

## When an onomatopoeia triggers different semelfactive interpretations: An experimental study

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### Introduction

In addition to the four aspect classes that Vendler (1957) defines, it is argued that there is the fifth aspect class that is called semelfactives (Comrie, 1976). Semelfactive verbs refer to punctual events (such as *blink*, *cough*, *rap*, and *flash*). One of the characteristics of semelfactives is brevity of the denoted events, as shown in(1a, b).

(1) a. *John blinked.*

b. *The light flashed.*

(Kearns, 2011: 159)

In(1a), the closing and opening of the eyes occur instantaneously, and in(1b), the light turns on and off momentarily.

In previous studies, it is pointed out that sentences with semelfactive verbs can also be interpreted to denote an iterative event depending on the type of temporal adverbials.

(2) a. *At nine o'clock the princess curtseyed in front of the guests.*

b. *Throughout the evening the princess curtseyed in front of the guests.*

(Brennan & Pykkänen, 2008: 142)

The verb *curtsey* in (2) is typically interpreted as a punctual action. So it can naturally co-occur with punctual adverbial *at nine o'clock* as in (2a). On the other hand, when combined with a durative adverbial *throughout the evening* in (2b), there is a mismatch between the point interpretation of the verb and the durative interpretation of the adverbial. A semantic operation occurs in order to repair this mismatch in such a way that the punctual event is converted to an iterative one. This is often called aspectual coercion in the literature (Moens & Steedman, 1987).

Some previous studies attempted to address whether such an aspectual mismatch was real. Brennan & Pykkänen (2008) conducted a norming study on a set of allegedly semelfactive verbs in English in order to examine whether they were interpreted as denoting either a single action or an iterative one. Following the norming study, they tested the effect of aspectual mismatch using single verbs (e.g., *glance out*) combined with durative or neutral adverbials, through self-paced reading and MEG studies. Their results revealed that there was a cost of mismatch between single verbs and durative adverbials.

Ishii & Ishikawa (2016) also examined semelfactives in Japanese denoting single events (e.g., *jump*).

(3) a. *Syoo-kaimaku-no ato shibaraku iruka-ga menomaede zyanpushi-ta node, kodomo-wa yorokon-da.*

show-start-GEN after for a while dolphin-NOM up close jump-PAST as child-TOP please-PAST

‘As for a while after the start of the show a dolphin jumped up close, the child was pleased.’

- b. *Syoo-kaimaku-no syunkan ni iruka-ga menomaede zyanpushi-ta node, kodomo-wa yorokon-da*  
 show-start-GEN moment at dolphin-NOM up close jump-PAST as child-TOP please-PAST  
 ‘As at the moment of the start of the show a dolphin jumped up close, the child was pleased.’

Using an eye-tracking method, they examined the reading times in each region and found that it was more costly to process when the single verbs were combined with durative adverbials than with neutral adverbials. In addition, they found that the mismatch effect disappeared when semelfactive verbs denoting iterative events were used. This suggests that semelfactive verbs behave differently depending on whether they denote a single event or an iterative one. However, in their experimental design, they compared different verbs, i.e., verbs denoting single events and those denoting iterative ones. Therefore, it is not clear whether these results were caused by the aspectual properties of different types of semelfactives or by using different sets of verbs.

## Experiment

The present study attempts to overcome this limitation by using the same verbs while making use of the contrast between simple and reduplicated onomatopoeia. One of the sets of examples are shown in (4a, b).

- (4) a. *kaminari-ga pikat-to hikata*  
 lightning-NOM PIKA-PARTICLE flash-PAST
- b. *kaminari-ga pika-pika hikata*  
 lightning-NOM PIKA-PIKA flash-PAST
- ‘The lightning flashed in a {PIKA/PIKA-PIKA} manner.’

