

## Article

# The Effective Type of Information Categorization in Online Curation Service Depending on Psychological Ownership

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**Abstract:** With the development of the Internet, consumers can acquire a variety of information; however, as the amount of information continuously increases, it becomes difficult for consumers to make decisions. In this era of information overload, online curation services are emerging to help consumers choose the information they want. In these online services, information is grouped and classified according to certain criteria and presented to consumers. In this context, there are typical goal-derived and taxonomic categories in the method of structuring information. This study investigated the effect of category types on the categorization attitude of consumers according to their psychological ownership of online services. To this end, this study confirmed the interaction effect of category types (goal-derived vs. taxonomic) and the degree of psychological ownership (higher vs. lower). As a result, users with higher (as opposed to lower) psychological ownership of online curation services revealed a more effective attitude toward categorization in the goal-derived (as opposed to taxonomic) type. The results of this study suggest implications on how to structure information in consideration of the psychological state of consumers in an online context and are expected to be useful guidelines for practitioners such as service providers, marketers, and UX(User Experience)/UI(User Interface) designers.

**Keywords:** psychological ownership; categorization; curation service; taxonomic category; goal-derived category

## 1. Introduction

As massive data flows, consumers come into contact with various content and enjoy a lot of benefits in terms of quantity of information. However, paradoxically, it is difficult for them to find the information they need in a myriad of information. In other words, consumers are starting to focus on selecting information that is meaningful, valuable, and accurate to them from the overabundance of information. With the emphasis on the quality aspect of information, it is inevitable that a curation service has appeared, and recently, related online services have attracted much attention from consumers. The online curation service is a service that collects, organizes, and edits related content according to the subject or viewpoint of the individual among numerous online contents to provide content that users may like. The greatest advantage of curation services is that they grasp the hidden needs of users and provide appropriate customized services.

For example, in recent years, as consumers' interest in food has increased, the demand for "popular" (i.e., good, famous) restaurants is increasing. In line with this, a curation service has emerged that recommends a popular restaurant among restaurants. Accordingly, service providers and editors

structure information to present customized contents to users. As a method of structuring information, based on the literature of categorization, there are two types of categories: the goal-derived category type and the taxonomic category type [1,2]. The goal-derived category classifies objects based on the purpose of the consumer (e.g., someplace quick and easy to eat before going to work), and the taxonomic category classifies objects based on the similarity of objects' attributes (e.g., seafood, noodle, barbeque, etc.) [1,3,4]. Depending on which categorization method is used, there may be a difference in the consumer's attitude toward the object [2], but it is not clear which of the two is better. That is, the effect of the categorization method may vary depending on the external and internal situation of the individual and the psychological state, and it may be necessary to use the categorization method according to the situation. However, few studies deal with the effects of categorization in consideration of the psychological state of individuals. Therefore, this study aimed to determine the effect of the degree of psychological ownership, which expresses an individual's psychological state in the online context, on the effectiveness of categorization.

In sum, the objective of this study is to investigate the effective information structure in online curation services. In particular, this study focused on the role of the psychological state (i.e., psychological ownership) of users of online services [5,6], verifying the interaction effect between the degree of psychological ownership for online services and categorization methods. Categorization, which is a method for indicating the structure of information delivered to users, is limited to the research scope based on previous literatures [2,7,8], which typically include the goal-derived type and taxonomic type. A possible theoretical implication of this study is the extension of the categorization literature, which was focused on product, into the online context. In addition, as a practical implication, it is expected to provide guidelines that can help in establishing an effective information presentation strategy from marketers, UX(User Experience)/UI(User Interface) designers, and online service providers.

The rest of the paper is structured as follows. The second section presents the literature review and hypotheses derived from previous literature. The third section then elaborates on the research method, followed by the presentation of the research results in the fourth section. The last section concludes with the summary, theoretical and practical implications, limitations, and future research suggestions.

## 2. Literature Review

### 2.1. Categorization Theory

Categorization refers to the process of assigning specific objects to groups with similar attributes [9,10]. Categorization not only has a central role in daily life [11] but has been adopted as a research topic in various research fields. For example, it has received a lot of attention in areas such as marketing, psychology, and consumer behavior [2,12,13]. Because categorization affects people's thinking style, it leads to changes in attitudes, judgments, and decisions about specific objects [14,15]. Furthermore, categorization can be variously classified according to scholars, though, in general, it is presented in terms of the taxonomic category and the goal-derived category [1,3]. The taxonomic category is distinguished by the physical common attributes of the objects, and the categories are determined by how similar the properties of the objects are based on the similarity-based theory [16]. In other words, the taxonomic category determines the category of the object depending on how similar the perceptual attributes of the objects are and explores the similarity between objects in order to effectively categorize them [2,17]. On the other hand, in the case of a goal-derived category, it is distinguished through factors related to the purpose achieved by consuming a particular target, and not by the nature of the target but by the individual situation or purpose with ad hoc characteristics to achieve the objective [1,3]. In other words, the goal-derived category is categorized as a means of achieving an individual's purpose, not determining the perceptual similarity of objects.

