ORIGINAL PAPER

Differences in the determinants of purchase intention through advertisements and advertising recognition among product types

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Abstract

The differences in effective advertising creative (intended to communicate a company's message to consumers) among product types have been poorly understood, despite the importance for advertising success. Using survey data on consumer responses to 2525 TV advertisements in Japan, this study investigates the differences in the determinants of purchase intention through advertisements and advertising recognition among product types defined on the basis of consumers' perceived risk and product knowledge. An empirical analysis using advertising likability and advertising perceptual scale constructs as factor-side variables reveals the heterogeneity in the determinants of purchase intention—the pattern of which is not predicted by the elaboration likelihood model—and the homogeneity in the determinants of advertising recognition. Furthermore, this study finds that advertising likability does not fully moderate the influence of advertising perceptual scale constructs, which suggests that it is an insufficient indicator to represent various perceptual dimensions of advertising.

Keywords Advertising creativity · Information processing · Advertising likability · Advertising recognition · Heterogeneity · Purchase intention

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Communicated by Takahiro Hoshino.

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1 Introduction

Advertising creative is widely accepted as critical to advertising success (Wood 2009). Owing to the upsurge in the volume of information dissemination and increased commoditization since the end of the 1900s, advertising creative has gained further significance. Producing effective advertising creative requires an in-depth understanding of the factors that affect advertising effectiveness. Several researchers have already explored consumer responses to advertising. For example, Shimp (1981) and Mitchell and Olson (1981) highlighted the significance of attitude toward advertisements (Aad). Several studies have also attempted to develop a multidimensional scale of advertising perception (Aaker and Stayman 1990; Leavitt 1970; Schlinger 1979; Wells 1964). Since the 2000s, the identification of the perceptual constructs of advertising creativity (Smith et al. 2007) and the influence of advertising creativity on consumer responses (Pieters et al. 2002; Smith et al. 2007, 2008; Till and Baack 2005; Yang and Smith 2009) have been studied. However, the depth and content of information processing differ according to consumers' motivation and ability to process information (Chaiken 1987; Greenwald and Leavitt 1984; MacInnis and Jaworski 1989; Mitchell 1981; Petty and Cacioppo 1986), suggesting that effective advertising creative also varies in the same way. Thus, marketers should adapt advertisements to suit consumers' motivation and ability to process information to enhance advertising effectiveness.

The majority of research on the heterogeneity of consumer responses to advertisements has conducted laboratory experiments, finding that the processing of advertising information and/or determinants of brand attitude formation differs (e.g., Celsi and Olson 1988; Maheswaran and Sternthal 1990; Petty et al. 1983). However, owing to the limited number of advertisements that can be presented to subjects in laboratory experiments, few studies have investigated several product types, and the different determinants of brand attitude formation at the product type level remain poorly understood. Furthermore, in laboratory experiments, it is difficult to measure advertising memory because subjects are forcefully exposed to advertisements; in other words, a natural advertising exposure environment cannot be assumed to exist. Indeed, although it is important for subjects to remember the advertisements for them to be effective at the actual point-of-purchase, no studies have thus far examined the different determinants of advertising memorability.

To bridge this gap in the literature, this study examines whether the determinants of purchase intention and advertising recognition differ across product types and to what extent, using survey data on consumer responses to 2525 TV advertisements in Japan. Figure 1 presents the research framework of this study. The product types used in this study are defined on the basis of consumers' perceived risk and product knowledge, which are the main determinants of consumers' motivation and ability to process information, respectively. Furthermore, the factor-side variables examined are advertising likability and advertising perceptual scale constructs, including originality, closeness, and persuasiveness.

The remainder of this paper is structured as follows. Section 2 reviews research on the factors that affect differences in processing advertising information, the
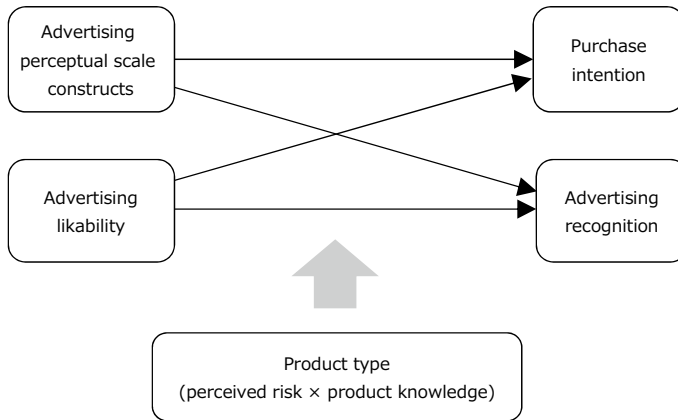
Fig. 1 Research framework

impact of Aad and advertising perception on brand attitude formation, and product types. Thereafter, the research hypotheses are developed in Sect. 3. Section 4 presents the empirical analysis and Sect. 5 presents the results. Finally, the contributions of this study and future research directions are discussed in Sect. 6.

2 Theoretical background

2.1 Differences in processing advertising information

Dual-process theories, such as the elaboration likelihood model (Petty and Cacioppo 1986) and heuristic-systematic model (Chaiken 1987), categorize the factors affecting information-processing patterns into motivation and ability. However, MacInnis and Jaworski (1989) extended the factors driving the processing of advertising information to additionally include opportunity. Here, motivation is defined as a consumer's desire or inclination to process brand information in advertisements (MacInnis et al. 1991). The motivation for and attention to advertisements are positively correlated. Ability refers to a consumer's aptitude to process and understand brand information in advertisements. Even if motivation is high, consumers lacking this ability cannot evaluate brand information. Opportunity refers to the extent to which distractions or limited exposure affects consumers' attention to brand information in advertisements (MacInnis et al. 1991). Advertisements must acquire consumers' attention and present relevant information on the brand to help consumers process brand information. A brief review on the factors affecting motivation, ability, and opportunity is presented in the following subsections.

2.1.1 Motivation

Several studies have used the concept of involvement as a factor motivating information processing (e.g., Celsi and Olson 1988; Petty et al. 1983). Although it is diverse, the importance of purchase is likely to be the most relevant factor in the processing of advertising information for purchase decision-making. According to Howard and Sheth (1969), the importance of purchase is the relative strength of consumers' motivation and is defined at the product class level.

