1. Anti-ambiguity phenomena

Some languages have ‘anti-ambiguity’ processes – processes that are blocked (or triggered) in order to avoid ambiguity.

Example: In Japanese, scrambling is blocked in sentences where both subject and object receive nominative case. (e.g. Kuno 1973; Tsujimura 1996)

Hanako-NOM    Taroo-NOM    afraid.of-PRES        Hanako-NOM    Taroo-NOM    afraid.of-PRES
‘Hanako is afraid of Taroo.’        ‘Hanako is afraid of Taroo.’

Many analyses of these phenomena often claim that they follow from inherent properties of the construction in question, and only accidentally prevent ambiguity (e.g. Tonoike 1980).

BUT: In Japanese, scrambling is also blocked when subject and object case particles are both dropped, as is possible in colloquial speech.

Hanako-ACC    Taroo-ACC    fear-PRES              Hanako-ACC    Taroo-ACC    fear-PRES
‘Hanako fears Taroo.’        ‘Hanako fears Taroo.’

Generalization: Scrambling is blocked when the subject and object are morphologically identical.

⇒ Japanese word order freezing is an anti-ambiguity effect, rather than simply an accidental property of a specific construction.

Other analyses of these effects have claimed that avoidance of all ambiguity is a fundamental property of grammar (e.g. Kuhn 2001, Lee 2001).

BUT: In Japanese (and all other languages), most sorts of ambiguity are tolerated.

(3) Taroo-wa, [Hanako-ga, jibun-oi-to]    omotteiru
Taroo-TOP Hanako-NOM self-ACC    hit      COMP thinks
‘Taroo thinks Hanako hit Taroo.’ OR ‘Taroo thinks Hanako hit Hanako.’

⇒ Avoidance of all forms of ambiguity is not a fundamental property of grammar.

My proposal falls in between these two extremes:

• Particular kinds of ambiguity are penalized by constraints in an Optimality Theory (OT) grammar (Prince and Smolensky 2004).

• Unless such an anti-ambiguity constraint is highly ranked, ambiguity is tolerated.

Outline of the talk:

• Where scrambling can and cannot occur in Japanese.

• The syntactic difference between scrambling and word order freezing.

• An OT constraint can appropriately penalize scrambling when it creates ambiguity.

• How this analysis appropriately both prevents and tolerates ambiguity.

• How to generate the set of potentially ambiguous forms for comparison.

2. The distribution and nature of scrambling

2.1. Interactions of scrambling, word order freezing, and ambiguity

Various case marking patterns and colloquial speech styles can cause morphological ambiguity between subjects and objects, and therefore affect the grammaticality of scrambling.

(4) Nom-ACC case marking distinguishes subjects and objects; scrambling is allowed.

(5) a. Taroo-ga Hanako-o osore-ru  b. Hanako-o, Taroo-ga    ti    osore-ru
Taroo-NOM Hanako-ACC    fear-PRES              Hanako-ACC    Taroo-NOM    fear-PRES
‘Taroo fears Hanako.’        ‘Taroo fears Hanako.’

Case morphology distinguishes subjects from objects, regardless of their position.

⇒ Scrambling is tolerated, because here it cannot create ambiguity.

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1 The scrambling discussed throughout the major portion of this paper is an optional process which moves a discourse topic to the front of a clause (Kuroda 1988; Saito and Fukui 1998); no clear meaning difference accompanies this movement. This sort of scrambling is different from focus-driven scrambling, which produces exhaustive meanings like ‘Taroo helps Hanako (and no one else)’, or contrastive meanings like ‘Taroo helps Hanako (not Ziroo)’; focus-driven scrambling is discussed in section 3.2.
When NOM-NOM case marking fails to distinguish subjects and objects, scrambling is blocked.

Stative verbs assign nominative –ga to both subjects and objects:

zyoozu ‘good at’, nigate ‘bad at’, suki ‘fond of’, kowai ‘afraid of’, etc.


Subjects and objects are morphologically identical, distinguished only by their position.

Scrambling cannot occur in these NOM-NOM sentences:

(7) a. Hanako-ga Taroo-ga kowa-i
    b. *Taroo-ga Hanako-ga ti kowa-i

This word order freezing prevents ambiguity between sentences with different subjects (bolded):


Scrambling may occur when either the subject or the object is missing its case particle:

(9) When colloquial case particle drop fails to distinguish subjects and objects, scrambling is blocked.

Some or all nominative and accusative case particles may drop in colloquial speech:

(10) a. Hanako-ga Taroo-o osore-ru
    b. Hanako-ga Taroo-ga osore-ru
    c. Hanako-ga Taroo-o osore-ru
    d. Hanako-ga Taroo-ga osore-ru

Scrambling may occur when either the subject or the object is missing its case particle:

(11) a. Taroo-o, Hanako-ga ti osore-ru
    b. Taroo-ga, Hanako-ga ti osore-ru

When both subject and object case particles drop, the two become morphologically identical, and are again distinguished only by their position.