For example, as a taxonomic category, animals are classified into mammals, birds, and fish among others. Looking at the properties of each categorized object, mammals have four legs, tailed features,

birds have two legs, wings, fish live underwater, covered with scales, and have finned properties. Therefore, animals with the corresponding characteristics are classified as a classification category. The goal-derived category, on the other hand, has different physical attributes such as knives, cutting boards, pots, and ladles, but can be grouped into one category through the common purpose of cooking. That is, the distinction depends upon ad hoc characteristics rather than the attributes of objects, as per an individual's situation or purpose [1,3,8,12]. Because taxonomic categories are based on physical properties, their use in a consumer environment may be limited, but they are particularly useful when organizing information about alternatives for consumers. Taxonomic categories also tend to be well defined and stable regardless of the situation. On the other hand, a goal-derived category can be useful for organizing information about products and services in situations where certain attributes are related to an individual's goals. However, rather than this, the target is considered only in the result of a specific context that he considers, so the field of view of choice may be reduced [4,18].

Depending on which categorization method is used, there may be a difference in the consumer's perception and attitude toward the object [2,19]. Accordingly, there may be a difference in the consumer's perception and attitude toward the object; that is, the effect of the categorization method may vary depending on the external and internal situations and psychological conditions of the individual, and, therefore, it may be necessary to use the categorization method according to the situation. However, few studies deal with the effects of categorization in consideration of the psychological state of the individual. In addition, the existing categorization literature focuses mostly on physical products [2,19,20]. Recently, various categories are available in online environments such as web pages and mobile applications. Therefore, this study attempts to confirm the categorization effect based on the psychological state of the individual, i.e., psychological ownership.

## 2.2. Psychological Ownership

The concept of psychological ownership has been defined as the identification of a particular target as "mine" and the psychologically experienced phenomenon in which an individual develops a possessive feeling for the object [6,21]. A sense of possession is the core of psychological ownership [22], which can occur alongside the ownership of both tangible (e.g., book, CD) and intangible (e.g., ideas, e-book) objects [23]. However, consumers can also develop psychological ownership toward particular objects (e.g., products, online services) that they do not legally own [24]. As a result, consumers experience special feelings about the objects they own and develop strong attitudes towards their ownership target [25].

To answer the question of how psychological ownership emerges, Pierce, Kostova, and Dirks [5,6], present three dimensions of psychological ownership that give rise to feeling of ownership: (1) investing the self into the target, (2) intimately knowing the target, and (3) controlling the target. First, investing the self into the target means that an individual has invested energy, time, effort, and interest in the object [5]. When an individual invests time and effort in a specific object, it means that the distance between the individual and the object is closely connected, which leads to a feeling of ownership of the object. Second, intimately knowing the target means the degree to which an individual understands the object and the depth of knowledge [6]. In other words, getting to know the object more deeply means that the relationship between the object and the individual is formed, and the individual considers this object to be a part of himself. As a result, this bond leads to psychological ownership. Third, controlling the target means the ability to control or use the target [6]. In other words, the greater the ability to exert control over a product or service as desired by individual, the more the object is felt as part of it. In addition, it has been suggested that customer participation, sense of belonging, social influence, and attachment positively affect psychological ownership [24,26,27]. Taken together, the factors that emerge in psychological ownership can be seen as the core of how individuals are considered to feel as part of them.

As a consequence of psychological ownership, many studies in various fields such as marketing, business, psychology, and consumer research suggest that the feelings of ownership toward a target

are positively related to the motivational, attitudinal, and behavioral effects [21,23,28–34]. Moreover, recent studies on the role of psychological ownership affecting consumer attitudes in the online context have emerged, focusing on significant consequences such as citizen behavior, continuance usage, willingness to pay more, security behavior, satisfaction, and intention to switch [26,27,35–37]. However, there have been few studies to empirically analyze the role of psychological ownership, especially in terms of consumer information processing. In other words, psychological ownership affects consumers' thinking style, which can lead to changes in consumer attitudes. For example, a study by Seo and Park [36] investigated the interaction effect between the degree of psychological ownership and the method of message framing for users' intention to change their passwords in online services. The analysis results revealed the role of psychological ownership by showing that positive messages were effective for password change intention among users with high psychological ownership of online services, and negative messages were effective for users with low psychological ownership. As in the prior study, psychological ownership can change an individual's mindset. From this perspective, the present study focuses on the role of psychological ownership to examine whether there are differences in the effects of categorization.

