

Advertisements printed on sweets enhance impressions, learning and communication.

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Abstract

The distribution of novelty items and goods with logos and brands is used various ways, ranging from promoting products and services to increasing brand awareness. These goods are thought to produce a publicity effect due to the simple contact effect and the principle of reciprocity. However, goods are unlikely to be used in an environment with many similar goods, so this approach may be less effective in promoting them. We created novelty sweets using snacks that can provide gustatory stimulation in addition to repeated stimulation and that are easily consumed. We conducted an experiment in which participants were asked to memorize the names of countries while they used novelty sweets and novelty goods printed with the names of companies. We found that novelty sweets were more effective than novelty goods in terms of participants' memory of the country names as well as the printed company names. Furthermore, novelty sweets were found to increase the amount of communication during the task and learning performance more than novelty goods.

Introduction

Many companies are working on initiatives to promote their services and products and increase their visibility. Novelty items, such as ballpoint pens and other miscellaneous goods with the company's logo, brand, or product advertisement printed on them, are widely used. This advertising technique is based on the "simple contact effect"^{1,2}, in which consumers obtain a better impression when they are repeatedly exposed to a company's name and other information, and on the "principle of reciprocity"³, in which consumers want to reciprocate when they are given something in return. The simple

contact effect is unlikely to occur in situations where a large number of similar novelty items are distributed, and the principle of reciprocity is unlikely to be effective if the consumer receives something that is not useful. In recent years, the market for promotional goods, including novelty items, has been expanding⁴. Therefore, increasing publicity through general novelty items may not be highly effective.

We created novelty sweets (printed-on sweets) using snacks that can provide gustatory stimulation in addition to repeated stimulation and that are easily consumed, unlike miscellaneous goods, which are traditionally a medium for novelty items. This paper reports on the impact of novelty sweets on publicity, memory and communication.

Materials and Methods

Novelty items

In this study, we used novelty sweets provided by Morinaga, Okashi Print. “Pringles”, “Hi-Chew”, “Dars”, “Koeda”, and “Ramune” were used as the medium for the novelty sweets. Five types of miscellaneous goods were used as the medium for novelty goods: ball-point pens, clear files, fans, wet wipes, and tote bags. Ten company names for the novelty sweets and goods were prepared and classified into two groups of five companies each (Corp. A-E and F-J). We prepared four sets (Set A-D) of novelty sweets and goods (Figure 1B).

Task

Of the 193 UN member states, names of countries with 3-9 katakana characters were randomly selected to create two sets of 20 countries per set (List A, B).

Experimental scheme

The study was conducted as a crossover study with 16 adults aged 19 to 52 years. An overview of the study is shown in Figure 1A. The participants were seated facing each other in pairs and memorized the names of 20 countries in 7 min (Task 1). After a 13-min interval, a second set of country names was memorized in 7 min in the same way (Task 2). Then, after a 53-min break, the test was conducted for 10 min (Test). In addition to the test, which asked participants to choose 120 countries from among 40 memorized names of countries and was announced in advance, the participants were asked to choose 10 companies from 30 choices of company names listed on the goods in the two tasks. Participants were instructed to select 10 companies for the company name test and 40 countries for the country name test. In the test phase, subjects were seated individually

and did not engage in conversation. In each task, a set of novelty goods was used. The combinations of goods presented to each subject are shown in Figure 1C.

Analysis of test results

The answer sheets were tabulated and statistically analyzed in Excel (Microsoft Corporation, WA, U.S.). In both tests, responses that did not match the specified number (company name test: 10; country name test: 40) were excluded from the analysis. In the analysis of the company name test, each subject was divided into two groups: five companies presented on the novelty sweets and five companies presented on the novelty goods. The percentage of correct responses for each group was calculated. In the analysis of the country name test, the group of country names that were memorized with the novelty sweets (Sets A and B) was defined as the novelty sweets group, and the other group was defined as the novelty goods group. The percentage of correct answers for each was calculated.