The onomatopoeia *pikat-to* in (4a) and *pika-pika* in (4b) include the same root morpheme *pika*, which represents a flashing manner. The former consists of a single root while the latter consists of a reduplication of the root. Such differences in the number of the root morpheme may trigger the difference in iconic inference. That is, it can be iconically inferred from a single root that the action is done once. In the case of the reduplicated root onomatopoeia, it can be iconically inferred that the action is repeatedly done. As a result, the flashing in (4a) can be regarded as a single event while the one in (4b) can be regarded as an iterative event. We took advantage of such iconic inferences of onomatopoeia, and conducted a self-paced reading experiment to address the question of whether the same verbs can denote different types of semelfactive events by using onomatopoeic adverbials, and whether this difference leads to different aspectual mismatch effects against temporal adverbials.

## Methods

### Materials

The experiment we conducted had a  $2 \times 2$  factorial design crossing the type of temporal adverbials (Durative/Non-durative) and the type of onomatopoeia (Simple/Reduplicated). The temporal adverbials were suffixed

with either *-kan* ‘for’ for the Durative conditions or *-go* ‘after’ for the Non-durative conditions. As for the second factor, 2 types of onomatopoeia were prepared. In one case, an onomatopoeia including a single root morpheme was used as a Simple onomatopoeia. On the other hand, an onomatopoeia with a reduplicated root morpheme was used for the Reduplicated conditions. Each sentence was embedded in another clause to avoid sentence wrap-up effects for the regions of our interest. Some sample materials are shown below, with slashes indicating region boundaries for presentation:

(5) a. Simple onomatopoeia × Durative adverbial

*I-pun-kan* / *inazuma-ga* / *pikat-to* / *tooku-de* / *hikat-ta node* /  
 1-minute-for / lightning-NOM / PIKA-PARTICLE / far.away-LOC / flash-PAST because /  
*kodomo-ga* / *oogoe-de* / *nai-ta*.  
 child-TOP / aloud / cry-PAST

b. Reduplicated onomatopoeia × Durative adverbial

*I-pun-kann* / *inazuma-ga* / *pika-pika* / *tooku-de* / *hikat-ta node* /  
 1-minute-for / lightning-NOM / PIKA-PIKA / far.away-LOC / flash-PAST because /  
*kodomo-ga* / *oogoe-de* / *nai-ta*.  
 child-TOP / aloud / cry-PAST

‘A child cried aloud because lightning flashed in a {PIKA/PIKA-PIKA} manner in the distance for one minute.’

c. Simple onomatopoeia × Non-durative adverbial

*I-pun-go* / *inazuma-ga* / *pikat-to* / *tooku-de* / *hikat-ta node* /  
 1-minute-after / lightning-NOM / PIKA-PARTICLE / far away-LOC / flash-PAST because /  
*kodomo-ga* / *oogoe-de* / *nai-ta*.  
 child-TOP / aloud / cry-PAST

d. Reduplicated onomatopoeia × Non-durative adverbial

*I-pun-go* / *inazuma-ga* / *pika-pika* / *tooku-de* / *hikat-ta node* /  
 1-minute-after / lightning-NOM / many times / far.away-LOC / flash-PAST because /  
*kodomo-ga* / *oogoede* / *nai-ta*.  
 child-TOP / aloud / cry-PAST

‘A child cried aloud because lightning flashed in a {PIKA/PIKA-PIKA} manner in the distance after one minute.’

We prepared 24 target items. They were distributed into 4 lists based on a Latin square design, and we added 48 filler sentences to each list.

## Participants and Procedures

Participants were 77 native speakers of Japanese, all of whom were undergraduates of Konan University. Sentences were pseudo-randomly presented region by region, non-cumulatively in a moving-window manner, using Linger (Rohde, 2003). A yes-or-no comprehension question followed each item.