Perceived risk, another important factor in purchase decision-making, relates to the undesirable consequences that consumers would want to avoid during the purchase or use of products (Peter and Olson 2005). This factor includes the importance and uncertainty of the consequences of product purchases and usage. Bloch and Richins (1983) indicated that the importance of purchase and importance of consequences in perceived risk are identical; therefore, the concept of perceived risk includes the concept of the importance of purchase. They also suggested that both the importance and the uncertainty of consequences are essential to motivate consumers to process information during purchase decision-making. Hence, the concept of the importance of purchase alone is insufficient to explain the motivation to process information.

2.1.2 Ability

A typical characteristic that influences a consumer's information-processing ability is knowledge of product categories. Johnson and Russo (1984) explored the association between product knowledge and the amount of information processed for brand choice. They found an inverted U-shaped relationship, thus implying that consumers with poor product knowledge process less information owing to their lack of ability to comprehend the brand information presented, whereas those with rich product knowledge process less information because they disregard irrelevant information when choosing among brands.

Celsi and Olson (1988) and Maheswaran and Sternthal (1990) studied the relationship between product knowledge and information-processing content. Celsi and Olson (1988) found that consumers with more product knowledge focus on brand information and process brand information significantly. Maheswaran and Sternthal (1990) compared consumer responses to advertisements that present product attributes with consumer responses to advertisements that present product benefits. They showed that information on product attributes facilitates deeper information processing for consumers with rich product knowledge, whereas that on product benefits facilitates deeper information processing for consumers with poor product knowledge.

2.1.3 Opportunity

An example of a factor that influences information-processing opportunity is the presence of acts that distract attention from advertisements. With regard to TV advertisements, factors such as conversing with family members and using a mobile

device during advertising exposure reduce attention to advertisements. In advertising management, there is a concern that the efficiency of advertising awareness (i.e., the rate of advertising awareness per unit of advertising) will continue to decrease owing to the rapid popularization of mobile devices. Conversely, attractive female models (Chestnut et al. 1977), humor (Duncan and Nelson 1985; Eisend 2009; Madden and Weinberger 1982), creativity (Pieters et al. 2002; Smith et al. 2007), and expressions that evoke emotions in consumers (Nielsen et al. 2010) are effective at directing consumers' attention toward advertisements. However, drawing consumers' attention toward advertising expressions that are unrelated to brand information might hinder information-processing opportunities (Teixeira et al. 2014). Thus, considering the compatibility of advertising expressions in garnering consumer attention with brand messages is important so that advertising expressions do not hinder information-processing opportunity.

2.2 Impact of Aad and advertising perception on brand attitude formation

2.2.1 Effects of Aad

Shimp (1981) and Mitchell and Olson (1981) demonstrated the importance of Aad for brand attitude formation. The meta-analysis by Brown and Stayman (1992) indicated that Aad is positively correlated with attitude toward the brand and purchase intention. Regarding the different effects of Aad, Lord et al. (1995) showed that, although Aad has a positive effect on purchase intention in groups with high and low involvement, the degree of influence is larger in the group with low involvement. This finding suggests that Aad plays an important role in brand attitude formation via shallow information processing.

2.2.2 Effects of advertising perception

Research on the effects of advertising perception has aimed to elucidate the role of ad-evoked emotions (Aaker et al. 1986; Brown et al. 1998; Edell and Burke 1987; Holbrook and Batra 1987; Olney, Holbrook and Batra 1991). Although many studies have highlighted the importance of ad-evoked emotions for brand attitude formation, identifying whether emotional and cognitive responses play a more important role remains a challenge. For example, Edell and Burke (1987) studied the impact of three emotional dimensions (upbeat, negative, and warm) and three judgmental dimensions (evaluation, activity, and gentleness) on brand attitude formation, and they showed that the impact of evaluation dimension is positive and large. Furthermore, in a comparative study of the effects of thinking advertisements that appeal to consumer rationality and feeling advertisements that appeal to consumer emotions, Golden and Johnson (1983) showed that thinking advertisements are more effective for Aad and purchase intention. Meanwhile, Heath et al. (2006) compared the impact of emotional and cognitive responses on brand favorability and showed that the impact of emotional responses outweighs the impact of cognitive responses. Furthermore, Hornik et al. (2017) conducted a meta-analysis on the effects of

advertising appeal type and showed that humor and sex appeal, which are considered to evoke emotional responses, are more effective for the formation of Aad and brand attitude than comparative and two-sided appeal, which are considered to evoke cognitive responses. With regard to the different effects of advertising perception, the impact of emotional responses on brand attitude formation is stronger for consumers with low motivation for information processing than those with high motivation (Batra and Stephens 1994). In summary, consensus on the effects of advertising perception on brand attitude formation is lacking. Moreover, only a few studies have investigated the heterogeneity of the relationship between advertising perception and brand attitude formation.

2.3 Product types and motivation and ability

Although the main determinant of information-processing motivation treated in prior research is involvement, this study adopts perceived risk as a product classification criterion for the strength of information-processing motivation, as in the Rossiter–Percy grid (Rossiter et al. 1991), because its definition and factors are more specific than involvement. A typical consumer factor that affects information-processing ability is consumers' product knowledge. Generally, with product usage experience, consumers' product knowledge becomes rich, and, thus, their information-processing ability strengthens. Hence, consumers' information-processing ability is likely to be higher for existing products than for new products.

The Rossiter–Percy grid links consumers' product knowledge and information-processing motivation. Specifically, it assumes that consumers who lack product knowledge have high motivation to process brand information because they need to acquire information to evaluate the brand. However, product knowledge and information-processing motivation are inherently different concepts. For example, consumers do not make detailed assessments of product attributes for low-risk products, such as carbonated beverages, even if their product knowledge is poor. By contrast, high-risk products, such as cars, are carefully compared with other brands even if consumers are considering a repeat purchase of a familiar brand. Therefore, it is unsuitable to directly associate product knowledge with information-processing motivation. This study regards information-processing motivation and ability as different concepts by assigning perceived risk as the factor of information-processing motivation and product knowledge as the factor of information-processing ability. Accordingly, it derives four product types from combinations of these two factors: perceived risk (low-risk or high-risk products) and product knowledge (new or existing products).