Analysis of the conversation data

In each task, a voice recorder was placed in the center of the desk where the participants were working, and conversations between pairs of participants during the task were recorded (Figure 4A, upper). The sampling rate was 16,000 Hz. Data analyses were performed using Python 3.6. The raw data were divided into 10 ms windows and converted to power by calculating the root mean square (Figure 4A, lower). From this dataset, we defined the duration of the conversation as the period during which power was continuously greater than a threshold value set by the mean plus standard deviation (Figure 4A, red line) without interruption for more than 100 ms (Figure 4A, blue line). If it exceeded the duration threshold of 1000 ms or less, it was considered noise and excluded from the duration of the conversation.

The obtained duration of the conversation was divided into two groups for all subjects, the novelty sweets group and the novelty goods group, and the conversation rate in the novelty sweets group was calculated using the following formula:

$$\text{conversation rate}_{real} = \frac{\sum \text{Time}_{sweets}}{\sum \text{Time}_{sweets} + \sum \text{Time}_{goods}}.$$

The calculated conversation rates were tested using the bootstrap hypothesis test ⁵. All subject pairs, 16 randomly selected from the duration of the conversation calculated from each task (n=32), were subjected to two operations to create two random groups. Using the two random groups we created, we calculated the surrogate dataset for conversation rates using the following equation:

$$\text{conversation rate}_{\text{surrogate}} = \frac{\sum \text{Time}_{\text{random1}}}{\sum \text{Time}_{\text{random1}} + \sum \text{Time}_{\text{random2}}}.$$

This manipulation was repeated 10000 times to create a surrogate group of conversation rates, which were compared and evaluated against the conversation rates obtained in the novelty sweets group.

Results

We obtained two types of test results and audio data from 16 subjects and analyzed them in two groups, the novelty sweets group and the novelty goods group. Valid responses from the obtained data (company name test: n=16, country name test: n=13) were used in the analysis. In the company name test, the percentage of correct answers for the names of the companies listed on the novelty sweets was 63.8%, which was significantly higher than that for the novelty goods (31.3%) (Figure 2; P=0.009, paired t-test). Furthermore, the percentage of correct answers on the country name test was significantly higher in the novelty sweets group (75.8%, n = 13) than in the novelty goods group (69.6%, n = 13) (Figure 3; P = 0.040, paired t-test).

In the analysis of the conversation data, the obtained waveform data were first converted to power by calculating the root mean square, and then the duration of the conversation was defined using a threshold defined by the mean + standard deviation (see Figure 4A; Materials and Methods). Both the novelty sweets and the novelty goods groups showed a long duration of conversation at 0-2 min (Figure 4B; novelty sweets group; 12.3 s/min, novelty goods group; 13.6 s/min). The duration of the conversation tended to decrease in both groups after 2 min. However, the duration of the conversation in the novelty sweets group was higher than that in the novelty goods group from 5-7 min (Figure 4B; novelty sweets group; 5.52 s/min, novelty goods group; 3.09 s/min). Conversation rates (see Materials and Methods) were calculated and compared with shuffled data. The trend was found to be significant (Figure 4B; P = 0.0012, bootstrap hypothesis test).

Discussion

In this study, we compared the impact of each novelty item on the memorization of a company's name and the name of an unrelated country in an environment where two types of novelty items were presented. First, we found that the names of companies printed on novelty sweets were more likely to be remembered by participants than those printed on novelty goods (Figure 2). This result suggests that novelty sweets are a more effective

advertisement than the novelty goods that are traditionally used. However, since contact with the novelty items in this study was short term (7 min) and the time to the memory test was relatively short (90 min), the long-term effects of publicity need to be examined separately.

