Influence of Purchase Context on Consumer Information-Seeking Behaviors and Product Evaluation: A Comparison of Investigations Through Eye-tracking Data and Evaluation Questionnaires

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Abstract:

Contingency in consumer choice behavior has long been discussed, and this behavioral uncertainty has appeared to occur because purchase context can change a consumer's decision-making strategy; yet, the specific mechanism of this context has remained unclear. Some studies in computational brain research have explained that contexts have temporal modification functions to information representations of objects or items in the brain (e.g., "Selective desensitization method"; Morita 2002).

In this study, we measured the viewing habits of consumers using eye-tracking systems, and investigated how purchase context influences consumers' information seeking while they make their decisions.

We observed that context inhibits cognition cost through the selective reduction of information seeking. This result concurs with previous computational brain studies. Additionally, by analyzing post-measurement questionnaires, some commonality and variance between context-dependent cognitive and emotional influences were observed.

This study's results serve as a basis for estimating how the evaluation of a product's attributes changes depending on context, and how context influences decision-making outcomes.

Background

Marketing and consumer research are increasingly using cognitive science or neuroscience methodology for more direct observations of consumers. Such research measures information-seeking behavior directly using eye-tracking techniques or measures brain activities using functional magnetic resonance imaging (fMRI) to discover the relationship between consumers' active brain regions and their consumption behaviors. For instance, studies using eye-tracking techniques primarily aim to explore the effects of product packaging elements and product display on consumers' attention and cognition time (Pieters 1999, Pierre 2007, Graham 2012, Vidal 2013), measure consumers' information-seeking behavior while they are on shopping websites (Roth 2013, Wang, 2014), or investigate consumers' information-seeking behavior at a point of purchase.

On the other hand, a field of research using brain-imaging is called neuromarketing, which investigates the effects of various factors that influence information processing by observing brain activities during the consumer decision-making process. For example, while it was widely recognized in consumer behavior studies that consumers modify their purchase decision making depending on the situation, it has been reported that the active region also changes in actual brain activity based on the situational difference (frame) of the decision-making process (Martino 2006, Tom 2007).

While technical limitations have also been mentioned, these techniques have made it possible to estimate "when" and "what parts of consumers' brains" are reacting more directly. Therefore, it is anticipated that an accumulation of practically beneficial knowledge could be feasible in the future if these techniques are combined with research that primarily focuses on conceptual models (Morin 2011, Sebastian 2013).

As these findings have accumulated, the importance of a theoretical neuroscience approach that can mathematically explain why and how brain activity relates to consumer behavior has become the focus. In particular, consumers' decision making, which is conducted through complex psychological processes, includes the contexts of past experiences, cognition, and emotional intervention. For this reason, understanding consumers' decision-making mechanisms by only focusing on neuromarketing research methods with no focus on the computational approach is rather difficult (Morokami 2008).

Due to these underlying reasons, we have aimed to explain and partially demonstrate uncertain consumers' decision-making mechanisms, which change depending on context, by applying computational neuroscience knowledge (Morokami 2013). Therefore, in this study we measure the viewing habits and evaluations of consumers via eye-tracking systems and questionnaires, and investigate how the purchase context influences consumers' information seeking while they make their decisions.

1. Context Effects on Consumer Choice Behavior

Contingency in consumer choice behavior has long been discussed and this behavioral uncertainty has appeared to occur because product evaluation and choice are generally affected by external factors. Consumer behavior research broadly deals with these external factors as "context." However, upon further scrutiny, the concept of context can be divided into two types. One type is related to the decision-making setting, such as purpose, situation, or background of the purchase (Stefflre 1971, Dickson 1982, Srivastava 1984, Ratneshwar 1991). In most cases, these studies treat the contextual effect as a black box; however, for instance, Warlop (1993) reported that cognitive processes during decision making can differ depending on whether the context is familiar to the consumer.

The other type involves context determined by options (Bettman 1991, Payne 1993). Unlike decision making in cases where there is only one option, decision making in multiple options brings about contrasting effects, such as trade-off contrasts, avoidance of extremes, and compromise (Alexander 2005, Amir 2008).

At the same time, these contexts are considered to greatly affect the consumer's decision-making strategy. The contingency of a consumer's decision making occurs because a consumer's information-processing capacity is limited, and it is believed that consumers lower the cost of information processing via a number of heuristics (Bettman 1991).

