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International Journal of Marketing & Distribution

Vol. 2 No. 1 (2018) 1 – 14

Japan Society of Marketing and Distribution

The effect of attribute importance and prior knowledge on the perceptions of customization and assortment

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This study focuses on how prior knowledge and the perceived importance of alignable and nonalignable attributes affect ordering through customization and searching from a retail assortment. The authors verify the moderating effect of prior knowledge on the relationship between the perceived importance of alignable and nonalignable attributes, and the perception of customization and retail assortments. Hypotheses are tested using structural equation modeling based on survey data from 3,328 running shoes consumers in Japan. The results show that the moderating effect of prior knowledge on the relationship between the perceived importance of an alignable attribute (e.g., shoe lightness) and the intention to customize is positive. These results reveal that product customization would be used more when expert consumers perceived the alignable attribute as important. Moreover, the moderating effect of prior knowledge on the relationship between the perceived importance of a nonalignable attribute (e.g., color and appearance design) and the perceived importance of a retail assortment is negative. These results reveal that novice consumers would not necessarily attach importance to retail assortments for searching an optimal product in the case that they do not perceive the importance of nonalignable attributes.

Key words: customization, retail assortment, prior knowledge, alignable attribute, nonalignable attribute

1 INTRODUCTION

It is important for researchers of customization to examine why some consumers prefer to purchase customized products over standardized ones. It is also necessary to understand how this customization process works. Prior research shows that, when customizing a product, consumers need to specify their preferences as specific attribute levels (Hildebrand, Häubl, & Herrmann, 2014; Levav, Heitmann, Herrmann, & Iyengar, 2010; Valenzuela, Dhar, & Zettelmeyer, 2009).

Previous studies have shown that some consumers prefer to buy customized products, as customization allows them to approach the 'ideal product' that matches their personal preferences (Dellaert & Stremersch, 2005; Franke, Keinz, & Steger, 2009; Franke, Schreier, & Kaiser, 2010). However, a recent study suggested that a customized product is not necessarily superior to a standardized one. Syam, Krishnamurthy, and Hess (2008) showed that consumers who have fuzzy product preferences tend to opt for a standardized product over a customized one.

Moreover, conventional retail wisdom suggests that, in search for an optimal product, most consumers prefer to search through a standard retail assortment rather than opting for product customization. At the same time, searching a large assortment for an optimal product may also be a burden for those consumers who have insufficient knowledge to properly evaluate products.

This study clarifies the determinants of consumers' perceptions of customization and retail assortment when they

Received: July 20, 2017 Accepted: February 18, 2018

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search for ideal products. The study examines this issue in terms of two factors. The first is prior knowledge, which is closely related to consumer preference states in terms of 'well-defined/articulated' versus 'fuzzy/non-articulated' preference states (Chernev, 2003; Franke et al., 2009; Kramer, 2007; Simonson, 2005). The second factor is consumer attribute importance. It was recently shown that it is important to determine the impact of qualitative attribute differences on customization (Nagpal, Lei, & Khare, 2015); specifically, alignable and nonalignable attributes are considered (e.g., Markman & Medin, 1995).

The remainder of this paper is structured as follows. In Section 2, we review the literature on customization, retail assortment, attributes, and prior knowledge in consumer behavior research. Section 3 discusses the research hypotheses, which we tested using data from an online survey on running shoes sold through both customization and retail assortments. The final section concludes the paper by discussing the implications of our findings and the limitations of our study.

2 LITERATURE REVIEW

2.1 Customization

Customization is the process by which consumers fix attributes from predefined modules to compose their preferred options (Wang, Kandampully, & Jia, 2013). According to Hildebrand et al. (2014), "the standard method of product customization is the attribute-by-attribute format, whereby consumers configure their own product by choosing each of its attributes individually" (p. 708). More specifically, consumers decide on the configuration of product attributes and level of each attribute to fit their individual preferences construct customized products (Levav et al., 2010; Valenzuela et al., 2009). For example, apparel customization allows consumers to specify their preferred level for each attribute, including size, style, and fabric (Cho & Fiorito, 2009). As a result, consumers obtain a product that is closer to their ideal product (Dellaert & Stremersch, 2005). Thus, customization is an approach by which product attributes are approximated to an individual consumer's preference.

Dellaert and Stremersch (2005) indicated that many customizable attributes increase the utility of customizing products. Similarly, Franke et al. (2010) revealed that consumers perceive customized products as corresponding more closely to their preferences when many customizable attributes are provided. Moreover, Franke et al. (2009) showed that customization generates greater benefits for consumers than standardized products as the former allows consumers to express their preferences. Therefore, customization enables consumers to specify product attributes that match their preferences, leading them to perceive the benefit of customization.

When consumers specify each attribute level, they make a decision based on their attribute importance. Consumer's attribute importance involves dimensions or elements that form the criteria for evaluating a particular consumption experience (Smith & Deppa, 2009). Consumer's attribute importance also reflects their wants and needs. Considering these reasons, attribute importance impacts consumers' sense of satisfaction (Martilla & James, 1977; Smith & Deppa, 2009). In the context of customization, consumers expect that each attribute level reflects their attribute importance. Hence, consumers attempt to specify product attributes to their desired level to construct the ideal customized products.

However, some studies have pointed out that consumers' evaluation of customization depends on their product attribute preferences (Franke et al., 2009; Kramer, 2007; Simonson, 2005; Syam et al., 2008). Research has suggested that consumers' preferences are not always clear or stable (e.g., Bettman, Luce, & Payne, 1998). This means that consumers' decisions are not always based on clear preferences. Such consumers have unstable and fuzzy preferences. Consumers with fuzzy preferences are not aware of their ideal attribute levels, and thus perceive that several attribute levels are ideal (Syam et al., 2008).