### *2.3. The Role of Psychological Ownership in the Online Curation Service*

In the era of information overload, online curation services are starting to draw attention more and more as the acquisition of meaningful and valuable information becomes increasingly important. Curation services are mentioned in various ways, but they can be defined as a service in which a service provider collects, organizes, and edits numerous contents and presents them to a user [38]. Curation does not automatically filter information but means that service providers, editors, and curators passively analyze and present valuable content. That is, the online curation service interprets a lot of content as a specific standard of the service, determines the importance, and rearranges the information to create useful information for use. As a result, curated contents presented to consumers are subjective, and the structure of information presented online can be classified into the aforementioned goal-derived category and taxonomic category, according to the categorization literature [1,4,18].

Taxonomic categories have traditionally been the most popular of the information organizational methods, since taxonomically organized lists are better recalled than lists of irrelevant words [4]. The taxonomic category is a useful way of organizing information in many situations, but the goal-derived category can also be useful in comparing products and services [2,4]. This study expected that the degree of psychological ownership of online service users can be moderated. According to a study by Choi and Na [39], it was argued that there would be a difference in the effect of categorization method of consumers according to the individual's purpose and the level of knowledge of the object. This is because consumers with low level of knowledge do not know what factors are important to satisfy their consumption purposes. In addition, because it may be difficult to evaluate the product related to the purpose, there is a high possibility of choosing taxonomic categorization in performing the task. Conversely, a consumer with a high level of knowledge of the object understands the relevant attributes well, evaluates, and selects how well it fits into the purpose of using information existing in the consumer's head and processing information. Therefore, they prefer purpose-related information and are more likely to prefer the goal-derived category in the manner of categorization tasks. As a result, the attitude toward the categorization method in the consumer's decision on product selection may vary depending on the psychological state of the individual [39].

In this context, the consumers who have a high psychological ownership of the online service are more likely to have a higher level of knowledge about a service. In this case, the contents in the online service are processed based on the experience and knowledge accumulated in the past usages. Conversely, the consumers with a low psychological ownership of the online service are more likely to have a low level of knowledge about the service. Consumers may have difficulties because they have little experience and memories of the past in selecting and evaluating products or what purpose they should achieve through the tasks performed by the service. For example, it is difficult to evaluate

curated (i.e., subjectively composed information) content when the level of knowledge about the object is low—that is, when the psychological ownership is low. Users may not understand why the information recommended by curators and editors is good. In other words, users feel reluctant about information subjectively composed by others. In this case, the taxonomic categories listed in dictionary form will be more effective for users with low psychological ownership of online services. However, users with high psychological ownership of online services will have invested a lot of time and effort into the service, and because they know the service better, it will be easier to understand why curated content is structured like this. Therefore, they will have a better understanding of content presented as goal-derived and have more favorable attitude toward it. Based on this, the following hypotheses can be proposed.

**Proposition 1.** *Depending on the degree of psychological ownership, consumers prefer a different category method (taxonomic categorization vs. goal-derived categorization)*

**Hypothesis 1.** *For consumers with a high degree of psychological ownership of online services, consumers prefer the goal-derived category method to the taxonomic category method.*

**Hypothesis 2.** *For consumers with a low degree of psychological ownership of online services, consumers prefer the taxonomic category method to the goal-derived category method.*

### 3. Research Method

#### 3.1. Design and Participants

To test the hypotheses of this experiment, the study design should be done according to two experimental variables, degree of psychological ownership (higher vs. lower) and category types (taxonomic vs. goal-derived). Since the level of each variable is separated into two, a  $2 \times 2$  factorial experimental was designed, and a total of four experimental conditions were constructed. Participants were randomly assigned to four experimental conditions. Two-hundred-and-thirty-four participants responded to this study's survey and were each given a compensation of \$5. Their average age was approximately 28.90 years, and 121 (51.7%) were male.