It has been reported that consumers generally employ compensatory decision-making strategies when there are only a few options, and non-compensatory strategies for more complex decision-making tasks (Payne 1976, Lussier 1979). This shows that when information overload occurs in a decision-making setting, strategies with a lighter information load are used.

As seen above, the contingency of consumers' product evaluation and decision-making process has been explained from two perspectives: the background of the decision-making setting and the effects of alternatives. However, there has been no mathematical discussion regarding context.

While the former context has been presented in some computational models (Beach 1978, Payne 1990), they primarily explain the connection between the context and decision-making strategy with minimal discussion regarding the mechanism of the context itself. Therefore, this study examines how product and contextual information are represented and how context affects product information.

2. Information Representation in Computational Neuroscience

One human-specific feature of high-level cognitive processing is the ability of flexible information processing to match specific conditions. Even when presented with identical information, humans can change their judgment or behave in accordance with the situation or context, and this flexibility of information processing can be regarded as a significant feature of the human brain. Even in actual biological findings, neurons that demonstrate context-dependent activity have been found in the inferior temporal cortex (Naya 1996).

We attempted to explain this mechanism from a computational perspective (Suemitsu 2004), and indicated that "selective desensitization method" (Morita 2002) could explain mathematically how the representation of inputted information is modified by context. In the following section, we will examine the methods of information representation for products and application of the selective desensitization method in the context of consumer decision making.

2-1 Distributed Representation of Information and the Selective Desensitization Method

A wide array of information is believed to be distributively represented through neuronal activities in the brain. Such information does not only contain codes that represent objects, such as "cake" or "umbrella," but also represents codes that describe contexts, such as "gave to a friend" or "saw in a department store."

Although, how information and context are combined in the brain has remained unexplained.

The theory that deals with this issue from a computational perspective is known as the "selective desensitization method" (Morita 2002). Verifying this model's validity with biological and psychological findings, it has been suggested that this theory is broadly used for all processes that require integration of information in the brain (Morita 2010).

According to the selective desensitization method, the original information itself is not affected by context, but a part of this information is temporarily inhibited to limit the parts (dimensions) that are used. By switching the usage of parts of the same information, the brain can create multiple associations and make inferences with the same stored information.

2-2 Application to the Consumer's Psychological Model

According to Fishbein et al.'s (1963) multi-attribute attitude model, the evaluation of a certain product or brand is represented by the value of the product's attributes and its sum of weights. This model became the basis of multi-attribute attitude formation or evaluation models. However, because it was not necessarily sufficient for behavior predictability, many corrective models were eventually presented. It is important to note that the majority of these models focused on the interpretation of the weighting.

One possible factor for the reason why multi-attribute attitude models cannot predict actual behavior could be the contextual effect of the decision-making setting. As explained earlier, under different contexts, individuals demonstrate different responses and/or behaviors even when they are presented with, and use, the same information. This dynamic changeability of the weight of the related attributes depending on purchase contexts may cause the low predictive validity of those models.

When considering this problem from the standpoint of the selective desensitization method, it can be predicted that the form of weighting given to an attribute by the context becomes "desensitized." As seen in Fig. 1, the product information is distributively represented as a variety of attribute information. However, the context (C_1, C_2) determines the attributes related to that context and it lowers the sensitivity to the unrelated attributes.

Through this mechanism, the context can lower the sensitivity towards recognition and processing of a product's information; thus, it can also lower the cost of information processing through a type of abbreviation or simplification.

3. Mathematical Model

Based on the above discussion, the following model is proposed for the perceived cost W_i of evaluating product i in a certain context.

$$W_i = \sum_{j=1}^{n} g_j b_{ij} + \varepsilon_i$$

b_{ij} represents the perceived cost of product i's attribute, j, while n represents the number of attributes. g_j represents the gain adjusted by context, while $g_j = \alpha_j (0 \leq \alpha_j < 1)$ corresponds to desensitized attributes, and $g_j = 1$ corresponds to the non-desensitized attributes. Finally, ε_i represents the error term.

4. Method

To verify the validity of this study's proposed model, we measured via an eye-tracking device the viewing habits of consumers (experimental participants) who were selecting products.

4-1. Experimental Environment

A 23-inch display was placed in a dark room and an ophthalmic chin rest was installed 80 cm in front of the display. An infrared eye camera (TE-9190B manufactured by Techno-works, 60 Hz temporal resolution) was installed directly below the display to measure participants' vision. The participants were instructed to place their chin on the chin rest and maintain the position from the beginning of vision calibration until the end of the measurement.