Consumers with fuzzy preferences perceive limited benefit in customization (Simonson, 2005), as they are unable to specify the most desirable attribute levels they want (Kramer, 2007; Simonson, 2005). Given this, consumers with fuzzy preferences find it effortful to specify each attribute level, and thus avoid product customization. Such consumers prefer standardized products that fit their ideal product. In other words, they purchase a standardized product rather than order a customized product if they perceive that it may be too effortful to specify the most desirable attribute levels in the customization process (Syam et al., 2008).

Consumers' preference state is an important factor in product customization. Studies have suggested that consumers' preference state is closely related to prior knowledge about products (Kramer, 2007; Simonson, 2005). Prior knowledge consists of a consumer's memory of evaluations of product-class knowledge (Park, Mothersbaugh, & Feick, 1994). According to Bettman et al. (1998), "consumers will use information in memory to make a choice to the extent that it is more accessible and more diagnostic than alternative sources of information" (p. 204). Studies have shown that prior knowledge is an important factor in information processing and decision making (Alba &

Hutchinson, 1987; Bettman et al., 1998; Maheswaran, Sternthal, & Gürhan, 1996; Raju, Lonial, & Mangold, 1995; Sujan, 1985), as knowledgeable consumers develop the cognitive structures required to analyze information, elaborate on the given information, and remember it to reduce the cognitive effort required (Alba & Hutchinson, 1987).

Consumers with sufficient prior knowledge are called "expert consumers" (Alba & Hutchinson, 1987; Maheswaran et al., 1996). Simonson (2005) argued that consumers with knowledge and experience are likely to have well-defined preferences. Expert consumers can use their ideal points for decision making as they have well-defined preferences based on their experience with products (Chernev, 2003; Simonson, 2005; Syam et al., 2008). These consumers know their ideal precisely (Syam et al., 2008), and hence can easily specify the level of each attribute using an attribute-by-attribute customization format.

On the other hand, novice consumers, who have insufficient prior knowledge, find it more effortful to compare product attributes and attribute levels owing to their fuzzy preferences (Chernev, 2003; Simonson, 2005; Syam et al., 2008). This means that novice consumers are unable to use their ideal points for decision making. For these reasons, novice consumers perceive product-related tasks (evaluation and choice) as effortful processing (Alba & Hutchinson, 1987; Maheswaran et al., 1996).

Thus, studies have shown that the effect of consumers' configurations of product attributes on their use of customization depends on the level of prior knowledge they possess. More specifically, consumers who have sufficient knowledge about a product will use customization (when available) to obtain a preferred product. In contrast, consumers who lack knowledge about a product will prefer standardized products, even if customization is available. In the latter case, consumers choose desirable products from a retail assortment. We elaborately discuss retail assortments below.

2.2 Retail assortment

A retail assortment is a combination of multiple products for sale in a retail store (Pan & Zinkhan, 2006). Consumers prefer retailers that offer a large assortment (Pan & Zinkhan, 2006), as they provide consumers with a greater opportunity to match their preference with a product (Chernev, 2003; Kahn, 1998; Simonson, 1999). Chernev (2003) argues that "consumers might feel more confident when selecting from a retailer that offers a larger assortment because it is less likely that a potentially superior alternative is not represented in the available choice set" (p. 171). As a result, consumers' attitudes to and evaluations of larger assortments are positive (Oppewal & Koelemeijer, 2005; Piris & Guibert, 2015).

Consumers search for a product provided as part of a retail assortment based on their individual preferences and the importance of the product attributes to obtain an optimal product. Attribute importance (Martilla & James, 1977; Smith & Deppa, 2009) enables consumers to search for an ideal product among a large assortment as it allows them to find the product that offers the best value for the important attributes (e.g., Bettman et al., 1998). Consumers search for a product based on perceived attribute importance. Hence, consumers who have a clear notion of what constitutes an important product attribute find it beneficial to search from among a large assortment.

However, the relationship between consumers' attribute importance and their perception of the benefit of large assortments depends on the consumers' prior knowledge. Prior knowledge encourages consumers to accurately express their preferences for attribute levels. Thus, consumers can use the ideal point for decision making when they have sufficient expertise on products (Chernev, 2003). Chernev (2003) shows that the ideal point availability can simplify choices, leading to a stronger preference for a product selected from a large assortment. Chernev (2003) also shows that the ideal point availability has the opposite effect on smaller assortments, leading to weaker preferences. Thus, such consumers prefer larger assortments, regardless of their attribute importance. In other words, expert consumers always recognize the benefits of larger assortments and avoid smaller assortments.

In contrast, novice consumers who are unable to use the ideal point prefer larger assortments if they have a perception of attribute importance. In other words, novice consumers who have a clear notion of what constitutes an important product attribute prefer larger assortments as they can search for a product based on this important attribute. However, novice consumers who have no clear notion of attribute importance perception may perceive a large assortment as having too many options, making it more difficult to have a satisfactory purchasing experience (Chernev, Böckenholt, & Goodman, 2010; Huffman & Kahn, 1998; Scheibehenne, Greifeneder, & Todd, 2010). Therefore, more effort is required to evaluate the options in a large assortment (Huffman & Kahn, 1998), suggesting that novice consumers without attribute importance perception may not prefer large assortments.

Thus, consumers' attribute importance perceptions determine the importance of assortment size used to search for an optimal product. Novice consumers have to make an extra effort to evaluate each product, as they are unable to refer to their ideal point.

Although it is supposed to be easier for consumers to search for an optimal product in a retail assortment than to use customization, both prior knowledge and attribute importance are determinants of the perception of customization and assortment size.

2.3 Attribute alignability

We also consider product attribute types. Studies have suggested that product attributes may be divided into alignable and nonalignable types (Markman & Lowenstein, 2010; Markman & Medin, 1995). Alignable attributes consist of attribute levels that vary along a single comparable dimension (Markman & Medin, 1995; Zhang & Fitzsimons, 1999), while nonalignable attributes consist of binary levels which are "all-or-nothing" alternatives (Gourville & Soman, 2005) within multiple dimensions that have no correspondence to each other (Markman & Medin, 1995; Nam, Wang, & Lee, 2012; Zhang & Fitzsimons, 1999). For example, among the product attributes of cars, the size of the engine (e.g., 2.2 vs. 2.6 liter engine) is an alignable attribute, while distinct features (e.g., a sun roof or leather interior) are nonalignable attributes (Gourville & Soman, 2005).

