturally, expressing the meaning of comparison should essentially be based on the meaning of gradable adjectives, not necessarily involving *-er/more*.

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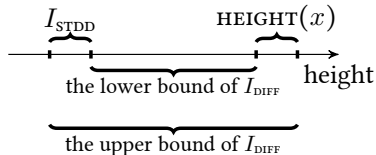
English comparatives vs. Chinese comparatives

- (16) a. Lucy is taller than Mary is. $\text{HEIGHT}(L) > \text{HEIGHT}(M)$
b. Lèlè bǐ Mǐmǐ gāo.
Lèlè STDD Mǐmǐ taller
'Lèlè is taller than Mǐmǐ.' $\text{HEIGHT}(L) > \text{HEIGHT}(M)$

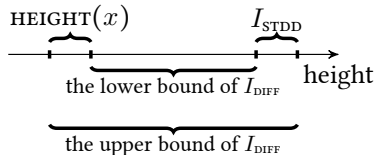
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Positive use
b. $\llbracket \text{Lucy is } 5'8'' \text{ inches tall} \rrbracket \Leftrightarrow \text{HEIGHT}(\text{Lucy}) \geq 5'8''$ Measure
c. $\llbracket \text{how tall is Lucy} \rrbracket \Leftrightarrow \lambda d. \text{HEIGHT}(\text{Lucy}) \geq d$ Degree Q.
d. $\llbracket \text{Lucy is as tall as Bill (is)} \rrbracket \Leftrightarrow \text{HEIGHT}(\text{Lucy}) \geq \text{HEIGHT}(\text{Bill})$
Equative
e. $\llbracket \text{Lucy is taller than Mary (is)} \rrbracket \Leftrightarrow \text{HEIGHT}(L) > \text{HEIGHT}(M)$
Comparative

- Our proposal on the meaning of 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*

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

(i.e., the height of x **reaches** the comparison standard, I_{STDD} .)

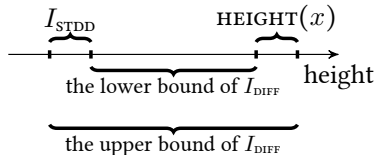
\leadsto the difference between them, I_{DIFF} , is **non-negative**)

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

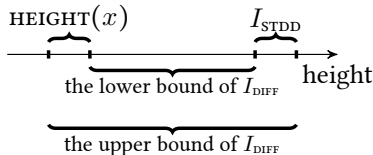
(i.e., the height of x **exceeds** the comparison standard, I_{STDD} .)

\leadsto 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*

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

(i.e., the height of x **does not exceed** the comparison standard, I_{STDD} .)

↪ the difference between them, I_{DIFF} , is **non-negative**)

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

(i.e., the height of x **is below / does not reach** the comparison standard, I_{STDD} .)

↪ the difference between them, I_{DIFF} , is **positive**)

The positive use of gradable adjectives

- In the **positive** use,
 - ▶ the comparison **standard** is **the contextual threshold**
 - ▶ the **difference** cannot be specified by a numerical value, but can be modified by modifiers like *very*, *quite*, etc.

(21) [[Lucy is POS tall]] English

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

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

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

(22) [[Lucy hěn POS gāo]] Chinese

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

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

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

Measurement sentences

- In measurement sentences,
 - ▶ the comparison standard is the absolute zero point, i.e., $[0, 0]$
 - ▶ the difference is specified by a numerical value, e.g., $5'8''$, $1.7m$.

(23) [[Lucy is 5 feet 8 inches tall]]

English

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

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

(24) [[Lucy (yǒu) 1.7 m gāo]]

Chinese

$$\Leftrightarrow \text{HEIGHT}(\text{Lucy}) \subseteq \iota I [I - [0, 0] = [1.7m + \infty) \cap (0, +\infty)]$$

$$\Leftrightarrow \text{HEIGHT}(\text{Lucy}) \subseteq [1.7m, +\infty)$$

Comparatives

- In comparatives,
 - ▶ the comparison **standard** is from the meaning of the *than*-clause (or context)
 - ▶ the **difference** can be optionally specified by a numerical value, e.g., 3'', 5cm.