In this study, the curation service that recommends popular restaurants (e.g., hot places) in Korea was adopted as the subject of experiment. There are three main reasons for selecting the subject. First, in recent years, social interest in foods and popular restaurants has been increasing, especially since there has been a growing tendency among various age groups to actively search and find out popular restaurants. Secondly, regardless of the time and place due to the development of the Internet, using a restaurant curation service through a PC or a mobile device is a common part of everyday life. Third, when presenting a restaurant to users in such a curation service, it may be a good experiment subject because it provides restaurant contents to the user by actually using a categorization method of the taxonomic type or goal-derived type. In this study, referring to the restaurant curation service actually launched in Korea, a virtual site for providing restaurant curation services was designed.

#### 3.2. Procedure and Measurements

The experiment of this study was carried out as follows. First, the participants were asked to assume that they were using an online service called Boing that can recommend restaurants. At the same time, they were shown the first page to access the site with a brief description of the best restaurant recommended by the online service (Figure 1). From the second page, five categories (i.e., visited, wish, rating, review, recommendation) were presented at the top of the screen, and web pages corresponding to each category were in turn presented to the participants (Figure 2). The stimulus for manipulating psychological ownership was created with a focus on being aware of how much time or effort participants spent on the online service. For example, on the page of the visited category, which summarizes the



restaurants visited by participants, participants with high psychological ownership were informed that they had visited 85 restaurants, while participants with low psychological ownership were informed that they had visited 1 restaurant. Similarly, in the review category, it was emphasized that participants in groups with high psychological ownership actively used the service, showing the number of reviews they wrote. In addition, on the wish and rating pages, participants with high psychological ownership were given higher numbers or scores than participants with low psychological ownership, emphasizing that they had invested a lot of time and effort in the online service. Next, the category pages were shown to the participants and the items were presented to check that the manipulation of psychological ownership was performed effectively. Next, in the recommendation pages, types of categorization (taxonomic vs. goal-derived) were presented to each group. The taxonomic type was categorized and presented based on the types of food (e.g., broth, grilled, seafood, etc.) and the goal-derived type was presented based on specific purposes (e.g., for diet, for low-priced meals, to enjoy an exotic atmosphere, etc.). Subsequently, the participants were asked questions for the manipulation checks on the category types and questions about the dependent variables.

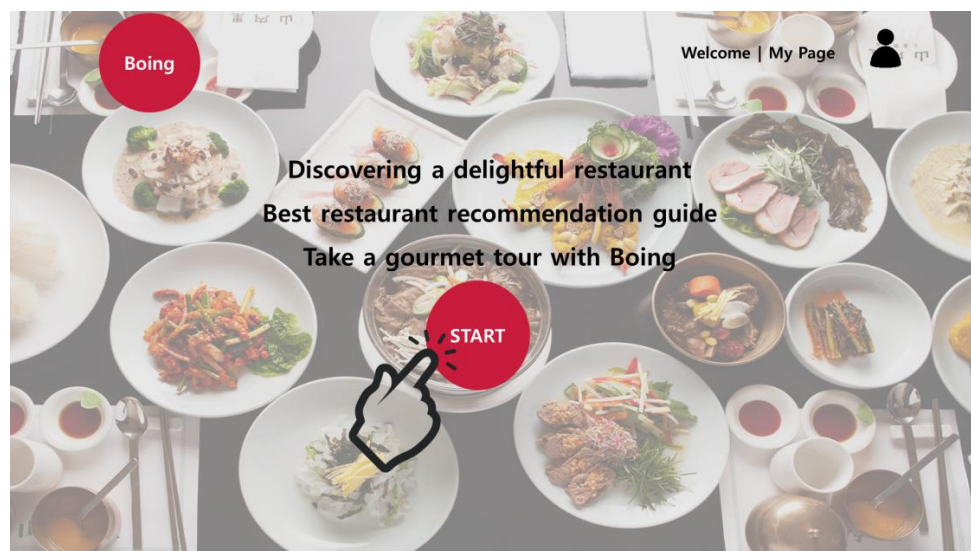


Figure 1. First page of experimental stimulus.

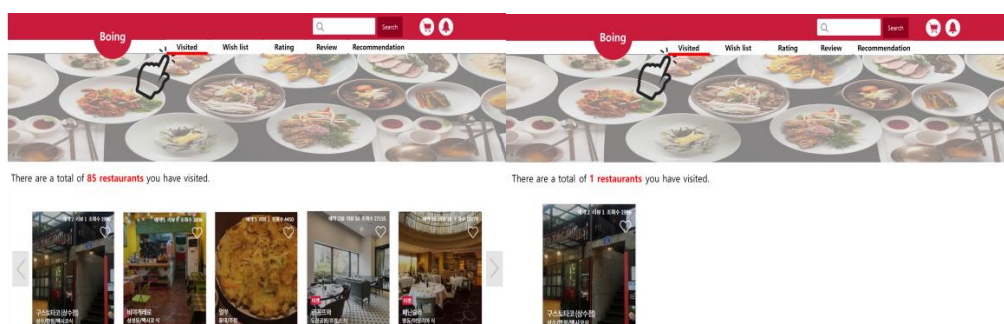


Figure 2. Example of visited page in stimuli presented to participants: higher psychological ownership condition (left), lower psychological ownership condition (right).