For alignable attributes, consumers perceive attribute levels as differences of degree (Gourville & Soman, 2005). Alignable attributes allow consumers to compare attribute levels based on a common dimension. Considering this reason, alignable attributes are easier to compare (Gourville & Soman, 2005; Markman & Medin, 1995; Nam et al., 2012; Zhang & Fitzsimons, 1999).

When the comparability is high (i.e., alignable attributes), consumers can easily search for an optimal product, and thus select a larger assortment (Gourville & Soman, 2005). Consumers easily process information based on alignable attributes (Markman & Lowenstein, 2010; Zhang & Fitzsimons, 1999). Considering these reasons, consumers can more easily choose an optimal option based on alignable attributes rather than nonalignable attributes (Markman & Medin, 1995). In other words, consumers select products based on nonalignable attributes if they find the attribute important enough to be motivated to process the information regarding the nonalignable attribute in question (Zhang & Markman, 2001). In addition, this impact of attribute alignability presumably occurs for customization as well.

Contrary to these previous studies, it is possible to propound another supposition that it is easier to perceive the difference between products with nonalignable attributes. Based on the comparison on a single dimension, an alignable attribute is composed of many levels along a dimension, while a nonalignable attribute is composed of binary levels which are "all-or-nothing" alternatives (Gourville & Soman, 2005). Therefore, for alignable attributes, consumers require rational decisions to process the information of options, which are based on the image of a sequential measure. On the other hand, nonalignable attributes are likely to influence intuitional decisions rather than rational ones owing to the effortful tasks in rationally comparing options. In addition, "all-or-nothing" alternatives of nonalignable attributes are distinct and visible features that influence intuitive decision making, which can be interpreted to offer the ease to compare products dependent on nonalignable attributes.

3 HYPOTHESES

3.1 Effect of attribute importance on customization and retail assortment

Consumers consider using customization, if they attach importance to attributes, regardless of whether they are alignable or nonalignable, as consumers are able to configure a product attribute based on its perceived importance to obtain a product that is close to their ideal. Customizing product attributes enhances consumers' perceptions of a match between their preferences and the product (Franke et al., 2010). Thus, consumers expect to obtain a customized product based on their own preferences. Hence, we hypothesize the following:

H1-1: The perceived importance that consumers attach to alignable attributes positively affects their intention to use customization.

H1-2: The perceived importance that consumers attach to nonalignable attributes positively affects their intention to use customization.

Similarly, the importance of product attributes, regardless of whether they are alignable or nonalignable, motivates consumers to search for an optimal product in a large assortment. Consumers who have a clear notion of what constitutes an important product attribute find it easier to choose from large assortments than those who do not hold clear notions of important product attributes. A larger assortment provides the former type of consumer with a wider set of options, making it easier to match their preferences to a product (Chernev, 2003; Kahn, 1998; Simonson, 1999). Therefore, when consumers seek products that conform to their attribute importance levels, they prefer a large assortment. Thus, we propose the following:

H2-1: The perceived importance that consumers attach to alignable attributes positively affects the per-

ceived importance they attach to the retail assortment.

H2-2: The perceived importance that consumers attach to nonalignable attributes positively affects the perceived importance they attach to the retail assortment.

In summary, consumers consider using customization and large assortments based on the perceptions of alignable and nonalignable attribute importance, to choose an optimal product. Although these hypotheses are symmetrical, the effects differ depending on the consumer's level of prior knowledge.

3.2 Moderating effect of prior knowledge on the relationship between attribute importance and customization

As mentioned previously, when consumers have a clear notion of what constitutes an important product attribute, they will use customization to acquire optimal attribute levels. In addition to this, expert consumers have sufficient knowledge about how to use their ideal point for specifying optimal attribute levels in customization (Kramer, 2007; Simonson, 2005; Syam et al., 2008). If such consumers attach importance to an attribute, they can more actively and effectively use customization than novice consumers.

In the case of novice consumers, as they consider the specification of attribute levels to be a more complex task (Dellaert & Stremersch, 2005; Randall, Terwiesch, & Ulrich, 2007), they may hesitate to use customization due to their fuzzy preferences (Kramer, 2007; Simonson, 2005; Syam et al., 2008), even if they have a clear notion of what constitutes an important product attribute. On the other hand, when consumers, regardless of whether they are an expert or novice, do not perceive specific product attributes as important, customization is not required for them. Therefore, we assume that the relationship between the consumer perception of attribute importance and their intention to use customization may be strengthened by prior knowledge of the product category.

In addition, we follow the discussion of previous studies regarding the difference between alignable and nonalignable attributes (Gourville & Soman, 2005; Markman & Medin, 1995; Nam et al., 2012; Zhang & Fitzsimons, 1999), and assume that the effect of prior knowledge will be clearer if consumers attach importance to nonalignable attributes when customizing products. The reason for this is that it is more challenging to perceive differences among nonalignable attribute levels, which are not readily comparable to each other (Gourville & Soman, 2005; Markman & Medin, 1995; Nam et al., 2012; Zhang & Fitzsimons, 1999).

Therefore, even if novice consumers are motivated to customize by their perceived importance of nonalignable attribute, they find it more effortful to specify nonalignable attribute levels for customization. On the other hand, expert consumers with sufficient knowledge intend to customize their optimal products when they perceive product attribute importance. This means that the positive moderating effect of prior knowledge on the relationship between attribute importance and customization is more emphasized in the case of nonalignable attributes than those of alignable attributes.