3 Hypotheses development

3.1 Purchase intention formation by advertising

Given that motivation for information processing is higher for high-risk products than for low-risk products, consumers' tendency to proactively evaluate brand information is stronger for high-risk products than for low-risk products. Consumers highly motivated for information processing that proactively evaluate brand information are expected to form purchase intention on the basis of the persuasiveness of the arguments in advertisements. Conversely, consumers with low motivation for information processing and who are least active in evaluating brand information do not form purchase intention based on the persuasiveness of arguments in advertising. Instead, they base their purchase intention on a positive feeling from advertisements, such as closeness and warmth and/or overall advertising likability. A positive feeling and advertising likability can arise from various elements in advertisements (e.g., the use of celebrities, music, and stories), and the persuasiveness of the presented arguments is unnecessary, unlike purchase intention formation for high-risk products. This leads to the following hypotheses:

H1: The impact of persuasiveness on purchase intention is greater for high-risk products than for low-risk products.

H2: The impact of closeness on purchase intention is greater for low-risk products than for high-risk products.

H3: The impact of advertising likability on purchase intention is greater for low-risk products than for high-risk products.

For both low-risk and high-risk products, consumers' ability to process information on new products is generally poorer than that on existing products. For low-risk products there is little difference in consumer responses to advertisements owing to their information-processing ability because consumers do not proactively evaluate the brand information presented in advertisements. By contrast, for high-risk products there is likely to be a significant difference in consumer responses to advertisements owing to their information-processing ability because consumers proactively evaluate such brand information. Although consumers with less ability but high motivation for information processing attempt to evaluate brand information proactively and precisely, they cannot evaluate the persuasiveness of arguments in advertisements. Hence, they need clues to speculate on the accuracy of brand information and form their purchase intention. Thus, the following hypothesis is developed:

H4: The degree of risk is a moderating factor such that there is a significant variation in the determinants of purchase intention between new and existing products for high-risk products, but only a negligible difference for low-risk products.

3.2 Advertising recognition

Thus far, purchase intention formation by advertisements has been discussed; however, advertisements must settle in a consumer's memory to be effective and

encourage purchase. Although memory of advertising information is reinforced with repeated advertising exposure (Schmidt and Eisend 2015), there appears to be a correlation among the level of attention to advertisements, depth of the processing of advertising information, and memorability of advertisements. This finding implies that it is important to both secure information-processing opportunity and enhance information-processing motivation for all product types.

One advertising creative factor that affects information-processing opportunity is the presence of expressions that attract consumers' attention. Similarly, advertising creative factors that affect the motivation for information processing include the presence of increased relevance to oneself and the arousal of curiosity (MacInnis et al. 1991). With respect to consumers' perceptions of advertising, advertisements with high originality, high closeness, and/or high curiosity are likely to be stored in their memory. By contrast, the impact of persuasiveness on advertising recognition is likely to be weak because it represents a consumer's evaluation of the quality of the arguments in advertisements and has a distant relation to advertising recognition. This leads to the following hypotheses:

H5: The impact of originality on advertising recognition is greater than that of persuasiveness.

H6: The impact of closeness on advertising recognition is greater than that of persuasiveness.

4 Empirical analysis

4.1 Data description

This study uses survey data on the evaluation of TV advertisements that actually aired (data were collected by a marketing research company in Japan for commercial use).[1] The survey is conducted monthly using the placement method. The sample for each survey comprises approximately 620 respondents aged 13–59 years selected using a random sampling technique. Specifically, households residing within 30 km of Tokyo Station in Japan are randomly chosen based on the Basic Resident Register, and then subjects are randomly selected from household members. If the age and sex composition of the selected subjects deviates from that of the population, then it is adjusted by recruiting additional subjects accordingly. Each page of the questionnaire contains information on an advertisement (six frames of images and textual information of narration and actors' lines) and survey items. Approximately 100 advertisements are presented in the questionnaire. Subjects were asked to answer all the questions within a week of the questionnaire being delivered and return it to the company via mail.

Each advertisement is considered to be a unit of the data. The data on 2525 TV advertisements collected from April 2012 to March 2016 were used for the analysis.

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[1] The questionnaire was developed in Japanese by a marketing research company. The survey items were translated into English by the author, to be included in this paper.

Table 1 Breakdown of product categories

Low risk/new		Low risk/existing	
Alcoholic beverage	31	Alcoholic beverage	180
Non-alcoholic beverage	77	Non-alcoholic beverage	520
Processed food/fresh food	41	Processed food/fresh food	626
Confectionery/ice cream	26	Confectionery/ice cream	248
Pharmaceuticals (including quasi-drugs)	18	Pharmaceuticals (including quasi-drugs)	175
Shampoo/conditioner	1	Shampoo/conditioner	30
Soap/body wash	0	Soap/body wash	24
Toothpaste/toothbrush	0	Toothpaste/toothbrush	27
Laundry detergent/dishwashing detergent	1	Laundry detergent/dishwashing detergent	24
Other household goods	2	Other household goods	60
Total	197	Total	1914
High risk/new		High risk/existing	
Car (including motorcycle)	17	Car (including motorcycle)	145
Camera	31	Camera	45
Home appliances	1	Home appliances	112
Information device/office automation equipment	3	Information device/office automation equipment	60
Total	52	Total	362

Table 1 presents the breakdown of product categories for each product type. Products were classified into high perceived risk and low perceived risk on the basis of the definition of Jacoby and Kaplan (1972). Products launched within 6 months before the date of the survey were classified as new products, and other products were classified as existing products. Although the newness of a product for an individual consumer depends on his or her buying experience, it can be assumed that the longer a product has been on the market, the higher the consumer's average buying experience.

