

# Statistical Anatomy of Unacceptability

## A Case Study in Japanese Causatives

Kenji Yoshida & Yoshihisa Kitagawa  
Indiana University

WPSI 3, Sept. 15, 2007

# Grammaticality Judgments in Generative Syntax & Their Problems

- Grammaticality of sentences based upon **contrast** in **acceptability judgments**:

ok vs. \*\* / \* / ?\* / ??? / ?? / ? / (?)

- The variation (\*\*~ (?)) is often left unexplained.
- Acceptability may be lowered by heterogeneous and extra-grammatical causes.
  - Their discrimination is often neglected.
- Researchers often disagree about the grammaticality of sentences.
  - The difference is ascribed to idiolectal variation or left irreconcilable.

# Goals

Attempt to resolve disagreement on grammaticality judgments

Explore a way to discriminate:

speakers' recognition of "ungrammaticality"

from

that of "grammaticality with somewhat lowered acceptability"

Statistical analysis of experimental results on the acceptability judgments by native speakers

# Case study: *Sase*-causative in Japanese

- Phonology → 'Causativized' complex V at PF

[<sub>IP</sub> Causer Causee *V-sase* ]

- Semantics → Syntactically complex structure at LF

[<sub>IP</sub> Causer (Causee<sub>1</sub>) [<sub>XP</sub> Causee<sub>1</sub> *V* ] *sase* ]

- 2 distinct particles can mark causees:

causee-*ni* 'dat' (= *ni-causative*) or

causee-*o* 'acc' (= *o-causative*)

# Controversy: Syntactic positions of *ni*-causee and *o*-causee

- *ni*-causee as matrix object: (Tonioke (1978))

[<sub>IP</sub> Causer Causee<sub>1</sub>-*ni* [<sub>XP</sub> [*e*]<sub>1</sub> ... V ] *sase* ]

- *o*-causee as matrix object: (Kuroda (1965))

[<sub>IP</sub> Causer Causee<sub>1</sub>-*o* [<sub>XP</sub> [*e*]<sub>1</sub> ... V ] *sase* ]

- No syntactic asymmetry between the two: (Kitagawa (1986))

[<sub>IP</sub> Causer Causee-*ni/o* ... V-*sase* ] (LF) ⇒

[<sub>IP</sub> Causer [<sub>XP</sub> Causee-*ni/o* ... V ] *sase* ] (LF)

# Interpretative asymmetry between *ni*-causative and *o*-causative

*ni*-causative tends to be more severely **restrained** than *o*-causative, pragmatically and semantically:

- a) The causer must assume that *ni*-causee must be willing or has consent to do the action being caused. (Kuroda (1965))
- b) The caused act in *ni*-causative must be self-controllable. (Harada (1973))
- c) The *ni*-causee must be assumed by the speaker of the utterance to have the ego or the conscious self of his (or its) own in the caused event. (Kitagawa (1979))

# A test case: The Distributed Morphology (DM-)analysis (Miyagawa (1998, 1999))

- Overt Syntax — Complex syntactic structure maintained
- PF — "Late insertion" of *-sase* (make/let) to "V[cause]"
- LF — *o*-causee moves into the matrix Spec-AGRoP for ACC

a) <i>ni</i> -causative:	Causer-ga	Causee <sub>i</sub> - <i>ni</i>	[ <sub>IP</sub> [ <sub>e</sub> ] <sub>i</sub> ... V ]	<i>sase</i>
	-nom	-dat		cause
b) <i>o</i> -causative:	Causer-ga		[ <sub>IP</sub> Causee- <i>o</i> ... V ]	<i>sase</i>
	-nom		-acc	cause

— *ni*-causee is in the **matrix** clause  
*o*-causee is in the **subordinate** clause

Predictions: (N.B. (ii) not considered by Miyagawa)

- (i) \* "V-Ajct + causee-*ni*" (V-Ajct = Adjunct that modifies V)
- (ii) \* "causee-*o* + C-Ajct" (C-Ajct = Adjunct that modifies *-sase*)<sup>7</sup>

# Reported contrast: (From Miyagawa (1999: 249) including judgments)

(1) a. <sup>ok</sup>Taroo-ga [<sub>IP</sub> kooen-*e*<sup>V</sup> kodomo<sub>i</sub>-*o* ik<sup>V</sup> ]-ase-ta.  
 Taro-nom park-to child-acc go-cause-past

b. <sup>???</sup>Taroo-ga kooen-*e*<sup>V</sup> kodomo<sub>i</sub>-*ni* [<sub>IP</sub> [e]<sub>i</sub> ik<sup>V</sup> ]-ase-ta.  
 park-to child-dat go-cause-past

'Taro made/let (his) child go to the park.'

(2) \*Adjunct movement in (1b):

Taroo-ga [<sub>VP</sub> kooen-*e*<sup>V</sup> [<sub>VP</sub> kodomo<sub>i</sub>-*ni* [<sub>IP</sub> [e]<sub>i</sub> *t*<sub>1</sub> ik<sup>V</sup> ]-ase ]]-ta  
 park-to child-dat |  
 ↑ ×

—VP-adjunction for the final landing of movement is prohibited (Miyagawa (1997))

# The DM-analysis (cont'd)

(3) Why is (1b) not completely unacceptable?

(?)Taroo-ga [<sub>XP</sub> KOOEN-E<sup>V</sup> [<sub>VP</sub> kodomo<sub>i</sub>-*ni* [<sub>IP</sub> [e]<sub>i</sub> t<sub>1</sub> ik<sup>V</sup> ]-ase]]-ta  
park-to child-dat |  
↑ \_\_\_\_\_ ok \_\_\_\_\_ |

— "... there is a **focus position** above the VP (Miyagawa (1997)), which is a legitimate landing site for 'to the park'. "  
(Miyagawa (1999: 249))

# Easily found counter-examples

(4) ???V-Ajct causee-ni [ ... V ] CAUS  
|\_\_\_\_\_×\_\_\_\_\_|

OK Kooti-wa hiraoyogi-de<sup>V</sup> sensyu-tati-ni oyog<sup>V</sup>-aseta  
coach-top breaststroke-in swimmers-dat swim-caused  
'The coach had the swimmers swim in the breaststroke.'

