1. Head-Complement orders in Chinese
1.1 Head-initial and head-final orders 1
- Head-Complement (H-C) (1a)
- modal-V: hui nian
  will read
- negative-V: meiyou nian
  not read
- preposition-NP: yong shou
  with hand
- V-O: nian shu
  read books

1.2 Disharmonic orders and parameter 2
- Travis 1984, Li 1990
Chinese is generally head-final except that at most one NP may follow a verb or a preposition.
The Chinese Word Order Constraint
a. Chinese is head-final except under the requirements of Case assignment.
b. Case is assigned from left to right in Chinese.
c. A Case assigner assigns at most one Case.
cf. Huang 1994

2. Roll-up movement deriving Complement-Head orders and the Final-Over-Final Constraint
2.1 Complement movement
- Kayne (1994) argues that consistent C-H order is derived from H-C order by cyclic movement of complement to the specifier position, as in (2) (cf. Abels and Neeleman 2012).

(2) ... X [Y ... Y ZP] ... →
  ... X [Y ZP Y t] ... →
  ... Y ZP Y t ZP X t

2.2 the Final-Over-Final Constraint (FOFC)
- Assuming this roll-up movement, Biberauer et al. (2008) propose the Final-Over-Final Constraint (FOFC) in (3), which prohibits complement movement from skipping cycles.

(3) * [Y ... Y P A] P, where A is the complement of B and P is the complement of A.
FOFC correctly rules out the word orders that are absent or rare in the world's languages:
  * [Y P V O] Aux
  * [Y P C P] [Y P V O] C

Proposal
Chinese is disharmonic in its head-directionality because tones on lexical items function as an output condition on the movement of complement to the specifier position.
Chinese word order supports the idea that head-directionality is universally determined by prosodic strength realized as stress or tone.
This is a step toward the hypothesis universal syntax and parametric phonology (USPP)

Road map
1. Head-Complement orders in Chinese
2. Roll-up movement deriving Complement-Head orders and the Final-Over-Final Constraint
3. Roll-up movement constrained by prosodic patterns
4. Some consequences: universal syntax and parametric phonology (USPP)
2.3 Chinese violates FOFC
- However, FOFC wrongly rules out a number of well-formed constructions in Chinese listed in (4).
- (4) a. clause-Q particle orders: [CP ... [VP V NP] C]
  - ni neng xie Zhongguo zi ma?
  - you can write Chinese character Q
  - 'Can you write Chinese characters?'
- b. prepositional phrase-V: LVP [VP P NP V]
  - cong Zhongguo lai le
  - from China come Perf
  - 'come from China'
- c. relative clause-N: LNP [VP V O] de N]
  - qi zixingche de ren
  - ride bicycle De person
  - 'people who ride bicycles'

3. Prosodic constraint on movement
3.1 Prosodic patterns in Chinese
- Instead of assuming FOFC, I propose that Chinese C-H orders in (1b) are derived from H-C in the base if the derived structure observes the prosodic patterns in Chinese, as shown in (5).
- (5) a. (10 W ... W S) TD: tonal/sandhi domain, W: weak position, S: strong position
  - Weak-Tone (5a) is the original Chinese pattern while Left-Stress (5b) is a system borrowed from Altaic languages. This mixed prosodic system makes Chinese word orders disharmonic.

3.2 Complement prominence
- Following the idea of Complement Prominence (Nespor and Vogel (1986) and Cinque's (1993), I argue that complement must be linearized in the strong position where citation tone is preserved (Right-Tone) and not neutralized (Left-Stress).
- head complement weak pos. strong position tone changed tone preserved complement strong position weak pos. tone preserved

3.3 Well-formed pattern
- Complements in head-complement sequences in (1a) keep their citation tone in the case of sandhi (e.g. third-tone sandhi in Mandarin).
- Heads in (1a) (modal, negative, preposition, V) have non-neutral tone, which may change into another tone in sandhi.
- This is a well-formed pattern since the citation tone of the complement is kept unchanged and heads still have non-neutral tone. 
  - hui nian meiyou nian yong shou nian shu
  - will read not read with hand read books

3.4 Ill-formed pattern 1
- If the order was reversed by complement movement, the resulting complement-head structure would need to have Left-Stress (5b) in order to keep complement prominent. However, neutral tone on the right in (5b) would conflict with the fact that these heads have non-neutral tone. Thus, complement movement does not apply to (1a) even in (4).