From the above, it is possible that the moderating effect of prior knowledge will be confirmed clearly when nonalignable attribute importance is involved. However, we first verify the moderating effect of prior knowledge when consumers perceive alignable and nonalignable attribute importance. Further, we will discuss the difference between alignable and nonalignable attribute importance based on the result of tests. Thus, we predict the following:

H3-1: Prior knowledge strengthens the relationship between the perceived importance that consumers attach to alignable attributes and their intention to use customization.

H3-2: Prior knowledge strengthens the relationship between the perceived importance that consumers attach to nonalignable attributes and their intention to use customization.

3.3 Moderating effect of prior knowledge on the relationship between attribute importance and retail assortment

Consumers who attach more importance to product attributes prefer a larger assortment as well as customization. However, the moderating effect of consumers' prior knowledge on retail assortment may differ from the moderating effect of consumers' prior knowledge on customization.

Although novice consumers do not necessarily have sufficient ability to specify their own ideal point (Chernev, 2003), they will compare products to search for more desirable levels of perceived attributes in a retail assortment, if they are motivated by attribute importance perceptions. On the other hand, novice consumers anticipate choice complexity in a large assortment, if they have no perceptions of the importance of attributes. Thus, in the case of novice consumers, attribute importance perceptions definitely increase the perceived importance of assortment. This

means that searching an optimal product in a large assortment is not as effortful for consumers as specifying the optimal attribute levels in customization.

In contrast, expert consumers with sufficient prior knowledge attach importance to larger assortments as a whole (Chernev, 2003). They have confidence in their ability to search optimal products from a large assortment through comparison of product options, even if they do not attach perceived importance to specific attributes. Therefore, in the case of expert consumers, the perceived importance of assortment remains high and is marginally heightened by the attribute importance perceptions. This tendency is also different from the relationship between attribute importance perception and customization. While customization is such a demanding task for expert consumers that they need to be motivated by the attribute importance perceptions, searching in a large assortment does not necessarily demand high levels of motivation from them.

From these discussions, we can state that prior knowledge negatively moderates the positive relationship between the perceived importance consumers attach to product attributes and the perceived importance they attach to retail assortment.

Considering the alignable and nonalignable attributes shown by prior studies (Gourville & Soman, 2005; Markman & Medin, 1995; Nam et al., 2012; Zhang & Fitzsimons, 1999), this negative moderating effect will be clear in the case of nonalignable attribute importance, as it is easier for novice consumers to process information based on alignable attributes in comparison to nonalignable attributes. As consumers find it easier to search in a large assortment, the difference between novice and expert consumers will become less pronounced. This means that there can be a weak relationship between attribute importance and a large assortment for novice consumers, as well as expert consumers, in the case of alignable attributes.

In other words, it is possible that the negative moderating effect of prior knowledge will be clear when nonalignable attribute importance is involved. However, we first verify the moderating effect of prior knowledge when consumers perceive alignable and nonalignable attribute importance respectively. Further, we will discuss the difference between alignable and nonalignable attribute importance based on the result of the tests. Consequently, the following hypothesis is proposed:

H4-1: Prior knowledge negatively moderates the relationship between the perceived importance consumers attach to alignable attributes and the perceived importance they attach to the retail assortment.

H4-2: Prior knowledge negatively moderates the relationship between the perceived importance consumers attach to nonalignable attributes and the perceived importance they attach to the retail assortment.

4 METHODS

4.1 Data collection and procedure

We test the hypotheses using data on consumers' use of running shoes. These data were obtained from a questionnaire used in a consumer research project investigating consumers' acceptance of customized running shoes services via information technology. Consumers can purchase running shoes from retailers or customizers. For instance, NIKEiD provides customized running shoes (Yu & Park, 2014). Therefore, consumers can search for information on customized and standardized products when purchasing a pair of running shoes. Thus, this context is appropriate for our analysis of the impact of perceived attribute importance on the use of customization and size of an assortment.

The data were taken from an Internet survey conducted in Japan and collected from February 19 to 23, 2015. The survey sample was selected by a marketing research agency in Japan. This marketing research agency asked 7681 people to participate in this survey and 4949 responded. All the respondents have running experience and/or have participated in a marathon. We first applied a list-wise deletion for missing values. Further, we employed the Smirnov–Grubbs outlier test ($\alpha = 0.05$) on the number of running shoes the respondents own. Finally, 3328 samples were used in our analysis.

The survey asked respondents to indicate the level of importance of a number of running shoe attributes when purchasing them, the level of prior knowledge regarding running shoes, intention to use customization, perception of importance of retail assortment, and a number of additional items. Hence, respondents answered questions on attribute importance and prior knowledge about running shoes based on their past consumption experience. Moreover, respondents also answered questions regarding perceptions of customization and importance of retail assortment when purchasing a pair of running shoes.

4.2 Measures

4.2.1 Dependent variables

Intention to use customization. This study measures the consumers' intention to use customization when purchasing running shoes. This measurement item uses a single-item, seven-point Likert-type scale ranging from (1) "not willing

to use customization" to (7) "willing to use customization." For this item, respondents were asked to indicate their general attitude toward customization of running shoes.

Importance of retail assortment. Retail assortment is constructed using a variety of product categories (i.e., width) and the number of product types within each category (i.e., depth; Dhar, Hoch, & Kumar, 2001; Maruyama & Wu, 2014). As we consider only a single product category (running shoes), we measure consumers' perceptions of the importance of assortment depth as the importance of the retail assortment. This measurement item uses a single-item, seven-point Likert-type scale ranging from (1) "not at all important" to (7) "very important."

4.2.2 Independent variables

Attribute importance (*alignable versus nonalignable*). This study uses consumers' perceived importance of the 'shoe lightness' attribute, and the 'color and appearance design' attribute. Prior research shows that the 'shoe lightness' attribute is an essential element of running shoe performance (i.e., running speed; Shorten, 2001), and the 'color and appearance design' attribute strongly relates to consumers' impression of a product (e.g., Wu, Chen, Lee, & Chen, 2010). Thus, both the attributes are key factors to consider when consumers purchase running shoes.