Psychological ownership was measured for the manipulation check by two items, adapted from Peck and Shu [40]. The two items were anchored by endpoints 1 (strongly disagree) and 7 (strongly agree): “I feel a sense of psychological ownership in the online service,” and “I feel a very large degree of personal ownership for the online service.” The items were loaded on a single factor ( $\alpha = 0.89$ ) and averaged. Types of category, adopted from Martin et al. [41], were modified and measured for the manipulation check by four items. The four items were anchored by endpoints 1 (strongly

disagree) and 7 (strongly agree): The recommendation category “is organized based on the user’s purpose,” “has presented the menus centered on the user’s goal,” “is organized based on similarities of food types,” and “has presented the menus centered on the taxonomic food type.” The items were loaded on a single factor, respectively ( $\alpha = 0.88, 0.81$ ), and averaged. The attitude toward category types was assessed by a three-item scale borrowed from Ajzen and Fishbein [42]. The items were anchored by endpoints 1 (strongly disagree) and 7 (strongly agree): “I think the recommended category offered by the service is desirable,” “I like the recommended category offered by the service,” and “I am satisfied with the recommended category offered by the service.” The items were loaded on a single factor ( $\alpha = 0.86$ ) and averaged. Finally, the demographic and control variables were measured and the experiment was terminated.

## 4. Research Results

### 4.1. Manipulation Check

To verify that the two experimental variables used in this study were controlled as intended, manipulation checks with ANOVA were performed. First, to examine psychological ownership, the mean of the two items (Eigenvalue = 1.81, Cronbach’s  $\alpha = 0.89$ ) was checked for differences between each group. The group’s average in conditions to manipulate a higher psychological ownership was 4.19, which confirmed a statistically significant difference from the group’s average of 3.52 in conditions of lower psychological ownership ( $F(1,232) = 13.43, p < 0.01$ ). Next, to determine whether there are differences between categories and groups, the average of two items of taxonomic type (Eigenvalue = 1.79, Cronbach’s  $\alpha = 0.88$ ) and the average of two items of goal-derived type (Eigenvalue = 1.68, Cronbach’s  $\alpha = 0.81$ ) were used. For taxonomic-type conditions, participants who were presented with the taxonomic type had a higher average than those who were presented with the goal-derived type ( $M_{\text{taxonomic}} = 5.04$  vs.  $M_{\text{goal-derived}} = 4.36, F(1,232) = 29.09, p < 0.01$ ). For goal-derived-type conditions, participants who were presented with the goal-derived type had higher averages than those who were presented with the taxonomic type ( $M_{\text{taxonomic}} = 4.65$  vs.  $M_{\text{goal-derived}} = 4.99, F(1,232) = 6.32, p < 0.05$ ). Taken together, it was confirmed that the two experimental variables were effectively manipulated as intended in this study.

### 4.2. Hypotheses Test

A two-way ANOVA was conducted to test the hypotheses suggested in this study. The attitude toward categorization was measured as three items (Eigenvalue = 2.36, Cronbach’s  $\alpha = 0.86$ ), which were averaged and used as a dependent variable. Table 1 shows the descriptive statistics of attitude toward category types, and Table 2 shows the results of the ANOVA test on attitude toward category types.