4.2 Variable description

Purchase intention and advertising recognition are adopted as the dependent variables. The independent variables include the advertising perception of 17 items, advertising likability, and a gross rating point (GRP). The survey measures purchase intention using a five-point scale (5 = want to buy very much, 4 = want to buy somewhat, 3 = neutral, 2 = do not want to buy very much, 1 = do not want to buy at all), advertising recognition using a three-point scale (3 = have seen it, 2 = probably have seen it, 1 = have not seen it), advertising likability using a five-point scale (5 = like very much, 4 = like somewhat, 3 = neutral, 2 = dislike somewhat, 1 = dislike very much), and the advertising perception of the 17 items using multiple-choice questions. As the unit of the data is advertising, the analysis used

Table 2 Factor loadings

	Factors				
	Originality	Closeness	Irritability	Persuasiveness	Refinedness
Impressive	**0.87**	− 0.25	− 0.03	0.04	0.19
Novel	**0.71**	− 0.20	**− 0.34**	− 0.18	− 0.02
Memorable	**0.70**	**0.36**	0.14	0.04	**0.31**
Amusing	**0.49**	0.15	0.07	− 0.24	**− 0.40**
Familiar	− 0.26	**0.94**	− 0.05	**− 0.35**	0.03
Unwearying	0.07	**0.65**	0.05	− 0.17	0.23
Sympathizing	− 0.15	**0.54**	− 0.11	0.18	0.03
Persistent	0.02	0.07	**0.80**	0.07	− 0.02
Tiring	− 0.20	0.00	**0.78**	− 0.05	0.04
Vulgar	0.11	− 0.09	**0.52**	0.00	− 0.13
Convincing	0.07	− 0.22	0.03	**1.03**	− 0.11
Credible	− 0.13	0.05	− 0.05	**0.50**	**0.35**
Understandable	− 0.25	**0.31**	− 0.15	**0.44**	− 0.26
Tasteful	0.14	0.17	− 0.05	− 0.12	**0.63**
Boring	− 0.20	**− 0.44**	**0.42**	− 0.18	− 0.04
Forgettable	− 0.29	**− 0.64**	− 0.14	− 0.21	0.07
Mundane	**− 0.77**	− 0.12	− 0.09	− 0.13	0.15

Bold indicates numbers with absolute factor loadings greater than 0.3

Table 3 Inter-factor correlations

	Originality	Closeness	Irritability	Persuasiveness	Refinedness
Originality	1.00				
Closeness	0.01	1.00			
Irritability	0.29	− 0.24	1.00		
Persuasiveness	− 0.20	0.26	− 0.38	1.00	
Refinedness	− 0.13	0.01	− 0.35	0.09	1.00

the percentage of subjects who selected either the top box or second box for purchase intention, advertising recognition, and advertising likability. Regarding the advertising perception of the 17 items, the percentage of subjects who selected each item was used.

For the 17 items of advertising perception, the common factors were extracted using exploratory factor analysis (Tables 2 and 3). The maximum likelihood method was used for the factor loading estimation, Promax method for the factor rotation, and Anderson–Rubin method for the factor score estimation. The number of factors was determined by parallel analysis and the minimum average partial test. In the parallel analysis, it was up to the fifth factor that the eigenvalues of the correlation matrix of the data exceeded the eigenvalues of the correlation

matrix of random simulative data. In addition, five factors were suggested to be retained according to the results of the minimum average partial test. Therefore, five factors were extracted for the analysis.

On the basis of the loadings, the factors were named originality, closeness, irritability, persuasiveness, and refinedness. Originality, which indicates the noticeability of advertising creative based on its novelty, is expected to contribute to advertising recognition (H5). Closeness represents a consumer's impression of relevance to self, which in turn enhances motivation for information processing (MacInnis et al. 1991), and this is likely to favor advertising recognition (H6). Moreover, closeness contributes to purchase intention, especially for low-risk products, since a likable impression of relevance to self is sufficient to change the attitudes of consumers with low motivation for information processing (H2). Irritability indicates discomfort with advertising creative. Although this is expected to have a negative impact on purchase intention, it may have a positive impact on advertising recognition because emotion arousal (positive or negative) contributes to memorizing advertisements. Persuasiveness, or the power of advertising creative to convince consumers of advertising claims, contributes to purchase intention, especially for high-risk products, because such consumers are expected to be highly motivated to process advertising information and form purchase intention based on the conviction of advertising claims (H1). Finally, refinedness is related to the sophistication of advertising creative. It does not represent the evaluation of brand information; however, it is likely to be a clue for gauging brand quality. Advertising-perceived creativity is known to enhance perceived brand quality by indicating perceived brand ability (Dahlén et al. 2008, 2018), and this signaling effect of advertising creativity may hold for advertising refinedness. Incidentally, originality and closeness, respectively, correspond to the concepts of divergence and relevance, which have been used as measures of advertising creativity (e.g., Smith et al. 2008).

All the variables (purchase intention, advertising recognition, the five factors of advertising perception, advertising likability, and GRP) were standardized for each product type prior to the analysis to compare the effect sizes of the independent variables.

4.3 Model and estimation

To test the hypotheses, seven models were estimated using hierarchical Bayesian models (Table 4), which are suitable for examining the heterogeneity among product types since they allow for the simultaneous estimation of the within- and between-product type effects. For each of the seven models, the dependent variable of product type g is defined as follows:

$$Y_g = X_g \beta_g + \varepsilon_g, \varepsilon_g \sim N_{n_g}\left(\mathbf{0}, \sigma^2_{g(\varepsilon)} I_{n_g}\right), \tag{1}$$

where Y_g is the vector of the dependent variable of product type g; the degree of the vector is n_g, which is the number of advertisements belonging to product type g;

Table 4 Estimated models

	Dependent variables	Independent variables		
		Perceptual scale	Ad likability	GRP
Model 1	Purchase intention	○	–	–
Model 2	Purchase intention	–	○	–
Model 3	Purchase intention	○	○	–
Model 4	Ad recognition	○	–	○
Model 5	Ad recognition	–	○	○
Model 6	Ad recognition	○	○	○
Model 7	Ad likability	○	–	–

X_g is the $n_g \times k$ matrix of the independent variables; $\boldsymbol{\beta_g}$ is the k degree parameter vector; $\boldsymbol{\varepsilon_g}$ is the n_g degree error term vector; and $\sigma^2_{g(\varepsilon)}$ is the error variance.