Generally, retail assortments provide this attribute information for consumers. On the other hand, product customization allows consumers to specify the features of color and appearance design attributes (Wu et al., 2010). When consumers customize shoes in terms of lightness, they are supposed to choose lightweight materials and specify the thickness of the sole based on the information of total weight of shoes.

We assume that the shoe lightness attribute is alignable as it is expressed in grams. We also assume that the color and appearance design attribute is nonalignable. The color and appearance design attribute is such that obtaining a desirable feature (e.g., a red upper) entails giving up another desirable feature (e.g., a blue upper). In other words, the color and appearance design attribute consists of binary levels of many dimensions of color and appearance design options. Hence, these assumptions satisfy the property of alignable and nonalignable attributes, and are reasonable. Therefore, alignable and nonalignable attributes were used to measure the consumers' perceptions of the importance of each attribute. Each measurement item used a single-item, seven-point Likert-type scale ranging from (1) "not at all important" to (7) "very important."

Prior knowledge. To measure prior knowledge, this study follows Park et al. (1994), who measured multiple dimensions of self-assessed prior knowledge on features, such as product attributes, product usage, and product brand. We measure three dimensions of prior knowledge on running shoes, running competition, and brands and manufacturers. Prior knowledge is measured using three-item, seven-point Likert-type scales ranging from (1) "limited knowledge" to (7) "knowledgeable."

4.2.3 Control variables

We use several control variables to test our hypotheses.

User characteristics. We consider the effects of the number of running shoes owned and involvement in running competitions. In the former case, we suppose that consumers who own a number of running shoes may prefer to collect them. Such consumers may be interested in customized shoes to further their collection and need retail assortment to gather information for their collection. Therefore, this item measures the number of running shoes the consumer owns to control these influences. In the latter case, depending on the consumer's level of involvement with a product category, there is a difference in the extent of their search for information (Laurent & Kapferer, 1985). In the running shoes context, some consumers aim to participate in running competitions. These consumers consider customization and assortment size to seek high-performance running shoes especially. On the other hand, other consumers may not consider the importance of performance. These consumers may make less effort to specify the lightness of the shoe when purchasing. We consider the effect of these consumers who have low involvement in running competitions. Low involvement is coded by using a dummy variable, where 1 represents inexperience and a lack of concern for competition.

Width size and price. Consumers consider shoe width size and price when purchasing running shoes. Both elements measure the consumers' perceptions of importance and are measured using a single-item, seven-point Likert-type scale ranging from "not at all important" (1) to "very important" (7).

Share of purchases for a retailer. Retailers' sales promotions (e.g., a frequent-shopper program) affect customers' store loyalty (Mägi, 2003). Mägi (2003) argued that sales promotions increase consumers' purchases and store visits. Thus, we consider these effects. The share of purchases is measured as the purchase amount at the primary store as a percentage of the total running shoe purchases. This measurement item uses a single-item, 10-point scale ranging from "0–10%" (1) to "over 90%" (10). Visit frequency is measured using a single-item, 4-point scale ("once a month" (1), "once every 3 months" (2), "once every 6 months" (3), and "once a year" (4)). We decided to create a dummy variable by dividing respondents into two catego-

Table 1 Descriptive statistics

Variables	Items	Mean	SD[1]
Customization	Do you want to use the made-to-order service of running shoes?	4.156	1.745
Assortment	How important are the following characteristics to you when you choose a store to make a purchase?		
	Variety of product types within categories	5.145	1.153
Attribute importance	How important are the following product attributes to you when you purchase running shoes?		
Alignable attribute importance	Shoe lightness	5.428	1.260
Nonalignable attribute importance	Color and appearance design	5.380	1.333
Prior knowledge	How much do you know about the following items?		
PK1	Running shoes	3.680	1.378
PK2	Running competitions	3.424	1.540
PK3	Brands and manufacturers	3.801	1.413
Number of sports shoes owned	Number of running shoes	1.697	0.882
Low involvement	Inexperience and lack of concern for competitions	0.417	0.493
Width size	I think the foot width size is important when I purchase running shoes	5.697	1.288
Price	I think the product price is important when I purchase running shoes	5.391	1.333
Share of purchase	Percentage of the purchase price at the primary store in the total purchase of running shoes	6.029	3.018
Visiting once in a month	Frequency of visit	0.217	0.412
Online retailer	Primary store format is online retailer	0.056	0.229
Gender	Respondent's gender	0.749	0.433
Age	Respondent's age	42.079	12.991

[1] SD refers to standard deviation.

ries of primary store visit frequency: those who visit once a month (1), versus those who visit less frequently (0).

Online retailer. Research shows that online retailers' assortments are larger than those of offline retailers (Kopalle, Hess, Murray, Talukdar, & Gosavi, 2010). Hence, we consider this impact. This item is coded as a dummy variable, taking a value of 1 if the respondent primarily used an online retailer and 0 otherwise.

Demographics (*MALE* and *AGE*). Gender is coded using a dummy variable set to 1 for male and 0 for female. Age is measured in years.

The descriptive statistics are shown in Table 1.

4.2.4 Moderator analysis

We test the hypotheses using structural equation modeling (SEM), and we use the method of Marsh, Wen, & Hau (2004) to estimate the moderating effects of prior knowledge on the intention to use customization and on the importance of a retail assortment as this method demonstrates good fitness and robust results in several probability distributions (Cham, West, Ma, & Aiken, 2012; Marsh et al., 2004).

Following the method, we first mean-centered the measurement items of each variable included in the interaction (i.e., the item's alignable attribute importance and prior knowledge). We then multiplied the alignable attribute importance by the first measurement of prior knowledge (i.e., PK1) to create the first measurement item of the latent interaction term (i.e., alignable attribute importance × prior knowledge). This procedure was followed for each subsequent pair of measurement items. Further, we followed the same procedure for nonalignable attribute importance and prior knowledge. Next, we used SEM to estimate the effect of the alignable attribute importance, nonalignable attribute importance, prior knowledge, and two latent interaction terms (i.e., alignable attribute importance × prior knowledge and nonalignable attribute importance × prior knowledge) on the intention to use customization and the importance of a retail assortment. Based on these procedures, we estimated the SEM model with a mean structure.

