

An experimental investigation of the deep double-*o* constraint in Japanese causative constructions

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Abstract. The double-*o* constraint (DoC) (Harada, 1973) was proposed to explain the ungrammaticality of having two or more noun phrases (NPs) marked by the accusative case marker *-o* in a single Japanese clause. Poser (2002) argued for two types of DoCs: the surface double-*o* constraint (SDoC) and the deep double-*o* constraint (DDoC). The DDoC prohibits two accusative arguments in a single argument structure and is not affected by the number of accusative case markers on the surface. The evidence is from Japanese causatives. Our study conducted an experiment to test the DDoC and found that it may not exist.

Keywords. Japanese; causative; case marker; double-*o* constraint

1. Introduction. In Japanese causative constructions, the causee can be marked by either the dative case marker *-ni* or the accusative case marker *-o* when the causativized verb is intransitive:

- (1) John-ga Mary-ni hashir-ase-ta.
 John-NOM Mary-DAT run-CAUSE-PAST
 ‘John had Mary run.’
- (2) John-ga Mary-o hashir-ase-ta.
 John-NOM Mary-ACC run-CAUSE-PAST
 ‘John made Mary run.’

According to previous studies (e.g., Kuno, 1973; Shibatani, 1973), the case alternation between *-ni* and *-o* gives rise to a semantic difference: *o*-causatives always involve a coercive reading while *ni*-causatives do not, as shown in the English translations of (1) and (2). In contrast, when the causativized verb is transitive, the causee can only be marked with *-ni*:

- (3) John-ga Mary-ni/*o ringo-o tabe-sase-ta.
 John-NOM Mary-DAT/ACC apple-ACC eat-CAUSE-PAST
 ‘John had/made Mary eat the apple.’

To account for why multiple occurrences of *-o* are prohibited in Japanese causatives such as (3), Harada (1973) proposed a constraint dubbed as the ‘double-*o* constraint’ (DoC):

- (4) Double-*o* constraint (Harada, 1973)

A derivation is marked as ill-formed if it terminates in a surface structure which contains two occurrences of noun phrases (NPs) marked with *o*, both of which are immediately dominated by the same verb phrase (VP) node.

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Under the DoC, the accusative marker *-o* cannot occur more than once within a single VP. This constraint was argued to be motivated by *tokoro* relative clauses (RCs). *Tokoro* RCs are a special type of RC, headed by *tokoro* ‘place,’ which serves as the argument of the matrix verb syntactically but not semantically, as in (5).

- (5) John-ga Mary-ga/*o nigeyoo toshi-ta tokoro-o tsukamae-ta.
 John-NOM Mary-NOM/ACC run away try-PAST TOKORO-ACC arrest-PAST
 ‘John caught Mary as she tried to run away.’ (Harada, 1973, modified)

In (5), it is the embedded NP *Mary* that semantically serves as the argument of the matrix verb *tsukamae* ‘to arrest.’ Note that it can only be marked with the nominative case marker *-ga*, not the accusative marker *-o*. Harada (1973, 1975) and Sawada (2010) further observed that when the embedded NP is clefted, it can be marked with *-o*:

- (6) [John-ga _{t_i} [nigeyoo toshi-ta tokoro]-o tsukamae-ta no]-wa [Mary-o]_i da.
 John-NOM run away try-PAST TOKORO-ACC arrest-PAST that-TOP Mary-ACC COP
 ‘It was Mary that John caught as she tried to run away.’ (Harada, 1973, modified)

The contrast between (5) and (6) regarding the licensing of *-o* with *Mary* suggests that multiple occurrences of *-o* are possible as long as the NPs marked with *-o* are not dominated by the same VP, which supports Harada’s DoC.

However, Harada (1975) and Sawada (2010) also found that the DoC cannot be saved by clefting when it comes to causatives:

- (7) John-ga ringo-o tabe-sase-ta no-wa Mary-ni/*o da.
 John-NOM apple-ACC eat-CAUSE-PAST that-TOP Mary-DAT/ACC COP
 ‘It was Mary that John had/made eat the apple.’ (Harada, 1975, modified)

- (8) John-ga Mary-ni/*o tabe-sase-ta no-wa ringo-o da.
 John-NOM Mary-DAT/ACC eat-CAUSE-PAST that-TOP apple-ACC COP
 ‘It was the apple that John had/made Mary eat.’ (Harada, 1975, modified)

(7) and (8) are in line with (3), all of which disallow the causee *Mary* to be marked with *-o*. This is not predicted by the DoC since the two NPs with *-o* are not in the same VP.

Poser (2002) argued that Harada’s (1973) DoC does not apply to the surface structure only. His evidence is below.

First, as shown in (3), multiple occurrences of *-o* are prohibited in Japanese causatives. Poser observed that topicalizing one accusative NP does not lessen the DoC violation:

- (9a) *ringo-wa John-ga Mary-o tabe-sase-ta.
 apple-TOP John-NOM Mary-DAT/ACC eat-CAUSE-PAST
 ‘As for the apple, John had/made Mary eat it.’

- (9b) *Mary-wa John-ga ringo-o tabe-sase-ta.
 Mary-TOP John-NOM apple-ACC eat-CAUSE-PAST
 ‘As for Mary, John had/made her eat the apple.’

Second, if we replace one accusative marker in (3) with another particle such as *mo* ‘also,’ the grammaticality cannot be improved, as in (10a) and (10b):

- (10a) *John-ga Mary-mo ringo-o tabe-sase-ta.
 John-NOM Mary-also apple-ACC eat-CAUSE-PAST
 ‘John also had/made Mary eat the apple.’

- (10b) * John-ga Mary-o ringo-mo tabe-sase-ta.
 John-NOM Mary-ACC apple-also eat-CAUSE-PAST
 ‘John also had/made Mary eat the apple too.’