4-2. Participants

Participants for this experiment comprised 25 female university student volunteers (19–21 years old, normal vision). We obtained their signed consent forms after giving them an oral overview of this experiment in advance.

4-3. Experimental Procedure

Each trial of the experiment was composed of the "title screen," "context presentation screen," and "product selection screen" (Fig. 2). On the title screen, the types of products for purchase consideration were presented at the center of the screen for two seconds. On the context presentation screen, the background of the purchase was presented in textual form for 10 seconds. The participants were instructed to read the text and imagine the situation. Moreover, there were two conditions: context condition and no-context condition. The participants in the context condition were presented with a background context that provided directionality for the product selection, such as "There was a sudden downpour and you do not have an umbrella, so you want to buy one quickly."

Conversely, those in the no-context condition were presented with a background context that did not include a restriction or guidance for product selection, such as "You saw the new products aligned in the storefront and decided to buy one."

On the product selection screen, four product choices (from A to D) were displayed. Each option was configured with four pieces of attribute information, including product image, and these were displayed in a matrix on the screen. The participants then selected one of these products after viewing the screen. The participants' point of gaze was measured with the eye-tracking device from the time the product selection screen was presented until the product was selected (Fig. 3).

Immediately after making their selection, the participants were also asked to respond verbally to which attribute information they considered or did not consider important when selecting while the product selection screen was still displayed. This experimental process was applied to five products (hair iron, umbrella, tumbler, lip balm, and shoes), each with two conditions (context/no-context).

After the eye-tracking device was calibrated, participants were given instructions regarding the experiment and sufficient practice was provided with a dummy set (products not used in the actual measurement) before the actual experiment. After all gaze measurement trials were completed, the participants were asked to evaluate the degree of attractiveness of each attribute in each of the options using a 5-point scale, from 1 (*Not attractive at all*) to 5 (*Very attractive*), by writing on the selection screen depicted in the questionnaire.

4-4. Experiment Results

First, we analyzed the effects of context on response time at the time of product selection. The average response time was 9.08 seconds ($\sigma = 5.42$) and 12.70 seconds ($\sigma = 5.91$) for the context condition and no-context condition, respectively. Compared to the no-context condition, the response time required until decision making was significantly reduced by approximately 28.5% for all products on average under the context condition, $F(1,24) = 42.33$, $p < .001$ (Table 1).

Table 2 indicates the percentage reduction in response time under the context condition against the no-context condition for each participant. It shows the contextual effect in which the response time is reduced by 20.0% on average. Additionally, a significant difference was observed in response time among product types, $F(4,96) = 3.54$, $p < .01$, suggesting no interactions between the context and product types.

In order to analyze this effect in detail, we examined the gaze retention time for each element of the matrix on the purchase decision screen. When the participants gazed at the same element for one second or longer, it was considered that they were actually recognizing the element's information. Then, we analyzed which information the participants were referring to until they reached their decisions.

Table 3 shows the attributes with observed inhibition in perception time caused by the contextual effect. Attributes marked with a check indicate that total fixation duration is reduced by more than 50%, while attributes marked △ denote a greater than 40% reduction. As the table shows, in many product selections, inhibition of cognitive processing cost was observed as the fixation duration for specific attributes was reduced due to the provision of background context information about product purchasing. A certain context can reduce the recognition time largely (more than 50%) and selectively of particular attributes. Furthermore, the most powerful context could make this affect 64% of participants as the context of umbrella could reduce the fixation duration of the "feature" attribute. For many attributes, the contextual reduction effect on perception time was observed in at least 30% of participants. On the other hand, differences in the degree of the reduction effect were found among the participants since some of the participants experienced the reduction effect on their perception time that involved many products and attributes or selective reduction effect for certain products while other participants saw almost no contextual reduction effect.

Moreover, we calculated to what extent all participants were able to reduce the perception time for each attribute using a certain context. The results showed no reduction for hair iron but more than a 30% reduction for many attributes involving umbrella, tumbler, lip balm, and shoes.

Next, we conducted the ANOVA on the level of attribute importance ($\mu = 2.38$, $\sigma = 1.79$) verbally expressed by the participants immediately after each trial and the perception time for each attribute ($\mu = 2.02$, $\sigma = 1.99$) measured by the eye-tracking device to investigate how the three factors—context, product type, and attribute—affected consumers' information seeking behavior at the time of their decision making.