The parameters of product type g in Eq. (1) are defined as follows:

$$\boldsymbol{\beta_g} = \boldsymbol{\mu} + \boldsymbol{\eta_g}, \boldsymbol{\eta_g} \sim N_k\left(\boldsymbol{0}, \sigma^2_{g(\eta)}\boldsymbol{I_k}\right), \tag{2}$$

where $\boldsymbol{\mu}$ is the k degree intercept vector representing the average level of $\boldsymbol{\beta_g}$, $\boldsymbol{\eta_g}$ is the k degree error term vector, and $\sigma^2_{g(\eta)}$ is the error variance.

For the prior distributions of each parameter ($\{\sigma^2_{g(\varepsilon)}\}$, $\{\sigma^2_{g(\eta)}\}$, $\boldsymbol{\mu}$), the following non-informative priors were set:

$$\sigma^2_{g(\varepsilon)} \sim U(0,5), \sigma^2_{g(\eta)} \sim U(0,5), \boldsymbol{\mu} \sim N_k\left(\boldsymbol{0}, 100\boldsymbol{I_k}\right). \tag{3}$$

The parameters were calculated using the Hamiltonian Monte Carlo algorithm, a widely known Markov chain Monte Carlo method. Three chains with 4500 draws were generated to measure the parameters. The first 500 draws of each chain were discarded as the burn-in, and the total number of post-burn-in draws was 12,000. The convergence of each parameter was confirmed by the potential scale reduction factor, namely, R-hat. Gelman (1996) proposed a criterion of convergence when the values of R-hat are all less than 1.1 or 1.2. The maximum R-hat of all the parameters in the seven models was 1.03; hence, all the parameters converged.

5 Results

Table 5 provides the estimates of $\boldsymbol{\mu}$ and $\boldsymbol{\beta_g}$ for each model. In the hypothesis testing, the probability that the parameter of a certain independent variable exceeds that of another explanatory variable was calculated as follows:

1. Generate random samples β_{1t} and β_{2t} from the posterior distributions of the two parameters (β_1 and β_2) to be compared.
2. When $\beta_{1t} > \beta_{2t}$, set flag 1.

Table 5 Posterior means of μ and β_g

Model 1

| | DV: purchase intention | | | | |
| | | Low risk | | High risk | |
	μ	New	Existing	New	Existing
Originality	0.21*	0.22*	0.20*	0.21*	0.19*
Closeness	0.36	0.46*	0.59*	0.15	0.26*
Irritability	− 0.34*	− 0.40*	− 0.33*	− 0.33*	− 0.29*
Persuasiveness	0.37	0.22*	0.22*	0.44*	0.61*
Refinedness	0.12	− 0.03	0.00	0.43*	0.06

Model 2

| | DV: purchase intention | | | | |
| | | Low risk | | High risk | |
	μ	New	Existing	New	Existing
Ad likability	0.60*	0.71*	0.74*	0.51*	0.44*

Model 3

| | DV: purchase intention | | | | |
| | | Low risk | | High risk | |
	μ	New	Existing	New	Existing
Originality	0.00	0.04	− 0.06*	− 0.02	0.03
Closeness	0.04	0.06	0.15*	− 0.11	0.03
Irritability	− 0.22*	− 0.25*	− 0.18*	− 0.22*	− 0.22*
Persuasiveness	0.35	0.21*	0.22*	0.41*	0.60*
Refinedness	0.07	− 0.05	− 0.03*	0.29*	0.05
Ad likability	0.50*	0.55*	0.61*	0.48*	0.33*

Model 4

| | DV: Ad recognition | | | | |
| | | Low risk | | High risk | |
	μ	New	Existing	New	Existing
Originality	0.29*	0.30*	0.31*	0.26*	0.26*
Closeness	0.42*	0.42*	0.45*	0.46*	0.38*
Irritability	0.24*	0.23*	0.27*	0.21*	0.28*
Persuasiveness	0.09	0.17*	0.11*	0.07	− 0.02
Refinedness	− 0.05	0.03	0.04*	− 0.20*	− 0.13*
GRP	0.29*	0.30*	0.28*	0.25*	0.32*

Table 5 (continued)

Model 5

	DV: Ad recognition				
		Low risk		High risk	
	μ	New	Existing	New	Existing
Ad likability	0.41*	0.40*	0.45*	0.42*	0.39*
GRP	0.35*	0.35*	0.34*	0.34*	0.36*

Model 6

	DV: Ad recognition				
		Low risk		High risk	
	μ	New	Existing	New	Existing
Originality	0.22*	0.24*	0.22*	0.21*	0.23*
Closeness	0.32*	0.29*	0.28*	0.41*	0.33*
Irritability	0.28*	0.27*	0.33*	0.23*	0.30*
Persuasiveness	0.07	0.17*	0.11*	0.07	− 0.02
Refinedness	− 0.07	0.02	0.03*	− 0.21*	− 0.14*
Ad likability	0.13	0.18*	0.24*	0.05	0.04
GRP	0.29*	0.31*	0.29*	0.25*	0.32*

Model 7

	DV: Ad likability				
		Low risk		High risk	
	μ	New	Existing	New	Existing
Originality	0.43*	0.37*	0.43*	0.50*	0.43*
Closeness	0.70*	0.72*	0.71*	0.64*	0.71*
Irritability	− 0.23*	− 0.27*	− 0.25*	− 0.19*	− 0.18*
Persuasiveness	0.02	0.01	0.01	0.03	0.02
Refinedness	0.10	0.05	0.04*	0.26*	0.04

*Indicates that the 95% credible interval (equal-tailed interval) does not include zero

3. Repeat $t = 1, 2 \ldots 1,000$, and calculate the total flags/1000, which is the estimate of $p(\beta_1 > \beta_2)$.

5.1 Impact of persuasiveness on purchase intention (H1)

In Model 1, the mean parameter of persuasiveness for high-risk products is larger than that for low-risk products for both new and existing products (Table 5, Model

l). The probability that the parameter of persuasiveness for high-risk products is greater than that for low-risk products is 0.981 for new products and 1.000 for existing products. This result supports H1, implying that the impact of persuasiveness on purchase intention for high-risk products exceeds that for low-risk products for both new and existing products.

5.2 Impact of closeness on purchase intention (H2)

In Model 1, the mean parameter of closeness for low-risk products is greater than that for high-risk products for both new and existing products (Table 5, Model 1). The probability that the parameter of closeness for low-risk products is greater than that for high-risk products is 0.999 for new products and 1.000 for existing products. This result supports H2, implying that the impact of closeness on purchase intention for low-risk products exceeds that for high-risk products for both new and existing products.