Third, as shown in (7) and (8), clefting one accusative NP in causatives does not eliminate the DoC violation. Poser further observed that the DoC violation still exists even though the accusative marker of the clefted NP is deleted:

- (11a) *John-ga ringo-o tabe-sase-ta no-wa Mary da.
 John-NOM apple-ACC eat-CAUSE-PAST that-TOP Mary COP
 ‘It was Mary that John had/made eat the apple.’

- (11b) *John-ga Mary-o tabe-sase-ta no-wa ringo da.
 John-NOM Mary-ACC eat-CAUSE-PAST that-TOP apple-ACC COP
 ‘It was the apple that John had/made Mary eat.’

Fourth, relativizing one accusative NP also does not save the sentence from the DoC:

- (12a) *John-ga Mary-o ringo-o tabe-sase-ta.
 John-NOM Mary-ACC apple-ACC eat-CAUSE-PAST
 ‘John made/let Mary eat the apple.’

- (12b) *kore-wa John-ga Mary-o tabe-sase-ta ringo da.
 this-TOP John-NOM Mary-ACC eat-CAUSE-PAST apple COP
 ‘This is the apple that John made/let Mary eat.’

(12b) can be derived by relativizing *ringo* ‘apple’ in (12a). If the DoC is only a constraint on the surface structure, the ungrammatical status of (12b) cannot be explained, as there is only one accusative NP.

Lastly, Poser stated that the most striking evidence against the DoC as a surface constraint is that the second accusative NP does not even need to be present for the DoC violation to occur:

- (13) Taro-ga Jiro-o but-ase-ta.
 Taro-NOM Jiro-ACC beat-CAUSE-PAST
 ‘Taro made someone beat Jiro.’
 * ‘Taro made Jiro beat someone.’

(Poser, 2002)

Since (13) does not involve multiple accusative markers on the surface, the DoC is not expected to apply. If so, the causative in (13) with a single accusative NP should involve two possible meanings: (i) ‘Taro made someone beat Jiro,’ where the accusative NP is the patient of the embedded verb *but* ‘beat’ and (ii) ‘Taro made Jiro beat someone,’ where the accusative NP is the agent of *but* ‘beat.’ However, Poser claimed that only (i) is possible in (13), which suggests that (13) cannot be derived from the deletion of the patient of *but* ‘beat,’ as in (14):

- (14) Taro-ga Jiro-o ~~dareka-o~~ but-ase-ta.
 Taro-NOM Jiro-ACC someone-ACC beat-CAUSE-PAST
 ‘Taro made Jiro beat someone.’

Rather, it can only be derived from the deletion of the agent of *but* ‘beat,’ as in (15):

- (15) Taro-ga ~~dareka-ni~~ Jiro-o but-ase-ta.
 Taro-NOM someone-DAT Jiro-ACC beat-CAUSE-PAST
 ‘Taro made someone beat Jiro.’

Based on the 5 pieces of evidence above, Poser (2002) argued that there are in fact two types of DoC: the surface double-*o* constraint (SDoC) and the deep double-*o* constraint (DDoC). The SDoC is equivalent to Harada’s (1973) DoC, whereas the DDoC accounts for the above five observations that the DoC fails to explain. The DDoC was proposed as follows: two accusative arguments are not allowed to occur in a single argument structure. According to Poser, DDoC violations are unaffected by case markers on the surface and consistently produce ungrammatical sentences that are not subject to variation among native Japanese speakers.

Note that the first four pieces of evidence provided by Poser all involved two accusative arguments on the surface, although these arguments are not necessarily marked by the accusative case marker *-o*. Only the last evidence involves a single accusative argument on the surface. However, to the best of our knowledge, no studies have experimentally tested the interpretation of a single accusative NP in a causative sentence involving a transitive verb. This study used a picture-matching truth value judgment task (Crain & Thornton 1998) to investigate whether it is truly impossible for such accusative NPs to be interpreted as the agents of the embedded verbs in Japanese causatives.

2. Experiment. We describe the participants, design, materials, and procedure of the experiment below.

2.1 PARTICIPANTS A total of 30 native Japanese speakers with ages ranging from 18 to 65 years old participated in this experiment. According to self-reporting on our background information survey, they all identified Japanese as their sole native language and had never lived outside Japan for more than one year by the age of 17. Also, all their parents speak Japanese as their sole native language.

2.2 DESIGN AND MATERIALS A picture-matching truth value judgment task (TVJT) (Crain & Thornton 1998) was utilized. Four Disney characters – *Mickey*, *Minnie*, *Donald*, and *Daisy* – were used in the materials. For each experimental item, participants first looked at a slide that had an introductory sentence (e.g. (11c)/(11d)) along with its corresponding picture (e.g. Figure 1/ Figure 2).

(11c) One day, Minnie asked Donald to punch Daisy and Donald did it.

(11d) One day, Minnie asked Daisy to punch Donald and Daisy did it.

Then, they moved to the next slide, where they viewed the same picture but read a new sentence (e.g. (13a)/ (13b)). They were asked to judge whether the sentence and the given picture matched by saying ‘match’ or ‘mismatch.’

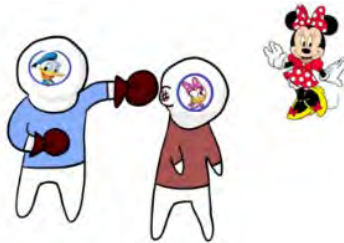


Figure 1. Donald punches Daisy under the direction of Minnie.

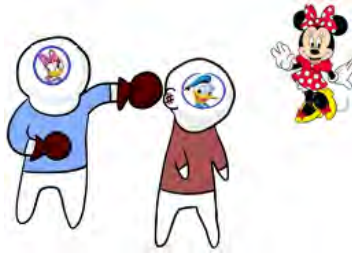


Figure 2. Daisy punches Donald under the direction of Minnie.