4.2.5 Common-method variance

In this study, a common-method variance may inflate the relationships between the variables measured from the same source. Studies have suggested assessing the common-method variance using Harman's single-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff & Organ, 1986). The test results indicated the

Table 2 Cronbach's alpha, AVE values, and correlation coefficients

Latent variables	Mean	SD	Alpha[2]	AVE	1	2	3
1. Prior knowledge	3.635	1.290	0.872	0.698			
2. Alignable attribute importance × Prior knowledge	0.211	1.814	0.887	0.726	0.069		
3. Nonalignable attribute importance × Prior knowledge	0.091	1.893	0.879	0.710	0.082	0.384	

[2] Alpha refers to Cronbach's alpha.

presence of eight factors with eigenvalues greater than 1.0. Moreover, the first factor did not account for a majority of the variance (30%). Thus, no general factor is apparent (Podsakoff et al., 2003; Podsakoff & Organ, 1986).

4.2.6 Internal consistency, convergent validity, and discriminant validity

We assessed internal consistency, convergent validity, and discriminant validity. First, internal consistency was examined using Cronbach's alpha. A value of 0.70 or higher is considered acceptable. Three latent variables (i.e., prior knowledge, alignable attribute importance × prior knowledge, and nonalignable attribute importance × prior knowledge) showed Cronbach's alpha coefficients of over 0.70 (Nunnally, 1975). Thus, there is internal consistency in the latent variables. Second, convergent validity was examined using the average variance extracted (AVE) values. The AVE values of the latent variables ranged from 0.698 to 0.726, exceeding the threshold of 0.50 (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). Hence, the latent variables satisfy convergent validity. Finally, the squared correlation coefficients between the latent variables, which were lower than the AVE values, indicated sufficient discriminant validity between the variables (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). Table 2 shows the Cronbach's alpha, AVE, and correlation coefficient values.

5 RESULTS

We assessed the SEM model in terms of goodness of fit. The goodness of fit term indicated (χ^2 (135) = 1468.079 ($p < 0.01$)), an adjusted goodness of fit index (AGFI) = 0.990, comparative fit index (CFI) = 0.931, and a root mean square error of approximation (RMSEA) = 0.054. The AGFI (> 0.90), CFI (> 0.90), and RMSEA (< 0.10) satisfy the criteria (Bentler & Bonett, 1980; Hu & Bentler, 1998). Table 3 shows the results of the measurement equation and Table 4 shows the results of the structural equation.

The perceived alignable attribute importance positively influences the intention to use customization ($\beta = 0.049$, $p < 0.01$). Similarly, the perceived nonalignable attribute importance positively influences the intention to use customization ($\beta = 0.075$, $p < 0.01$). Thus, H1-1 and H1-2 are supported. The perceived alignable attribute importance positively influences the importance of the retail assortment ($\beta = 0.121$, $p < 0.01$). Moreover, the perceived nonalignable attribute importance positively influences the importance of the retail assortment ($\beta = 0.157$, $p < 0.01$). Therefore, H2-1 and H2-2 are supported.

The interaction term between the perceived alignable attribute importance and prior knowledge positively influenced the intention to use customization ($\beta = 0.051$, $p < 0.01$). In contrast, the interaction term between the perceived nonalignable attribute importance and prior knowledge did not influence the intention to use customization ($\beta = -0.035$, $p > 0.05$). Considering the latter result, H3-2 is not supported.

On the other hand, as the interaction term between the perceived alignable attribute importance and prior knowledge did not influence the importance of the retail assortment ($\beta = 0.034$, $p > 0.05$), H4-1 is not supported. However, the interaction term between the perceived nonalignable attribute importance and prior knowledge negatively influences the importance of the retail assortment ($\beta = -0.059$, $p < 0.01$). Thus, in relation to H3-1 and H4-2, we conduct a simple slope analysis on the significant interaction terms.

5.1 Simple slope analysis

The procedure for this analysis follows that of Aiken and West (1996). The conditional effects of the two slopes, divided by the mean of the moderating variable (i.e., prior knowledge) into above one standard deviation (SD) and below one SD, are used to examine the differences when other predictors are equal to their mean values (Aiken & West, 1996).

The perceived alignable attribute importance positively influences the intention to use customization when prior knowledge is above one SD ($\beta = 0.130$, $p < 0.01$). In contrast, when prior knowledge is below one SD, the relationship between the perceived alignable attribute importance and intention to use customization is not statistically significant ($\beta = 0.003$, $p > 0.05$). Thus, H3-1 is supported. These results are shown in Figure 1.

Table 3 Result of measurement equation

Latent variables	Measurement items	Standardized loadings	z-values
Prior knowledge	PK1	0.901 **	139.411
	PK2	0.832 **	111.531
	PK3	0.775 **	91.498
Alignable attribute importance × Prior knowledge	Alignable attribute importance × PK1	0.897 **	152.274
	Alignable attribute importance × PK2	0.860 **	132.598
	Alignable attribute importance × PK3	0.803 **	106.105
Nonalignable attribute importance × Prior knowledge	Nonalignable attribute importance × PK1	0.898 **	146.472
	Nonalignable attribute importance × PK2	0.829 **	114.516
	Nonalignable attribute importance × PK3	0.811 **	107.028