(コーチは、平泳ぎで選手達に泳がせた。)

cf. こんなにひどくお前達に心配させちゃって済まない。

(5) ???[ causee-o C-Ajct V ] CAUS  
|\_\_\_\_\_×\_\_\_\_\_|

OK Kariforunia-wa subeteno huhoonyuukokusya-o kyooseetekini<sup>C</sup>  
Carifornia-top all illegal.alien-acc coersively  
kikokus-ase<sup>C</sup>ta. (カリフォルニア州は、全ての不法入国者を強制的に  
return.caused 帰国させた。)

cf. 守衛さんは、切符のない僕たちを見て見ぬ振りをして入場させてくれた。

# Research questions

1. What factors and their interactions lower acceptability in causative Ss and to what extent?

Is the prediction of the DM-analysis supported?

2. Can we and should we recognize dialectal or idiolectal variations in the case in question?

If so, in what way are they distinguished?

# Design of test sentences

## Pre-test sentences:

- V-adjunct vs. C-adjunct
- In V-frame vs. C-frame  
( $2 \times 2 \times 6 = 24$  Sentences)

# Design of test sentences (cont'd)

(6) Acjt-testing frames:

a. **V-frame:**

Syuzu-yutu-no yokuzitu aono kanzya-wa {ziyuuni<sup>V</sup> / # kyooseetekini<sup>C</sup>} arukimawatta  
operation-gen next.day that patient-top freely coersively walked.around  
'That patient walked around { freely / coersively } on the next day of the operation.'

(手術の翌日、その患者は {自由に<sup>V</sup> / # 強制的に<sup>C</sup>} 歩き回った。)

b. **C-frame:**

Isya-ga watasi-ni {# batahurai-de<sup>V</sup> / muriyari<sup>C</sup>} saseta koto-ga aru  
doctor-nom I-dat butterfly.stroke.in coersively made thing-nom exit  
'There is something the doctor made me do { in the butterfly stroke / coersively }.

(医者が、私に {# バタフライで<sup>V</sup> / 無理矢理<sup>C</sup>} させた事がある。)

→ Check if speakers properly distinguish the adjuncts to be associated with V and those associated with the causative predicate, and if the adjuncts can be safely used in the main experiment.

# Design of test sentences (cont'd)

## Experimental causative sentences:

- Adjunct type: *V-Ajct* vs. *C-Ajct* (6 adjuncts × 2)
- Particle: *ni* vs. *o* (2 types)
- Location of adjunct: *left* vs. *right* (2 types)

( $2 \times 2 \times 2 \times 6 = 48$  Sentences)

→ Test the influence of all these relevant factors and their interaction on acceptability judgments.

# Design of test sentences (cont'd)

## Causative sentences in Pseudo-cleft:

(7) V-adjunct + *ni*:

[Background ... *hiraoyogi-de*<sup>V</sup> *sensyutati-ni* *oyog*<sup>V</sup>-ase-ta-no-wa ]  
breast.stroke-in swimmers-dat swim-cause-past-NZR-top

[Focus *ano-kooti-desu* ]  
that.coach-copula

'It is that coach who made the swimmers do the breaststroke.'

(自由形の競技なのに 平泳ぎで 選手達に泳がせたのは、あのコーチです。)

→ The adjuncts placed in the background portion of a pseudo-cleft sentence to **avoid** their **focus interpretations**.

# Design of test sentences (cont'd)

## Filler sentences:

- Grammatical Causatives 6 Sentences
- Ungrammatical Non-causatives 18 Sentences

(8) Boku-ga **teeneeni** hara-o-tateteiruno-wa aitu-ga **hidoku** ayamarooto-sinai-kotodesu  
I-nom politely am.angry-NZR-top he-nom badly wouldn't.apologize-thingCOP  
'The reason why I am politely angry is because he wouldn't badly apologize.'

\*僕が**ていねい**に腹を立てているのは、あいつが**ひどく**謝ろうとしないことです。

cf.\*私たちが**健康**に望んでいるのは、家族全員が **たったひとつ**暮らしていくことです。

- Involve the same type of **improper modification** as in ungrammatical pre-test Ss and allegedly ungrammatical 'V-Ajct + *ni*' experimental causative Ss.

→ To obtain the **base line judgment** of **clearly acceptable** and **clearly unacceptable** sentences.

# Abbreviation of sentences

- *G-pre*: pre-test sentences where V/C-Ajcts are used in the compatible frames

- *U-pre*: pre-test sentences where V/C-Ajcts are used in the incompatible frames

- *o-caus*: Causative sentences with the particle '-o' as the causee marker

- *ni-caus*: Causative sentences with the particle '-ni' as the causee marker

- *G-filler*: filler sentences that has no problem

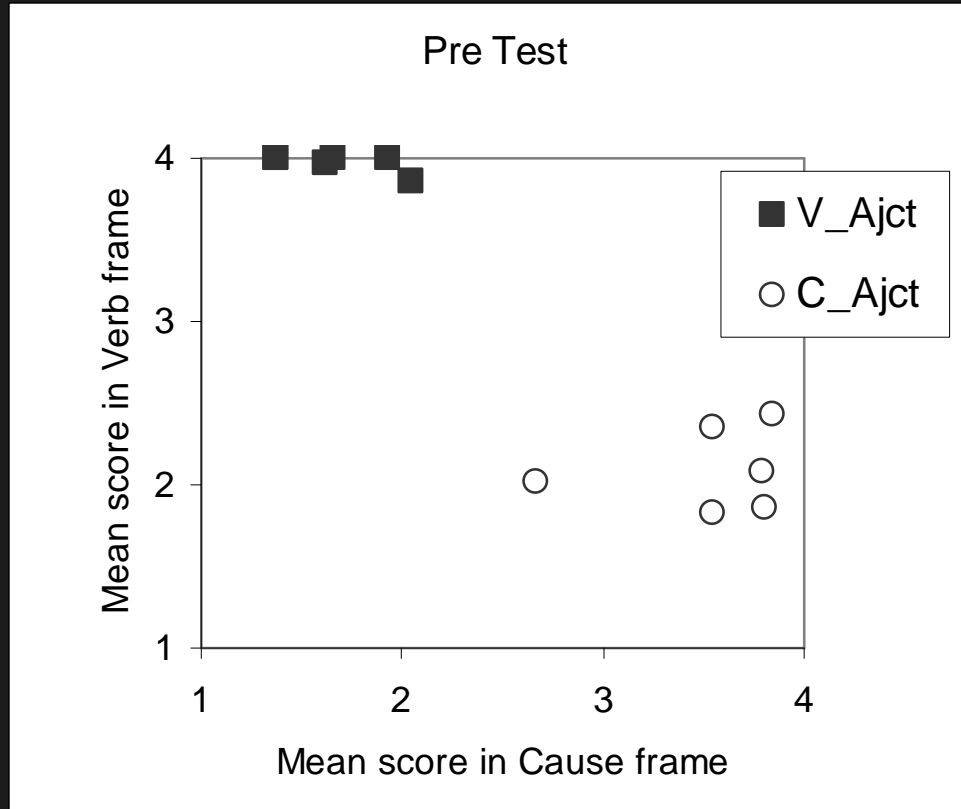
**U-sentences**

- *U-filler*: filler sentences with improper modification or otherwise infelicitous use of vocabulary

