1. Right-branching compounds
- Haider (2001): recursive compounds (complex compounds) are possible only if their structure is head-final.
  (1) a. [baby [cat [fish]]]
     b. [[poisson] chat] (*bèbè]
        fish cat baby

1.5 Non-restricted/restricted compounding
- Mukai (2008) argues that right-branching compounding is more restricted than left-branching compounding for some reason.

1.4 Language-specificity
- Italian compounds are not recursive while in English, Dutch and German (i.e. Germanic languages) compounding is normally recursive (Scalise 1992: 196).
  (1) a. [ [towel rack] designer]
     b. [[ [towel rack] designer] training]
  (2) [[ziekte verzuim] bestrijdings] programma
     illness absence fight programme
     ‘programme for reducing absence due to illness’

1.1 Right-branching compounds
- Left-branching and right-branching compounds are syntactically-derived compounds while right-branching compounds are phrases semantically interpreted as words at LF. (§1).
- Movement of complement into a specifier position changes a right-branching phrase into a left-branching phrase. (§1).
- Recursivity of compounding in a language is determined by the canonical word-stress location. (§2).
- Left-branching compounds are language-specific. (§2).
- The canonical word-stress location corresponds to the main stress location of compounds derived from complement-movement. (§3).

1.2 Left-branching compounds
- Certain types of languages have left-branching recursive compounds.
  (1) a. [[[waste] disposal] plan]
     b. [[[towel rack] designer] designer]
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

2. 1.5 Non-restricted/restricted compounding
- Mukai (2008) argues that right-branching compounding is more restricted than left-branching compounding for some reason.

2. Left-branching and right-branching compounds
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

3. The number of heads in a compound
- Certain types of languages have left-branching recursive compounds.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

3. Left-branching and right-branching compounds
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

4. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

5. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

6. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

7. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

8. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

9. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

10. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

11. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

12. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

13. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

14. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

15. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

16. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

17. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

18. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

19. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’

20. The number of heads in a compound
- Left-branching compounds have multiple heads.
  (1) a. [[[waste] disposal] plan]
     plan of disposal of waste
  (2) [[[Arbeits vertrags] rechts] anpassungs gesetz]
     work contract right adjustment law
     ‘adjustment law for the right of work contracts’
1.6 Two types of recursive compounds

<table>
<thead>
<tr>
<th>example</th>
<th>branch</th>
<th>head</th>
<th>language-specificity</th>
<th>compounding</th>
</tr>
</thead>
<tbody>
<tr>
<td>[baby [cat [fish]]]</td>
<td>right</td>
<td>single</td>
<td>non-specific</td>
<td>restricted</td>
</tr>
<tr>
<td>[[waste] disposal] plan</td>
<td>left</td>
<td>multi</td>
<td>specific</td>
<td>non-restricted</td>
</tr>
</tbody>
</table>

- Right-branching: phrase-like categories (XP)
- Left-branching: recursive compounds (X)

2. Derivation of recursive compounds

2.1 Derivation of right-branching compounds
2.2 Derivation of left-branching compounds
2.3 Juncture strength in branching structure
2.4 Evidence for juncture-strength asymmetry

2.2 Derivation of left-branching compounds
- Universal base structure: Spec-Head-Complement
- Left-branching compounds are real recursive compounds, in which the complement iteratively moves to the specifier position of the head
  \[
  \text{[plan [[waste] disposal]]} \rightarrow \text{[plan [[waste] disposal] plan]}
  \]
- Silent categories and the constituent made by merging them to another constituent are invisible at PF.

2.4 Evidence for juncture strength asymmetry 1
- Sequential Voicing in Japanese is blocked only in right-branching structure (Otsu 1980):
  \[
  \text{nise [tanuki jiru]} \text{ vs. } \text{[nise danuki] jiru (<shiru)}
  \]
- Similar blocking in Korean n-Insertion (Han 1994)

2.4 Evidence for juncture strength asymmetry 2
- Suffixes attach to stems more closely than prefixes (Hyman 2008):
  \[
  \text{[prefix [stem] ...]} \text{ vs. } \text{[[stem ...]-suffix]}
  \]
- Quasi-incorporation in Dutch NV (Booij 2009)
  a. .. dat Jan \{piano wilde spelen\}/wilde piano spelen\
     that John piano wanted play/want piano play
  b. Jan \{piano aan het spel-en\}/aan het piano spel-en\
     John \{piano at the play-INF/at the piano play-INF\}

3. Stress constraint on left-branching compounds

3.1 Categories and complement-head order
3.2 Complement-head orders and stress
3.3 Stress in phrases, compounds and words
3.4 Word stress and compound stress
3.5 Complement-head compounds in leftward stress languages
3.6 Head-complement compounds in rightward stress languages
3.7 Left-branching compounds in languages with leftward stress and without stress
3.8 Problems and prospects
3.1 Categories and complement-head order

