

Use of Alignable and Nonalignable Attributes in Decision Making: The Role of Between-Alternatives Heterogeneity

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ABSTRACT

With the help of information technology, consumers today can easily compare tourism and hospitality products directly based on various attributes. Grounded in Structural Alignment Theory and the notion of process goals, this study investigated how between-alternatives heterogeneity affect consumers' use of alignable (i.e., attributes shared by all the alternatives) and nonalignable attributes (i.e., attributes not shared by all the alternatives). Results of two experiments showed that consumers attach more relative importance to alignable attributes when the between-alternative heterogeneity is high, but attach more relative importance to nonalignable attributes when the between-alternative heterogeneity is low. Important theoretical and practical implications are discussed.

Keywords: *attribute alignment, decision making, process goal*

INTRODUCTION

Instead of forming an overall evaluation, consumers often compare and choose products directly based on specific product attributes (i.e., attribute-based processing) (e.g., Bettman, Johnson, & Payne, 1991; Johnson, 1989; Russo & Doshier, 1983; Tversky & Kahneman, 1986). For example, a consumer may choose a cruise ship A over B because A has a better spa than B. In hospitality and tourism context, the attribute-based processing can be easily done because consumers can obtain various attribute-level information from websites of service providers (e.g., hotels and cruise lines) or third-party intermediaries (e.g., Travelocity). The information about some attributes, however, may not be available for all the alternatives in the comparison. For example, a consumer may know that cruise ship B has a four-star spa facility, but has no information about the spa on ship A. In other words, the “spa” attribute is not shared by both alternatives (i.e., nonalignable attributes). This is contrasted with the alignable attributes which are shared by all the alternatives. Although alignable attributes seem more common, decision making often does involve nonalignable attributes, which are present when some attributes are

unique to or strategically hidden for some alternatives. Therefore, it is both theoretically and practically important to understand what affects consumers' use of alignable and nonalignable attributes (Zhang & Markman, 2001). Unfortunately, only two influential factors have been identified thus far: involvement (Zhang & Markman, 2001) and abstractness of mindset (Malkoc, Zauberan, & Ulu, 2005). Building upon the Structural Alignment Theory (Medin, Goldstones, & Markman, 1995) and the notion of process goals (Ross, Carlson, Meloy, & Yong, 2008), this study explored a novel factor that influences consumers' use of nonalignable and alignable attributes, namely, between-alternatives heterogeneity (i.e., the level of heterogeneity between alternative products in the comparison).

THEORETICAL GROUNDING

Structural Alignment Theory

Structural Alignment Theory (Gentner & Markman, 1994, 1997; Medin et al., 1995) distinguishes between three types of attributes: commonalities, alignable, and nonalignable. Commonalities refer to the attributes that have the same attribute level across all the alternatives. For example, in-room Internet is a commonality if two hotels in the comparison both have a high-speed Internet. Alignable attributes are the attributes shared by all the alternatives but have different levels across the alternatives. For example, in-room Internet is an alignable attribute if one hotel has a dial-up speed Internet but the other has a high-speed Internet. Nonalignable attributes are the attributes not shared by all the alternatives. For example, in-room Internet is a nonalignable attribute if one hotel has a dial-up Internet but the information about the Internet is absent for the other hotel. Consumers' perceptions of alignable and nonalignable attributes are different. First, nonalignable attributes are more difficult to process and induce more uncertainty than alignable attributes (Gunasti & Ross, 2008). Second, because nonalignable attributes are not shared by all alternatives, they are perceived to be more distinctive and discriminative than alignable attributes (Gati & Tversky, 1982). For example, Tversky (1977) found that individuals use more on alignable attributes when rating the between-objects similarity, but focus more on nonalignable attributes when rating the dissimilarity.

According to Structural Alignment Theory, commonalities do not discriminate among alternatives and therefore provide little diagnostic value. Alignable attributes tend to be predominantly used by consumers because they provide comparable and diagnostic information. Nonalignable attributes, however, are difficult to process and thus receive less attention in decision making (Markman & Medin, 1995; Zhang & Markman, 1998). Only two studies have explored the factors that affect consumers' use of alignable and nonalignable attributes. In one study, Zhang and Markman (2001) found that consumers with a higher level of involvement have stronger motivation to process and use the "effort-consuming" nonalignable attributes (Petty & Cacioppo, 1986; Petty & Wegener, 1999). Another study (Malkoc et al., 2005) found that consumers have a more abstract mindset when choosing for the far future than for the near future (Trope & Liberman, 2003; Liberman & Trope, 2008), and the more abstract mindset facilitate the use of nonalignable attributes.

Between-alternatives heterogeneity, process goals, & use of alignable/nonalignable attributes

Process goals are the goals related to the choosing process (Osselaer et al., 2005). The informational environment of decision making can activate various process goals, which in turn affect consumers' information processing behavior (Kruglanski et al., 2002). For example, various process goals can drive consumers to minimize uncertainty, achieve consistency between old and new information, or maximize accuracy in information processing (Russo et al., 2008). Environmentally activated goals are similar to behavioral compensation where individuals' goals and behavior are adjusted by the external environment (Chernev & Hamilton, 2008). For example, individuals are cautious when they perceive a risky environment, but are more risk taking in a safe environment (Hedlund, 2000).

