Exclusive (Dis)harmonies in Mandarin Chinese

Mingming Liu

Follow this and additional works at: https://repository.upenn.edu/pwpl

Recommended Citation
Liu, Mingming (2016) "Exclusive (Dis)harmonies in Mandarin Chinese," University of Pennsylvania Working Papers in Linguistics: Vol. 22 : Iss. 1 , Article 23. Available at: https://repository.upenn.edu/pwpl/vol22/iss1/23

This paper is posted at ScholarlyCommons. https://repository.upenn.edu/pwpl/vol22/iss1/23
For more information, please contact repository@pobox.upenn.edu.
Exclusive (Dis)harmonies in Mandarin Chinese

Abstract
The paper discusses two types of exclusive (dis)harmonies in Mandarin. Exclusive-(dis)harmony-A—only is compatible with few but not many, and exclusive-(dis)harmony-B—only is compatible with less than n but not more than n. We suggest Exclusive-(dis)harmony-A can be explained along the lines of Chen 2005. We further propose that Exclusive-disharmony-B can be explained by Maximization failure (Fox 2007). But Maximization failure rules out Exclusive-harmony-B as well. We then propose to use a scalar presupposition of jiu/zhi/only to restrict the standard Rooth-style focus alternative set. This presupposition achieves two things: it captures the scalar meaning of only, and it allows maximization to work with less than n, by filtering out problematic alternatives.
Exclusive (dis)harmonies in Mandarin Chinese

Mingming Liu∗

1 Dou (Dis)Harmony

Chen (2005) observes that the distributive operator *dou* (Lin 1998) in Mandarin is compatible with quantifiers describing large quantities such as *henduo* ‘many’ (1a), but not with small-quantity quantifiers such as *henshao* ‘few’ (1b).

(1) Dou-(dis)harmony
   a. Zuotian juhui, *henduo ren dou* lai le.
      yesterday party, many people DOU come ASP
      ‘Yesterday, many people came to the party.’
      yesterday party, few people DOU come ASP
      Intended: ‘Yesterday, few people came to the party.’

Chen names this phenomenon *dou*-(dis)harmony and offers an explanation based on a context-dependent expected value $s_c$. Specifically, *dou* carries a presupposition that the number of ‘NPs’ ($\text{people in (1)}$) that ‘VP’ ($\text{came to the party in (1)}$) falls above the expected value $s_c$.

Since “few NP VP” is true iff the number of ‘NPs’ that ‘VP’ falls below $s_c$ (Partee 1988), contradicting the high-rank presupposition of *dou*, *dou* is incompatible with *few*.

In a parallel manner, the compatibility of *dou* and *many* is explained by taking “*many NP VP*” to be true iff the number of ‘NPs’ that ‘VP’ falls above $s_c$.

2 Exclusive (Dis)Harmonies

2.1 Exclusive (Dis)Harmony-A

Mandarin exclusive particles (*jiu, zhi*(you) ‘only’) exhibit the opposite pattern from *dou* (already mentioned in Chen (2005)). Specifically, they are compatible with quantifiers denoting small quantities such as *few* (2a) but not with those denoting large quantities such as *many* (2b). We call this exclusive (dis)harmony-A.

(2) Exclusive-(dis)harmony-A
      yesterday party, only/only few people come
      ‘Yesterday, only few people came to the party.’
      yesterday party, only/only many people come
      Intended: ‘*Yesterday, only many people came to the party.’

An analysis based on Chen (2005) is conceivable for exclusive (dis)harmony-A. All we have to assume is that Chinese exclusives carry a low-rank presupposition that its ‘NP’-associate that ‘VP’ falls below the expected value $s_c$. This is actually the mirative particle analysis of English *only* in Zeevat (2009), where the core meaning of *only* is ‘less than expected’.

∗I am grateful to Veneeta Dayal for advice and support, and to Simon Charlow, Mark Baker, Maria Bittner, Kristen Syrett, Ken Safir, Roger Schwarzschild, Satoshi Tomioka for comments and discussions. All errors and inadequacies are mine.
2.2 Exclusive (Dis)Harmony-B

We further discover Exclusive (dis)harmony-B: Mandarin exclusives are compatible with modified numeral *budao n “less-than n” (3a), but not with *chaoguo n “more-than n” (3b).