# Procedure

- Acceptability judgments by 58 native speakers (college students, 18 – 20 years old) by silent reading.
- 4-grade rating scale
  - a: Perfectly legitimate
  - b: Not perfect, but basically legitimate
  - c: May be interpretable, but not permissible
  - d: Never permissible
- This ordinal 4 scale (a ~ d) was treated as continuous (4 ~ 1).
- Sentences are randomized in order within pre-test and others (experimental causative sentences & fillers).

# Pre test result: V-Ajct vs. C-Ajct



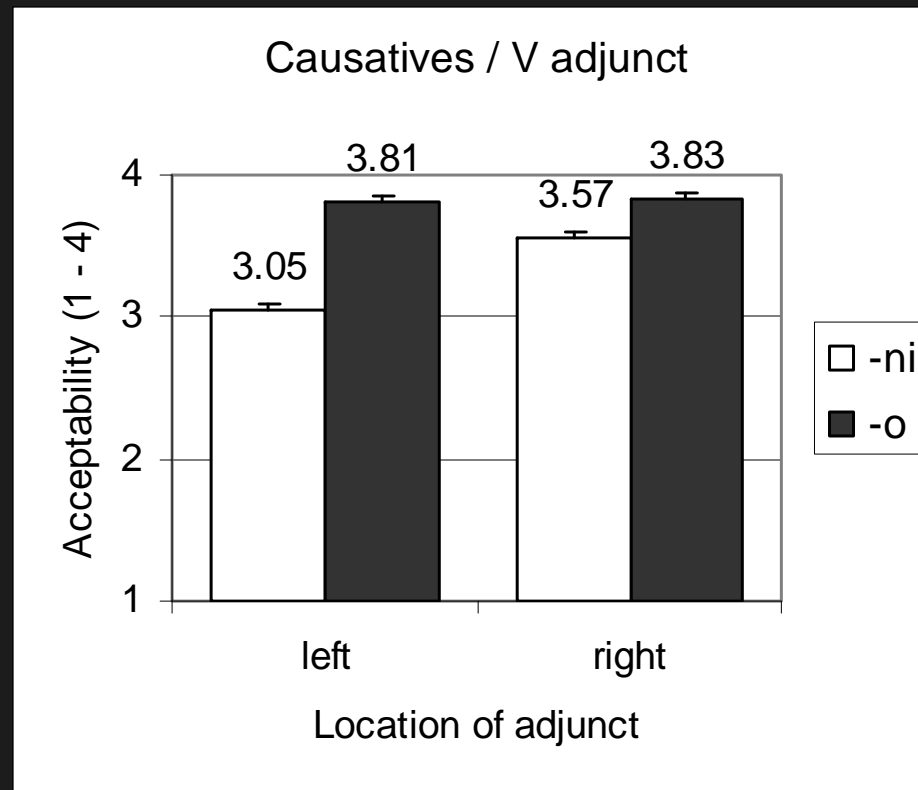
V- & C-adjuncts are distinguished based on the acceptability in two frames.

→ Adjuncts can be reliably used in Analysis 1 & 2.

# Analysis 1: Experimental Causative Sentences

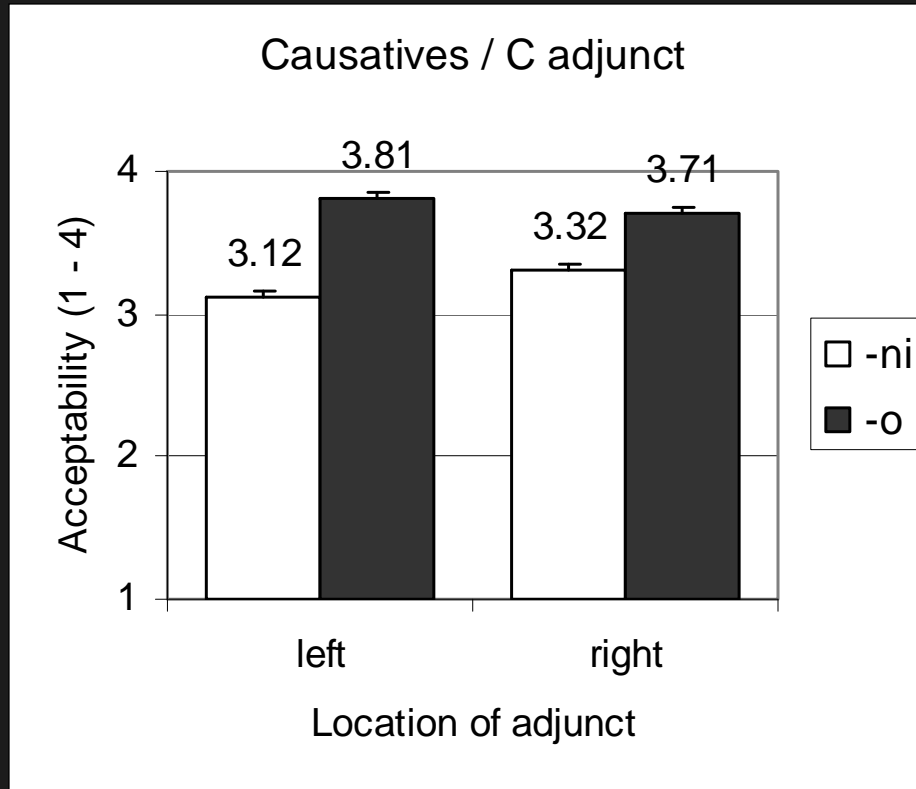
- Investigate the influential factors working on the judgments of *ni-/o-* causatives
- 2-way *ANOVA of repeated measures*
  - Dependent variables: acceptability scores (4 - 1)
  - Independent variables (treated as within-subject factors)
    - Particles: *ni* vs. *o*
    - Location of adjuncts: left vs. right (of causee)
  - Conducted for V-Ajct & C-Ajct data separately.