** $p < 0.01$.

Table 4 Result of structural equation

	Customization		Assortment	
	β [3]	z-values	β	z-values
Main effects				
Alignable attribute importance	0.049 **	2.792	0.121 **	7.026
Nonalignable attribute importance	0.075 **	4.255	0.157 **	8.950
Prior knowledge	0.283 **	17.274	0.124 **	7.307
Interaction effects				
Alignable attribute importance × Prior knowledge	0.051 **	2.731	0.034	1.844
Nonalignable attribute importance × Prior knowledge	–0.035	–1.875	–0.059 **	–3.185
Control variables				
Number of sports shoes owned	0.056 **	3.328	0.050 **	2.965
Low involvement	–0.111 **	–6.941	–0.024	–1.487
Width size	0.086 **	5.094	0.180 **	10.821
Price	–0.089 **	–5.245	0.029	1.683
Share of purchase	0.016	1.022	0.059 **	3.657
Visiting once in a month	0.036 *	2.208	0.037 *	2.305
Online retailer	–0.004	–0.249	–0.062 **	–3.871
Gender	–0.059 **	–3.651	–0.022	–1.379
Age	–0.162 **	–9.800	–0.001	–0.041
R-square	0.160		0.152	

[3] β refers to the standardized coefficients.

* $p < 0.05$, ** $p < 0.01$.

The positive relationship between the perceived nonalignable attribute importance and importance of a retail assortment is evident above one SD ($\beta = 0.088$, $p < 0.01$) and below one SD ($\beta = 0.181$, $p < 0.01$). As the difference between the coefficients for above one SD and below one SD was statistically significant ($z = 3.111$, $p < 0.01$), the effect of the perceived nonalignable attribute importance on the importance of a retail assortment is stronger when prior knowledge is below one SD than above one SD. These results are shown Figure 2.

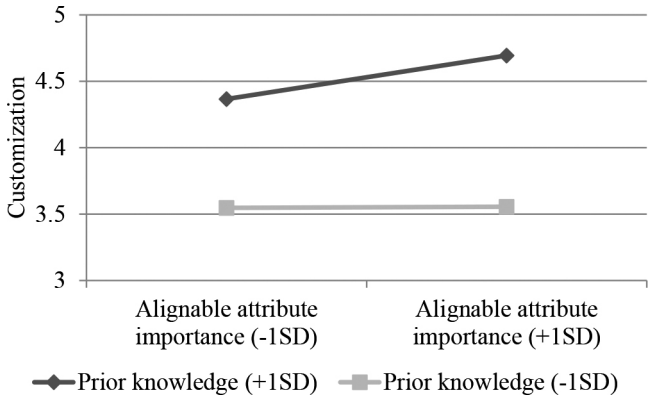

Figure 1 Alignable attribute importance and customization.

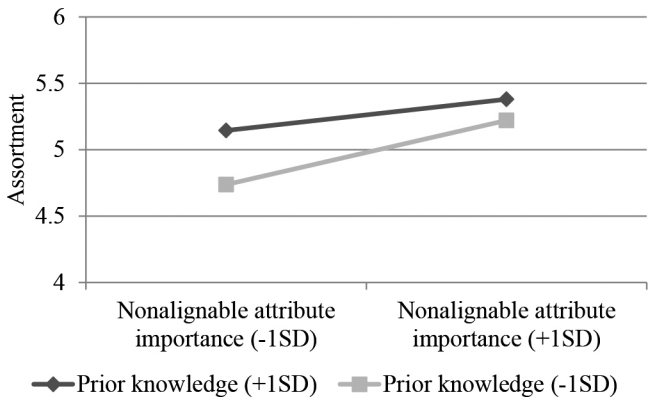

Figure 2 Nonalignable attribute importance and retail assortment.

In addition, we estimated the mediation model to further assess the proposed SEM model. The mediation model is tested for whether the effect of prior knowledge on the outcomes (i.e., the intention to use customization and perceived importance of the retail assortment) is mediated by the perceived attribute importance (alignable and nonalignable), which includes the effects of control variables on the outcomes. As a result, the goodness of fit term in the mediation model indicated χ^2 (54) = 1784.301 ($p < 0.01$), AGFI = 0.661, CFI = 0.788, and RMSEA = 0.098. This goodness of fit term is inferior to the proposed SEM model and does not satisfy the criteria of AGFI and CFI. Thus, this mediation model was rejected in this study.

6 DISCUSSION

The empirical results concerning the perception of customization and retail assortment show the following. First, the perceived alignable and nonalignable attribute importance increases with the greater intention to use customization. Consumers expect a customized product to be closer to their ideal, based on the importance of the attributes.

Second, the perceived alignable and nonalignable attribute importance increases the perceived importance of a retail assortment. Consumers anticipate that a larger assortment will provide an opportunity to match their preferences to a product.

Third, the results show a moderating effect of prior knowledge on the relationship between the perceived importance of alignable attribute and intention to use customization. More specifically, alignable attribute importance positively influences the intention to use customization when consumers have sufficient prior knowledge. On the other hand, the impact of the perceived nonalignable attribute importance on the intention to customize does not depend on the consumer's level of prior knowledge. This result shows that the relationship between the importance of nonalignable attribute and that of customization is not influenced by whether the consumer is a novice or an expert.

This suggests that H3-1 is supported and that H3-2 is not supported. However, it is not consistent with the expectation derived from previous studies (Gourville & Soman, 2005; Markman & Medin, 1995; Nam et al., 2012; Zhang & Fitzsimons, 1999). Based on previous studies, we expect that H3-2 is more likely to be supported than H3-1 owing to less comparability of nonalignable attributes. In other words, novice consumers are supposed to find it effortful to process the information of nonalignable attributes for customization, which enlarges the difference with expert consumers.

These results suggest that it is probable that it is easier, rather than more effortful, for consumers to specify nonalignable attribute levels than alignable attribute levels. As discussed previously, based on the comparison of a single dimension, a nonalignable attribute that comprises of "all-or-nothing" alternative contains lesser levels than an alignable attribute. In addition, consumers need rational decisions to process the information of alignable attributes for customization. Therefore, it appears reasonable to suppose that it can be easier to specify nonalignable attribute levels than alignable attribute levels for customization. This tendency is supposed to be dependent on the feature of customization, for which consumers do not process the information on many attributes owing to the necessity to specify each attribute level. However, there is room for further investigation as this is contrary to previous studies (Gourville & Soman, 2005; Markman & Medin, 1995; Nam et al., 2012; Zhang & Fitzsimons, 1999).