(3)

Exclusive-(dis)harmony-B

a. *jiu/zhi(you) budao shi ge ren lai.
   only/only  less-than 10 CL people come
   Only less than 10 people came to the party.

b. *jiu/zhi(you) chaoguo shi ge ren lai.
   *only/only  more-than 10 CL people come
   Intended: “Only more than 10F people came to the party.’

Exclusive (dis)harmony-B cannot be explained by Chen (2005)’s analysis which crucially relies on the expected value \(s_c\). This is because the standard semantics (Hackl 2000, Nouwen 2010) of modified numerals such as *more/less-than n does not involve a context-dependent \(s_c\).

(4)

\[
\text{more than 10} = \lambda D.\max(D) > 10 \\
\text{less than 10} = \lambda D.\max(D) < 10
\]

(cf. Nouwen 2010, (13))

Compare (4) with a recent proposal for *many/few in Solt (2014): \(s_c\) is encoded in the latter but not in the former, and thus Chen’s analysis cannot be extended to (3).

(5)

\[
\text{many} = \lambda D.\max(D) > s_c \\
\text{few} = \lambda D.\max(D) < s_c
\]

(cf. Solt 2014, (9))

3 Towards an Explanation

3.1 Universal Density of Measurement and Maximization Failure

Based on their Universal Density of Measurement (UDM), Fox and Hackl (2006) provide an analysis for *only’s incompatibility with *more than n (cf. (3b)), which we adopt to explain half of our Exclusive (dis)harmony-B puzzle.

(6) The UDM

Measurement scales needed for natural language semantics are always dense.

(7) Density

A scale \(S\) is dense iff for any two degrees \(d_1\) and \(d_2\) on \(S\), there is a degree \(d_3\) between \(d_1\) and \(d_2\):

\[
\forall d_1 \forall d_2 (d_1 < d_2) \rightarrow \exists d_3 (d_1 < d_3 < d_2)
\]

Specifically, we take the standard semantics of *only (Horn 1969, Schwarzschild 1994), as in (8):\(^1\) with UDM, we will run into contradiction when we combine *only with *more than \(n_F\), and contradiction like this gives rise to ill-formedness (Gajewski 2002).

(8) Semantics of *only

\(\text{only}_C(p)\) presupposes \(p(w) = 1\)\(^2\)

if defined, it asserts \(\lambda w \forall q \in C[q(w) \rightarrow p \subseteq q]\)

Exclusive assertion

(9) Fox and Hackl’s reasoning: *only more than 10F people came = (3b)

a. (3b) presupposes \(p\): more than 10 people came

\(^1\)\(^C\) in (8) is the quantificational domain of *only and it is restricted by focus: focus on an expression \(a\) triggers alternatives which share with \(a\) the same semantic type (Rooth 1985). \(C\) is required to be a subset of the set of propositions obtained by replacing the focus part of the prejacent with its alternatives (Rooth 1992).

\(^2\)Neither Fox & Hackl’s reasoning nor my reformulation needs to assume that the prejacent is presupposed. The reasoning goes through as long as the prejacent is entailed, that is, it could be asserted instead.
b. (3b) asserts $q$: it’s not the case that more than $n$ people came, with $n > 10$;

c. $p$ entails $r$: there were $10 + \varepsilon$ people coming;

d. because of UDM and $r$: more than $10 + \varepsilon/2$ people came;

e. but according to $q$ and the fact that $10 + \varepsilon/2 > 10$: it’s not the case that more than $10 + \varepsilon/2$ people came;

f. contradiction.

There is a simpler way of looking at the above reasoning (cf. Chierchia 2013 on NPI): first, it is

a fact that for any $n > 10$, more than $n$ people came entails more than 10 people came; next, because

of only, it’s not the case that more than $n$ people came, for any $n > 10$; but negating all these stronger

alternatives means that exactly 10 people came, which contradicts the prejacent.

There is also a more general way of looking at this, which sees (3b) as an instance of maximization failure

(Fox 2007, cf. the negative island literature).

Roughly, maximization failure happens when a maximization operator (only in our case) fails to

pick out the correct greatest element (the prejacent of only in our case when applied to a (algebraic)

set.)