$$(25) \quad \llbracket \text{Lucy is tall } \underbrace{\text{er}}_{(0, +\infty)} \underbrace{\text{than Mary is}}_{I_{\text{STDD}}} \rrbracket$$
$$\Leftrightarrow \text{HEIGHT}(\text{Lucy}) \subseteq \iota I [I - \text{HEIGHT}(\text{Mary}) = \underbrace{(0, +\infty)}_{\llbracket \text{er} \rrbracket} \cap [0, +\infty)]$$
$$\Leftrightarrow \text{HEIGHT}(\text{Lucy}) \subseteq \iota I [I - \text{HEIGHT}(\text{Mary}) = (0, +\infty)]$$

$$(26) \quad \llbracket \text{Lèlè bǐ Mímǐ gāo} \rrbracket$$
$$\Leftrightarrow \text{HEIGHT}(\text{Lèlè}) \subseteq \iota I [I - \text{HEIGHT}(\text{Mímǐ}) = (0, +\infty)]$$

Comparison in English vs. Chinese

- Within our proposed view, comparison is universally conducted by gradable adjectives
 - For languages that require the use of *-er* in comparatives (e.g., English): gradable adjectives encode a non-strict inequality (In terms of degrees: ' \geq '; in terms of intervals: ' $[0, +\infty)$ ')
 - 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 degrees: ' $>$ '; in terms of intervals: ' $(0, +\infty)$ ')

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Parallelism between *-er/more* and *another*

- *-er/more* has an **additive use** similar to *another* (see also Greenberg 2010 and Thomas 2010):

(27) Increase in the domain of entities: Additive use

- a. I ate an^x apple. Then I ate another^y (apple).
- b. A^x girl, Sue, met another^y girl, Mary.
- c. I ate two^x bars of chocolate. Then I ate (a bit) more^y.
- Labels in the diagram:
- Blue brackets under "an^x apple" and "two^x bars of chocolate" are labeled "base item".
- Red brackets under "another^y (apple)", "another^y girl", and "(a bit) more^y" are labeled "increase".

From the additive use to the comparative use of *-er/more*

- Additive use of *more*: in the domain of entities
- Comparative use of *-er/more*: in the domain of scalar values (i.e., degrees or intervals)

(27c) Increase in the domain of entities: Additive use

I ate two^x bars of chocolate. Then I ate (a bit) more^y.

base item increase

(28) Increase in the domain of scalar values: Comparative use

a. Mary is tall. Sue is tall er. Across sentences

base item: HEIGHT(Mary) increase

b. Sue is tall er than Mary is tall. Within the same sentence

increase base item:
HEIGHT(Mary)

More uses of *-er/more* and *another*

- *-er/more* and *another*

- ▶ denotes an increase in the domain of entities or scalar values
- ▶ presuppose there is a salient base that the increase is anaphoric to

(29) **Repetitive use of *-er/more* and *another***

- Lucy is becoming taller and taller and taller.
- Janice had a little lamb and another and another and another.

(30) **Accumulating increases along with a universal quantifier**

- Every year Mary wrote a more interesting book.
- Everyday there is another story to write.

The anaphoricity of *-er/more*

- **Additivity** should be considered a phenomenon of **QUD-based anaphoricity**, indicating an extension of a previous salient answer in addressing the QUD
 - ▶ For the **additive use** in the domain of entities, *more / another* indicates an **increase from a part to a whole**.
 - ▶ For the **comparative use** in the domain of scalar values, *-er/more* indicates an **increase from a lower to a higher scalar value**.

(31) Additive use of *more*

Current question (CQ): What did you eat?

- a. I ate two bars of chocolate. Then I ate (a bit) more.
- base item:
a partial answer to the CQ
- increase
- b. #I didn't eat a bar of chocolate. Then I ate more.

(e.g., Roberts 1996/2012, Zeevat 2004, Zeevat and Jasinskaja 2007, Beaver and Clark 2009, Thomas 2011, Zhang and Ling 2021)

The anaphoricity of *-er/more*

- **Additivity** should be considered a phenomenon of **QUD-based anaphoricity**, indicating an extension of a previous salient answer in addressing the QUD
 - ▶ For the **additive use** in the domain of entities, *more / another* indicates an **increase from a part to a whole**.
 - ▶ For the **comparative use** in the domain of scalar values, *-er/more* indicates an **increase from a lower to a higher scalar value**.