With regard to the effect of attribute, the test results revealed statistical significance at $p < .01$ for both verbal response and perception time. On the other hand, the difference in product types was found to have a statistically significant effect ($p < .01$) on perception time, while attribute importance based on verbal responses was only marginally significant ($p < .1$). Additionally, context had a statistically significant effect only on perception time ($p < .01$). Moreover, the results indicated an interaction between context and attribute as well as between product and attribute ($p < .01$) for verbal response. With regard to perception time, an interaction was observed between product and attribute ($p < .01$).

Lastly, we calculated Pearson product-moment correlation coefficients between the perception time for each attribute and the level of each attribute's importance based on verbal responses. The results revealed only low correlation coefficients (with context: $r = .148$, $p < .01$; without context: $r = .221$, $p < .01$; overall: $r = .187$, $p < .01$)

5. Discussion

In this study, we established a model of information-seeking behavior displayed by consumers upon their product selection based on the selective desensitization theory. We investigated the validity of the model by performing empirical studies. As Table 1 indicates, a substantial reduction in the response time due to the use of context was observed for three (umbrella, lip balm, and shoes) out of the five products targeted in this study. While no significant variance in the average response time was observed among five completely different products under the no-context condition, a significant difference was found in the response time for each product under the context condition. This indicates the possibility that the context used in this study, instead of product attributes, had no apparent effects on the participants' decision making involving the remaining two products. It is essential to conduct additional detailed analyses on this aspect in the future..

Based on the participants' eye-tracking data, our study demonstrated that the reference time for specific attributes was reduced by providing context. This effect was commonly observed among the participants involving the identical products to a certain extent, suggesting that the context desensitizes attribute information processing to some degree for specific attributes. It is reasonable to argue that the empirical research findings indicate the validity of the mathematical model we propose in this study.

On the other hand, this study discovered that the contextual reduction effect on the perception time varies significantly among individuals since some participants experienced the reduction effect on many attributes in many product options or on many attributes in specific product options while no apparent reduction effects were observed in any of the product choices from other participants.

In order to test whether each product attribute weight obtained from the eye-tracking data can be used to predict consumers' decision making, we calculated the evaluation value for each option based on the following equation and then investigated to what extent the highest value conforms to the option actually selected by the participants.

$$E_i = \sum_{j=1}^{n} T_j \, a_{ij}$$

E_i denotes the evaluation value for option i. a_{ij} represents the evaluation value for attribute, j, of option i for which the participants conducted evaluations using a scale of 1(Not attractive at all) to 5(Very attractive) on the post-trial questionnaire. Moreover, T_j expresses total perception time for attribute j of all options, while n is the number of attributes. For comparison purposes, we performed the same calculation by replacing T_j with the level of attribute importance on a scale of 1(Not considered at all) to 5(Strongly considered) expressed verbally by the participants and then calculated which option had the highest score.

Table 4 shows the goodness of fit (accuracy rate) between the options with the highest evaluation values and options actually selected by the participants. While the accuracy rate is 76% for shoes, it is apparent that the prediction of the participants' decision making on the option using the gaze data is generally less accurate than the one using the verbal responses. From a practical perspective, gaze data is expected to lead to some type of predictions about consumers' selection behavior. Therefore, it would be necessary to further conduct detailed examinations in the future, including calculation methods.

This study indicates that the “selective desensitization” hypothesis could explain consumers’ variable information acquisition in that contexts can lower the cost of information processing through a type of abbreviation of recognizing some aspects or attributes of product information. However, our model could not predict participants’ actual decisions. We believe that our model must consider the effects of other options on the evaluation of a certain option as a contextual effect. This is due to the fact that “the existence of other options” and “purchase background” can be considered qualitatively different as a context. Therefore, it would be essential to construct a model based on a hypothesis that is completely different from the selective desensitization model that was used in this study. Further examinations of this aspect are needed.

This study’s results serve as one of the stepping stones to estimate how context changes the evaluation of attributes found in the product and affects consumers’ decision-making outcomes. It is our hope to further analyze the relationship between evaluation and selective desensitization in the future.