Consider (3b). Only says that its prejacent is the strongest true proposition (=all non-weaker

alternative propositions are false), but this requirement cannot be satisfied: supposing that 14 people

came (based on what the prejacent in (3b) means), the set of true alternative propositions is

$\{ \ldots \text{more than 9 people came} \supset \text{more than 10 people came} \supset \text{more than 11 people came} . . . \}$. Because of
density, this set (interval) is not right bounded, thus no greatest element exists and maximization
fails. Since 14 is arbitrarily chosen, maximization always fails and using only is infelicitous.

3.2 Problem With Less than $n$

Exclusive-(dis)harmony-B as in (3) has two parts, the harmony part (3a) and the disharmony part

(3b). We have looked at how Fox and Hackl (2006) and Fox (2007) explain the disharmony part, but

what about the harmony part?

It turns out that they predict exclusives are equally bad with less than $n$, thus failing to explain

their compatibility in Mandarin, illustrated again in (10).

(10) **Exclusive-harmony-B**

$jiu/zhì(you)$ budao $shi\ \text{ge}\ \text{ren}\ \text{lai}$.

Only/only less-than 10 CL people come

Only less than 10 people came to the party.

The reasoning sketched in (11) is exactly parallel to the case of more than $n$.

(11) **An incorrect prediction**

a. only in (10) says that less than 10 people came is the strongest proposition;

b. (10) also presupposes that less than 10 people came; let’s say actually 8 people came.

c. now the set of true alternative propositions is

$\{ \ldots \text{less than 9 people came} \supset \text{less than 10 people came} \supset \text{less than 11 people came} . . . \}$

d. Because of density, this set (interval) is not left bounded; thus no greatest element.

e. since 8 is arbitrarily chosen, maximization always fails.

f. (10) is incorrectly predicted to be bad.

The rest of the paper is devoted to tackling this problem. Here is a preview of how we are going
to do it: we will propose that only/jiu/zhì(you) can restrict an alternative set (interval) $C = \{ \ldots \text{less than 9 people came} \supset \text{less than 10 people came} \supset \text{less than 11 people came} . . . \}$ into a Restricted
alternative set $C' = \{ \text{less than 10 people came} \supset \text{less than 11 people came} . . . \}$. The new set (interval)
has a strongest element, i.e., the prejacent; thus no maximization failure.

Before we explain why exclusives can do this with less than $n$ but not with more than $n$, let’s
look at the scalar/evaluative component of only/jiu/zhì(you). It turns out that the restricting function
of exclusives mentioned above are independently needed for analyzing their scalarity.

3 Following Horn 1996, we call the only-less part of an only-sentence the prejacent of only.

4 Underlining singles out the prejacent.
3.3 Only’s Scalar Presupposition

*Only* and its Mandarin counterparts *jiu/zhi* trigger scalar inferences (cf. Zeevat 2009, Klinedinst 2005, Alxatib 2013, Coppock and Beaver 2013), illustrated by (12) for English *only* and (13) for Mandarin *jiu/zhi*(you).

(12) The scalar inference of *only*

a. 10 people came, which were a lot.

b. #Only 10 people came, which were a lot.

(13) The scalar inference of *jiu/zhi*

a. *you* *shi* *ge ren* *lai,* *zhen* *duo!*

   ‘10 people came, which were a lot.’

b. #*jiu/zhi* *you* *shi* *ge ren* *lai,* *zhen* *duo!*

   only/only *have* ten CL people come, really many

   Intended: #only 10 people came, which were a lot.

Sentences (12a) and (13a) are good because 10 people can either be many or few, depending on the context. But (12b) and (13b) sound contradictory because the *only/jiu/zhi*(you) trigger a scalar meaning that the people that came were few, which contradicts the content of the following relative clause.

To formally represent the scalar reading, we propose to assign *only/jiu/zhi*(you) a presupposition that requires the focus associated with *only/jiu/zhi*(you) to be ranked lower on a scale *R* than its any other alternatives. Formally, this is represented in (14).

(14) Scalar Presupposition of *only/jiu/zhi*(you)

\[
\forall x \in C \left[ x \neq \text{[focus]} \rightarrow \text{[focus]} < R x \right]
\]

(15) Scalar Presupposition of *even*

\[
\forall q \in C \left[ q \neq \text{[prejacent]} \rightarrow \text{[prejacent]} < \text{likely} q \right]
\]

Sentence (14) follows a common way of capturing the scalar presuppositions of scalar FPs like *even* (Karttunen and Peters 1979) and *already/still* (Krifka 2000). Take *even* as an instance. The only difference between (14) and (15) is that the former ranks individuals while the latter propositions. By ranking the prejacent of *even* as the bottom of a likelihood scale we obtain the inference that the prejacent is the least likely. Similarly, by ranking 10 as the bottom of the number scale, we obtain the inference that 10 is a small number. The contrast shown in (12) and (13) is thus captured.