**Table 1.** Descriptive statistics on attitude toward category types.

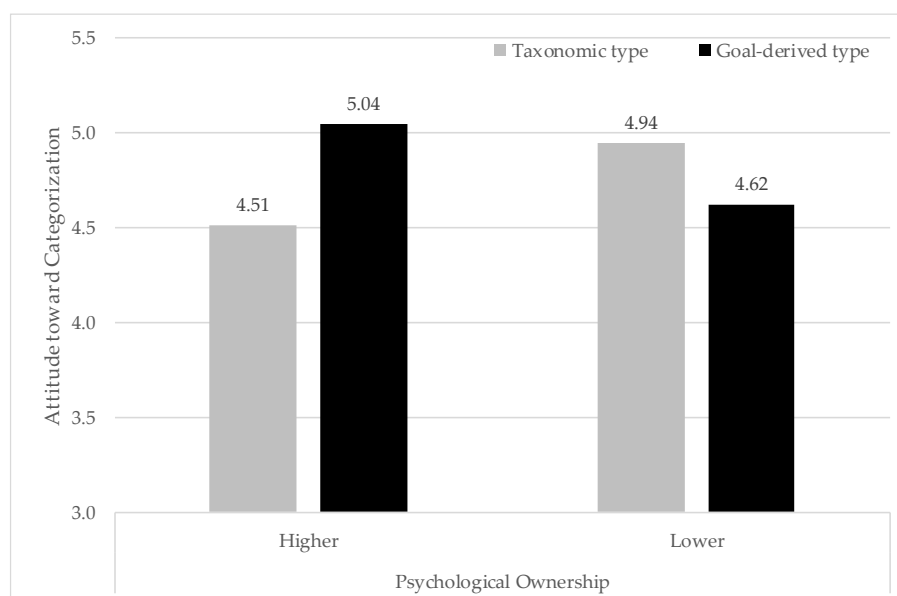
Category Types	Psychological Ownership	Mean	Std. Deviation	N
Taxonomic	Higher	4.51	0.94	58
	Lower	4.94	0.90	60
Goal-derived	Higher	5.04	0.81	61
	Lower	4.62	0.82	55

The results of the ANOVA test presented that the gender and age of the participants had no effect on attitude toward categorization. The main effect of both category types and psychological ownership were not significant. However, the interaction effects of category types and psychological ownership were significant ( $p < 0.01$ ). The interaction effect between category types and psychological ownership can be seen in the graph below (see Figure 3). Specifically, in the condition of lower psychological ownership, participants had a higher attitude in the taxonomic type ( $M = 4.94$ ) than in the goal-derived type ( $M = 4.62; F(1,113), p < 0.05$ ). By contrast, in the condition of higher psychological ownership, they had a higher attitude in the goal-derived type ( $M = 5.04$ ) than in the taxonomic type ( $M = 4.51$ ;

$F(1,117)$ ,  $p < 0.01$ ). Consequently, all hypotheses were supported. This result reveals that effective categories are different depending on the psychological ownership of consumers. The results of the analysis confirmed that consumers were affected by their psychological state, psychological ownership, in evaluating the information categorization presented to them.

**Table 2.** ANOVA test on attitude toward category types.

Source	Sum of Squares	Degree of Freedom	Mean Square	F-Value	p-Value
Corrected Model	14.216	5	2.843	3.780	0.003
Intercept	149.853	1	149.853	199.207	0.000
Gender	0.201	1	0.201	0.267	0.606
Age	2.115	1	2.115	2.812	0.095
Category Types (Taxonomic vs. Goal-derived)	0.002	1	0.002	0.003	0.957
Psychological Ownership (Higher vs. Lower)	0.834	1	0.834	1.109	0.293
Category Types $\times$ Psychological Ownership	11.009	1	11.009	14.635	0.000
Error	171.513	228	0.752		



**Figure 3.** Interaction effect of category types  $\times$  psychological ownership on the attitude toward categorization.

#### 4.3. Additional Analysis

Although it was not proposed as a hypothesis, it can be expected that the participants' attitude toward the category type could lead to satisfaction with the recommended contents (e.g., restaurants recommended to users through online services). To further verify this, three items of attitude toward content recommended to users were measured in this study: "I'm interested in," "I like," and "I am satisfied with" the best restaurant offered through the recommended category in the online service (Eigenvalue = 2.42, Cronbach's  $\alpha = 0.88$ ). Descriptive statistics and ANOVA results of attitudes toward the recommended content are shown in Tables 3 and 4.