- (13a) Minnie-ga Donald-o panchi-sase-ta
 Minnie-NOM Donald-ACC punch-CAUSE-PAST
 ‘Minnie made someone punch Donald.’
 ? ‘Minnie made Donald punch someone.’

- (13b) Minnie-ga Donald-ni panchi-sase-ta
 Minnie-NOM Donald-DAT punch-CAUSE-PAST
 * ‘Minnie made someone punch Donald.’
 ‘Minnie made Donald punch someone.’

For (13a)/(13b) to match Figure 1, *Donald* in the two sentences must be interpreted as the agent of the embedded verb *panchi* ‘punch.’ On the other hand, for (13a)/(13b) to match Figure 2, *Donald* must be interpreted as the patient of *panchi* ‘punch.’ There were two factors in this experiment: (i) whether the target NP was marked by the accusative case marker *-o* or the dative case marker *-ni*, as *Donald* in (13a) and (13b); (ii) whether the target NP was an agent or a patient in the given picture. These two factors result in four critical conditions: a. accusative NP as an agent (ACC-AG, e.g., Figure 1 and (13a)); b. accusative NP as a patient (ACC-PA, e.g., Figure 2 and (13a)); c. dative NP as an agent (DAT-AG, e.g., Figure 1 and (13b)); d. dative NP as a patient (DAT-PA, e.g., Figure 2 and (13b)).

A total of 16 sentences of different lexicalizations were created (see Appendix for a full set of sentences), and experimental items involving these sentences were further created. For each experimental item, there were 2 types of clusters (Cluster A & B) and there were 3 trials for each cluster: ACC-AG, DAT-AG, and a filler for Cluster A, and ACC-PA, DAT-PA, and a filler for Cluster B. Two experimental lists were made, each of which only includes Cluster A or B for each experimental item. That is, every participant saw only one type of cluster for each experimental item. Each critical condition had 8 items per list. The fillers were all non-causative sentences such as (14a) and (14b):

- (14a) Donald-ga Daisy-o panchishi-ta
 Donald-NOM Daisy-ACC punch-PAST
 ‘Donald punched Daisy.’
- (14b) Daisy-ga Donald-o panchishi-ta
 Daisy-NOM Donald-ACC punch-PAST
 ‘Daisy punched Donald.’

If the given picture is Figure 1, (14a) matches it while (14b) does not. There were 8 matching trials and 8 mismatching trials in each list. The fillers were used to monitor whether our participants paid enough attention to the experimental trials. Based on a binomial distribution, an attentive participant was supposed to accept 7 or more matching trials and reject 7 or more

mismatching trials. The order of experimental items was pseudorandomized, and the order of trials within each item was randomized.

2.3 PROCEDURE All participants used their computers to complete the picture-matching TVJT online. They gave their answers orally, which were further recorded by the experimenter. The participants viewed one trial at a time on their computer screen and were not allowed to go back to previous trials. After the TVJT, each participant answered questions from our background information survey. It took them about 30 minutes to finish the experiment.

3. Results and Analysis. The results of the fillers showed that every participant accepted all matching trials and rejected at least 7 mismatching trials, which suggests all of them were sufficiently attentive to our experimental trials.

3.1 SUMMARY STATISTICS Recall that there were four critical conditions: (i) ACC-AG (accusative NP as an agent); (ii) ACC-PA (accusative NP as a patient); (iii) DAT-AG (dative NP as an agent); (iv) DAT-PA (dative NP as a patient). Table 1 summarizes the mean proportion of ‘match’ answers in each critical condition.

Condition	Mean Proportion	Standard Error
I. ACC-AG	0.39	0.06
II. ACC-PA	0.86	0.03
III. DAT-AG	0.97	0.01
IV. DAT-PA	0.1	0.03

Table 1. Summary of Participants’ Mean Proportions of ‘Match’ Answers in Critical Conditions

We can also observe trends in the acceptance of each condition in Figure 3. Conditions III and IV saw the highest rates of acceptance and rejection, respectively, with the least variability. Condition II yielded generally high acceptance with some variation. Condition I has a mode of 0 sentences accepted, but it displays a large amount of variability, with half of the participants accepting 4 or more sentences.

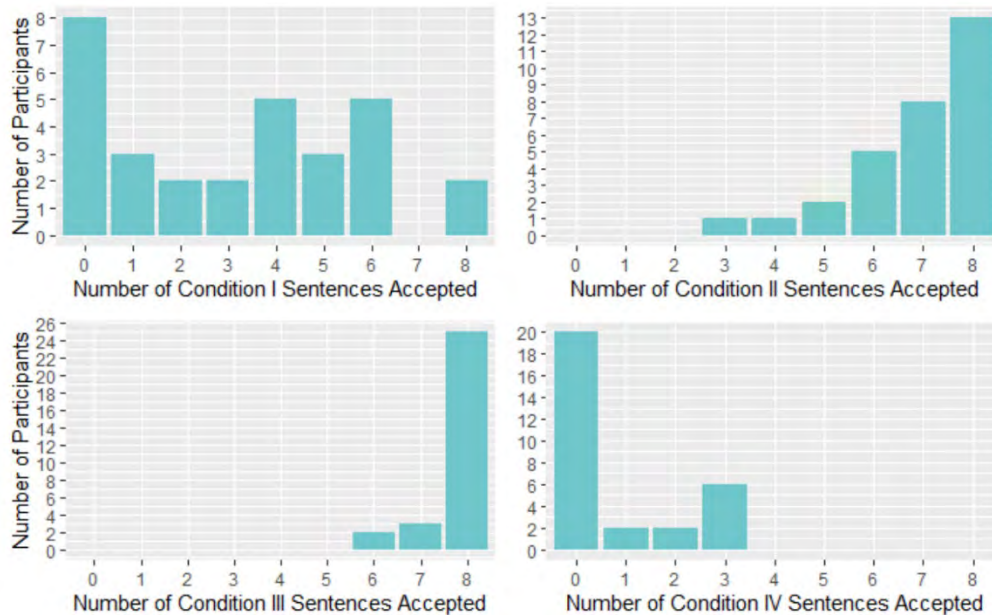


Figure 3. Number of each condition accepted by participants

3.2 MODELING A mixed effects logistic regression model was constructed to investigate the associations between probability of acceptance and the experimental conditions. Logistic regression was chosen to suit the binary nature of the response (‘match’ vs. ‘mismatch’), and mixed effects were incorporated with random intercepts for participant and sentence to account for variation introduced by these factors. The full model specification is as follows:

$$\text{logit}(P(y_i = 1)) = \beta_0 + \alpha_{0,j[i]} + \delta_{0,k[i]} + \beta_{\text{accdat}} \cdot \text{accdat}_i + \beta_{\text{agepat}} \cdot \text{agepat}_i + \beta_{\text{int}} \cdot \text{accdat}_i \times \text{agepat}_i$$

y_i = whether response i was Mismatch (0) or Match (1)

$\alpha_{0,j}$: random intercept for participant j

$\delta_{0,k}$: random intercept for item sentence k

β_{accdat} : slope associated with whether item has dative (0) or accusative (1) NP

β_{agepat} : slope associated with whether item depicts agent (0) or patient (1) role

β_{int} : slope associated with the interaction between thematic role and case marker

The model results are displayed in Table 2.

Term	Estimate	95% Confidence Interval	P-Value
β_0	3.91	(3.01, 4.81)	< 0.0001
β_{accdat}	-4.43	(-5.40, -3.47)	< 0.0001
β_{agepat}	-6.46	(-7.49, -5.43)	< 0.0001
β_{int}	9.06	(7.84, 10.27)	< 0.0001

Table 2. Mixed effects logistic regression model results (not exponentiated)

From Table 2, we find statistically significant associations for both case marker and thematic role, as well as for the interaction between these factors. We can calculate the expected odds and corresponding probabilities of acceptance for each of the four conditions as follows:

Condition I: The expected odds of acceptance for a sentence with an accusative case marker and agent thematic role are 0.59 for a typical participant and sentence, corresponding to a probability $P(\text{acceptance}) = 0.3724 = 37.24\%$.

Condition II: The expected odds of acceptance for a sentence with an accusative case marker and patient thematic role are 7.99 for a typical participant and sentence, corresponding to a probability $P(\text{acceptance}) = 0.8887 = 88.87\%$.

Condition III: The expected odds of acceptance for a sentence with a dative case marker and agent thematic role are 49.97 for a typical participant and sentence, corresponding to a probability $P(\text{acceptance}) = 0.9804 = 98.04\%$.

Condition IV: The expected odds of acceptance for a sentence with a dative case marker and patient thematic role are 0.08 for a typical participant and sentence, corresponding to a probability $P(\text{acceptance}) = 0.0727 = 7.27\%$.

In addition to the odds and probabilities of acceptance in each condition, we can calculate odds ratios to compare the odds of acceptance within each case marker or thematic role, utilizing model results and contrasts of model parameters to obtain p-values:

Within the accusative case marker (Conditions I and II): When the case marker is accusative, the odds of acceptance for the patient role are expected to be 13.46 times those for the agent role with a typical sentence and participant ($z = -10.03$, $p < 0.0001$).

Within the dative case marker (Conditions III and IV): When the case marker is dative, the odds of acceptance for the patient role are expected to be 0.002 times those for the agent role with a typical sentence and participant ($z = -12.26$, $p < 0.0001$).

Within the agent thematic role (Conditions I and III): When the thematic role is agent, the odds of acceptance for the accusative case marker are expected to be 0.01 times those for the dative case marker with a typical sentence and participant ($z = -9.00$, $p < 0.0001$).

Within the patient thematic role (Conditions II and IV): When the thematic role is patient, the odds of acceptance for the accusative case marker are expected to be 101.87 times those for the dative case marker with a typical sentence and participant ($z = -11.39$, $p < 0.0001$).

Across case marker and thematic role (Conditions III and II): For a typical sentence and participant, the odds of acceptance for an agent thematic role and dative case marker are expected to be 6.26 times those for a patient thematic role and accusative case marker ($z = 3.73$, $p = 0.0002$).

Across case marker and thematic role (Conditions I and IV): For a typical sentence and participant, the odds of acceptance for an agent thematic role and accusative case marker are expected to be 7.57 times those for a patient thematic role and dative case marker ($z = -5.73$, $p < 0.0001$).

From these results, we observe a statistically significant difference between odds of acceptance, and thus probability of acceptance, between all conditions. Case marker, thematic role, and the interaction between these factors appear to be associated with the likelihood of grammatical acceptance. This is particularly notable between Condition I (proposed to be universally unacceptable by Poser (2002)) and Condition IV (the least acceptable condition overall).

3.3 INDIVIDUAL DATA The results from modeling are further supported by the individual data. Since there were 8 items in each critical condition, then based on a binomial distribution, a participant would be considered to consistently accept/reject the items in a condition if they accept/reject 7 items or more. The data show that 19 participants (63.3%) did not consistently reject the ACC-AG items. Also, 15 participants (50%) accepted 4 or more out of the 8 ACC-AG items, suggesting that when Japanese causatives involve a single accusative NP on the surface, it can be interpreted as the causee or the agent of the embedded verb.

4. Discussion. Both our group and individual data suggest that Poser's (2002) DDoC may not apply to causatives involving a single accusative NP on the surface, indicating that there may be no constraint on the deep structure. If ACC-AG items were universally ungrammatical to native Japanese speakers, we would expect them to be rejected at least as often as the least acceptable condition in the experiment overall (DAT-PA). However, the probability of acceptance for ACC-AG items was 37.24%, compared to only 7.27% for DAT-PA items, along with a statistically significant difference in odds of acceptance between the two sentence types. Given these findings, we argue that the DoC is a surface constraint, and the DDoC can be revised as follows:

(15) Double accusative argument constraint (DAAC)

Two accusative arguments of the same verb are not allowed to co-occur on the surface.

