# RELATIONSHIPS AMONG ATTRIBUTES OF EPISODES IN AUTOBIOGRAPHICAL ELABORATION IN INCIDENTAL MEMORY

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# Abstract

The present study investigated the differences in the attributes of episode that participants remembered between recalled words and non-recalled ones in incidental free recall. Participants were asked to judge whether an episode came to mind when each target word was presented in the orienting task phase, followed by an unexpected free recall and rating phases. In the rating phase, they were asked to rate the degree of three attributes, vividness, pleasantness, and nostalgia, for each episode. Positive correlations among the three attributes were observed for episodes of recalled words, whereas for episodes of non-recalled words, they were not. These results showed strong relationships among the attributes of episodes that were determinants of the effectiveness of autobiographical elaboration on incidental recall regarding distinctiveness.

# RELATIONSHIPS AMONG ATTRIBUTES OF EPISODES IN AUTOBIOGRAPHICAL

ELABORATION IN INCIDENTAL MEMORY

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Summary The present study investigated the differences in the attributes of episodes that participants remembered between recalled words and non-recalled ones in incidental free recall. Participants were asked to judge whether an episode came to mind when each target word was presented in the orienting task phase, followed by an unexpected free recall and rating phases. In the rating phase, they were asked to rate the degree of three attributes, vividness, pleasantness, and nostalgia, for each episode. Positive correlations among the three attributes were observed for episodes of recalled words, whereas for episodes of non-recalled words, they were not. These results showed strong relationships among the attributes of episodes that were determinants of the effectiveness of autobiographical elaboration on incidental recall regarding distinctiveness.

Elaboration in memory refers to adding more information to a target's trace (Jacoby & Craik, 1979). The newly added information could be of many types, some of which, but not all, lead to effective elaboration. Thus, effective elaboration could lead to better recall, and the quality of the added information determines the effectiveness of elaboration. Toyota (1984) reviewed the research on elaboration in memory and indicated the contrast between the two types of elaboration. Semantic elaboration refers to the addition of semantic information stored in semantic memory and autobiographical elaboration stored in episodic memory. The distinction between semantic and episodic memory is based on Tulving's (1972) proposal. Autobiographical elaboration was first proposed by Warren, Chattin *et al.* (1983). Each target was presented to the participant and asked to rate how long it had been since its last visual contact with the object indicated by each target on a temporal category scale (e.g., minutes, hours, day, week, month, year), followed by a free recall test. The found "recency effect," namely target words rated in temporally recency position (e.g., minutes, hours), were recalled more often than those in temporally primacy position (e.g., month, year). They also showed that target words with visual contact were recalled more often than were those with no visual contact. When the participants remembered the visual contact with the object indicated by the target word, they added autobiographical information, namely, personal episodes. Therefore, they elaborated on each target word using their episodes.

Toyota (1989) also replicated the "recency effect" using Kanjimaterials in Ex.1. He focuses on the determinants of the effectiveness of autobiographical elaboration in Ex. 2 to 4. In the orienting task of Ex.2, participants were asked to rate the number of episodes that came to mind for each target word, followed by an incidental free recall test. The targets rated as eliciting many episodes were recalled more often than those that did not. This result showed that the number of episodes elicited by a target word determined the effectiveness of autobiographical elaboration. Ex.3 investigated whether the pleasantness of an episode determined the effectiveness of autobiographical elaboration. The targets rated as eliciting pleasant episodes were recalled more often than those that did not. This result showed that the pleasantness of an episode elicited by a target word was the determinant of the effectiveness of autobiographical elaboration. In the orienting task of Ex. 4, participants were asked to rate the vividness of an episode that came to mind for each target word, followed by an incidental free recall test. The targets rated to elicit vivid episodes were recalled more often than those that were dull. This result showed that the vividness of an episode elicited by a target word was the determinant of the effectiveness of autobiographical elaboration. Episodes, including any person (social memories), became more vivid than those not involving any person (non-social memories). Toyota (2012) investigated the difference in recall performance between target words associated with social memories and those associated with non-social memories. The results showed that targets with social memories were recalled more often than those with non-social memories.