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Table 1 ANOVA Results for Response Time

Source	Type III Sum of Squares	df	Mean Square	F
Corrected Model	1041.853[a]	9	115.761	3.587**
Intercept	29639.575	1	29639.575	918.34**
Context	818.605	1	818.605	25.363**
Product	182.528	4	45.632	1.414
Context*Product	40.720	4	10.180	.315
Error	7746.036	240	32.275	
Total	38427.464	250		
Corrected Total	8787.889	249		

a. R Squared= .119 (Adjusted R Squared = .086)   N=250, ** p<.01

We performed the ANOVA on response time based on two factors: context and product type.

Table 2 Response Time Reduction Due to the Effects of Context

subject no.	*umb*	*tam*	*iro*	*lip*	*sho*	*avg.*
1	**76.6**	0.4	**40.2**	**27.4**	-61.7	16.6
2	**24.5**	10.2	-5.7	**23.8**	-21.0	6.3
3	**48.4**	**36.8**	**20.9**	10.2	**41.5**	**31.6**
4	**26.0**	5.4	-1.3	8.6	**20.6**	11.9
5	**62.9**	**35.0**	-26.5	**39.2**	12.2	**24.6**
6	**27.8**	**38.9**	-3.7	**25.4**	**25.5**	**22.8**
7	11.4	**56.6**	**40.4**	**35.2**	**54.3**	**39.6**
8	-38.9	**21.5**	-29.0	**47.7**	12.7	2.8
9	-10.8	**30.7**	10.5	-0.5	-30.9	-0.2
10	**65.6**	**67.1**	**55.9**	**74.0**	15.6	**55.7**
11	**33.1**	**75.0**	**24.5**	**51.0**	**52.7**	**47.3**
12	**33.2**	**51.0**	**36.0**	**21.9**	**32.9**	**35.0**
13	**35.5**	**93.5**	-134.7	**69.8**	11.7	15.2
14	**81.4**	-5.6	-7.9	**70.8**	**61.5**	**40.1**
15	5.5	-29.0	-50.1	**92.3**	**24.4**	8.6
16	**32.2**	**27.4**	8.0	**28.9**	**68.9**	**33.1**
17	**64.8**	**37.7**	-8.2	18.2	**37.1**	**29.9**
18	**75.2**	-179.2	-41.0	9.4	**58.2**	-15.5
19	**49.9**	**24.4**	**24.7**	**44.0**	**38.0**	**36.2**
20	**50.6**	-13.1	-38.8	15.5	-24.1	-2.0
21	**56.1**	-25.8	-72.1	**24.4**	**21.0**	0.7
22	-32.7	-10.0	**43.4**	**54.7**	**59.2**	**22.9**
23	**49.9**	17.5	13.7	4.1	**82.6**	**33.6**
24	**42.7**	-141.9	**22.8**	3.1	5.3	-13.6
25	**47.7**	10.2	-14.9	4.0	**37.5**	16.9
avg.	**36.7**	9.4	-3.7	**32.1**	**25.4**	20.0

This table indicates the ratio of the response time reduced by the contextual effect for each product (in %). Entries in bold are time reductions of more than 20%.