**Head-Compl** -> **Compl-Head**

a. Prefix-Stem
   *m*-wita (Swa)

b. Word(H)-Word(C)
   capo stazione (It)

c. Noun-Genitive
   nífó ma-Kókó (Kronko)

d. Preposition-DP
   into rooms

e. Verb-Object
   read books

f. AdvSubordinator-Cl
   before you go

3.2 Complement-head orders and stress

<table>
<thead>
<tr>
<th>C-H</th>
<th>Genus</th>
<th>Jp/Kr</th>
<th>Ural</th>
<th>Germ</th>
<th>Eng</th>
<th>Rom</th>
<th>Bantu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root-Affix</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>W(C)-W(H)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Modifier-N</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>O-V</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>O-Adp</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>CI-Subord</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Word stress: no initial R-ori R-ori R-ed penult

Cf. Goedemans and van der Hulst (2005a, b) for word stress

3.3 Stress in phrases and compounds

- Assign stress to the most deeply embedded element (Cinque 1993)
  a. [John loves [Mary]]
  b. [[waste] disposal] plan
- [up Head Compl] -> [up Compl Head]
- [up α [up β γ]] -> [up α [up β γ]] -> [up [up β γ] α]

3.4 Word stress and compound stress

- Words and compounds must have the same stress pattern in a language.
- Comounds in Germanic (R-oriented (leftward))
  \[\{Wd \circ \circ \circ \} \rightarrow \{\text{Comp} [\circ \circ \circ \circ \circ \circ \circ \circ \circ] \} [Wd \circ \circ \circ \circ \circ \circ \circ \circ \circ]\]
- Right-edge stress (Romance)
  (1) capo-stazione \(\rightarrow\) *stazione-capo (Italian)
      head station ‘stationmaster’
  (2) dereva teksi \(\rightarrow\) *teksi dereva (Swahili)
      driver taxi ‘taxi driver’
- Rightward stress languages make semantic compounds with head-complement order.

3.5 Complement-head compounds in leftward stress languages

- Complement-movement derives complement-head compounds with leftward stress in leftward word-stress languages.
- Right-oriented stress (leftward) (Germanic)
  (1) a. master station \(\rightarrow\) státonmaster
      b. disposal waste \(\rightarrow\) wáste disposal
- Initial stress (Uralic)
  (2) a. fónök állomá \(\rightarrow\) állomásfónök
      boss station station-master (Hungarian)
  b. päällikó asema \(\rightarrow\) asemapiällikko
      master station station-master (Finnish)

3.6 Head-complement compounds in rightward stress languages

- Complement-movement cannot make complement-head compounds with leftward stress in rightward word-stress languages.
- Right-edge stress (Romance)
  (1) capo-stazione \(\rightarrow\) *stazionecapo (Italian)
      head station ‘stationmaster’
- Penultimate stress (Bantu)
  (2) dereva teksi \(\rightarrow\) *teksi dereva (Swahili)
      driver taxi ‘taxi driver’
- Rightward stress languages make semantic compounds with head-complement order.

3.7 Left-branching compounds in languages with leftward stress and without stress

- Leftward stress languages (Germanic, Uralic)
  (1) a. [[waste] disposal] plan
      b. [[towel] rack] designer
- Rightward stress languages (Romance, Bantu)
  (2) a. * [[rifiti] smallmento] piano
      waste disposal plan
      b. [piano di smallmento [dei rifiuti]]
      plan of disposal of waste
- Stressless languages
  (3) a. gomi shori keikaku (Japanese)
      b. sseulega cheoli gyeohoe (Korean)
      c. feívá chúži jíhuá (Chinese)

3.8 Problems and prospects

- Classification of recursive compounds
- Possibility of recursion in compounding
- Stress location in words and compounds
- Data of more languages
- Indonesian (two words, penult) (Cohn 1989: 188)
- Vietnamese (? , tone) (Lieber 1980: 99)
  \(x [x, tákap] [x, cát]\)
  artisan print ‘printer’
- Data of
- Vietnamese (?, tone) (Lieber 1980: 99)
  \(x [x, ngvít] [y, ò]\)
  person be located ‘servant’
- Prominence location in tone languages

Conclusion

- Recursivity of compounding in a language is determined by the canonical word-stress location.
  - Left-branching compounds are syntactically-derived compounds while right-branching compounds are phrases semantically interpreted as words at LF (§1).
  - Movement of complement into a specifier position changes a right-branching phrase into a left-branching compound, which has strong juncture between elements (§2).
  - The canonical word-stress location corresponds to the main stress location of compounds derived from complement-movement (§3).