# Results: V-Ajct



- *ni* < *o*:  $F(1, 305) = 218.00, p < .001$
- left < right:  $F(1, 305) = 76.26, p < .001$
- *ni*  $\times$  left = worst:  $F(1, 305) = 66.81, p < .001$

# Results: C-Ajct



- *ni* < *o*:  $F(1, 305) = 161.3$ ,  $p < .001$
- no location effect:  $F(1, 305) = 3.53$ ,  $p = .061$
- *ni*  $\times$  left = worst:  $F(1, 305) = 28.47$ ,  $p < .001$

# Discussion:

## Influential Factors on Acceptability Judgments

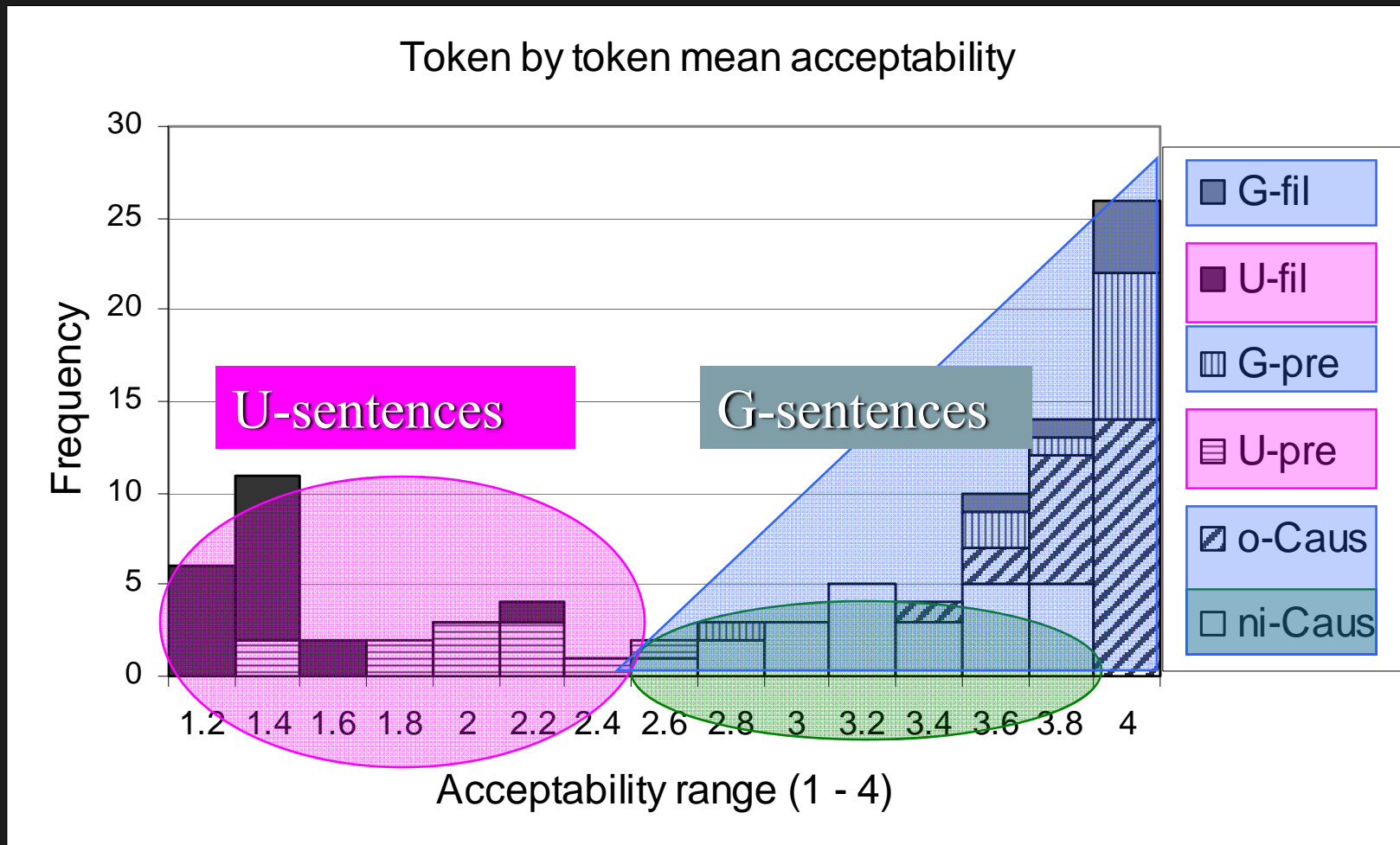
1. Particle effect for both V/C-Ajct:  
 $ni < o$  **regardless of adjunct type**
2. Location effect for V-Ajct but not for C-Ajct:  
left < right      only for V-Ajct  
(not observed: left > right for C-Ajct)
3. Particle  $\times$  Location interaction for both V/C-Ajct:  
 $ni \times$  left is least acceptable **regardless of adjunct type**  
→ Incompatible with the prediction of the DM- analysis.

Source of the effects (1, 2 above)?

- $ni < o$ : Pragmatic restriction on *ni*-causatives
- left < right: Markedness on the position of an adjunct relative to the modified V/C

# Meaning of 'mean' acceptability

- $V\text{-Ajct} \times ni \times \text{left} = 3.05$ : Low enough to support the prediction?  
→ Not really. They are well above U-fillers and U-pre sentences.



## Analysis 2: Variation among speakers

- Investigate if there is a sub-group of speakers whose grammar is distinct (e.g., the DM-analysis).
- *Factor Analysis* to explore possible 'latent dimensions' (a.k.a. *factors*) underlying the speakers' judgments.
  - *Unweighted Least square* method, *varimax rotation* (non-orthogonal) with *Kaiser normalization*
- Data set: acceptability judgments (4-1)
  - of All subjects (58) × All sentences (96)
  - *Cronbach's alpha* (reliability measure) = **.993**

# Result of Factor Analysis

- 3 factors extracted (criterion = eigenvalues  $> 1.0$ ,  $R^2 = .766$ ).
- Speakers divided in 3 groups based on relative magnitude of factor load (i.e., correlation with 3 factors).