5.3 Impact of advertising likability on purchase intention (H3)

In Model 2, the mean parameter of advertising likability for low-risk products is greater than that for high-risk products for both new and existing products (Table 5, Model 2). The probability that the parameter of advertising likability for low-risk products is greater than that for high-risk products is 0.951 for new products and 1.000 for existing products. This result supports H3, implying that the impact of advertising likability on purchase intention for low-risk products exceeds that for high-risk products for both new and existing products.

5.4 Differences in the determinants of purchase intention between new and existing products (H4)

Comparing the results of high-risk/new and high-risk/existing products in Model 1, the mean parameter of persuasiveness for new products is less than that for existing products, whereas that of refinedness for new products is greater than that for existing products (Table 5, Model 1). However, a comparison of the results of low-risk/new and low-risk/existing products in Model 1 shows that the mean parameters of persuasiveness and refinedness are almost equal (Table 5, Model 1). The probabilities that the parameters of persuasiveness and refinedness for high-risk/new products are greater than those for high-risk/existing products are 0.079 and 0.999, respectively. By contrast, the probabilities that the parameters of persuasiveness and refinedness for low-risk/new products are greater than those for low-risk/existing products are 0.503 and 0.325, respectively. These results support H4; this indicates that for high-risk products there is a significant difference in the determinants of purchase intention between new and existing products. Specifically, for high-risk/new products consumers have fewer chances of evaluating the persuasiveness of brand information and instead use advertising refinedness to gauge brand quality, even though advertising persuasiveness is still important.

Table 6 MSE of the purchase intention models (holdout data)

| | | MSE | | |
| | | Model 1 | Model 2 | Model 3 |
	n	(Perceptual scale)	(Ad likability)	(Perceptual scale and ad likability)
Low risk/new	66	0.60	0.50	0.46
Low risk/existing	638	0.39	0.42	0.33
High risk/new	17	0.78	0.91	0.76
High risk/existing	121	0.45	0.88	0.47

5.5 Relationships among the constructs of the advertising perceptual scale, advertising likability, and purchase intention

In H1–H4, the different influences of the advertising perceptual scale constructs and advertising likability on purchase intention were examined. Furthermore, the heterogeneity of the relationship between the constructs of the advertising perceptual scale, advertising likability, and purchase intention was investigated. First, the mean squared error (MSE) was measured using holdout data to compare the predictive power of the constructs of the advertising perceptual scale and advertising likability for purchase intention. For each product type, two-thirds of the data were randomly chosen as the training data, and the rest were used as the holdout data. Three models with the following independent variables were compared: the constructs of the advertising perceptual scale (Model 1), advertising likability (Model 2), and the constructs of the advertising perceptual scale and advertising likability (Model 3). Table 6 presents the MSE of each model.

The MSE of Model 1 is significantly smaller than that for Model 2 for high-risk/new and high-risk/existing products. However, for low-risk/new products, the MSE of Model 2 is smaller; for low-risk/existing products, the difference in the MSE is negligible. This result indicates that the predictive power of the advertising perceptual scale constructs for purchase intention exceeds that of advertising likability only for high-risk products. Although the MSE of Model 3 is smaller than that of Model 1 for low-risk/new products and low-risk/existing products, the MSE of both models are nearly equal for high-risk/new and high-risk/existing products. This finding implies that advertising likability does not contribute to the prediction accuracy of purchase intention for high-risk products.

Figure 2 summarizes the relationship between the constructs of the advertising perceptual scale, advertising likability, and purchase intention. The paths to purchase intention in the figure indicate that the absolute value of the mean parameter in Model 3 is above 0.2. Similarly, the paths to advertising likability indicate that the absolute value of the mean parameter in Model 7 is above 0.2. The positive and negative effects are distinguished by the solid and dotted lines of the arrow. As shown in Fig. 2, originality and closeness affect purchase intention via advertising likability, whereas irritability, persuasiveness, and refinedness have a direct effect on purchase intention. The
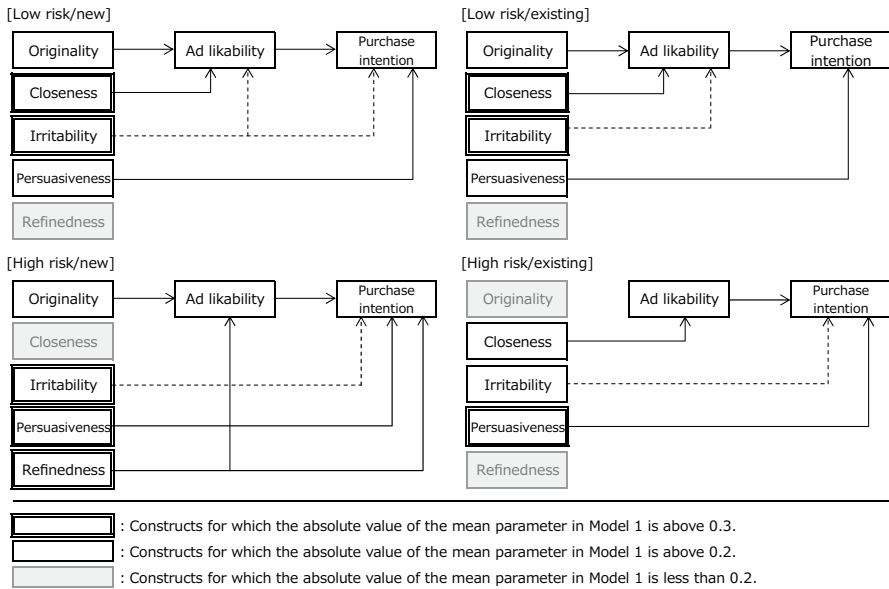
Fig. 2 Relationships among the constructs of the advertising perceptual scale, ad likability, and purchase intention. Paths to ad likability indicate that the absolute value of the mean parameter in Model 7 is above 0.2. Paths to purchase intention indicate that the absolute value of the mean parameter in Model 3 is above 0.2. Dotted paths indicate that the mean parameter is negative. Paths from the constructs of the advertising perceptual scale whose absolute value of the mean parameter in Model 1 is less than 0.2 are omitted

prediction accuracy of Model 2 is low for high-risk/new products because the influence of irritability, persuasiveness, and refinedness, which is highly significant for high-risk/new products, is ignored in this model. Similarly, the prediction accuracy of Model 2 is low for high-risk/existing products because the influence of persuasiveness, which is highly significant for high-risk/existing products, is ignored. However, the prediction accuracy of Model 2 is not low compared with Model 1 for low-risk products because much of the influence of closeness, which is the largest for low-risk products, is encompassed in Model 2.