Finally, a moderating effect of prior knowledge is found on the relationship between the perceived importance of nonalignable attribute and that of retail assortment. In contrast, the moderating effect of prior knowledge on the relationship between the perceived importance of alignable attributes and that of retail assortment is not significantly

negative.

Considering nonalignable attribute, Figure 2 shows that the relationship between attribute importance and assortment importance is not clearly positive for expert consumers. This suggests that, on the whole, expert consumers prefer large assortments. In the case of novice consumers, nonalignable attribute importance increases the importance of a retail assortment. In other words, when novice consumers are motivated by their perceived importance of attributes, they will attach importance to a large assortment.

On the other hand, considering alignable attribute, the assortment importance perceived by novice consumers is not supposed to considerably increase according to their alignable attribute importance. This tendency is similar to the case of expert consumers, such that the moderating effect of prior knowledge on the relationship between alignable attribute importance and retail assortment is not verified.

Based on the reasoning of previous studies (Gourville & Soman, 2005; Markman & Medin, 1995; Nam et al., 2012; Zhang & Fitzsimons, 1999), H4-2 regarding nonalignable attribute is more likely be supported than H4-1 regarding alignable attribute. Therefore, these results are dependent on less comparability of nonalignable attribute, similar to prior research.

However, we should refer to the incoherence with the interpretation on customization. In other words, while nonalignable attribute offers the ease for customization, it poses complexity for searching in a large assortment. As mentioned above, as customization requires consumers to specify each attribute level for a limited number of product attributes, this may be easier to do for nonalignable attributes, which are distinctive. In contrast, searching in a retail assortment requires consumers to compare products on the basis of many attributes. In this case, consumers may find it easier to compare alignable attributes than nonalignable attributes, as the former are easier to process and evaluate (Zhang & Fitzsimons, 1999). This point also needs further investigation.

6.1 Contributions of the study

Although consumers consider customizing products and the choices provided by a retail assortment when searching for optimal products, this has not received significant attention until recently. We examined how the perceived importance of attributes (alignable and nonalignable) affects customization and assortment size. We also examined the moderating effect of prior knowledge.

Our findings suggest that the moderating effect of prior knowledge on the perception of customization and assortment differs depending on whether the attributes are alignable or nonalignable.

Regarding customization, prior research has noted the importance of specifying the effects of qualitative differences among product attributes on customization (Nagpal et al., 2015). Prior research has also shown that novice consumers perceive the specification of attribute levels as a complex task (Dellaert & Stremersch, 2005; Randall et al., 2007). This study shows that prior knowledge has a positive moderating effect on the intention to customize in the case of alignable attributes. In other words, as novice consumers find it effortful to specify alignable attribute levels, consumers require a combination of prior knowledge and the perception of alignable attribute importance to specify concrete attribute levels during customization.

On the other hand, in relation to retail assortment, prior knowledge has a different moderating effect on the perceived importance of assortment in the case of nonalignable attributes. Consumers require either nonalignable attribute importance perceptions or prior knowledge to search from among a large assortment.

6.2 Managerial implications

The findings reported above have two main managerial implications for firms and retailers that offer customization. First, novice consumers may perceive challenges to use customization, even if they perceive alignable attribute importance. Thus, firms need to capture consumers' level of prior knowledge. Moreover, firms should provide a customization process that corresponds to this level. For example, Randall et al. (2007) showed that novice consumers created a customized product through a needs-based customization process. Such a customization process requires consumers to specify the relative importance of their needs; its optimization algorithm then recommends the combination of attribute levels most likely to maximize the consumers' utility (Randall et al., 2007).

Second, in the case of retail assortment, previous studies suggest the competitive advantage of retailers' high-variety assortment strategies (e.g., Kahn, 1998). However, the results suggest that novice consumers do not heavily perceive the importance of retail assortment when they do not perceive nonalignable attribute importance. Therefore, if retailers adopt high-variety assortment strategies for products with nonalignable attributes, it will be necessary to make novice consumers perceive the importance of nonalignable attributes.

6.3 Limitations and future research

This study has several limitations. First, this argument is based on shoe lightness as an alignable attribute, and color and appearance design as nonalignable attributes. These

features of running shoes can be paralleled with other aspects of product attributes. For example, shoe lightness can be understood as a functional attribute, and color and appearance design as aesthetic aspects (e.g., Vázquez, Del Río, & Iglesias, 2002). We did not consider the possibility of other dimensions of product attributes, which may provide different explanations on the effects of product attributes and prior knowledge. Therefore, future research should investigate more aspects corresponding with alignable and nonalignable attributes. Moreover, the influences of the number of such aspects regarding alignable and nonalignable attributes could be studied in further research.

Second, we use alignable and nonalignable attributes based on consumers' perceptions. The actual stimuli for alignable and nonalignable attributes cause complexity in information processing and decision making. This calls for a different methodology for analyzing the relationship between customization and retail assortment. Hence, research on the impact of actual stimuli for alignable and nonalignable attributes is required.

Finally, this study considers a single product category (running shoes). Future research should examine data from a variety of product categories. One way to structurally explore the influence of product category might be to investigate this topic in terms of durable versus nondurable goods, or utilitarian versus hedonic products.

ACKNOWLEDGEMENTS OF ASSISTANCE

The consumer data used in this study were collected for the project "Innovative Design/Manufacturing Methodology of Tailor-made Rubber Products and Socio-Economic Value Co-Creation with Reactive 3D printer." This project is funded as part of the Cross-ministerial Strategic Innovation Promotion Program (SIP) which is led by the Cabinet Office's Council for Science, Technology and Innovation, government of Japan.

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