3.4' Ill-formed pattern 2
- If Chinese applied roll-up complement movement to satisfy FOFC, the resulting phrase would not conform to Chinese prosodic patterns.
- (4')a. clause-Q particle orders: *[CP ... [VP V NP] C]
  - *ni Zhongguo zi xie ma?
  - you Chinese character write Q
  - 'Do you write Chinese characters?'
  - b. postpositional phrase-V: *LVP [PP NP P V]
  - *Zhongguo cong lai le
  - China from come Perf
  - 'come from China'
  - c. relative clause-N: *LNP [VP V O] de N]
  - *zixingche qi de ren
  - ride bicycle De person
  - 'people who ride bicycles'

3.5 Left-stress 1
- Complements in complement-head order in (1b) keep their tone by Left-Stress (5b).
  - Heads in (1b) are divided into two categories: clitics (affix, aspect, postposition, Q particle) and lexical words (N, A, V).
- Clitics have neutral tone and conform to Left-Stress (5b).
- (5) b. (qun T N) Pwd: prosodic word, T: tone, N: neutral/light tone
  - stem-affix: pengyou-men
  - friend people
  - NP-postposition: pengyou de
  - friend De
  - V-aspect: lai le
  - come Perf
  - clause-Q particle: ni lei ma?
  - you tired Q

3.5' Left-stress 2
- (5) b. (qun T N) Pwd: prosodic word, T: tone, N: neutral/light tone
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3.6 Lexical heads and boundary 1
- On the other hand, lexical heads have tone and do not conform to (5b) (qun T N).
  - However, they can be separated from the preceding complement by a prosodic boundary in order to keep their tone. 
  - Thus, complement movement applies to these constituents to derive complement-head order.
3.6 Lexical heads and boundary 2
- modifier-N: pengyou de # fangzi
- friend De house
- PP-V: cong Zhongguo # lai le
- from China come Perf
- [ba-NP]-V: ba shi # zuo hao
- Ba thing do well
  a. ba ren do
  Ba people hit
  b. ba la dado
  Ba him overthrow
  c. ba shi zuo hao
  Ba thing do well
- degree word:A: hen hao
  very good

4. Summary and consequences
4.1 Summary
- To sum, head-complement orders are determined by universal Complement Prominence and language particular prosody in (5) in Chinese.
- This study has a number of consequences in diachronic and dialectal linguistics and the architecture of grammar.

4.2 Variation
- As Hashimoto (1978) argues, classical Chinese and southern Chinese dialects have more tonal characters and more head-complement orders than present day Chinese and northern dialects.
- These correlated changes and variations are explained straightforwardly with the prosody-based theory of word orders presented here.
- Northern dialects: (5) b. (\(\overset{\text{p}}{\text{W}}\) N T) stress C-H
- Southern dialects: (5) a. (\(\overset{\text{W}}{\text{D}}\) W ... W S) tone H-C

Languages in East Asia

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<tr>
<th>Language</th>
<th>tone</th>
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<td>Thai</td>
<td>8</td>
<td>0</td>
<td>NG NA PN VO SC</td>
</tr>
</tbody>
</table>

Hashimoto (1981): Languages in East Asia have a gradational variation of tone complexity and coda inventory.

Tokizaki and Kuwana (2011): These languages also have a gradational variation of syntactic head-complement orders (C-H/H-C) (Adj-N, N-PostP, Clause-Subordinator.)

4.3 Word stress and word orders
- Tokizaki (2011) argues that word-stress location decides head-complement orders in stress languages in the world.
- Then, disharmonic head-complement orders are no longer a problem for the minimalist program in that an output condition decides linearization of hierarchical structure.

Stress and head-complement orders

- As the stress moves leftward, complement-head orders increase.

Conclusion
- To sum, head-complement orders are determined by universal Complement Prominence and language particular prosody in (5) in Chinese.
- This study has a number of consequences in diachronic and dialectal linguistics and the architecture of grammar.
- The idea of Universal Syntax and Parametric Phonology (USPP) does away with head parameter in syntax (Feng 2002, Kayne 2011).
References