5.6 Impact of originality, closeness, and persuasiveness on advertising recognition (H5 and H6)

Table 7 shows the probability that the parameters of originality and closeness are greater than that of persuasiveness in Model 4. The lowest probability in Table 7 is 0.953 for "originality > persuasiveness" for high-risk/new products. This finding signifies that the impact of originality and closeness on advertising recognition exceeds that of persuasiveness for all product types; thus, this statement supports H5 and H6.

Table 7 Comparison of the parameters in Model 4

	Probability	
	Originality > persuasiveness	Closeness > persuasiveness
Low risk/new	0.962	0.998
Low risk/existing	1.000	1.000
High risk/new	0.953	1.000
High risk/existing	1.000	1.000

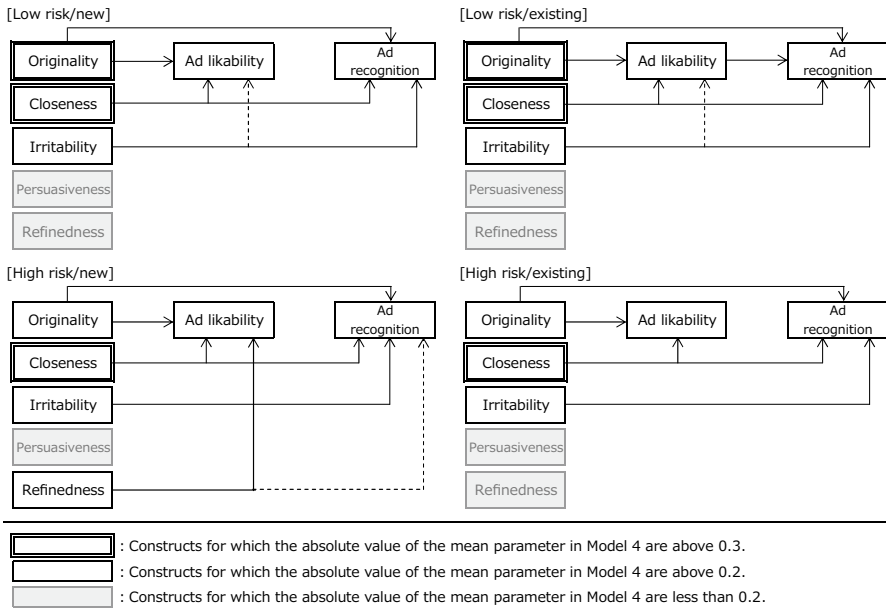**Table 8** MSE of the advertising recognition models (holdout data)

		MSE		
		Model 4	Model 5	Model 6
	n	(Perceptual scale and GRP)	(Ad likability and GRP)	(Perceptual scale, ad likability, and GRP)
Low risk/new	66	0.54	0.69	0.52
Low risk/existing	638	0.49	0.68	0.48
High risk/new	17	0.47	1.08	0.50
High risk/existing	121	0.52	0.64	0.54

5.7 Relationships among the constructs of the advertising perceptual scale, advertising likability, and advertising recognition

Similar to Sect. 5.5, the relationships among the constructs of the advertising perception scale, advertising likability, and advertising recognition were examined. First, the MSE was measured using the holdout data to compare the predictive power of the constructs of the advertising perceptual scale and advertising likability for advertising recognition. The training and holdout data are identical to those used in Sect. 5.5. Three models with the following independent variables were compared: the constructs of the advertising perceptual scale and GRP (Model 4); advertising likability and GRP (Model 5); and the constructs of the advertising perceptual scale, advertising likability, and GRP (Model 6). Table 8 presents the MSE of each model.

The MSE of Model 4 is smaller than that of Model 5 for all product types, indicating that the predictive power of the constructs of the advertising perceptual scale for advertising recognition exceeds that of advertising likability. Furthermore, the MSE is nearly equal between Models 4 and 6 for all product types. This finding implies that advertising likability does not contribute to the prediction accuracy of advertising recognition.

Figure 3 summarizes the relationships among the constructs of the advertising perceptual scale, advertising likability, and advertising recognition. The paths to advertising recognition in the figure indicate that the absolute value of the mean parameter in Model 6 is above 0.2. Similarly, the paths to advertising likability indicate that the absolute value of the mean parameter in Model 7 is above 0.2. The positive and negative effects are distinguished by the solid and dotted lines of the arrow, as in Fig. 2.

Fig. 3 Relationships among the constructs of the advertising perceptual scale, ad likability, and ad recognition. Paths to ad likability indicate that the absolute value of the mean parameter in Model 7 is above 0.2. Paths to ad recognition indicate that the absolute value of the mean parameter in Model 6 is above 0.2. Dotted paths indicate that the mean parameter is negative. Paths from the constructs of the advertising perceptual scale whose absolute value of the mean parameter in Model 4 is less than 0.2 are omitted

Figure 3 shows that originality, closeness, and irritability have a direct effect on advertising recognition for all product types. Therefore, the prediction accuracy of Model 5 is low for all product types because the influence of originality, closeness, and irritability is ignored in this model.

6 Conclusion

This study defined four product types based on consumers' perceived risk and product knowledge and investigated the different determinants of purchase intention and advertising recognition for these product types. The study's hypotheses were then tested using a survey dataset of consumer responses to 2525 TV advertisements, in which the determinants of purchase intention were found to be heterogeneous and the determinants of advertising recognition homogeneous.