Scrambling cannot occur when both case particles drop:

(12) *Taroo-ga, Hanako-ga ti osore-ru

Word order freezing again prevents ambiguity between sentences with different subjects:


Colloquial case particle drop (see (12), above) is a PF phenomenon – a stylistic choice about whether to spell out or delete case particles.

Because case particle drop can trigger word order freezing, word order freezing must also be a PF phenomenon.

Assumptions: Movement occurs in syntax, creating a chain of two copies of the moved item.

One of these copies is then spelled out at PF.

(14) Syntax   PF (morphological spellout)

    Syntactic structure   ➔    Phonological string

    Movement occurs, creating
    two copies of the moved item

    My claim: The difference between scrambling and word order freezing is whether the head or the tail of the movement chain is pronounced at PF.

In a NOM-ACC sentence, scrambling occurs.

In a scrambled sentence, the head of the scrambling chain is pronounced at PF.

(15) Syntax   PF

    O-ACC, S-NOM O-ACC VERB ➔ O-o, S-ga O-o, VERB

Note: In schematic examples throughout the handout, O = Object; S = Subject.

The default pattern of chain resolution is this chain head pronunciation.
In a NOM-NOM sentence, scrambling is blocked.

Scrambling occurs in syntax, but the tail of the scrambling chain is pronounced at PF.

\[(16) \quad \text{Syntax} \quad \text{PF} \quad \text{O-NOM, S-NOM O-NOMi, VERB} \rightarrow O-ga, S-ga O-ga, VERB \quad \text{*O-ga, S-ga O-ga, VERB} \]

Pronouncing the tail of the scrambling chain avoids ambiguity between sentences with different subjects.

\[(17) \quad \text{*-“Taroo-ga, Hanako-ga Taroo-ga, kowa-i.” = “Taroo-ga Hanako-ga kowa-i.”} \]

\[
\text{T-NOMH-NOMT-NOMH-NOMafraid.of-PRES} \quad \text{T-NOMH-NOMafraid.of-PRES} \]

\[
\'\text{Hanako is afraid of Taroo.} \quad \text{‘Taroo is afraid of Hanako.'} \]

**Summary**

Chain heads are usually pronounced – that is, the syntactic effects of scrambling are usually allowed to surface at PF.

BUT – ambiguity could result if the chain head were pronounced in a scrambled NOM-NOM sentence, i.e. if the effects of scrambling surfaced.

\[\text{Avoiding ambiguity is more important than pronouncing the head of a movement chain.} \]

### 3. Word order freezing as contrast preservation

#### 3.1. Subject contrast preservation triggers word order freezing

We need a formal architecture that can do two things:

- **Penalize specific kinds of ambiguity:**
  - Subject ambiguity is bad.
  - Other kinds of ambiguity (e.g. coreference) are okay.

- **Give different levels of importance to different priorities:**
  - Chain tail pronunciation is bad.
  - Ambiguity is worse.

The relative importance of priorities suggests an OT analysis (Prince and Smolensky 2004):

Constraints encoding the various priorities are ranked in order of their importance.

A form which violates a highly-ranked constraint is eliminated in favor of a form violating only lower-ranked constraints.

**Regarding the penalization of specific kinds of ambiguity:**

In OT phonology, much recent work has proposed systems that can enforce **contrast preservation**, i.e. ambiguity avoidance (e.g. Flemming 1995, 1996; Lubowicz 2003; Padgett 2003, 2004).

The desire to avoid subject-related ambiguity can be rephrased as a desire to preserve underlying subject-related contrasts.

That is: If two syntactic structures have different subjects, their surface (phonological) forms must be different – the subject-related contrast between these forms must be preserved.

\[\text{(18) a. Contrast neutralization (= ambiguity)} \]

\[\begin{align*}
\text{T-NOM, H-NOM T-NOM, kowa-PRES} & \quad \text{T-NOM H-NOM kowa-PRES} \\
'\text{Hanako is afraid of Taroo.'} & \quad \text{‘Taroo is afraid of Hanako.'} \\
\end{align*} \]

\[\quad \text{“Taroo-ga Hanako-ga kowa-i.”} \]

b. **Contrast preservation (= no ambiguity)**

\[\begin{align*}
\text{T-NOM, H-NOM T-NOM, kowa-PRES} & \quad \text{T-NOM H-NOM kowa-PRES} \\
'\text{Hanako is afraid of Taroo.'} & \quad \text{‘Taroo is afraid of Hanako.’} \\
\end{align*} \]

\[\quad \text{“Hanako-ga Taroo-ga kowa-i.”} \quad \text{“Taroo-ga Hanako-ga kowa-i.”} \]

**NOTE:** Throughout the handout, T is an abbreviation for Taroo and H for Hanako.

I propose that the constraint **PreserveContrast(Subject)** penalizes subject-related ambiguity.