According to Hunt (2006), distinctiveness is a critical memory factor. This result was interpreted in terms of distinctiveness. Namely, episodes with social memories made targets more distinctive than those with non-social memories. Therefore, the person's information in an episode determines the effectiveness of autobiographical elaboration. McDonough and Gallo (2008) used the distinctive heuristic (Schacter et al. 1999) to explain that autobiographical elaboration reduces false recognition. "This heuristic is used when one correctly rejects an item as having been studied in a target source because that item does not bring to mind detailed recollections that would be expected if it had been studied in that source" (p1430). Specifically, autobiographical elaboration makes the target distinctive by adding personal episodes. Thus, the target's degree of distinctiveness determines the effectiveness of autobiographical elaboration.

Although some attributes in an episode were identified as determinants of the autobiographical elaboration's effectiveness, the relationships among these attributes, such as pleasantness and vividness, were not clarified (Toyota, 1989). Cheung et al. (2018) has focused on nostalgia in autobiographical memory functions and stressed the uniqueness of its positive effect compared to rumination and counterfactual thinking. Nostalgia is also assumed to be a critical attribute of effective autobiographical elaboration. If so, targets with episodes involving nostalgia would be recalled more often than those without nostalgia.

The present study examined the relationships among these attributes, pleasantness, vividness, and nostalgia, using correlations between each pair attribute to induce strong relationships. As an episode with strong relationships among attributes would be more distinctive than those with weak relationships, the former episode would be an effective cue for retrieving the target associated with it. Thus, targets with strong relationships among attributes are recalled more than those with weak relationships. The present study also used Cronbach's alpha to index the strong relationships among attributes.

It was predicted that positive correlations among rating scores of these attributes and higher alpha were observed in recalled targets. Nevertheless, those correlations and alpha were not in non-recalled targets. The purpose of the present study is to examine this prediction.

### METHOD

## Participants

Female students in a nursing school participated in the study (N =28 mean age 20.1 years, SD=1.99 years).

#### Materials

A total of 20 target words were selected from Japanese Kanji norms, a normative set used in a previous study (Kitao et al., 1977) and used in the previous studies (Toyota, 1989). Each target word was written in a Japanese *Kanji* character familiar to the participants on separate PowerPoint slides. The familiarity of these target words ranged from 4.1 to 5.8, and the concreteness of these words ranged from 81% to 98%. Each target word was placed on its slide on an orienting list (20 targets and two buffers). Each participant was asked to answer the orienting question: "Do you remember episodes related to a presented word ?" implicitly, without orally answering "Yes" or "No." The sequence of the target words in the orienting list was fixed.

## Procedure

The participants were told that the task was a pilot test to gather information about Japanese *Kanji* characters. The procedure used in this study was similar to that used in previous studies (Toyota, 2012) except that the target words were not repeated.

## Orienting task phase

The experiment was conducted with a group of participants under incidental memory conditions. The participants were informed that the task was a pilot test to gather information about the Japanese language. The task was explained with examples of slides on a screen in front of the classroom. The orienting instructions were: "A Kanji word is shown on the screen." "On each slide (pointing to the example on the screen), your task is to recall episodes you have experienced in the past but not say anything." Each participant performed the tasks on each slide on the orientation list with a 5 s per slide time limit.

# Free recall test phase

Following the orienting task, the participants were given 5 minutes to recall and write as many target words as possible.

#### Rating episodes phase

Following the free recall test, the participants were provided with a sheet containing all the target words. Each participant was asked to indicate whether each target word reminded them of a previous episode. If a particular target word reminded them of an episode, they were asked to rate the degree of three attributes of each episode. These include pleasantness on a scale of 1 (most unpleasant) to 6(most pleasant), vividness on a scale of 1 (most dull) to 6 (most vivid), and nostalgia on a scale of 1 (never nostalgic) to 6 (most nostalgic) at their own pace. This phase lasted approximately 6 minutes.