Recall that Harada's (1973) *DoC* is a constraint on multiple occurrences of the accusative case marker *-o* on the surface within a VP. Like the *DoC*, our DAAC can also rule out sentences with multiple accusative markers. Furthermore, the DAAC is compatible with the first four motivations that Poser (2002) used to argue against the *DoC*, which all involve two accusative arguments. Thus, instead of having a Surface Double-*o* Constraint and a Deep Double-*o* Constraint, we propose that the DAAC alone is sufficient, which applies to all surface structures in Japanese.

4.1 METHODOLOGICAL CONSIDERATIONS. Although the present methodology yields several insights into the nature of the *DDoC*, there are several important considerations which should not be ignored when interpreting results.

Firstly, although the mixed effects logistic regression model assumes independence between observations (i.e., one response of either 'match' or 'mismatch' has no bearing on another response), there may be a violation of independence between the ACC-AG and DAT-AG conditions, as well as between the ACC-PA and DAT-PA conditions. Because participants were presented with both ACC-AG and DAT-AG within a single cluster (or both ACC-PA and DAT-PA within a single cluster), it is possible that their response to one condition may have primed their response to the other, and this is especially plausible for the ACC-AG condition, as participants were often quite unsure and deliberated extensively before responding to the ACC-AG condition.

For instance, a participant who accepts the DAT-AG condition may then observe the ACC-AG condition and reject it on the basis that it is very different from the DAT-AG condition. Perhaps if this participant observed only the ACC-AG condition alone and was not primed to compare it with the DAT-AG condition, they may have been more likely to accept it. We attempted to account for this possibility by varying the order of sentences within clusters; this may have partially mitigated the potential bias that participants might exhibit when seeing a certain condition consistently after another and comparing the two. Nevertheless, because data were gathered on both ACC-AG and DAT-AG conditions for the same experimental item, we cannot completely rule out the possibility of non-independence between these conditions (and, similarly, between ACC-PA and DAT-PA conditions).

Another notable methodological decision was to display written sentences to the participants rather than audio recordings. Because we believe the *DDoC* and our usage of an accusative case marker to denote the agent in a causative sentence are not explicitly taught in Japanese textbooks (either for native speakers or second language learners), we did not anticipate participants possessing any textbook knowledge about the phenomenon; thus, written sentences should be sufficient. While we did not find evidence that participants utilized any memorized prior information, we did observe a "sentence repetition" strategy. For each cluster, participants first read a sentence like (15a):

- (15a) Aru hi Minnie-ga Donald-ni Daisy-o panchisuru yoo ni itta.
One day Minnie-NOM Donald-DAT Daisy-ACC punch-PRESENT tell-PAST
'One day, Minnie told Donald to punch Daisy.'

After the expository sentences, participants were presented with sentences such as (13a) and (13b) (replicated here), as well as a filler. Upon reading (13a), some participants would verbally repeat (15a) to themselves and quickly reject (13a). Similarly, upon seeing sentence (13b), these participants would verbally repeat (15a) and immediately accept (13b).

- (13a) Minnie-ga Donald-o panchi-sase-ta
 Minnie-NOM Donald-ACC punch-CAUSE-PAST
 ‘Minnie made someone punch Donald.’
 ? ‘Minnie made Donald punch someone.’
- (13b) Minnie-ga Donald-ni panchi-sase-ta
 Minnie-NOM Donald-DAT punch-CAUSE-PAST
 * ‘Minnie made someone punch Donald.’
 ‘Minnie made Donald punch someone.’

From this observation, we believe the parallel structure between (15a), (13a), and (13b) may have been utilized by some participants as a strategy for determining whether sentences were labeled ‘match’ or ‘mismatch’: (13b) employs the dative case marker for the agent, which agrees with the expository sentence (15a), leading the participant to label (13b) as a ‘match.’ In contrast, (13a) employs the accusative case marker for the agent, which conflicts with the dative case marker used in (15a), leading the participant to label (13a) as a ‘mismatch.’ Participants who displayed this process often made these decisions quickly, while those who did not appear to use this strategy were more hesitant over their responses (especially to (13a), or the ACC-AG condition).

If the experiment were to be repeated, a mitigating factor for this sentence repetition strategy might involve utilization of audio recordings rather than written sentences. The written medium allowed participants to commit sentences like (15a) to memory for later reference and repetition, while audio recordings would make this memorization less likely. Alternatively, the expository sentences might be altered to convey the same meaning using different language that removes the parallel structure with test items, reducing the likelihood that participants will make direct comparisons. Because most participants did not seem to employ the sentence repetition strategy, we believe the experimental results remain sound, but this phenomenon may be of interest in further experiments.

4.2 IMPLICATIONS FOR FUTURE WORK. This study investigated the validity of the claim in Poser (2002) about the universality of the DDoC among native Japanese speakers, and based on the results, we see that the DDoC is not supported by experimental evidence. As native speakers do not display evidence of the DDoC, this indicates that there is no violation of the DoC when a second *-o* is only implied by the sentence structure rather than provided on the surface.

In addition to refining current knowledge of Japanese linguistics, these findings can contribute to research surrounding second language learners of Japanese. The causative structure involves the merging of main events and sub-events into one clause, in addition to a more complicated verb conjugation, making it more difficult for L2 learners of Japanese (Kawaguchi, 2009). It appears that the accusative marker can be utilized with the agents of causative sentences if no other accusative NPs are overtly present, and this absence of the DDoC in native speaker interpretations presents a significant observation for learners – some popular Japanese textbooks provide instruction that in causative sentences, *-o* may mark the causee when 1. the caused action is reflexive (e.g. *nakaseru* ‘cry’, *warawaseru* ‘laugh’) or 2. the verb did not originally utilize the particle *-o* (e.g. *ikaseru* ‘go’, *suwaraseru* ‘sit’). Under these guidelines, a verb such as *nomu* ‘to drink’ would not allow *-o* to mark the causee, but given that the DDoC constraint has not been observed, a sentence such as (16) would be acceptable, contrary to the textbook information.

