

It has been reported that when the head (a verb) retrieves its argument noun phrase, NP, (a target) through a cue-based retrieval mechanism, if a non-target NP (an attractor) shares similar features with the target, similarity-based interference occurs (Lewis et al., 2006). Other prior studies have found that interference causes facilitatory effects—*facilitatory interference*.

Although facilitatory interference is triggered not only by syntactically similar features (Wagers et al., 2009) but also by semantically similar features (Cunnings & Sturt, 2018), only a few studies have investigated the effect of different types of features on facilitatory interference with the same sentence structures, especially in languages other than English. Therefore, we investigated whether different types of features trigger facilitatory interference in Japanese through a single experiment. The results indicated that facilitatory interference was triggered by both semantic and syntactic similarities of features, suggesting that the same underlying mechanism is responsible for processing both syntactic and semantic features.

Eighty native speakers of Japanese (41 males and 39 females, with a mean age of 40.5 years) were recruited through the Japanese crowd service *Lancers*. The test sentences comprised a subject (NP1), an object (NP2-gen NP3), and a transitive verb.

A total of 48 sets of 8 sentence types were constructed, divided into 8 lists, and mixed with 108 filler sentences. Four of the eight sentence types were semantically manipulated: NP2 (the attractor) and NP3 (the target) were chosen to be semantically congruent or incongruent with the verb (1a–d). For instance, a *cabinet* (the target: 1a&b) and a *document* (the attractor: 1a&c) are openable and semantically congruent with the verb *hiraku* “open,” but *sizes* (the target: 1c&d) and *dishes* (the attractor: 1b&d) are unopenable and hence incongruent with *open*. The main object NPs (NP2-gen NP3) did not differ in plausibility across conditions. The other four sentence types were syntactically manipulated: NP1 (the target) and NP2 (the attractor) in the 48 sets were personal names with which an honorific affix for a socially high-status person was attached or not (2a–d). For instance, if an honorific affix *-sensei* is attached to NP1, NP1 holds a socially high status and is syntactically congruent with the verb with the honorific affix *o ni naru* (2a&b); otherwise, NP1 designates a layperson and is syntactically incongruent with *o ni naru* (2c&d). And NP2 has an honorific affix attached as in (2a&c) but has no honorific affix in (2b&d).

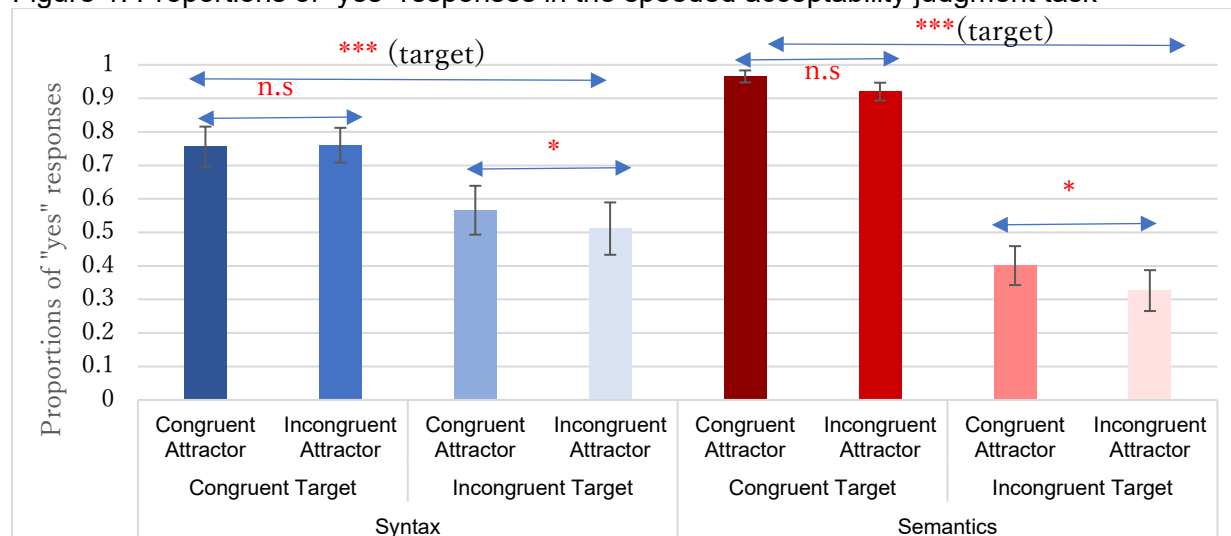
In our speeded acceptability judgment task, the sentences were presented word by word, and each word was shown for 300 ms, with a 100 ms ISI. The participants were instructed to judge the acceptability of the sentences, press a “yes” or “no” button within 3 seconds, and then answer a “yes” or “no” question about the content of the sentences.