# RESULTS

The mean scores of the three attributes of pleasantness, vividness, and nostalgia are shown in Table 1 as functions of the type of target (recalled vs. non-recalled). An analysis of variance was conducted for each attribute score to investigate the difference between the recalled and non-recalled targets. The main effect of the type of target (recalled vs. non-recalled) was significant,  $F_{(1, 27)} = 11.72$ , p < .01,  $\eta^2 = .15$  for pleasantness rating,  $F_{(1, 27)} = 21.63$ , p < .001,  $\eta^2 = .12$  for vividness rating, and  $F_{(1, 27)} = 10.86$ , p < .01,  $\eta^2 = .13$  for nostalgia ratings. The correlations between each pair (e.g., pleasantness vs. vividness) are shown in Table 2. Only a significant correlation between vividness and nostalgia rating scores was observed for episodes of recalled targets. Cronbach's coefficient alpha among the three attributes was calculated and non-recalled targets to investigate internal consistency in each episode. The alphas are shown on the right-hand side of Table 2. The difference in alphas between the two indicated that the internal consistency in an episode in the recalled target was better than that in non-recalled targets.

## Table 1

Mean rating scores of pleasantness, vividness, and nostalgia as a function of the type of targets (recalled vs. non-recalled)

		Attributes Pleasantness	Attributes	Attributes Vividness	Attributes	Attributes Nostalgia
Recalled targets	M SD	4.58 .78		4.86 .77		4.70 .83
Non-recalled targets	M SD	3.85 .97		4.26 .82		4.06 .87

# Table 2

Correlations between each pair attributes and Cronbach's alphas as a function of the

type of targets (recalled vs. non-recalled)

	Pleasantness vs. Vividness	Vividness vs. Nostalgia	Nostalgia vs. Pleasantness	Internal
Recalled targets	.29	.44*	10	.44
Non-recalled targets	12	.00	.12	02

#### \*p<.05

#### DISCUSSION

Previous studies (Toyota, 1989) showed that targets with pleasant or vivid episodes were recalled more often than those with unpleasant or dull episodes. The present study also indicated that the rating scores for pleasantness and vividness with recalled targets were higher than those with non-recalled targets. The nostalgia rating score for recalled targets was higher than that for non-recalled targets. These results show that nostalgia, pleasantness, and vividness determine the effectiveness of autobiographical elaboration.

The primary purpose of the present study was to examine the prediction that positive correlations among rating scores of attributes and higher alpha were observed in recalled targets. Nonetheless, those correlations and alpha were not in non-recalled targets. The results showed a positive correlation between vividness and nostalgia attributes, and a higher alpha was observed in recalled targets. Notwithstanding, no correlations and low alpha were observed in non-recalled targets. These results supported the prediction and indicated that strong relations among attributes in an episode led to effective autobiographical elaboration. According to Hunt (2006), distinctiveness is a critical memory factor. Thus, the results were interpreted regarding their distinctiveness. Episodes with strongly connected attributes make the targets more distinctive than those with weak attributes. Therefore, the effectiveness of autobiographical elaboration is determined by the strong relations among the attributes of an episode with a target.

Although the present study indicated the importance of relations among attributes in an episode, the most crucial attribute for effective autobiographical elaboration has not been clarified. Toyota (1995) showed that targets with episodes with the highest vividness ratings were recalled more often than those with the highest pleasant ratings. This result was interpreted as indicating the superiority of vividness to pleasantness. The present study results indicated that the effect size of vividness was larger than that of the other two attributes, pleasantness and nostalgia. Therefore, it can be inferred that vividness is the most effective attribute. However, the effects of combinations of attributes, such as vivid, pleasant, and nostalgic, on recall

were not examined. Further research is required to explore the most effective combination of attributes in an episode.

Finally, the methodological problems should be addressed. This is about the procedure of the rating episode phase. Participants were required to rate the degree of each attribute in an episode associated with a target word in the orienting task phase. However, as a time lag existed between the orienting task phase and the rating episode phase, possibly, each participant could not precisely remember the episode elicited by each target during the orienting task phase. This problem was indicated in a previous study (Toyota, 2012) using the power-point slide presentation procedure. It is difficult for participants to rate in such a presentation because the targets were presented on a screen at the front of the classroom and the rating sheet was close to them.

Further research is necessary to provide a booklet of targets for each participant and rate the degree of attributes in an episode with each target during the orienting task phase. Another problem concerns the attributes of the target word itself. As the present study focused on the episode elicited by each target, the attributes of each target word itself have not been examined precisely. For example, if each target is associated with general episodes, such as *a book* eliciting an episode of studying hard, it would be difficult to discriminate between general episodes and personal episodes with each target.

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