Group 1 (32 speakers) = high Factor 1 load

Group 2 (19 speakers) = high Factor 2 load

Group 3 ( 7 speakers) = high Factor 3 load

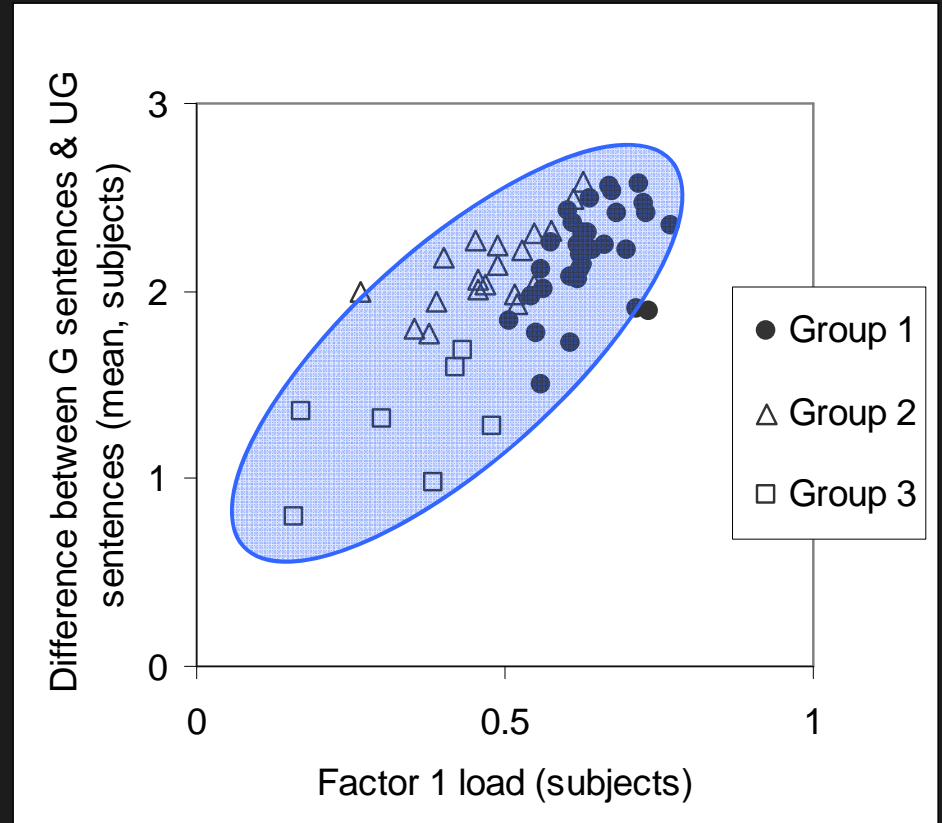
→ Grouping is not related to regional affiliation of the speakers ( $\chi^2 = 5.505$ ,  $p = .064$ ). → No grouping by dialects

	Group 1	Group 2	Group 3
Eastern JPN	19	15	7
Western JPN	13	4	0

# Interpretation of factors: Factor 1

- The higher Factor 1, the larger the rating differences between G- and U-sentences.

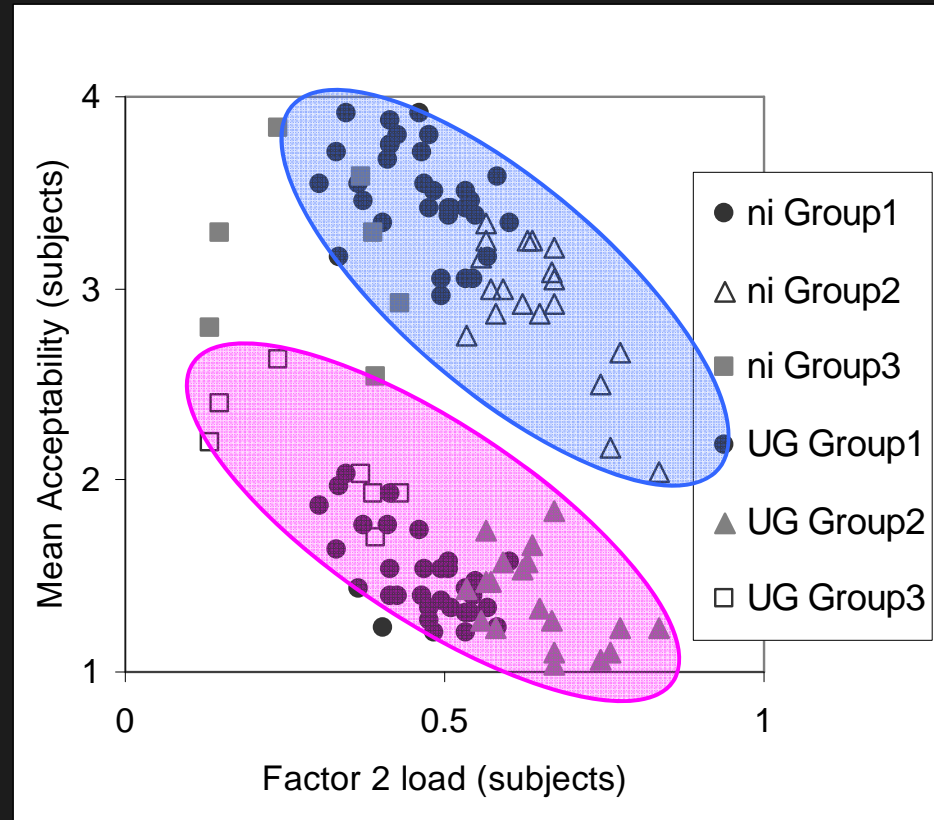
→ Factor 1 = (Speakers' tendency of being)  
**Discriminant of grammaticality**



# Interpretation of factors: Factor 2

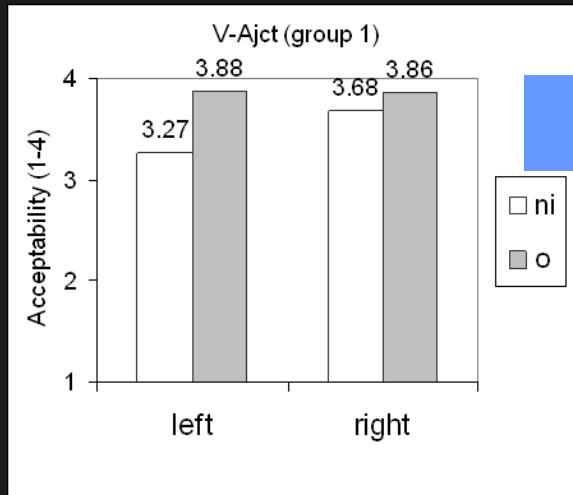
- The higher Factor 2, the lower the ratings of *ni-causatives* & *U-sentences*.