- (16) Tanaka-ga Chisato-o nomaseta.
 Tanaka-NOM Chisato-ACC drink-CAUSE-PAST
 ‘Tanaka made Chisato drink.’

Future research may focus on whether learners can overcome this potentially misleading textbook instruction and accept the interpretation of the missing NP as a direct object even in sentences that utilize transitive verbs.

Additionally, Chung (2015) notes that double accusative structures exist grammatically in Korean. The existence (and grammaticality) of double accusative sentences in Korean provides a possible confounding factor in L1 Korean learners’ acquisition of Japanese sentences relating to the DDoC – given the lack of evidence for the DDoC, would L1 Korean learners perform differently from learners with L1s that do not utilize case markers, such as English or Chinese? Exploration of the implied double accusative causative structure in Japanese presents many opportunities for further experimentation with L2 learners.

5. Conclusions. The DoC was proposed by Harada (1973) to account for the ungrammaticality of having two or more NPs marked by the accusative case marker *-o* in a single VP. Poser (2002) argued that two types of DoCs should be distinguished: the SDoC and the DDoC. The DDoC was argued to disallow two accusative arguments in a single argument structure and is not affected by case markers on the surface, indicating that the DDoC does not just apply to the surface structure. The evidence is from the interpretation of a single accusative NP in a causative that involves a transitive verb: it can only be interpreted as the patient of the verb, not the causee or the agent of the verb. Using a TVJT to experimentally test this argument, our findings suggest that, contrary to Poser’s claim, it is possible for the single accusative NP to be interpreted as the causee or the agent of the embedded verb, which further indicates that the DDoC may not apply to the deep structure. We proposed the DAAC instead to account for what the DoC and DDoC fail to explain in Japanese causatives.

References

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Appendix

EXPERIMENTAL ITEM LISTS

Sentences numbered in parentheses (e.g., (1), (2), etc.) are expository sentences that were intended to provide context, requiring no responses from the participants. Sentences numbered with a numeral and a letter (e.g., 1a, 1b, 1c, 2a, etc.) are test items which participants labeled ‘match’ or ‘mismatch.’

LIST 1

Number	Sentence	Translation In Context
(1)	ある日、ミッキーがデイジーにドナルドをけるように言った。 そして、デイジーはドナルドをけた。	One day, Mickey told Daisy to kick Donald. Then, Daisy kicked Donald.
1a	デイジーがドナルドをけた。	Daisy kicked Donald.
1b	ミッキーがデイジーをけらせた。	? Mickey made Daisy kick [someone].
1c	ミッキーがデイジーにけらせた。	Mickey made Daisy kick [someone].
(2)	ある日、ドナルドがミニーにミッキーをだっこするように言った。 そして、ミニーはミッキーをだっこした。	One day, Donald told Minnie to carry Mickey. Then, Minnie carried Mickey.
2a	ドナルドがミニーをだっこさせた。	? Donald made Minnie carry [someone].
2b	ドナルドがミニーにだっこさせた。	Donald made Minnie carry [someone].
2c	ミニーがミッキーをだっこした。	Minnie carried Mickey.
(3)	ある日、デイジーがミニーにミッキーをかざるように言った。 そして、ミニーはミッキーをかざった。	One day, Daisy told Minnie to decorate Mickey. Then, Minnie decorated Mickey.
3a	ミッキーがミニーをかざった。	Mickey decorated Minnie.
3b	デイジーがミッキーにかざらせた。	Daisy made Mickey decorate [someone].
3c	デイジーがミッキーをかざらせた。	Daisy caused Mickey to be decorated.
(4)	ある日、ミニーがデイジーにドナルドをさわるように言った。 そして、デイジーはドナルドをさわった。	One day, Minnie told Daisy to touch Donald. Then, Daisy touched Donald.
4a	ミニーがドナルドにさわらせた。	Minnie made Donald touch [someone].
4b	デイジーがドナルドをさわった。	Daisy touched Donald.
4c	ミニーがドナルドをさわらせた。	Minnie caused Donald to be touched.
(5)	ある日、デイジーがミニーにミッキーをかくように言った。 そして、ミニーはミッキーをかいた。	One day, Daisy told Minnie to draw Mickey. Then, Minnie drew Mickey.
5a	デイジーがミッキーにかかせた。	Daisy made Mickey draw [someone].
5b	デイジーがミッキーをかかせた。	Daisy caused Mickey to be drawn.
5c	ミニーがミッキーをかいた。	Minnie drew Mickey.
(6)	ある日、ドナルドがミニーにミッキーをおすように言った。 そして、ミニーはミッキーをおした。	One day, Donald told Minnie to push Mickey. Then, Minnie pushed Mickey.
6a	ドナルドがミニーをおさせた。	? Donald made Minnie push [someone].
6b	ドナルドがミニーにおさせた。	Donald made Minnie push [someone].
6c	ミッキーがミニーをおした。	Mickey pushed Minnie.
(7)	ある日、デイジーがミニーにミッキーをなでるように言った。 そして、ミニーはミッキーをなでた。	One day, Daisy told Minnie to pat Mickey. Then, Minnie patted Mickey.
7a	デイジーがミッキーをなでさせた。	Daisy caused Mickey to be patted.
7b	ミッキーがミニーをなでた。	Mickey patted Minnie.
7c	デイジーがミッキーになでさせた。	Daisy made Mickey pat [someone].
(8)	ある日、ドナルドがミニーにミッキーをほめるように言った。 そして、ミニーはミッキーをほめた。	One day, Donald told Minnie to praise Mickey. Then, Minnie praised Mickey.
8a	ドナルドがミニーにほめさせた。	Donald made Minnie praise [someone].
8b	ミッキーがミニーをほめた。	Mickey praised Minnie.
8c	ドナルドがミニーをほめさせた。	? Donald made Minnie praise [someone].
(9)	ある日、ミニーがデイジーにドナルドをたすけるように言った。 そして、デイジーはドナルドをたすけた。	One day, Minnie told Daisy to save Donald. Then, Daisy saved Donald.
9a	ミニーがドナルドをたすけさせた。	Minnie caused Donald to be saved.