## Results and Discussions

Prior to analysis, 14 subjects showing an overall accuracy rate of less than 70% were removed from the analysis. The data points with  $z$ -score higher than 5 in each region  $\times$  condition cell and the reading times shorter than 150ms were removed from the analyses. Region 3 was the onomatopoeia region where the first effects of the aspectual mismatch might be found in the Simple  $\times$  Durative condition, and Region 5 was the critical verb region where the aspectual computation might be completed. Region 6 was a spillover region. The mean reading times for each region are summarized in Fig.1, where error bars represent standard errors. We conducted statistical analyses using linear mixed effects models with the adverbial type and the onomatopoeia type as fixed effects and participants and items as random effects. The models were fitted with maximal random effects structure whenever possible.

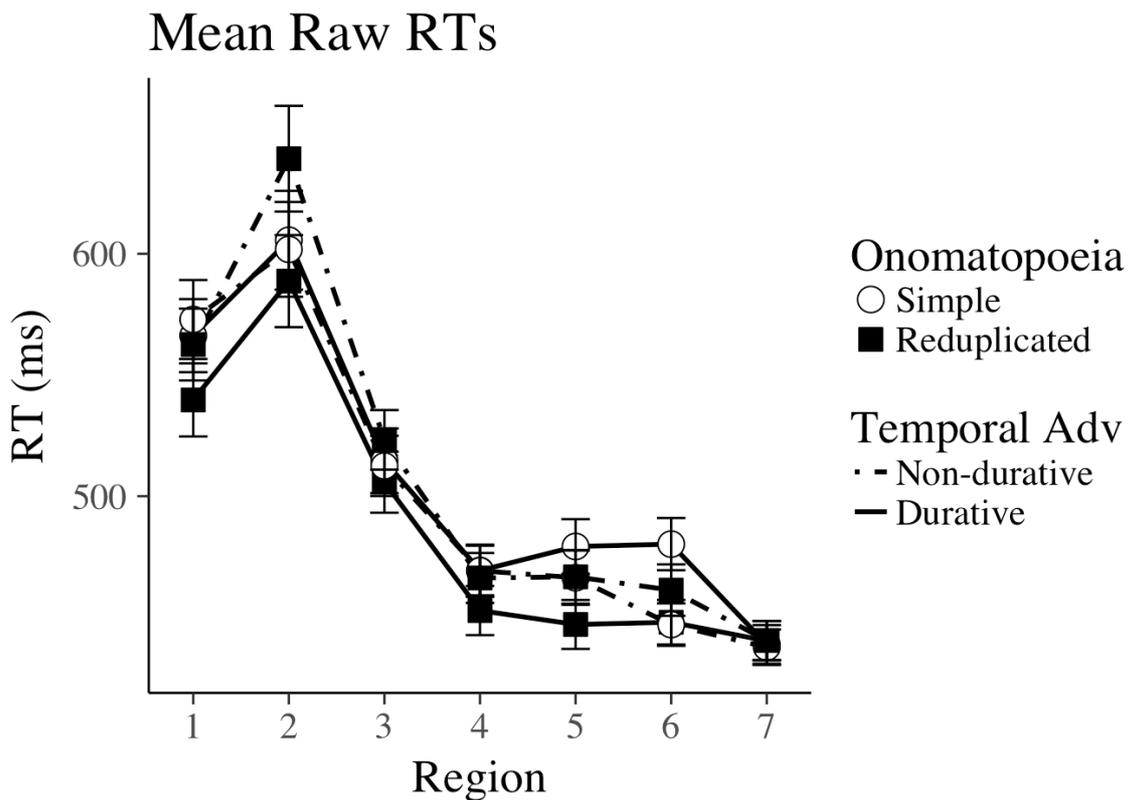


Figure 1: Mean RTs for R1–7

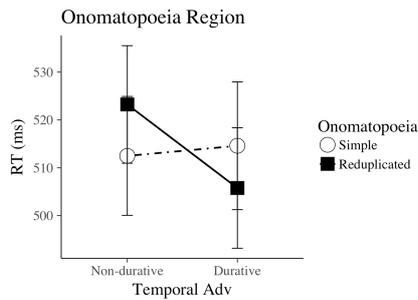


Figure 2: Mean RTs in R3

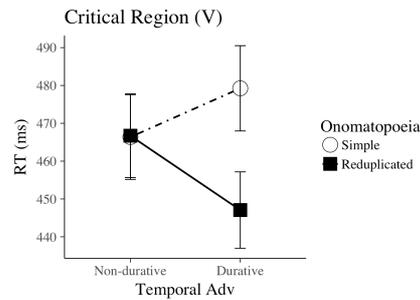


Figure 3: Mean RTs in R5

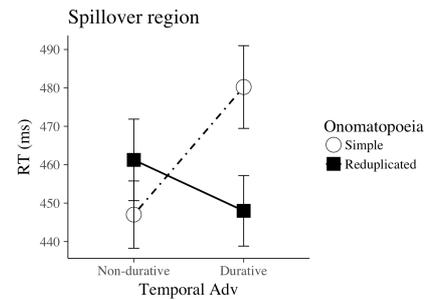


Figure 4: Mean RTs in R6

In the onomatopoeia region (R3), shown in Figure 2, there were no main effects of the temporal adverbial factor ( $t=0.05, p=.963$ ) or the onomatopoeia factor ( $t=-0.59, p=.558$ ). There was no interaction between these two factors ( $t=0.86, p=.390$ ).

In the critical region (R5), shown in Figure 3, there were no main effects of the temporal adverbial factor ( $t=1.35, p=.187$ ) or the onomatopoeia factor ( $t=-0.14, p=.890$ ). Furthermore, there was no interaction between these two factors ( $t=1.52, p=.135$ ).

In the spillover region (R6), shown in Figure 4, again, there were no main effects of the temporal factor ( $t=1.13, p=.261$ ) or the onomatopoeia factor ( $t=0.95, p=.346$ ). However, there was a significant interaction between these two factors ( $t=2.21, p<.05$ ). We further conducted pairwise comparisons to analyze the interaction. The pairwise comparison revealed that (i) within the Durative conditions, the mean reading time for Simple onomatopoeia was significantly slower than that for Reduplicated ones ( $t=2.38, p<.05$ ), and (ii) within the Simple onomatopoeia conditions, the reading time for Durative adverbials was significantly slower than that for Non-durative ones ( $t=2.549, p<.05$ ). All other comparisons did not show significant differences. This indicates that the slowdown in the Simple  $\times$  Durative condition was the source of the found interaction in this region.