- Cuts across grammaticality
- *ni-causatives* pragmatically more restricted than *o-causatives*.

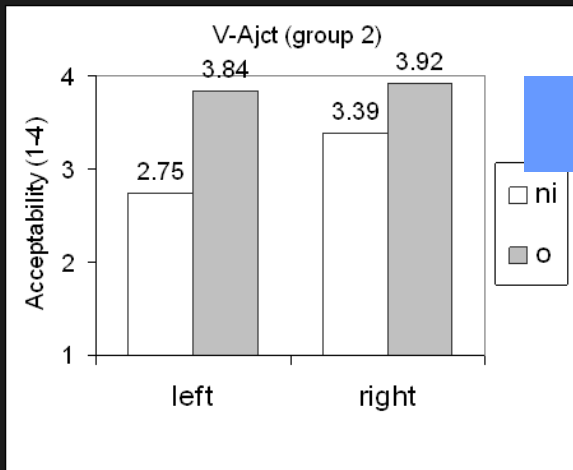
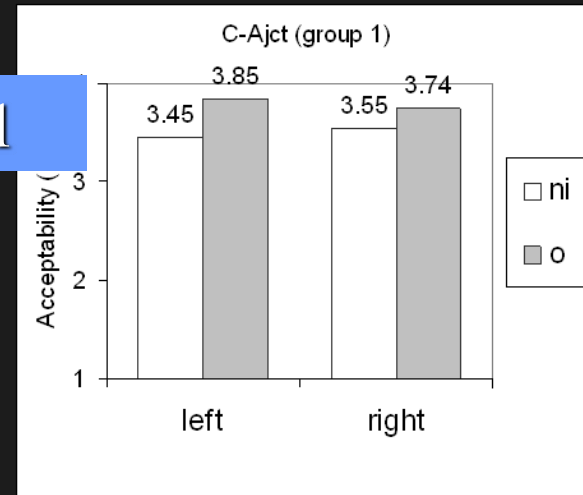


→ Factor 2 = Sensitive to **extra-grammatical degrading** of the sentences

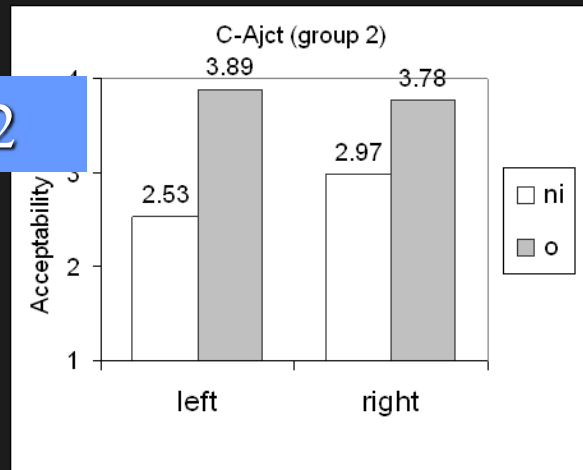
# Group 1 & 2, Rating for Causatives



Group 1



Group 2



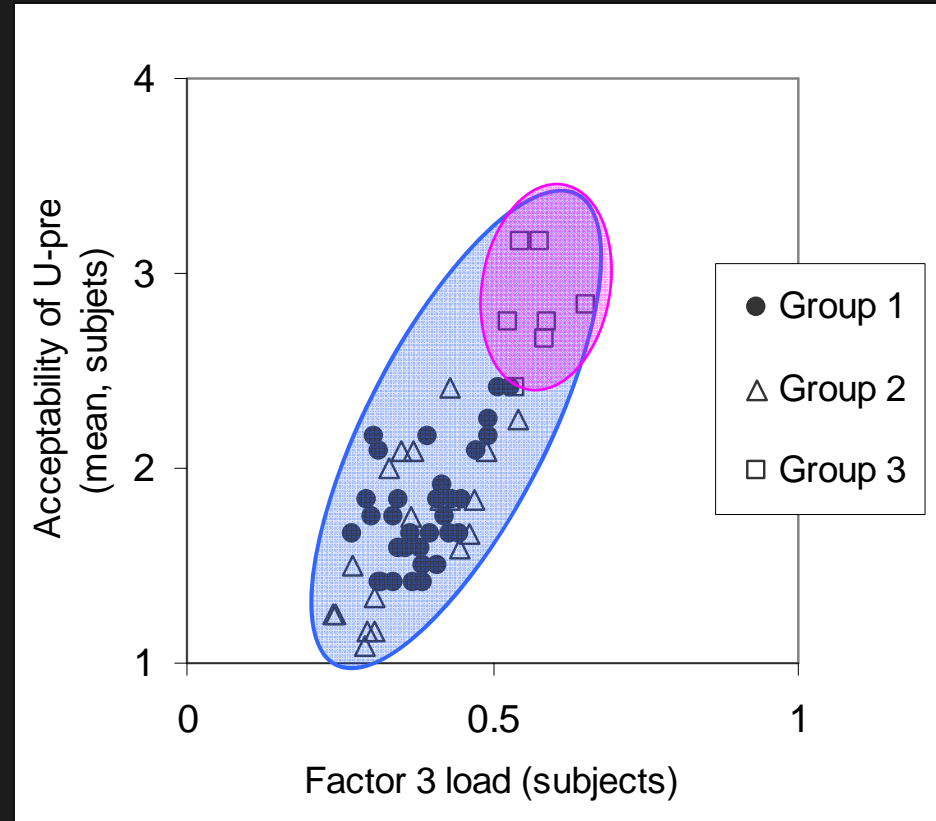
- Group 1 and 2 have homogeneous judgment patterns.
- Group 2 with lower acceptability of *ni-causatives* irrespective of positions and Ajct types.

# Interpretation of factors: Factor 3

The higher Factor 3, the higher U-pre Ss were rated.

→ Factor 3 = Equivocal in judgments on Ajct use.

→ Group 3 = Unable to discriminate between V & C-Ajct (**fail to qualify the pre-test**).



# Discussion

Subgroups of Speakers were identified:

Group 1: Clear judgments on grammaticality

Group 2: Sensitive to extra-grammatical  
degrading

Group 3: Equivocal judgments

→ No subgroups with distinct grammar.

