Can Mandarin *dou* Collapse Homogeneity?
A new perspective to the *mei-dou* puzzle

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The puzzling multi-functional adverb *dou*

Mandarin universal terms such as *mei*-NP in preverbal positions have to co-occur with the famous multi-functional adverb *dou*.

No such constraint exists in English.

(1) Every/all kid(s) (*all) went to the park.

(2) mei-ge haizi *(dou) qu-le   gongyuan
    mei-cl kid   DOU   go-ASP park
    'Every kid went to the park.'

Exceptions to *mei-dou* co-occurrence

Mei-dou co-occurrence 'constraint' is loose since:

Dou doesn't necessarily co-occur with *mei* when there is a numeral indefinite in the predicate ().

(3) a. mei-ge haizi *(dou) hua-le   hua
         mei-CL kid   DOU   draw-ASP picture
         'Every kid did picture-drawing.'

    b. mei-ge haizi (dou) hua-le   yi-fu-hua
        mei-CL child DOU draw-ASP one-CL-picture
        'Every child drew one picture.'

If *mei*-NPs are like *every*-NPs, why the additional *dou*?

What is the role of *dou*
dou can bring forth maximality

It is well-known that predications with definite plurals allow exceptions (Link 1983, Dowty 1987, a.o.); This is also the case with Mandarin plurals.

(4) *Concerning the children's reaction to their Christmas presents:*

    a. haizi-men luchu-le   xiaorong
       kid-pl   show-ASP smile

       'The kids smiled.' (Allows some neutral faces)

    b. haizi-men dou   luchu-le   xiaorong
       kid-pl   DOU show-ASP smile

       'The kids all smiled.' (All the kids smiled without exceptions)

Dou removes non-maximality.

What is the role of *dou*
dou can bring forth distributivity

Another core semantic component of *dou* is that it gives rise to distributive effect.

(5) a. haizi-men hua-le   yi-fu hua
       kid-pl   draw-ASP 1-cl picture
       'The kids drew 1 picture.' (Without *dou*, the collective reading is prefered)

   b. haizi-men dou hua-le   yi-fu-hua
      kid-pl   DOU draw-ASP 1-CL-picture
      'The kids all drew 1 picture.' (With *dou*, only distributive reading)

To explain the *mei-dou* puzzle

It is important to first figure out *dou*'s semantic contribution. Is there any difference between the meaning of (6a) and (6b)?

(6)   a. mei-ge haizi hua-le   yi-fu hua
              mei-CL kid   draw-ASP 1-cl   picture

            'Every kid drew 1 picture.'

       b. mei-ge haizi dou   hua-le   yi-fu-hua
              mei-CL kid   DOU draw-ASP   1-CL-picture

            'Every kid drew 1 picture.'

Another question: If *mei*-NPs are quantificational like *every*-NPs, why the additional *dou*?

Dou as truth-conditionally vacuous?

Liu (2021): A pragmatic account

dou is an alternative-sensitive operator

it is **truth-conditionally vacuous**

dou's **presuppositional** contribution: Its prejacent is the strongest (in terms of entailment) among all **contextually relevant alternatives**

dou forces a *Dist* within its scope.

When *dou*'s presupposition is satisfied, MP blocks the *dou*-less version of the sentence.

Contexts can affect *dou*'s presence

(7) *At a secondhand bookstore:*

    a. The bookstore owner: Our store is having a big sale,

        mei-ben shu   mai 10   yuan
        mei-CL   book 10   yuan

        'Every book is 10 yuan.'

    b. John: This one looks brand-new. Is it also 10 dollars?

    c. The owner:

        mei-ben shu   dou   10 yuan
        mei-CL   book DOU 10 yuan

        'EVERY book is 10 yuan.'

Contexts can affect *dou*'s presence

(8) *At a secondhand bookstore:*

    a. The bookstore owner: Our store is having a big sale,

       mei-ben shu   mai **10** yuan
       mei-CL   book sell 10 yuan

       'Every book is **10** yuan.'

QUD: How much is every book? (Assuming every book costs the same.)

According to Liu, in such a context, the price of individual books is intuitively not relevant to the QUD.

In a context with 3 books a,b,c:
$Alt([[\pi]]) = \{a, b \text{ and } c \text{ is } 10 \text{ yuan}\}$

The non-vacuity presupposition fails and *dou* should be absent.

(9) a. John: This book looks brand-new. Is it also 10 yuan?

   b. The owner:

   mei-ben shu   **dou**   mai 10 yuan
   mei-CL   book DOU sell 10 yuan

   'EVERY book is 10 yuan.'

QUD: Are all the books 10 yuan?

In a context where there are 3 books a,b,c:
$Alt([[\pi]]) = \{a$ is 10 yuan, b is 10 yuan, c is 10 yuan$\}$

Dou's prejacent is the strongest; MP blocks the *dou*-less sentence.

(10)   *At a secondhand bookstore:*

      a. The bookstore owner: Our store is having a big sale,

          mei-ben shu   mai **10** yuan
          mei-CL   book sell 10 yuan

          'Every book is **10** yuan.'

QUD: How much is every book? (Assuming every book costs the same.)

Since the focus is on '10' and the universal statement is irrelevant, why assume individual alternatives?