Table 3 Attributes in Which Inhibition of Fixation Duration was Found

	subject no.	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*ratio*	*reduced*
umb	*pic*	✔	–	✔	–	✔	–	✔	–	–	✔	✔	–	–	✔	–	–	△	✔	✔	–	✔	✔	–	–	✔	**48%**	**39%**
	fea	✔	–	✔	–	✔	✔	–	–	–	✔	–	–	✔	✔	△	–	✔	✔	✔	✔	✔	✔	✔	✔	✔	**64%**	**58%**
	siz	✔	✔	✔	✔	–	✔	–	–	✔	✔	–	△	✔	✔	△	–	✔	✔	–	–	–	–	✔	✔	✔	**56%**	**53%**
	pri	✔	✔	–	–	–	–	–	–	–	–	✔	✔	–	–	–	–	✔	✔	–	–	✔	–	–	–	–	**28%**	13%
tam	*pic*	✔	–	–	–	✔	✔	✔	–	–	✔	**	✔	–	–	–	△	✔	✔	–	–	–	–	–	✔	–	**38%**	**41%**
	fea	–	–	–	–	✔	–	–	✔	–	✔	**	–	–	–	–	–	✔	✔	–	–	✔	–	✔	–	–	**29%**	**34%**
	cap	–	–	–	–	–	–	✔	–	✔	–	**	✔	✔	–	–	–	–	✔	–	–	–	–	–	–	–	**21%**	13%
	pri	–	✔	✔	✔	–	–	✔	–	–	✔	**	✔	✔	✔	–	✔	△	–	✔	–	–	–	–	–	✔	**46%**	**45%**
iro	*pc*	**	✔	✔	–	–	–	–	–	✔	✔	✔	✔	–	–	–	✔	–	–	–	✔	△	✔	✔	△	–	**42%**	**23%**
	fea	**	–	–	–	✔	–	✔	–	–	–	–	△	–	✔	–	△	–	–	–	–	–	✔	–	–	–	17%	5%
	rep	**	✔	–	–	–	✔	✔	–	✔	–	–	–	△	✔	–	–	–	–	✔	–	–	–	–	✔	–	**29%**	19%
	pri	**	–	✔	–	–	–	–	–	–	✔	✔	–	–	✔	–	–	–	–	–	–	–	–	–	–	–	17%	-33%
lip	*pic*	–	–	–	–	–	–	✔	–	**	✔	✔	–	–	–	–	–	–	–	△	△	✔	–	–	–	–	17%	4%
	fea	✔	–	–	–	✔	✔	–	✔	**	✔	✔	–	✔	–	–	–	–	–	△	–	–	–	✔	✔	–	**38%**	**37%**
	rep	✔	✔	–	✔	–	–	✔	✔	**	–	–	–	✔	–	–	✔	✔	–	✔	–	–	–	✔	✔	–	**46%**	**33%**
	pri	✔	–	–	✔	✔	–	✔	✔	**	✔	–	–	✔	✔	–	–	–	✔	–	–	✔	–	–	–	✔	**46%**	**31%**
sho	*pic*	**	–	✔	✔	–	–	–	–	–	–	**	△	–	–	–	✔	✔	✔	–	–	✔	✔	✔	–	–	**35%**	**37%**
	pri	**	✔	–	–	–	–	✔	–	✔	–	**	–	–	✔	–	△	–	△	–	–	–	–	✔	✔	✔	**30%**	**28%**
	bra	**	✔	–	✔	✔	✔	✔	✔	–	–	**	–	–	✔	✔	✔	✔	✔	✔	–	–	–	–	–	✔	**57%**	**60%**
	fea	**	–	✔	–	–	–	✔	✔	–	–	**	–	✔	✔	–	✔	–	–	–	–	–	✔	–	–	–	**30%**	6%

Marked attributes show that information-seeking time was reduced by more than 50% in the context condition compared with the no-context condition. "Ratio" represents the percentage of attributes in which an inhibited perception time of more than 50% was observed, and "reduced" corresponds to the inter-participant average of the ratio of reduced time. ** indicates a trial that could not track the eye sight. (*pic*: picture, *fea*: feature, *siz*: size, *pri*: price, *rep*: reputation, *bra*: brand).

Table 4. Comparison of Calculated Prediction Accuracy Rates

	umb	*tum*	*iro*	*lip*	*sho*
verbal	48.0	64.0	68.0	60.0	83.3
eye-tracking	20.0	41.7	41.7	37.5	76.5

The table shows the level of conformity for each product between the option with the highest evaluation value calculated with the level of attribute importance expressed verbally by the participants, perception time, and option, which the participants picked for purchasing.

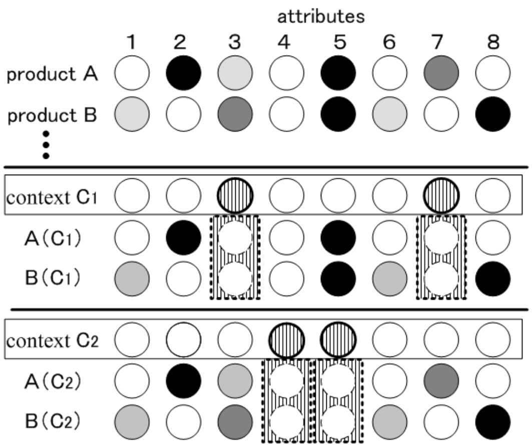

Fig. 1 Partial Desensitization of Product Information Due to Context Switching

The product information (A, B) and context information (C) are represented distributively, and sensitivity to different attribute information is lowered by context switching.