# Goals

Attempt to resolve disagreement on grammaticality judgments

Explore a way to discriminate:

speakers' recognition of "ungrammaticality"  
from

that of "grammaticality with somewhat lowered acceptability"

Statistical analysis of experimental results on the acceptability judgments by native speakers

# Conclusions

1. ① 'Ungrammaticality' vs. ② 'Grammaticality with lowered acceptability' can be distinguished.
2. Controversy on grammaticality judgment can be resolved.

Test case: *ni-causative* should be regarded as a case of ②

→ The DM-analysis should be rejected as a case involving the confusion between ① & ② above.

3. Proposal — Effective method to resolve controversy through experimental investigations involving:
  - (i) Large sample of speakers' acceptability judgments
  - (ii) Quest for the fine structure of the collected data (e.g., data mining appealing to statistical analysis)

# Future projects

- New experiments on different linguistic phenomena that may involve similar confusion between 'Ungrammaticality' vs. 'Grammaticality with lowered acceptability'.  
(e.g., LF Intervention effect + Anti-superiority)
- Other analyses to reconfirm the results of the present analysis (cluster analysis, nonparametric methods, etc.).
- Corpus study to investigate the frequency distribution of causative Ss.

Thank you  
for your attention

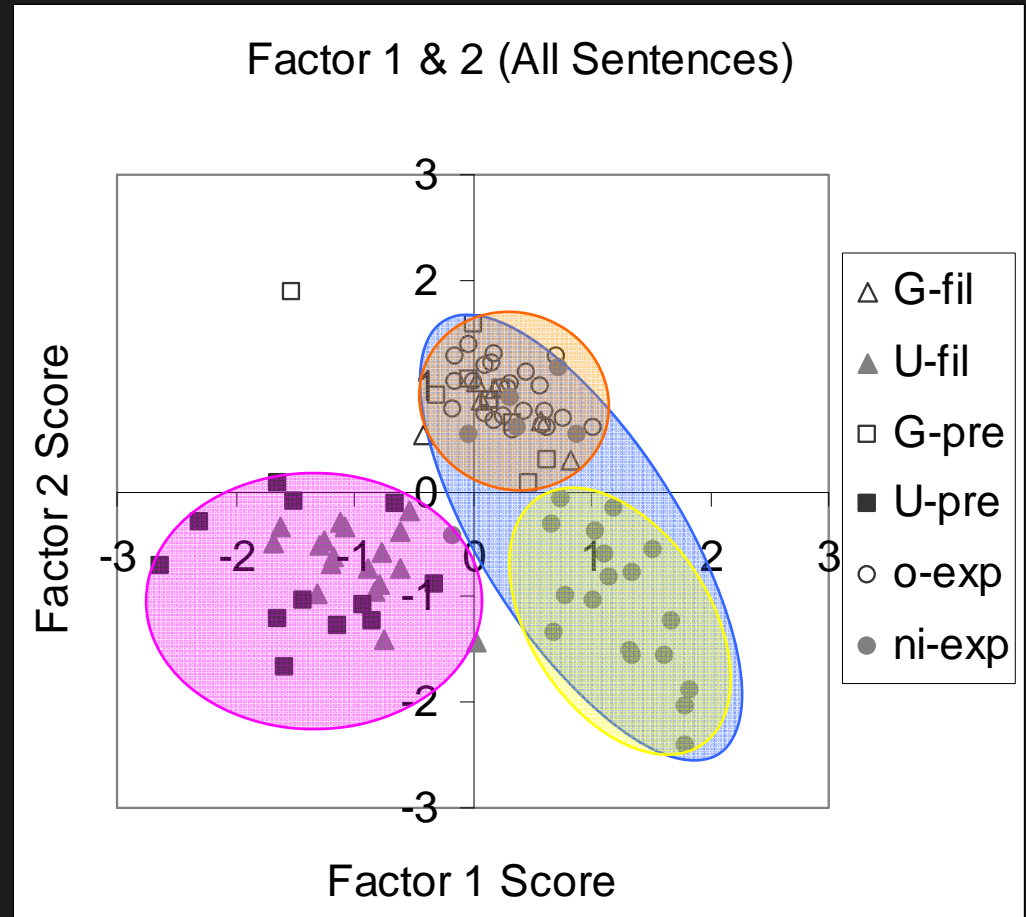
Special thanks to Yuki Hirose  
for providing experimental  
resources

# References

- Harada, S. I. (1973) "Counter Equi NP Deletion," *Annual Bulletin*,, Research Institute of Logopedics and Phoniatics, University of Tokyo.8, 133-143.
- Kitagawa, Yoshihisa (1979) "Notes on Semantics of Japanese Causativization," *Attempts in Linguistics*, 7.17-30.
- Kitagawa, Yoshihisa (1986) *Subjects in Japanese and English*, Ph. D. dissertation, University of Massachusetts at Amherst (available as Kitagawa (1994) with annotations).
- Kuroda, S.-Y. (1965) "Causative Forms in Japanese," *Foundations of Language*, 1,.30-50.
- Miyagawa, Shigeru (1997) "Against Optional Scrambling," *Linguistic Inquiry*, 28.1, 1-25.
- Miyagawa, Shigeru (1998) "(S)ase as an Elsewhere Causative and the Syntactic Nature of Words," *Journal of Japanese Linguistics*, 16.67-110.
- Miyagawa, Shigeru (1999) "Causatives," in Tsujimura, Natsuko (ed(s).), *The Handbook of Japanese Linguistics*, Blackwell, Oxford, 236-268.
- Tonioke, Shigeo (1978) "On the Causative Construction in Japanese," in Hinds, John and Irwin Howard (ed(s).), *Problems in Japanese Syntax and Semantics*, Kaitakusha, Tokyo, 3-29.