(32) Comparative use of *-er/more*

Current question (CQ): How tall is Sue?

Mary is not tall. Sue is tall **er** .

base item – a partial answer
to the CQ: HEIGHT(Mary)

er
increase

(e.g., Roberts 1996/2012, Zeevat 2004, Zeevat and Jasinskaja 2007, Beaver and Clark 2009, Thomas 2011, Zhang and Ling 2021)

The semantics of English *-er/more*

- The semantics of English *-er/more* is **not responsible for comparison**.
- English *-er/more* is similar to *another* in being an **additive particle**, denoting an **increase on a discourse-salient base**.

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The optional presence of *gèng* in Chinese comparatives

(33) Lèlè bǐ Mímǐ (*gèng*) gāo.
Lèlè STDD Mímǐ MOREOVER tall
'Lèlè is taller than Mímǐ.'

- 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 Mímǐ, indicating that Mímǐ is already tall.
 - ▶ Others (e.g., [Guo 2022](#)) claim that there is no obvious meaning distinction between the sentence with vs. without *gèng*.

What is special about *gèng*

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

(34) * Lèlè bǐ Mímǐ **gèng** gāo wǔ límǐ.
Lèlè STDD Mímǐ MOREOVER taller five cm
Intended: ‘Lèlè is 5 cm taller than Mímǐ.’

- *gèng* also has an additive use:

(35) Jinqián 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.’ ~→
Love exceeds friendship in being unable to be bought with money.

More observations on Chinese *gèng*

- The use of *gèng* is reminiscent of **implicit comparison** and the use of *moreover*.

- (36) 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.
- (37) 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.**
↪ The preciousness of love reaches a threshold that the preciousness of friendship doesn't.

Chinese *gèng* is also an additive particle

- Our proposal:
 - ▶ With the use of *gèng*, the use of a gradable adjective is essentially a **positive use** (like the one in **implicit comparison**).
 - ★ Thus the use of *gèng* is never compatible with numerical differentials.
- $\llbracket \text{gèng} / \text{moreover} \rrbracket (p)$
 - ▶ 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**.

- (36) 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.
- (37b) **Money cannot buy friendship. Moreover, it cannot buy love.**

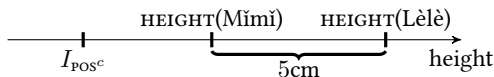
Comparison can be compatible with various additive particles

- The use of *-er/more* in English **comparatives** is similar to the use of *another*.
- The use of **Chinese *gèng*** is similar to English *moreover*, making the **positive use** of a gradable adjective like **implicit comparison**.
- How about other particles?

Chinese *gèng* vs. Chinese *hái*



[[Lèlè bǐ Mímǐ *gèng* gāo]]: Compared to Mímǐ, Lèlè is tall.



[[Lèlè bǐ Mímǐ *hái* gāo (5cm)]]: Lèlè is even (5 cm) taller than Mímǐ.

- Presumably, the semantics of Chinese *hái* is similar to English *even* (see [Greenberg 2018](#), [Zhang 2022](#) for a scalarity-based view on *even*).

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Concluding remarks

- **Comparison / inequality** is universally conducted by **gradable adjectives**, which encode (strict or non-strict) inequalities.
 - **English gradable adjectives** encode a **non-strict** inequality.
 - **Chinese gradable adjectives** encode a **strict** inequality, making it unnecessary to use an *-er*-like morpheme in comparatives.
- **English morpheme *-er/more*** is an additive particle like *another*, denoting an **increase** anaphoric to a contextually salient base item.
- Languages like Chinese also have optional morphemes in comparatives.
 - In particular, **Chinese *gèng*** works like additive particle *moreover*, indicating a threshold with enhanced positiveness for the **positive use** of gradable adjectives.

Thank you!

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For the manuscript of this project, please see

<https://ling.auf.net/lingbuzz/008122>

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