**Table 3.** Descriptive statistics on attitude toward contents recommended to users.

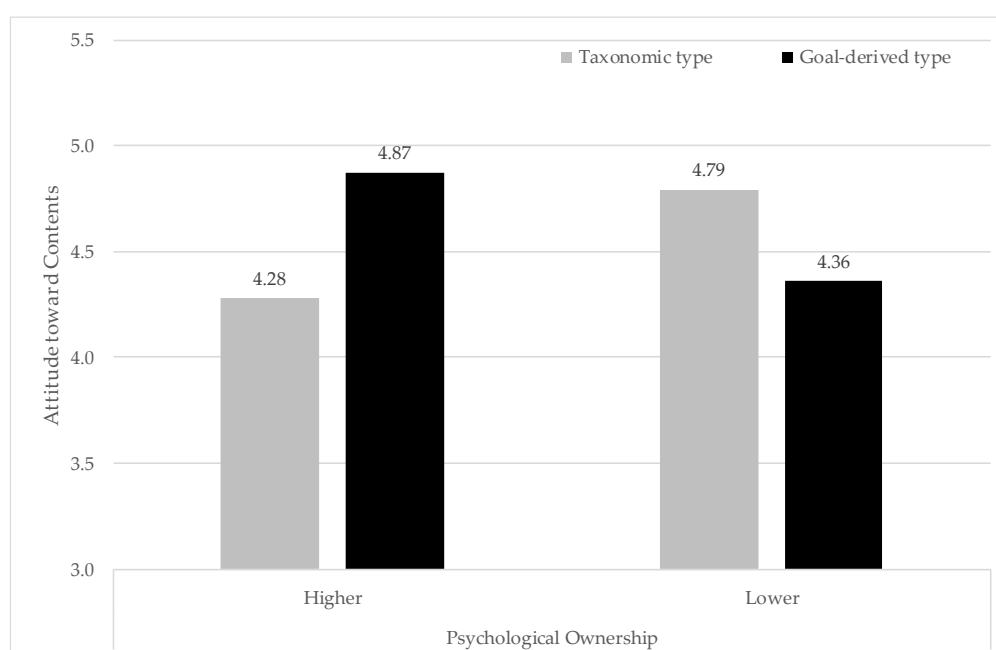
Category Types	Psychological Ownership	Mean	Std. Deviation	N
Taxonomic	Higher	4.28	1.00	58
	Lower	4.79	0.93	60
Goal-derived	Higher	4.87	0.86	61
	Lower	4.36	0.73	55



**Table 4.** ANOVA test on attitude toward contents recommended to users.

Source	Sum of Squares	Degree of Freedom	Mean Square	F-Value	p-Value
Corrected Model	17.925	5	3.585	4.489	0.001
Intercept	145.293	1	145.293	181.926	0.000
Gender	0.091	1	0.091	0.114	0.736
Age	1.928	1	1.928	2.414	0.122
Category Types (Taxonomic vs. Goal-derived)	0.001	1	0.001	0.001	0.979
Psychological Ownership (Higher vs. Lower)	0.545	1	0.545	0.682	0.410
Category Types $\times$ Psychological Ownership	15.658	1	15.658	19.605	0.000
Error	182.089	228	0.799		

In both category types and psychological ownership, the main effect was not significant on the participants' attitudes toward recommended content. As in the previous results, the interaction effect of the two variables on the participants' attitudes toward recommended content was significant ( $p < 0.01$ ). In the condition of the higher psychological ownership specifically (see Figure 4), participants presented in the goal-derived category had a higher attitude toward recommended content than the participants presented in the taxonomic category ( $M_{\text{taxonomic}} = 4.28$  vs.  $M_{\text{goal-derived}} = 4.87$ ,  $F(1,117) = 12.05$ ,  $p < 0.01$ ). Conversely, in the condition of the lower psychological ownership, participants presented in the taxonomic category had a higher attitude toward recommended content than participants presented in the goal-derived category ( $M_{\text{taxonomic}} = 4.79$  vs.  $M_{\text{goal-derived}} = 4.36$ ,  $F(1,113) = 7.48$ ,  $p < 0.01$ ). As a result, it can be seen from the results of this additional analysis that the psychological ownership of online service users and the interaction effect of category types have a significant influence on attitudes toward categorization as well as attitudes toward recommended content.

**Figure 4.** Interaction effect of category types  $\times$  psychological ownership on the attitude toward recommended contents.

## 5. Conclusions

In the era of big data—called the flood of information—online curation services that provide customized information to consumers are rapidly emerging. In this flow, it is important for the service provider of the curation service to organize and structure information, but it is also important to consider how to effectively present information from the user's perspective. There are various ways

to structure and deliver information to users in curation services, but this study set the research scope in two ways (taxonomic vs. goal-derived) based on the categorization literature. In addition, this study considered the psychological state of online service users. That is, the effects of psychological ownership and category types on consumer attitudes toward categories were verified through empirical analysis. As a result, users with higher psychological ownership of online services had more favorable categorization attitude toward goal-derived-type category than taxonomic-type category. In addition, it was confirmed that these interaction effects were significant in attitudes toward online services.