The mean proportions of “yes” responses (Figure 1) were analyzed using generalized linear mixed-effects logistic regression with the information (syntax / semantics), target (congruent / incongruent), attractor (congruent / incongruent) as fixed factors. The maximal random-effect model with random slope and random intercept for subject and item was adopted. The interaction of information and target was found. Sentences with the congruent targets were judged as more acceptable in the semantic condition (2a&b) than in the syntactic condition (1a&b), but the sentences with incongruent targets were judged as more acceptable in the syntactic condition (1c&d) than in the semantic condition (2c&d). This could be because the semantic congruency between the targets and the verb was easier to judge than their syntactic one. Further analyses revealed that in both syntactic and semantic conditions, the congruent targets were judged as more acceptable than the incongruent targets, and when the targets were incongruent, the sentences with the congruent attractors tended to be judged as more acceptable than those with incongruent attractors (1c vs. 1d; 2c vs. 2d), which indicates facilitatory interference. To conclude, different types of information triggering facilitatory interference suggests the presence of a mechanism shared between different information types.

- (1) Semantic conditions: NP1-nom NP2 (attractor)-gen NP3 (target)-o Verb
- Tanaka-ga shorui-no tana-o akete mita-youda.  
-nom document ([+opn])-gen cabinet([+opn])-acc open ([+opn]) tried seemed
  - Tanaka-ga shokki-no tana-o akete mita-youda.  
-nom dish(es) ([-opn])-gen cabinet ([+opn])-acc open ([+opn]) tried seemed
  - ??/ Tanaka-ga shorui-no size-o akete mita-youda.  
-nom document ([+opn])-gen size ([-opn])-acc open ([+opn]) tried seemed
  - ??/ Tanaka-ga shokki-no size-o akete mita-youda.  
-nom dish(es) ([-opn])-gen size ([-opn])-acc open ([+opn]) tried seemed  
“Tanaka seemed to have tried to open the cabinet (openable) / size (unopenable) / of documents (openable) / dishes (unopenable).”  
#[+opn]: holding an “openable” feature, [-opn]: holding no “openable” feature.

- (2) Syntactic conditions: NP1 (target)-nom NP2 (attractor)-gen NP3-o o-Verb-ni naru ...
- Tanaka-sensei-ga Ueda-sensei-no tana-o o-ake-ni-natte mita-youda.  
([+h])-nom ([+h])-gen cabinet-acc open-([+h]) tried seemed
  - Tanaka-sensei-ga Ueda-no tana-o o-ake-ni-natte mita-youda.  
([+h])-nom ([-h])-gen cabinet-acc open-([+h]) tried seemed
  - ??/ Tanaka-ga Ueda-sensei-no tana-o o-ake-ni-natte([+h]) mita-youda.  
([-h])-nom ([+h])-gen cabinet-acc open-([+h]) tried seemed
  - ??/ Tanaka-ga Ueda-no tana-o o-ake-ni-natte mita-youda.  
([-h])-nom ([-h])-gen cabinet-acc open-([+h]) tried seemed  
“Tanaka-sensei (+honorific) / Tanaka (-honorific) seemed to have opened the cabinet of Ueda-sensei (+honorific) / Ueda (-honorific).”  
#[+h]: holding an “honorable” feature, [-h]: holding no “honorable” feature.

Figure 1. Proportions of “yes” responses in the speeded acceptability judgment task



The error bars indicate the 95% credible intervals for each condition.

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