In a context with 3 books a,b,c:
$Alt([[\pi]]) = \{a, b \text{ and } c \text{ is } n \text{ yuan}\}$

Such account suffers from various problems:

dou's presupposition is trivial in *mei-dou* sentences

> MP: Speakers should use the alternatives with the strongest presupposition, i.e. as many 'undefined' as possible.

Whenever *dou* co-occurs with *mei*, the prejacet is always the strongest. *dou*'s presupposition is automatically satisfied and thus trivial.

The *dou*-sentence with a trivial presupposition is unable to enter the competition.

Recall our initial question:

Is there any difference between the meaning of (11a) and (11b)?

(11) a. mei-ge haizi hua-le   yi-fu hua
          mei-CL kid   draw-ASP 1-cl   picture
          'Every kid drew 1 picture.'
     b. mei-ge haizi dou   hua-le   yi-fu-hua
          mei-CL kid   DOU draw-ASP 1-CL-picture
          'Every kid drew 1 picture.'

Does the presence/absence of *dou* simply reflect different QUDs?

Missing piece of the Puzzle: Homogeneity

Similarly as in English, Mandarin plurals give rise to homogeneity effect.

(12) haizi-men chi-le   yi-ge pinguo
      kid-pl   eat-ASP 1-cl   apple

'The kids each ate 1 apple.'
true iff all the kids ate 1 apple.
false iff none of the kids ate 1 apple.
undef. otherwise

Homogeneity removal

Notably, homogeneity disappears when dou is inserted.

(13)   haizi-men dou   chi-le   yi-ge pinguo
       kid-pl   DOU eat-ASP 1-cl   apple
       'The kids all ate 1 apple.'

One can see what happens when the sentences are under negation.

Diagnostics: Questions with negative answer

(14)   haizi-men chi-le   yi-ge pinguo ma
       kid-pl   eat-ASP 1-cl apple SFP
       'Did the kids eat 1 apple?.'

With a negative answer: 'No, this is not the case.'

⤳ None of the kids ate 1 apple.

Diagnostics: Questions with negative answer

(15) haizi-men dou   chi-le   yi-ge pinguo ma
      kid-pl   DOU eat-ASP 1-cl apple   SFP
      'Did the kids all eat 1 apple?.'

With a negative answer: 'No, this is not the case.'

⇝ At least one kid didn't eat 1 apple.

One way to think about the D operator:

It takes a predicate P and returns a new homogeneous predicate
(Križ 2019)

(16) $D(P)(a)$
       true iff P is true of all parts of a
       false iff P is false of all parts of a
       undef. otherwise

The diagnostic above sets dou apart from silent D operator;
Dou behaves similarly to other overt quantifiers which remove
homogeneity.

Hypothesis

Assume there is only one slot for DIST, covert D is blocked when
the explicit alternative *dou* is present in the sentence.

(17) $Dou(P)(a)$
       true iff P is true of all parts of *a*
       false iff P is false of at least some parts of *a*

Contexts can affect *dou*'s presence

(18) *At a secondhand bookstore:*

    a. The bookstore owner: Our store is having a big sale,

        mei-ben shu   mai 10 yuan
        mei-CL book sell 10 yuan

        'Every book is 10 yuan.'

    b. John: This one looks brand-new. Is it also 10 dollars?

    c. The owner:

        mei-ben shu   dou   mai 10 yuan
        mei-CL book DOU sell 10 yuan

        'EVERY book is 10 yuan.'

Homogeneous context can't license *dou*

(19) *At a secondhand bookstore:*

    a. The bookstore owner: Our store is having a big sale,

       mei-ben shu   mai **10** yuan

       mei-CL   book sell 10 yuan

       'Every book is **10** yuan.'

QUD: How much is every book? (Assuming every book costs the same.)

Homogeneity is presupposed by the context.

Instead of saying non-vacuity fails in this case, and *dou* is not licensed by a homogeneous context; Covert D thus takes the DIST slot.

dou is compatible with non-homogeneous contexts

(20) a. John: This book looks brand-new. Is it also 10 yuan?

b. The owner:

mei-ben shu **dou** mai 10 yuan
mei-CL book DOU sell 10 yuan

'EVERY book is 10 yuan.'

QUD: Are all the books 10 yuan?

No-homogeneity is presupposed by the context.

Instead of saying MP blocks the *dou*-less sentence, *dou* is needed to take the DIST slot to remove homogeneity.

This can also explain why:

Dou must be absent when *mei*-NP describes a standard unit of measurement (first obeserved by Liu 2019).

(10)   guang mei-miao   (*dou) chuanbo san-shi-wan qianmi
        light   mei-second DOU   travel   3000000   km
        'Light travels 3000000km every second.'

Dou also doesn't co-occur with *pingjun* 'averagely'.

(11)   zhangsan mei-tian (*dou) pingjun   sanbu yi xiaoshi
        zhangsan mei-day DOU   averagely walk   1 hour
        'Zhangsan walks averagely 1 hour per day.'

Summary

Although dou's ability to remove non-maximality has long been under the spotlight, its ability to remove homogeneity has not receive enough attention.

This talk is to, hopefully, constitute a novel perspective to the *mei-dou* puzzle:

Contexts can indeed affect *dou*'s presence in the sense that *dou* is compatible with the contexts that presuppose homogeneity.

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Thanks!

Questions? Comments?