This can’t be a general anti-ambiguity constraint like **NoAmbiguity**, because it’s specifically subject ambiguity that gets avoided in Japanese.

**Intuitively:**

\[\text{(19) PreserveContrast(Subject)} \quad \text{Syntactic structures with different subjects must have different phonological forms (i.e. must sound different).} \]
Formally:

(20) PRESERVECONTRAST(Subject):

Given two pairs of input-output correspondents \(I, O\) and \(I', O'\) where \(O\) and \(O'\) are in cluster \(C\), if Subject\((I) \neq \text{Subject}(I')\) and \(O = O'\), assign one violation to \(C\).

\(\text{Subject}(I)\) is a function which returns the value of the lexical material in spec-IP of \(I\), where \(I\) is a syntactic structure which is an input to PF.

The other relevant priority is that chain heads are usually pronounced (rather than deleted). This can be captured in the constraint MAX(Head).

(21) MAX(Head) \quad \text{Do not delete the head of a chain.}

Avoiding subject ambiguity is usually more important than pronouncing chain heads; this means that the constraint PRESERVECONTRAST(Subject) is ranked higher than MAX(Head).

(22) PRESERVECONTRAST(Subject) \succ MAX(Head)

One more thing: Ambiguity is a property of a pair of sentences, not single forms.

That’s why PRCONTR(Subj) needs to look at sets of forms, not single forms.

\(\Rightarrow\) OT evaluations must consider sets of inputs and outputs.

This sort of ‘multiple-input’ model of OT evaluation has been proposed in phonology by Flemming (1995, 1996), Lubowicz (2003), and Padgett (2003, 2004) among others.

PRCONTR(Subj) \succ MAX(Head) causes word order freezing in case particle drop sentences.

Any source of morphological ambiguity triggers freezing.

(24) \[
\begin{array}{ccc}
| \text{Input} | \text{Output} | \text{Constraint} | \text{Violated} |\\
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>{H-ACC, T-NOM, H-ACC, osore-PRES}, {H-NOM, T-ACC, osore-PRES}</td>
<td>{T-\varnothing, H-\varnothing, osore-ru}</td>
<td>\text{PRCONTR(Subj)}</td>
<td>\ast</td>
</tr>
<tr>
<td>{H-\varnothing, T-\varnothing, osore-ru}, {H-\varnothing, T-\varnothing, osore-ru}</td>
<td>\ast</td>
<td>\ast</td>
<td></td>
</tr>
</tbody>
</table>
| \{T-\varnothing, H-\varnothing, osore-ru\}, \{H-\varnothing, T-\varnothing, osore-ru\} | | \\
| \{T-\varnothing, H-\varnothing, osore-ru\}, \{H-\varnothing, T-\varnothing, osore-ru\} | | \\
| \{T-\varnothing, H-\varnothing, osore-ru\}, \{H-\varnothing, T-\varnothing, osore-ru\} | | \\
\end{array}
\]

PRCONTR(Subj) \succ MAX(Head) allows scrambling in NOM-ACC sentences.

Scrambling is only blocked where it should be blocked.

(25) \[
\begin{array}{ccc}
| \text{Input} | \text{Output} | \text{Constraint} | \text{Violated} |\\
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>{T-ACC, H-NOM, T-ACC, osore-PRES}, {H-NOM, T-ACC, osore-PRES}</td>
<td>{T-\varnothing, H-\varnothing, osore-ru}</td>
<td>\text{PRCONTR(Subj)}</td>
<td>\ast !</td>
</tr>
</tbody>
</table>
| \{T-\varnothing, H-\varnothing, osore-ru\}, \{H-\varnothing, T-\varnothing, osore-ru\} | | \\
| \{T-\varnothing, H-\varnothing, osore-ru\}, \{H-\varnothing, T-\varnothing, osore-ru\} | | \\
| \{T-\varnothing, H-\varnothing, osore-ru\}, \{H-\varnothing, T-\varnothing, osore-ru\} | | \\
\end{array}
\]

When subjects and objects are distinguished by case, PRCONTR(Subj) isn’t violated.

3.2. Not all subject-related ambiguity is prohibited

There is an exception to the generalization about scrambling and ambiguity given above:

In a NOM-NOM sentence where scrambling is driven by focus, scrambling can occur, despite the fact that this causes ambiguity.

Scrambling may be driven by a focus ([FOC]) feature.