In summary, there were no effects found in the onomatopoeia region or the critical verb region. The lack of effects in the onomatopoeia region suggests that the aspectual interpretation is not exclusively determined by the combination of temporal adverbial and onomatopoeia, possibly delayed until the predicate is encountered. Also, there were no effects in the critical verb region, either, while an interaction was found in the spillover region (cf. Long et al. 2010). We interpret these results as indicating that there should be a cost of aspectual mismatch at the verb when a durative adverbial is combined with a single onomatopoeia, but this effect is somewhat delayed. The effect was not immediately found at the verb region in our experiment possibly because the aspectual processing involves some higher-order, complex semantic computation, an effect of which a self-paced reading method could not catch immediately at the critical region. The fact that the slowdown with durative adverbials was not found for reduplicated onomatopoeia suggests that multiplying an onomatopoeic root triggers a different self-factive reading—i.e., an iterative one.

## Conclusion

This study examined the effect of aspectual mismatch triggered by a certain combination of onomatopoeia and

temporal adverbials. We found that an effect of aspectual mismatch occurred in the spillover region when a durative adverbial was combined with a simple onomatopoeia, but not with a reduplicated one. These results support our hypothesis that the different onomatopoeic expressions may trigger different semelfactive interpretations. However, no effects were found at the onomatopoeia region, which followed the temporal adverbial region, suggesting that aspectual computation is temporarily suspended until the predicate is encountered. Also, the fact that the effect was only found in the spillover region indicates that it takes time to process the aspectual meaning based on the combination of temporal adverbials and onomatopoeia.

## References

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