



- (5) a. Causer-ga V-Ajct Causee<sub>1</sub>-*ni* [<sub>IP</sub> [e]<sub>i</sub> ]-sase  
 b. Causer-ga [<sub>IP</sub> Causee-*o* C-Ajct V ]-sase

The contrast in (6) is reported as support for this analysis. ((6a-b) are from Miyagawa (1999: 249) including judgments and translations. We disregard other aspects of the DM-analysis that are irrelevant to our discussion.)

- (6) a. <sup>ok</sup>Taroo-ga [<sub>IP</sub> [<sub>V-Ajct</sub> **kooen-e** ] kodomo-*o* [<sub>V</sub> **ik** ]]-ase-ta. 'Taro made (his) child go to the park.'  
 Taro-NOM park-to child-ACC go-CAUSE-PAST  
 b. <sup>???</sup>Taroo-ga [<sub>V-Ajct</sub> **kooen-e** ] kodomo<sub>1</sub>-*ni* [<sub>IP</sub> [e]<sub>i</sub> [<sub>V</sub> **ik** ]]-ase-ta. 'Taro let (his) child go to the park.'  
 Taro-NOM park-to child-DAT go-CAUSE-PAST

**3. Experiments:** We conducted experiments described in (7) below to examine this prediction. Our main goal here is to demonstrate the usefulness of statistical analyses in discriminating speakers' recognition of ungrammaticality from that of lowered acceptability induced by extra-grammatical factors, rather than refuting the DM-analysis in particular.

- (7) a. 58 subjects, all non-linguists, native speakers of Japanese, ages 18-20.  
 b. Pre-test: 24 sentences to test if the subjects actually distinguish V-Ajct from C-Ajct. 51 reliable subjects were identified. (7 persons who failed to clearly discriminate V-Ajct from C-Ajct were excluded.)  
 c. Main experiment: Causative sentences containing an adjunct with 8 distinctive combinations of 3 aspects of causative sentences — [1] Adjunct type (V-Ajct vs. C-Ajct), [2] Particle type (*ni* vs. *o* on causee), and [3] Location of Ajct (left vs. right of causee), 6 sentences each, totaling 48.  
 d. The subjects rated 48 experimental and 24 filler sentences by selecting one of: (a) clearly legitimate, (b) basically legitimate, (c) perhaps illegitimate, (d) clearly illegitimate, with some general instructions and examples clarifying the notion of "legitimate sentences" provided in advance. (a)~(d) in the subjects' answers were converted into scores of 4~1 points, respectively.

In all experimental sentences, the sequence of an adjunct and a causee (in either order) was placed in the background portion of a pseudo-cleft construction as in (8) below in order to discourage the focalization of the adjunct, which Miyagawa considers to be the reason why (6b) may not be regarded as fully unacceptable.

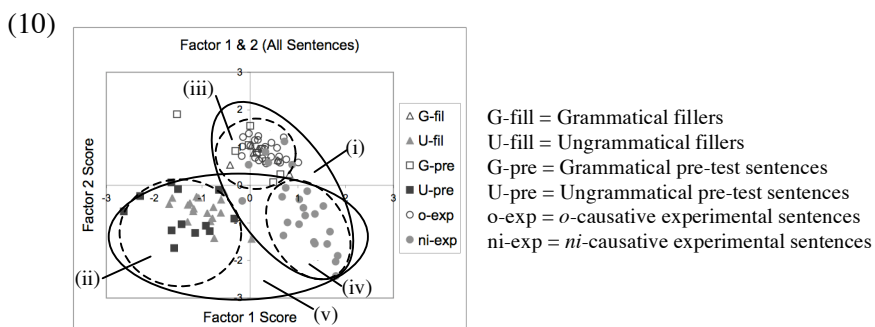
- (8) [<sub>Background</sub> ... *hiraoyogi-de sensyutati-ni* oyog-ase-ta-no-wa ] [<sub>Focus</sub> ano-kooti-desu ]  
 breast.stroke-in swimmers-DAT swim-CAUSE-PAST-HE.WHO-TOP that.coach-COPULA  
 'It is that coach who made the swimmers do the breaststroke.'

We obtained the findings and conclusions summarized in Sections 4-7 below.

**4. Factor analyses:** In order to examine in what way sentences and speakers are divided into subgroups, we conducted Factor Analysis which compared the patterns of acceptability responses concerning distinct sentence types by each subject, using (9).

- (9) Extraction Method: Unweighted Mean Square, Rotation: Varimax, 3 Factors with Eigenvalues higher than 1 were extracted,  $R^2 = .766$  (Factor 3 identified the 7 subjects mentioned in (7b) above.)

(10) below illustrates all sentences plotted by Factor 1 and Factor 2 scores — because the number of sentences is larger than that of subjects in our experiment, we put the subjects in columns and the sentences in rows in the data set for our Factor Analysis.