Table 9 Determinants of purchase intention

	Low risk		High risk	
	New	Existing	New	Existing
This research	Closeness	Closeness	Persuasiveness/refinedness	Persuasiveness
Elaboration likelihood model	Peripheral cues	Peripheral cues	Peripheral cues	Argument quality

6.1 Theoretical implications

This study presents three novel theoretical implications. The main implication is that the determinants of purchase intention are heterogeneous among low-risk, high-risk/new, and high-risk/existing products. Petty and Cacioppo's (1986) elaboration likelihood model posits that consumers' motivation and ability to process information affect the likelihood of scrutinizing information, and the degree of scrutiny causes heterogeneity in the determinants of brand attitude formation. However, the elaboration likelihood model regards the broad and abstract concepts of "argument quality" and "peripheral cues" as factors of brand attitude formation, and it does not specifically identify the differences in the determinants of brand attitude formation. Table 9 compares the critical factors of purchase intention identified in this study with the factors of brand attitude formation in the elaboration likelihood model. As the elaboration likelihood model assumes that the quality of issue-relevant arguments matters when consumers' motivation and information-processing ability are both high, "argument quality" is posited to be the factor influencing brand attitude formation for high-risk/existing products, whereas "peripheral cues" are posited to be the factors influencing brand attitude formation for the other product types. Importantly, Table 9 indicates that, although the determinants of brand attitude formation for low-risk/new, low-risk/existing, and high-risk/new products are considered "peripheral cues" and are not distinguished in the elaboration likelihood model, the determinants of purchase intention for high-risk/new products are qualitatively different from those for low-risk/new and low-risk/existing products in this study.

Additionally, a comparison of the determinants of purchase intention between high-risk/new and high-risk/existing products revealed that, although advertising persuasiveness and refinedness were key factors in the purchase intention formation for high-risk/new products, the influence of persuasiveness on the purchase intention for high-risk/new products was smaller than that for high-risk/existing products. This finding implies that consumers with high motivation but with low ability for information processing compensate for this low ability using advertising refinedness as a sign of brand quality. Furthermore, the effect of closeness (which can be considered a construct of advertising creativity) on the purchase intention for low-risk products outweighed that for high-risk products. This finding contributes to the literature on this topic because few studies have investigated the inter-consumer and inter-product heterogeneity in the effects of advertising creativity constructs on consumer responses.

Second, the determinants of advertising recognition do not differ among product types. The homogeneity in the determinants of advertising recognition, despite its importance, has not been indicated by prior research. The results of the present study show that the impact of originality and closeness on advertising recognition is higher than that of persuasiveness and refinedness on advertising recognition for all product types. Thus, advertising originality and closeness are important antecedents of advertising effectiveness for high-risk products, for which consumer information-processing motivation is high, as well as for low-risk products, for which consumer information-processing motivation is low. It is noteworthy that focusing only on brand attitude formation and ignoring advertising recognition, as in dual-process theories, would underestimate the importance of advertising originality and closeness for high-risk products.

Third, advertising likability only partially mediates the influence of the advertising perceptual scale constructs on purchase intention and advertising recognition. Using purchase intention as the dependent variable, the following factors were confirmed:

- For high-risk products, the predictive power of the constructs of the advertising perceptual scale is higher than that of advertising likability.
- The effects of advertising originality and closeness are toned down by advertising likability.
- Advertising irritability, persuasiveness, and refinedness have a direct effect that is not via advertising likability.

Furthermore, when advertising recognition was used as the dependent variable, the following factors emerged:

- For all product types, the predictive power of the constructs of the advertising perceptual scale is higher than that of advertising likability.
- For all product types, predictive power does not improve when advertising likability is added into the model with the independent variables of the advertising perceptual scale constructs.
- Advertising originality, closeness, and irritability have a direct effect that is not via advertising likability.

These findings imply that the semantic contents of the advertising perceptual scale include advertising likability in the context of predicting advertising recognition.

6.2 Practical contributions

First, the influence of the constructs of the advertising perceptual scale on purchase intention and advertising recognition on each product type was demonstrated. In advertising creative pretesting, an attempt is made to predict the effectiveness of advertising creative, comprehend the factors behind this predicted effectiveness, and

suggest modifications. The advertising perceptual scale constructs that have significant influences on purchase intention and advertising recognition are considered as important driving forces for effective advertising. Therefore, considering the influence of the constructs of the advertising perceptual scale for each product type, the points of modifications in advertising creative can be efficiently specified.

Second, advertising likability was found to be an unsuitable performance indicator of advertisements. However, it is often used to assess the overall performance of advertising. For high-risk products, the predictive power of the constructs of the advertising perceptual scale for purchase intention is higher than that of advertising likability for purchase intention because advertising irritability, persuasiveness, and refinedness have a direct effect that is not via advertising likability. Moreover, for all product types, the predictive power of the constructs of the advertising perceptual scale for advertising recognition is higher than that of advertising likability for advertising recognition because advertising originality, closeness, and irritability have a direct effect that is not via advertising likability. Accordingly, advertising likability is an insufficient indicator to represent various perceptual dimensions. Practitioners should thus use multidimensional perceptual constructs to predict or interpret the effectiveness of advertising creative.

6.3 Future research directions

Future research should aim to address the following issues. First, product types arising from the differences in consumer needs should be examined. This study defined product types on the basis of consumers' perceived risk and product knowledge. However, the determinants of purchase intention and advertising recognition might differ depending on the direction of consumer needs. Voss et al. (2003) developed a scale to measure the utilitarian and hedonic dimensions of consumer attitudes toward products and found that the impact of each dimension on purchase intention varies per product category. This result implies that their utilitarian and hedonic dimensions are effective for identifying the direction of consumer needs among product categories.

Second, heterogeneity due to factors other than product types should be explored. Factors influencing the heterogeneity of the determinants of purchase intention and advertising recognition are not limited to product types. Consumers' motivation, ability, and opportunity vary even for the same product depending on factors such as the stage of the buying process (e.g., problem recognition, information seeking, and product comparison), objectives of purchase, and advertising medium. For example, consumer motivation for information processing from point-of-purchase advertisements is likely to be higher than that for TV advertisements. Therefore, it is necessary to examine the heterogeneity arising from factors other than product type to devise an appropriate and context-specific advertising creative strategy.

Compliance with ethical standards

Conflict of interest The author has no potential conflict of interest to report.

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