Next, we examined how the novelty items presented during the country name memorization task changed participants' performance on the task and behavior during the task. Surprisingly, the memorization performance of the country name group was better when they were presented with the novelty sweets than with the novelty goods (in other words, when the participants were presented with non-printed sweets) (Figure 3). Furthermore, in the novelty sweets sessions, conversation lasted longer than in the novelty goods sessions (Figure 4B). In meetings and workshops, the provision of sweets has been reported to increase the amount of communication and enhance the efficiency of tasks^{6,7}. In addition to these reports, the results of this study show that these effects are more pronounced when advertisements are printed on sweets than when advertisements are not printed on sweets. Moreover, it has been shown that rote learning is more effective in memory consolidation with speaking than with silent reading⁸. The reason for the improved performance on the country name test in this study may be that the amount of task-related conversation increased with the duration of the communication in the novelty sweets group, which led to more effective retention in memory.

Finally, it is important to note that sweets stimulate our senses of taste, smell and touch. It is possible that because the brand names of the sweets used in this study were well known, a sense of discomfort (*i.e.*, unusuality) arose in response to the difference from the usual packaging. This discomfort may have facilitated the retention of memory. In this test, we did not reveal that the participants had to memorize the name of the company. In addition to the names of the companies, the test scores increased in terms of recalling the name of the country, which was the main test. This result is in line with the theory that in environments where there is a stimulus of pleasure, memory that is not directly related to pleasure is also facilitated, suggesting that printed snacks are more enjoyable. In fact, the amount of conversation during memorization was also high. In conclusion, we find that these originally designed snacks serve as a conversation starter.

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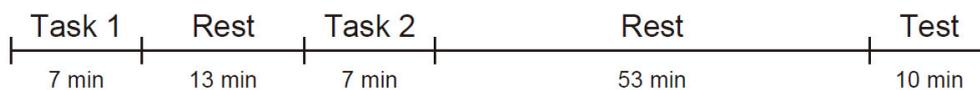
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Notes

This work is part of private investigations and is free of copyright. We declare no conflicts of interest. Correspondence should be addressed to Yuji Ikegaya (yuji@ikegaya.jp).

Figure

A



B

	Set A	Set B	Set C	Set D
Pringles	Corp. A	Corp. F	None	None
Hi-Chew	Corp. B	Corp. G	None	None
Dars	Corp. C	Corp. H	None	None
Koeda	Corp. D	Corp. I	None	None
Ramune	Corp. E	Corp. J	None	None
Ball-point pen	None	None	Corp. A	Corp. F
Clear file	None	None	Corp. B	Corp. G
Fan	None	None	Corp. C	Corp. H
Wet wipes	None	None	Corp. D	Corp. I
Tote bag	None	None	Corp. E	Corp. J

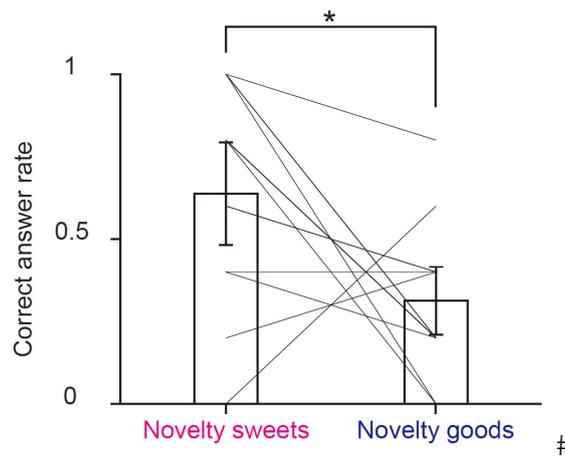
C

Pair	Task 1	Task 2
1	Set A / List A	Set D / List B
2	Set B / List A	Set C / List B
3	Set C / List A	Set B / List B
4	Set D / List A	Set A / List B
5	Set A / List B	Set D / List A
6	Set B / List B	Set C / List A
7	Set C / List B	Set B / List A
8	Set D / List B	Set A / List A

Figure 1. Overview of the experimental scheme in this study. (A) Timeline of the experimental protocol for this study. (B) Components of a set of novelty items. Five sweets are used as novelty sweets: Pringles, Hi-Chew, Dars, Koeda and Ramune. Five sundries are used as novelty goods: ball-point pen, clear file, fan, wet wipes, and tote bag. Notably, all sets contain all sweets and sundries, but only Sets A and B include sweets printed with the company name, "novelty sweets" (Pink). Similarly, only Sets C and D include sundries printed with the company name, "novelty goods" (Blue). (C) A set of novelty items and a list of countries used by each participant pair in the two tasks.