[1] Factor analysis of sentences: Factor 1 clearly distinguishes **grammatical fillers & grammatical** pre-test sentences (= (i) in (10)) from **ungrammatical fillers & ungrammatical** pre-test sentences (= (ii)). Crucially, all experimental causatives are grouped with (i). (Mean acceptability: (i) = 3.60, (ii) = 1.53 (possible range of acceptability = 1.00 ~ 4.00)) That is, Factor 1 discriminates grammatical sentences ((i) including all causative sentences under all distinct experimental conditions described in (7c) from ungrammatical sentences ((ii)).

Factor 2 distinguishes, in a less clear fashion, all grammatical fillers & grammatical pre-test sentences, *o*-causatives and 20% of *ni*-causatives (= (iii) in (10)) from 75% of *ni*-causatives (= (iv)) **within the group (i) above**. The *ni*-causatives in (iii) are highly acceptable while those in (iv) are less acceptable. (Mean acceptability: (iii) = 3.78, (iv) = 3.15) Factor 2, in other words, distinguishes grammatical and highly acceptable sentences ((iii) from grammatical but somewhat less acceptable sentences ((iv)).

[2] Factor analysis of speakers: Factor 1 is correlated with each subject's degree of discriminating the grammatical sentences (i) from ungrammatical sentences (ii) above. The higher the Factor 1 load of each subject is, the more clearly she accepts sentences of group (i). (Pearson's *r* (Factor 1 \* Mean acceptability of sentences in (i) by all subjects) = .800)

Factor 2 is correlated with the degree the subjects were affected by whatever awkwardness grammatical sentences (i) may involve. The higher the Factor 2 load is, the lower the acceptability of **some** *ni*-causatives ((iv)) becomes. (Pearson's *r* (Factor 2 \* Mean acceptability of (iv) (= 75% of *ni*-causative) by all subjects) = -.634) This phenomenon is well in accordance with the oft-reported observation that *ni*-causative is pragmatically more restricted than *o*-causative. Apparently, Miyagawa's *ni*-causative example (6b) and its adjusted version (8) belong to (iv).

**5. Subgroups of Subjects:** Factor Analysis identified two speaker groups. Both Group 1 and Group 2 clearly distinguish grammatical sentences from ungrammatical sentences, but Group 2 is more affected by the (arguably extra-grammatical) awkwardness in their acceptability judgment than Group 1, and deems **grammatical but somewhat awkward** sentences ((iv)) to be lower in acceptability. (Mean acceptability of (iv) (= 75% of *ni*-causative): Group 1 (32 subjects) = 3.43, Group 2 (19 subjects) = 2.69)

## **6. Interaction of particle types & Ajct locations — 2-way ANOVA:**

[1] Particle effect: Acceptability is lower with *ni*-causee than *o*-causee irrespective of the position of Ajct in relation to the causee. (Main effect of particles: **V-Ajct** — mean acceptability of *o* = 3.88, *ni* = 3.32,  $F(1, 305) = 218.00$ ,  $p < .001$  / **C-Ajct** — mean acceptability of *o* = 3.81, *ni* = 3.22,  $F(1, 305) = 161.3$ ,  $p < .001$ )

[2] Particle\*Location Interaction: When the adjunct is located to the left of *ni*-causee, acceptability tends to be lower. (Interaction (particle\*location): **V-Ajct** —  $F(1, 305) = 66.81$ ,  $p < .001$ ; mean acceptability of "**V-Ajct** to the **right** of *ni*" = 3.57 / "**V-Ajct** to the **left** of *ni*" = 3.07) cf. The lower acceptability of (5b)/(8).

[3] No Ajct effect: [1]-[2] above are observed for not only V-Ajct but also C-Ajct. (Interaction (particle\*location): **C-Ajct** —  $F(1, 305) = 28.47$ ,  $p < .001$ ; mean acceptability of "**C-Ajct** to the **right** of *ni*" = 3.33 / "**C-Ajct** to the **left** of *ni*" = 3.10)

[4] High acceptability: All experimental conditions yield mean acceptability higher than 3. (Range of mean acceptability of sentences under all experimental conditions: 3.07 (**V-Ajct** to the **left** of *ni*) ~ 3.89 (**V-Ajct** to the **right** of *o*)

**7. Conclusion on the DM-analysis:** Thus, no speaker provided the grammaticality judgments predicted by the DM-analysis, and the two claims of the DM-analysis on the adjunct-particle-location interaction (5a-b) fail to be supported. The informants whose judgments were used to support the DM-analysis are likely to belong to Group 2, and the lower acceptability they reported, presumably, was misinterpreted as ungrammaticality. Further experiments and analyses along this line are being planned for a few more empirical phenomena that involve similarly controversial judgments.

**References:** 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) *Generative Grammatical Studies in the Japanese Language*, Ph. D. dissertation, Massachusetts Institute of Technology. / Miyagawa, Shigeru (1999) "Causatives," in Tsujimura, Natsuko (ed(s).), *The Handbook of Japanese Linguistics*, Blackwell, Oxford, 236-268. / Tonoike, 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.