(26) a. Hanako-ga Taroo-ga kowa-i
    Hanako-NOM Taroo-NOM [FOC] afraid.of-PRES
    ‘Hanako is afraid of Taroo.’

b. Taroo-ga Hanako-ga Taroo-ga kowa-\varnothing
    ‘Hanako is afraid of Taroo.’

\[2\] This kind of focus-driven scrambling is most natural in response to a question like “Who is Hanako afraid of?”
This scrambling causes ambiguity when it occurs in a NOM-NOM sentence.

Intonation does not disambiguate between these two meanings, as the two distinct syntactic structures have identical phonological and intonational forms.3


‘Hanako is afraid of TAROO’

T-NOM[FOC] H-NOM afraid.of-PRES

‘TAROO is afraid of Hanako’

This is expected when ambiguity avoidance is enforced by a violable constraint.

A constraint which demands chain head pronunciation in focus-driven scrambling contexts only must dominate PRCONTR(Subj).

(28) MAX(Head)/[Focus] Do not delete the head of a chain when it bears a [Focus] feature.

MAX(Head)/[Focus] » PRCONTR(Subj) » MAX(Head) allows ambiguity in focus contexts:

(29) [T-NOM[FOC] H-NOM T-NOM[FOC] kowa-PRES],


MAX(Head)/[Focus] PRCONTR(Subj) MAX(Head)

[ T-ga H-ga T-ga kowa-i]1

a. [ T-ga H-ga kowa-i]2

*!

b. [ T-ga H-ga kowa-i]2

Which set of forms must be compared?

In order to block subject-related ambiguity, the grammar must ensure that no two sentences with different subjects have identical phonological forms.

The grammar must look at a set of sentences with different subjects, and compare their phonological forms.

3.3. Which set of forms must be compared?

In order to guarantee that ambiguity is appropriately avoided, the grammar must look at a set of all syntactic structures whose phonological forms might become ambiguous.

Question: Where does the set of all possibly-ambiguous syntactic structures come from?

The wrong answer: Compare each sentence to all other possible sentences.

The problem with this: The set of all possible sentences is infinite.

Which sentences can be ambiguous?

Those with all the same words (i.e. those which are lexically identical).

If two sentences have different words, they can’t have identical phonological forms.

Where does the complete set of lexically identical syntactic structures come from?

The short answer: From the syntax evaluation which precedes PF.

In the multiple-input model of OT argued for here, all evaluations operate on sets of forms:

(30) a. (Exhaustive) set of lexically identical argument structures

b. Set of optimal syntactic structures

c. Set of optimal phonological forms

Syntax evaluations start with a set of all possible lexically identical argument structures.

This set is based on a single set of words, which are given all possible combinations of features and argument structure relationships among them.

The syntax evaluation chooses the optimal syntactic structure for each of the lexically identical argument structures.

This produces the desired complete set of lexically identical syntactic structures.

The PF evaluation then chooses the optimal phonological form for each syntactic structure, making sure that subject-related ambiguity is avoided as appropriate.

---

3 These phonologically ambiguous sentences are usually contextually unambiguous. For example, TAROO-ga Hanako-ga t, kowa ‘Hanako is afraid of TAROO’ is most natural in response to a question like ‘Who is Hanako afraid of?’, while TAROO-ga Hanako-ga kowa-i ‘TAROO is afraid of Hanako’ is most natural in response to ‘Who is afraid of Hanako?’; in each case, the context strongly prefers one meaning of the ambiguous sentence over the other.
3.4. Advantages of a constraint-based analysis of ambiguity avoidance

Word order freezing is triggered by subject ambiguity, not specific constructions.

Unrelated sources of morphological ambiguity between subjects and objects – e.g. NOM-NOM case marking and colloquial case particle drop – both block scrambling.

Constraints penalize only specific kinds of ambiguity.

PRCONTR(Subj) penalizes only subject-related ambiguity, while tolerating other common kinds of ambiguity (e.g. coreference).

(31) Taroo-wa [Hanako-ga, jibun-ov] nagutta]-to omotteiru
Taroo- TOP Hanako-NOM self-ACC hit COMP thinks
‘Taroo thinks Hanako hit Taroo.’ OR ‘Taroo thinks Hanako hit Hanako.’

Constraints are violable; undesirable ambiguity can be tolerated under pressure from higher-ranked constraints.

Focus-driven scrambling is always allowed despite the fact that it causes ambiguity, due to the ranking MAX(Head)/Focus » PRCONTR(Subj).

(32) “Taroo-ga Hanako-ga faree-ge kowa-i.”
‘Hanako is afraid of Taroo’

4. Conclusion

Observation: Japanese generally (though not always) avoids subject-related ambiguity, while readily tolerating other kinds of ambiguity.

Proposal: OT evaluations consider sets of lexically identical forms, in order to detect and penalize ambiguity.

Subject-related ambiguity is penalized by the constraint PRESERVECONTRAST(Subject).

The effects of this anti-ambiguity constraint depend on its ranking with respect to other constraints in an OT grammar.

References


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