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Figure 2. Comparison of company name test results between novelty sweets and goods. The bars represent the mean of the participants' scores (n = 16, error bar; ± 2 SEM). Each line shows the change in score for each participant. The rate of correct answers was significantly higher in the group with company names printed on novelty sweets ($*P < 0.05$, paired t -test).

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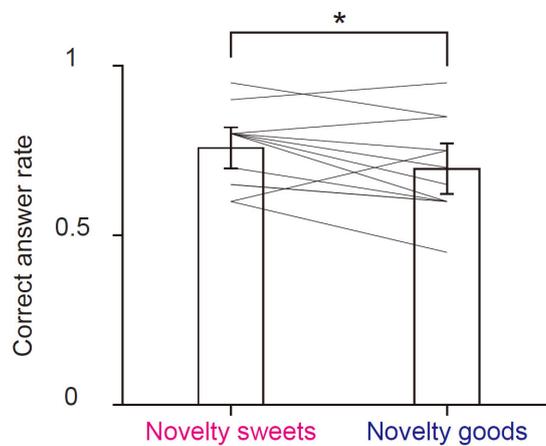


Figure 3. Comparison of country name test results between the novelty sweets group and the goods group. The bars represent the mean of the participants' scores (n = 13, error bar; ± 2 SEM). Each line shows the change in score for each participant. The rate of correct answers was significantly higher in the group with country names that were memorized while using novelty sweets ($*P < 0.05$, paired t -test).

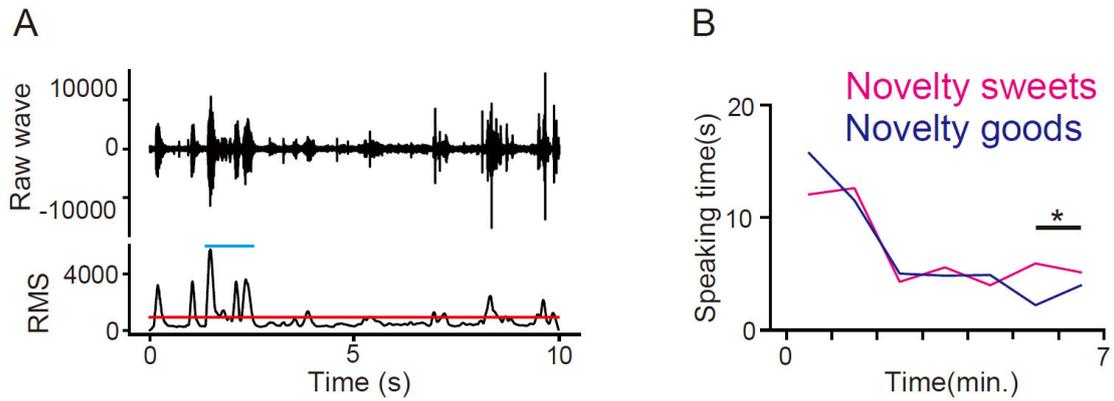


Figure 4. Quantification and comparison of the amount of conversation during the task in pairs of participants. (A) The representative raw audio data in this study (upper) and overview of quantification duration of the conversation (bottom). The red line shows the threshold used to calculate the duration of the conversation, and the blue line represents the duration of the detected conversation (see Materials and Methods). (B) Time course of the duration of the conversation in the novelty sweets and goods group. The amount of conversation in the novelty sweets group was significantly higher in the last stage of the task (see Results and Materials and Methods; $*P < 0.05$, Bootstrap hypothesis test).