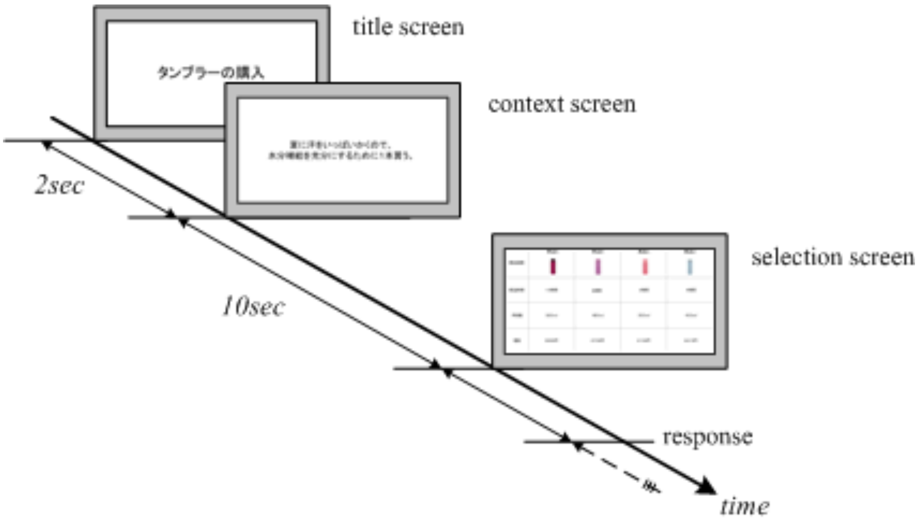

Fig. 2 Flow of a Trial

Each trial of the experiment was composed of the "title screen," "context presentation screen," and "product selection screen." One of five products (hair iron, umbrella, tumbler, lip balm, and shoes) and one of two conditions (context, no-context) were used in each trial. The participants in the context condition were presented with a background context that provided directionality for the product selection, such as "You will want to buy one to keep your hairstyle good in the steamy hot summer" (hair iron), "There was a sudden downpour and you do not have an umbrella, so you want to buy one quickly" (umbrella), "You will sweat a lot in summer, so you want to buy one for adequate hydration" (tumbler), "You will want to buy one more to care for your lips in the incoming dry season" (lip balm), and "You will want to buy one to ware it to school everyday".

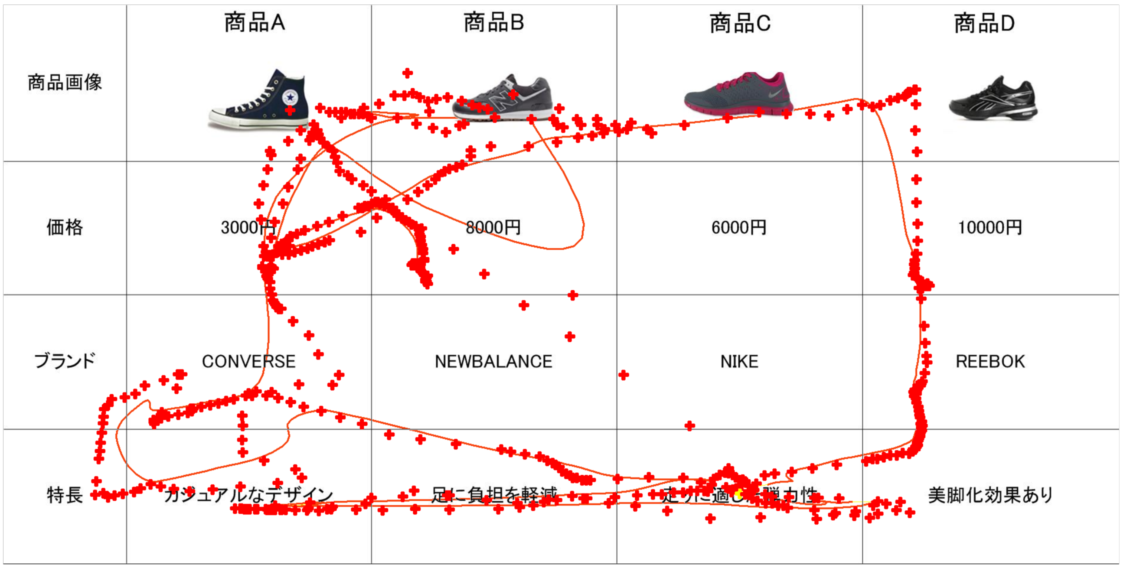

Fig. 3 Selection Screen

Four choices with four attributes (product image, price, brand, and features) are displayed, and the participants select one of these products after viewing each of them.

The red marks denote the movement of the participants' point of gaze.