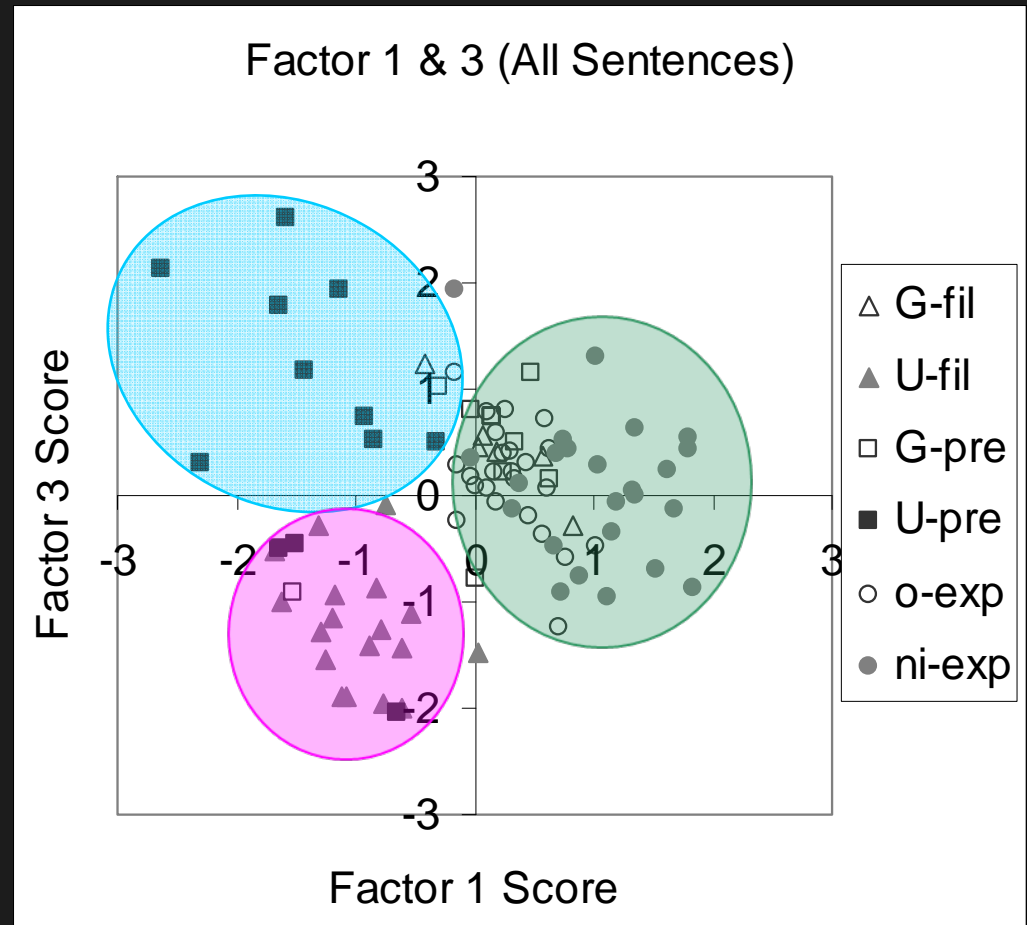
# Sentences (factor 1 & 2)

- Factor 1
  - Divides U-sentences (U-filler, U-pre) from others (G-sentences)
- Factor 2
  - Divides about 3/4 of *ni*-causatives from other causative Ss

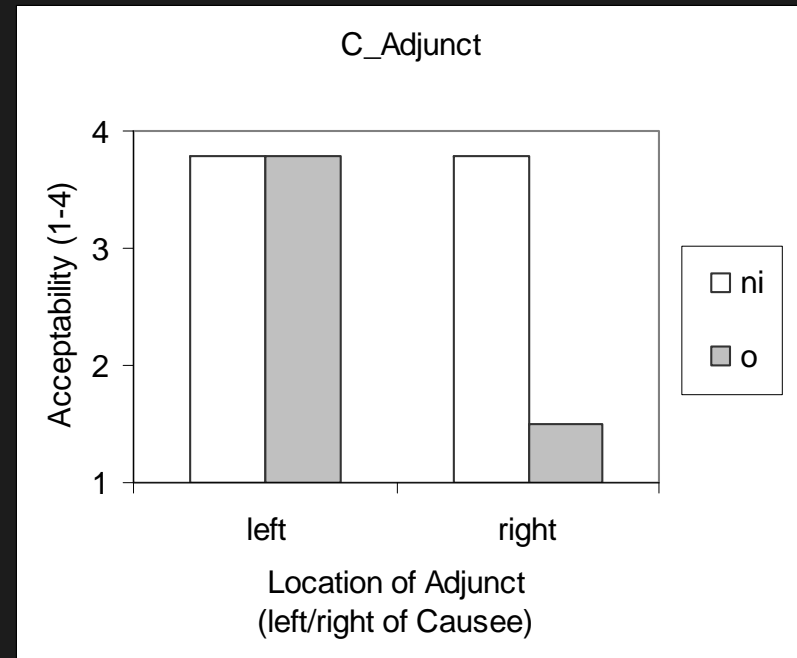
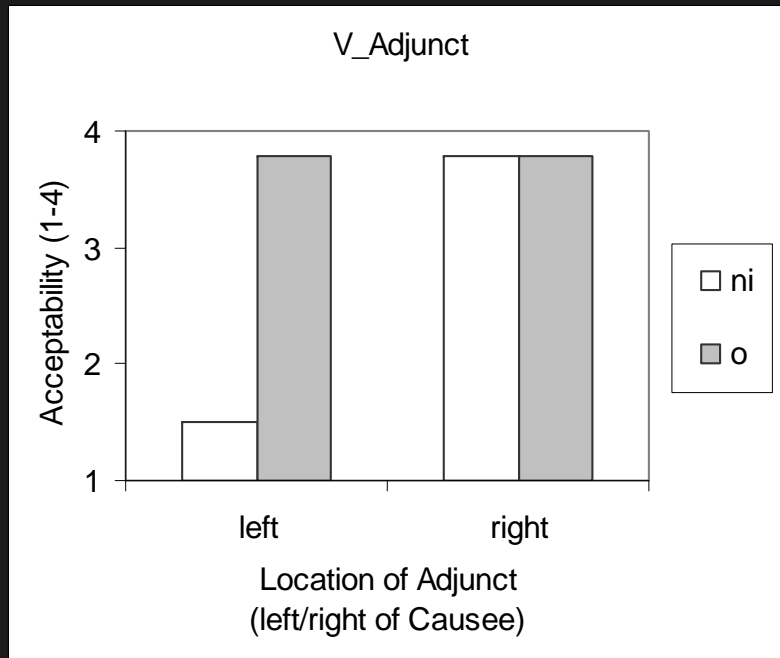


# Sentences (Factors 2 & 3)

- Factor 3
  - Divides U-sentences into U-filler and U-pre
  - Backs up the interpretation of Factor 3 (Group 3 fails to properly distinguish C-/V-Ajcts)



# Prediction to be tested (the DM-analysis)



- V-Ajct: adjunct to the left of causee is dispreferred with the particle 'ni'. (left panel)
  - C-Ajct: adjunct at the right of causee is dispreferred with the particle 'o'. (right panel)
- Significant interaction (Location × Causee marker) is predicted