3.4 Restricted Alt

To capture the scalar component of *only*, we virtually restrict the Rooth-style alternative set triggered by focus to an (ordered) subset *C*′ of which the focus value is the bottom. Restricted Alt is the key to the above-mentioned exclusive-harmony-B puzzle.

---

5Krifka 2000 is interested in German *schon/noch* ‘already/still’, which contribute *early/late* scalar inferences. Krifka’s way of capturing these scalar inferences is exactly like our (14). For example, *schon* is truth-conditionally vacuous but presupposes that its associate is ranked earlier than all the other alternatives.

6We are here actually using a superlative semantics to capture an evaluative intuition, which is not quite right. To witness, that John is lower than any of its alternatives on an effort scale does not mean getting hold of John is easy (perhaps all of them are difficult to get hold of), just as John is the tallest does not mean John is tall. To fix this, we posit a requirement (i) which says that the context dependent expected value *s_ε* (Kennedy 1999) should always be included in the restricted alternative set induced by *jiu*. Intuitively, this is plausible, since the restricted alternative set tries to capture the idea of *alternatives under consideration* (Krifka 2000), and the expected value seems to always qualify as one of them.

(i) Expected value is always under consideration

\[
\exists x \in C \left[ x \neq \text{[\alpha]} \land \mu_R (x) = s_\varepsilon \right]
\]
Consider *jiu/zhi* with less than *n* \( \in \mathbb{F} \) in (16).

(16)  
\[
\text{jiu/zhi less than } 10_\mathbb{F} \text{ people came.}
\]

**Restricted Alt:** \( 10 < 11 < 12 < \ldots \)

\[
\begin{align*}
\text{C:} & \quad \{ \text{less than } 10 \text{ people came} \} \subset \text{less than } 11 \text{ people came}, \ldots \\
\text{Maximization} & \text{ applies successfully; the prejacent is the strongest proposition.}
\end{align*}
\]

In (16), the presupposition of *jiu/zhi* in (14) restricts the alternative set of \( 10_\mathbb{F} \) into \{10, 11, 12, \ldots \}. Because less than 10 people came entails less than \( n \) people came for every \( n \geq 10 \), the prejacent can never be the strongest proposition due to density. As a result, *jiu/zhi*’s requirement is not satisfied and exclusive disharmony B follows.

3.5 Trivialization

The essence of our story is that we allow the exclusive component of *jiu/zhi* to be trivialized/vacuous.

(18)  
\[
\text{jiu/zhi less than } 10_\mathbb{F} \text{ people came.}
\]

**Restricted Alt:** \( 10 < 11 < 12 < \ldots \)

\[
\begin{align*}
\text{C:} & \quad \{ \text{less than } 10 \text{ people came} \} \subset \text{less than } 11 \text{ people came}, \ldots \\
\text{Exclusive Assertion} & \text{ in (8) applies vacuously.}
\end{align*}
\]

This is correct, since *jiu* and *zhi*, when associated with less than \( n_\mathbb{F} \), are indeed nonexclusive. Consider the following dialogue.

(19)  
\[
\text{A: Zuotian Yuehan } \text{*jiu/zhi* only/only chi le budao [san]_\mathbb{F} ge pingguo? yesterday John only/only eat LE less-than 3 CL apple}
\]

‘Yesterday, did John eat only less than 3 apples?’

\[
\begin{align*}
\text{B: Dui, qishi lian liang ge dou budao.} & \quad \text{Right. actually even } 2 \text{ CL even less-than} \\
\text{‘Yes, actually he ate even less than 2.’}
\end{align*}
\]

In (19), B uses *dai* ‘right’ to affirm the proposition \( p \) that *John only ate less than 3 apples* but then he adds a proposition \( q \) that *John ate less than 2 apples*; this is impossible if the only in \( p \) were exclusive: being exclusive, it would negate \( q \) according to the standard semantics of *only* (8), for \( q \) asymmetrically entails the prejacent of \( p \) that *John ate less than 3 apples*.