9b	ドナルドがデイズーをたすけた。	Donald saved Daisy.
9c	ミニーがドナルドにたすけさせた。	Minnie made Donald save [someone].
(10)	ある日、ドナルドがミニーにミッキーをさすように言った。 そして、ミニーはミッキーをさした。	One day, Donald told Minnie to stab Mickey. Then, Minnie stabbed Mickey.
10a	ミニーがミッキーをさした。	Minnie stabbed Mickey.
10b	ドナルドがミニーをささせた。	? Donald made Minnie stab [someone].
10c	ドナルドがミニーにささせた。	Donald made Minnie stab [someone].
(11)	ある日、ミッキーがデイズーにドナルドをなぐるように言った。 そして、デイズーはドナルドをなぐらせた。	One day, Mickey told Daisy to hit Donald. Then, Daisy hit Donald.
11a	ミッキーがデイズーをなぐらせた。	? Mickey made Daisy hit [someone].
11b	デイズーがドナルドをなぐらせた。	Daisy hit Donald.
11c	ミッキーがデイズーになぐらせた。	Mickey made Daisy hit [someone].
(12)	ある日、デイズーがミニーにミッキーをおいかけるように言った。 そして、ミニーはミッキーをおいかけた。	One day, Daisy told Minnie to chase Mickey. Then, Minnie chased Mickey.
12a	デイズーがミッキーをおいかけた。	Daisy made Mickey chase [someone].
12b	ミッキーがミニーをおいかけた。	Mickey chased Minnie.
12c	デイズーがミッキーをおいかけた。	Daisy caused Mickey to be chased.
(13)	ある日、ミッキーがデイズーにドナルドをかくすように言った。 そして、デイズーはドナルドをかくした。	One day, Mickey told Daisy to hide Donald. Then, Daisy hid Donald.
13a	ドナルドがデイズーをかくした。	Donald hid Daisy.
13b	ミッキーがデイズーをかくさせた。	? Mickey made Daisy hide [someone].
13c	ミッキーがデイズーにかくさせた。	Mickey made Daisy hide [someone].
(14)	ある日、ミッキーがデイズーにドナルドをしばるように言った。 そして、デイズーはドナルドをしばった。	One day, Mickey told Daisy to tie up Donald. Then, Daisy tied up Donald.
14a	ミッキーがデイズーにしばらせた。	Mickey made Daisy tie up [someone].
14b	ミッキーがデイズーをしばらせた。	? Mickey made Daisy tie up [someone].
14c	デイズーがドナルドをしばった。	Daisy tied up Donald.
(15)	ある日、ミニーがデイズーにドナルドをハグするように言った。 そして、デイズーはドナルドをハグした。	One day, Minnie told Daisy to hug Donald. Then, Daisy hugged Donald.
15a	ミニーがドナルドをハグさせた。	Minnie caused Donald to be hugged.
15b	ミニーがドナルドにハグさせた。	Minnie made Donald hug [someone].
15c	デイズーがドナルドをハグした。	Daisy hugged Donald.
(16)	ある日、ミニーがデイズーにドナルドをパンチするように言った。 そして、デイズーはドナルドをパンチした。	One day, Minnie told Daisy to punch Donald. Then, Daisy punched Donald.
16a	ミニーがドナルドにパンチさせた。	Minnie made Donald punch [someone].
16b	ミニーがドナルドをパンチさせた。	Minnie caused Donald to be punched.
16c	ドナルドがデイズーをパンチした。	Donald punched Daisy.

LIST 2

Number	Sentence	Translation In Context
(1)	ある日、デイズーがミッキーにミニーをかくように言った。 そして、ミッキーはミニーをかいた。	One day, Daisy told Mickey to draw Minnie. Then, Mickey drew Minnie.
1a	デイズーがミッキーをかかせた。	? Daisy made Mickey draw [someone].
1b	デイズーがミッキーにかかせた。	Daisy made Mickey draw [someone].
1c	ミッキーがミニーをかいた。	Mickey drew Minnie.
(2)	ある日、ミニーがドナルドにデイズーをさわるように言った。 そして、ドナルドはデイズーをさわった。	One day, Minnie told Donald to touch Daisy. Then, Donald touched Daisy.
2a	ミニーがドナルドをさわらせた。	? Minnie made Donald touch [someone].
2b	ミニーがドナルドにさわらせた。	Minnie made Donald touch [someone].
2c	ドナルドがデイズーをさわった。	Donald touched Daisy.
(3)	ある日、ミッキーがドナルドにデイズーをけるように言った。 そして、ドナルドはデイズーをけた。	One day, Mickey told Donald to kick Daisy. Then, Donald kicked Daisy.
3a	ミッキーがデイズーをけらせた。	Mickey caused Daisy to be kicked.
3b	ミッキーがデイズーにけらせた。	Mickey made Daisy kick [someone].
3c	ドナルドがデイズーをけた。	Donald kicked Daisy.
(4)	ある日、ミッキーがドナルドにデイズーをかくすように言った。 そして、ドナルドはデイズーをかくした。	One day, Mickey told Donald to hide Daisy. Then, Donald hid Daisy.
4a	ミッキーがデイズーにかくさせた。	Mickey made Daisy hide [someone].