The findings of this study have several theoretical implications. First, this study extended the literature of categorizations into an online context to identify the effective information structure method presented to consumers. Most of the previous studies have focused mainly on the category method of physical products [2,12,13], so little has been done from the perspective of online information structure. Moreover, recently, a content curation service for providing customized information to consumers has attracted attention, and accordingly, in this study, the two aforementioned category methods have been representatively selected to perform empirical analysis. The results of the analysis conducted in this study—which attempted to solve the problems of consumers who felt excessive information, focusing on the categorization method and the psychological state of consumers—are expected to make theoretical contributions in line with the trend of the times. Second, this study confirmed the role of psychological ownership of online service users through experiments. Recently, psychological ownership has been highlighted in various fields such as marketing, business, psychology, and consumer research [25,32,43,44]. In particular, research on psychological ownership of online services or intangible content is actively being conducted [26,29,35–37,45]. This study also paced this trend, once again, confirming that consumers feel psychological ownership of online services that are intangible, while empirically verifying that psychological ownership affects their attitudes through experiments. The development of digital devices and the Internet is increasingly leading consumers to the digital world, and, therefore, the psychological ownership they feel for intangible objects (i.e., online services, online contents, etc.) may continue to be an issue worthy of further investigation. Therefore, the psychological ownership variable utilized in this study may have the theoretical implication of strengthening the theoretical framework for studies on psychological ownership studies in an online context.

This study also has practical implications. First, the findings of this study provide marketers or UX/UI designers with guidelines to effectively structure the information presented to consumers. According to the analysis results, the main effect of consumer attitudes according to the two types of categories was not significant, but the effect of interaction with psychological ownership was confirmed. This means that when structuring the information presented to consumers, their intrinsic psychology must be considered. Therefore, we expect practitioners, for example, to be able to utilize the results of this study when creating and planning categories to provide consumers on web pages. Second, from a service provider's point of view, it can help to establish various business strategies by using two-dimensional user groups separated in the analysis results. In this study, users were classified into two groups based on the concept of psychological ownership. For example, online service providers may measure users' psychological ownership by using log data such as the time users spend on online services (e.g., frequency and duration of access to online service, etc.), involvements, and efforts in the online services (e.g., number of comments or reviews, etc.) or collecting additional questionnaires. To produce an effective business strategy, understanding the psychology of consumers is a very important task for consumer providers. As a result, this study provided a certain criterion to distinguish users, and it is expected that service providers can utilize it in planning business strategies such as advertising and marketing. Finally, this study can help UX/UI designers in constructing services and contents. UX/UI designers mainly design experiences such as reactions and actions that users feel while using a product or service and build on how to materialize the service or product used by customers. In addition, they design the front end of the service provided to the consumer in terms of usability, usefulness, and emotion and play a key role in enabling the consumer to use the

service well. The findings of the hypothesis presented in this study may help them (1) understand consumers, (2) provide some different ways of service depending on consumers, and (3) finally provide appropriate satisfaction for each individual customer.

Despite the theoretical and practical implications, this study has the following limitations. First, this study used virtual stimulus to manipulate degree of psychological ownership. Similarly, the Seo and Park [36] study manipulates psychological ownership by presenting scenarios of how much time and effort was invested in online services. In addition, research by Peck et al. [46] suggests that individuals who just imagine touching an object lead to greater perceived ownership. Based on these previous studies, the stimuli and experimental methodology used in this study could be sufficiently supported. However, because the limitations of the virtually produced stimulus obviously exist, future research will require that participants actually use the particular online service and then manipulate their psychological ownership through conditional stimuli (e.g., higher vs. lower). This advanced experimental method is expected to improve the validity of the mechanism for the formation of psychological ownership. Second, in this study, an online curation service that recommends restaurants to users was used as the subject of the experiment; however, this study did not consider the object's attributes (i.e., the nature of online services). Jussila, Tarkiainen, Sarstedt, and Hair [25] suggests that the attributes of an object can play a moderator role on the effects of psychological ownership on consequences. For example, Lessard-Bonaventure and Chebat [47] show that the effects of touch on psychological ownership are moderated by the nature of the products (hedonic vs. utilitarian). In addition, Shu and Peck [32] investigated the relationship between product nature, affective reaction, and psychological ownership, based on Dhar and Wertenbroch [48], who suggest that the loss aversion will be stronger for hedonic items. In sum, based on the clues of these previous studies, it is expected that further exploration of the relationship between an object's characteristics (i.e., attributes, natures, etc.) and psychological ownership toward online services may be an interesting topic for future research. Finally, based on the theory of the endowment effect that people respond more sensitively to loss than to gain, psychological ownership may be linked to human emotion. For example, Shu and Peck [32] described of the relationship between human emotion and psychological ownership based on the loss aversion of endowment effect theory. Recently, interest in research related to sentiment analysis of consumer is growing [49–51], and in future studies, it is expected that the research field can be expanded on how psychological ownership affects human emotions (e.g., joy, sadness, anger, etc.) or vice versa.

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