Sentence (19) contrasts with (20), where the *jiu/zhi* is exclusive, and thus leads to a contradiction.

(20)  
\[
\text{A: Zuotian Yuehan } \text{jiu/zhi* only/only chi le [san]_\mathbb{F} ge pingguo? yesterday John only/only eat LE 3 CL apple}
\]

‘Yesterday, did John eat only 3 apples?’

\[
\begin{align*}
\text{B: # Dui, qishi ta chi le si ge.} & \quad \text{‘# Yes, actually he ate } 4 \text{.’}
\end{align*}
\]

The contrast between (19) and (20) is a consequence of our proposal. While the exclusive component of *jiu/zhi* is trivialized (by their scalar presupposition) in the case of less than \( n_\mathbb{F} \) as in (18), it stays intact in the case of bare numerals, as is illustrated in (21).
John jiu/zhi ate 3\textsubscript{F} apples.

\textbf{Restricted Alt:} 3 < 4 < 5 < \ldots \\
\textbf{C:} [John ate 3 apples \supset John ate 4 apples, \ldots ]

\textbf{Exclusive Assertion:} For any \(n > 3\), John didn’t eat \(n\) apples.

Not everyone agrees that the assertion of \textit{only}-like exclusives can be trivialized (see for example, Beaver and Clark 2008, Alxatib 2013). They would have a non-vacuity condition built into the lexical entry of \textit{only}, for example: the prejacent of \textit{only} (or its negation) cannot entail all of its alternatives.

They base their non-vacuity claim on cases like *\textit{He only saw [every student]}\textsubscript{F}: because \textit{he saw every student} entails all the other alternatives (or its negation), non-vacuity is violated, and thus the sentence is bad.

But scalar presupposition as in (14) can also explain this: \textit{every student} just cannot be the bottom of any alternative set.

Furthermore, it needs to be mentioned that trivialization of a covert \textit{only} is essential in Chierchia (2013) to explain the distribution of weak NPIs like \textit{any} (on its NPI use). Roughly, \textit{any} triggers alternatives and needs a covert \textit{only} to ‘exhaustify’/‘tame’ them. In positive contexts, the covert \textit{only} gives rise to contradiction, and thus \textit{any} is not licensed; on the other hand, in negative contexts, the covert \textit{only} is trivialized, and thus there is no contradiction or ill-formedness for \textit{any}.

Finally, English \textit{only} is not very comfortable with \textit{less than} \(n\).\footnote{Judgements come from several native speakers I consulted and an anonymous PLC reviewer.} We might take this fact to suggest that English \textit{only} (not the covert one) does not allow its exclusive component to be trivialized. For instance, (22) and (23) are both bad, but for different reasons. This might explain why people tend to feel a difference between (22) and (23).

\begin{align*}
\text{(22)} \quad *\text{Only more than 10}\textsubscript{F} & \text{ people came.} & \text{Contradiction} \\
\text{(23)} \quad ??\text{Only less than 10}\textsubscript{F} & \text{ people came.} & \text{Trivialization}
\end{align*}

But crucially, Mandarin jiu/zhi are fully compatible with \textit{less than} \(n\), suggesting they do not have a non-vacuity condition built into their semantics.

\section*{4 Conclusion}

We have discussed two types of exclusive (dis)harmonies in Mandarin. Exclusive-(dis)harmony-A—\textit{only} is compatible with \textit{few} but not \textit{many}, and exclusive-(dis)harmony-B—\textit{only} is compatible with \textit{less than} \(n\) but not \textit{more than} \(n\).

We suggest Exclusive-(dis)harmony-A can be explained along the lines of Chen 2005.

We further propose that Exclusive-dis-harmony-B can be explained by Maximization failure (Fox 2007). But Maximization failure rules out Exclusive-harmony-B as well. We then propose to use a scalar presupposition of jiu/zhi/\textit{only} to restrict the standard Rooth-style focus alternative set. This presupposition achieves two things: it captures the scalar meaning of \textit{only}, and it allows maximization to work with \textit{less than} \(n\), by filtering out problematic alternatives.

\section*{References}

Alxatib, Sam. 2013. ‘Only’ and Association with Negative Antonyms. Doctoral dissertation, Massachusetts Institute of Technology.