4b	デイジーがドナルドをかくした。	Daisy hid Donald.
4c	ミッキーがデイジーをかくさせた。	Mickey caused Daisy to be hidden.
(5)	ある日、ドナルドがミッキーにミニーをだっこするように言った。そして、ミッキーはミニーをだっこした。	One day, Donald told Mickey to carry Minnie. Then, Mickey carried Minnie.
5a	ミッキーがミニーをだっこした。	Mickey carried Minnie.
5b	ドナルドがミニーをだっこさせた。	Donald caused Minnie to be carried.
5c	ドナルドがミニーにだっこさせた。	Donald made Minnie carry [someone].
(6)	ある日、ミニーがドナルドにデイジーをハグするように言った。そして、ドナルドはデイジーをハグした。	One day, Minnie told Donald to hug Daisy. Then, Donald hugged Daisy.
6a	ドナルドがデイジーをハグした。	Donald hugged Daisy.
6b	ミニーがドナルドをハグさせた。	? Minnie made Donald hug [someone].
6c	ミニーがドナルドにハグさせた。	Minnie made Donald hug [someone].
(7)	ある日、ドナルドがミッキーにミニーをほめるように言った。そして、ミッキーはミニーをほめた。	One day, Donald told Mickey to praise Minnie. Then, Mickey praised Minnie.
7a	ミニーがミッキーをほめた。	Minnie praised Mickey.
7b	ドナルドがミニーにほめさせた。	Donald made Minnie praise [someone].
7c	ドナルドがミニーをほめさせた。	Donald caused Minnie to be praised.
(8)	ある日、デイジーがミッキーにミニーをおいかけるように言った。そして、ミッキーはミニーをおいかけた。	One day, Daisy told Mickey to chase Minnie. Then, Mickey chased Minnie.
8a	デイジーがミッキーにおいかけてさせた。	Daisy made Mickey chase [someone].
8b	ミニーがミッキーをおいかけた。	Minnie chased Mickey.
8c	デイジーがミッキーをおいかけてさせた。	? Daisy made Mickey chase [someone].
(9)	ある日、ドナルドがミッキーにミニーをおすように言った。そして、ミッキーはミニーをおした。	One day, Donald told Mickey to push Minnie. Then, Mickey pushed Minnie.
9a	ミニーがミッキーをおした。	Minnie pushed Mickey.
9b	ドナルドがミニーにおさせた。	Donald made Minnie push [someone].
9c	ドナルドがミニーをおさせた。	Donald caused Minnie to be pushed.
(10)	ある日、ミッキーがドナルドにデイジーをしばるように言った。そして、ドナルドはデイジーをしばった。	One day, Mickey told Donald to tie up Daisy. Then, Donald tied up Daisy.
10a	ミッキーがデイジーにしばらせた。	Mickey made Daisy tie up [someone].
10b	ドナルドがデイジーをしばった。	Donald tied up Daisy.
10c	ミッキーがデイジーをしばらせた。	Mickey caused Daisy to be tied up.
(11)	ある日、ミニーがドナルドにデイジーをパンチするように言った。そして、ドナルドはデイジーをパンチした。	One day, Minnie told Donald to punch Daisy. Then, Donald punched Daisy.
11a	ミニーがドナルドをパンチさせた。	? Minnie made Donald punch [someone].
11b	デイジーがドナルドをパンチした。	Daisy punched Donald.
11c	ミニーがドナルドにパンチさせた。	Minnie made Donald punch [someone].
(12)	ある日、デイジーがミッキーにミニーをなでるように言った。そして、ミッキーはミニーをなでた。	One day, Daisy told Mickey to pat Minnie. Then, Mickey patted Minnie.
12a	デイジーがミッキーをなでさせた。	? Daisy made Mickey pat [someone].
12b	ミニーがミッキーをなでた。	Minnie patted Mickey.
12c	デイジーがミッキーになでさせた。	Daisy made Mickey pat [someone].
(13)	ある日、ミッキーがドナルドにデイジーをなぐるように言った。そして、ドナルドはデイジーをなぐった。	One day, Mickey told Donald to hit Daisy. Then, Donald hit Daisy.
13a	ミッキーがデイジーになぐらせた。	Mickey made Daisy hit [someone].
13b	ミッキーがデイジーをなぐらせた。	Mickey caused Daisy to be hit.
13c	ドナルドがデイジーをなぐった。	Donald hit Daisy.
(14)	ある日、ドナルドがミッキーにミニーをさすように言った。そして、ミッキーはミニーをさした。	One day, Donald told Mickey to stab Minnie. Then, Mickey stabbed Minnie.
14a	ドナルドがミニーをささせた。	Donald caused Minnie to be stabbed.
14b	ミッキーがミニーをさした。	Mickey stabbed Minnie.
14c	ドナルドがミニーにささせた。	Donald made Minnie stab [someone].
(15)	ある日、デイジーがミッキーにミニーをかざるように言った。そして、ミッキーはミニーをかざった。	One day, Daisy told Mickey to decorate Minnie. Then, Mickey decorated Minnie.
15a	デイジーがミッキーをかざらせた。	? Daisy made Mickey decorate [someone].
15b	デイジーがミッキーにかざらせた。	Daisy made Mickey decorate someone.
15c	ミニーがミッキーをかざった。	Minnie decorated Mickey.

(16)	ある日、ミニーがドナルドにデイジーをたすけるように言った。そして、ドナルドはデイジーをたすけた。	One day, Minnie told Donald to save Daisy. Then, Donald saved Daisy.
16a	デイジーがドナルドをたすけた。	Daisy saved Donald.
16b	ミニーがドナルドをたすけさせた。	? Minnie made Donald save [someone].
16c	ミニーがドナルドにたすけさせた。	Minnie made Donald save [someone].