We argue that different levels of between-alternatives heterogeneity will activate two process goals: uncertainty avoidance (Bettman, Luce, & Payne, 1998) and discrimination of alternatives (Nosofsky, Palmeri, & McKinley, 1994). An uncertainty avoidance goal drives consumers to reduce the level of uncertainty in the decision, while discrimination goal leads consumers to focus on distinctive features to separate the alternatives (Yamauchi & Markman, 1998, 2000). Further, activation of the uncertainty avoidance goal should lead consumers to focus more on alignable attributes because alignable attributes are more capable of reducing uncertainty (Gunasti & Ross, 2008). Activation of the discrimination goal, on the other hand, should lead consumers to focus more on nonalignable attributes because nonalignable attributes are more distinctive and discriminative (Gati & Tversky, 1982).

When consumers perceive a high level of heterogeneity between alternatives (e.g., two hotels of different unknown brands), they tend to perceive that decision making involves a high level of uncertainty. Therefore, the uncertainty avoidance goal should be activated. The discrimination goal, however, should be relatively suppressed because alternatives are already perceived to be heterogeneous. As a result, the uncertainty avoidance goal is likely to lead consumers to focus more on the alignable attributes. When consumers perceived a low level of heterogeneity between alternatives (e.g., two hotels of the same unknown brand), they tend to think that the decision making involves a low level of uncertainty. Therefore, the uncertainty avoidance goal is likely to be suppressed. The discrimination goal, however, should be activated because alternatives are perceived to be homogeneous and consumers would want to discriminate the alternatives. As a result, consumers are expected to shift more attention to nonalignable attributes. The hypothesis is summarized as follows.

H1: Consumers will focus on alignable attributes more when choosing between alternatives with a high level of heterogeneity, but will focus on nonalignable attributes more when choosing between alternatives with a low level of heterogeneity.

STUDY 1: CHOOSING POPCORN FOR A BIG PARTY

Design, participants, and procedure

A between-subject experiment with two conditions (i.e., low vs. high level of between-alternatives heterogeneity) was conducted. Participants were randomly assigned to one of the two conditions, and asked to choose one between two popcorns (P and Q) for a big party. The level of between-alternatives heterogeneity was manipulated by stating that the two popcorns

were made by the same company (i.e., low between-alternatives heterogeneity) or by different companies (i.e., high between-alternatives heterogeneity). Each popcorn has one commonality attribute, two alignable attributes, and two nonalignable attributes. The attribute information was adapted from Zhang and Markman's (2001) study such that 1) P has superior alignable attributes; 2) Q has superior nonalignable attributes; and 3) P and Q have similar levels of overall attractiveness (Appendix A). The order of alignable and nonalignable attributes was counterbalanced to remove potential sequence effect (Carlson, Meloy, & Russo, 2006).

Eighty-six undergraduate students at a large state university in northeastern US participated in the study. Participants were first presented with a scenario of choosing popcorn for a big party and the attribute information about the two popcorns. After reviewing the information, participants were asked to answer two questions regarding their preference. The first question asked participants which popcorn they preferred based on a 9-point semantic scale (left anchor = definitely P (coded as -4); midpoint = indifferent (coded as 0); right anchor = definitely Q (coded as +4)). The second question asked participants to allocate 100 points between the two popcorns with the preferred popcorn being allocated with more points. In addition, participants were asked to list the attributes they used in arriving at their preference.

Results

As expected, participants in the "same company" condition preferred Q (i.e., superior in nonalignable attributes) more but P (i.e., superior in alignable attributes) less than their counterparts in the "different companies" condition ($M_{\text{same}} = .444$ vs. $M_{\text{different}} = -.439$; $t(84) = 2.055$, $p < .05$). Consistently, participants in the "same company" condition allocated more points to Q but less to P than those in the "different companies" condition (P: $M_{\text{same}} = 45$ vs. $M_{\text{different}} = 55$; $t(84) = -2.527$, $p < .05$). Participants' quantitative preference was also coded into three preference categories: P, Q, and no preference. A Chi-square analysis revealed a significant difference of preference between the two conditions ($\chi^2(2, N=86) = 6.885$, $p < .05$). Participants in the "same company" condition were more likely to prefer Q than their counterparts in the "different companies" condition (51.1% vs. 29.3%, $\text{ladj. residuall} = 2.1$, $p < .05$), while the reverse is true for P (51.2% vs. 24.4%; $\text{ladj. residuall} = 2.6$, $p < .01$) (Figure 1). Finally, the attributes listed by participants were coded and analyzed. It is expected that participants listed more nonalignable relative to alignable attributes in the "same company" condition than in the "different companies" condition. This prediction was supported by the results of a 2 (same company vs. different companies) \times 2 (alignable vs. nonalignable attribute) mixed ANOVA, where attribute type was treated as a repeated factor. Specifically, there was a significant interaction between level of heterogeneity and attribute type ($F(1, 58) = 9.468$, $p < .01$). Planned contrasts showed that alignable attributes were listed significantly more than nonalignable attributes in the "different companies" condition ($M_{\text{alignable}} = 1.10$ vs. $M_{\text{nonalignable}} = .52$; $F(1, 28) = 7.534$; $p = .01$). In the "same company" condition, however, nonalignable attributes were mentioned more than alignable attributes, though the difference was not significant ($M_{\text{nonalignable}} = .87$ vs. $M_{\text{alignable}} = .55$; $F(1, 30) = 2.496$; $p = .13$) (Figure 2).

Figure 1
Percentage of Participants who Preferred P and Q in Two Conditions (Study 1)

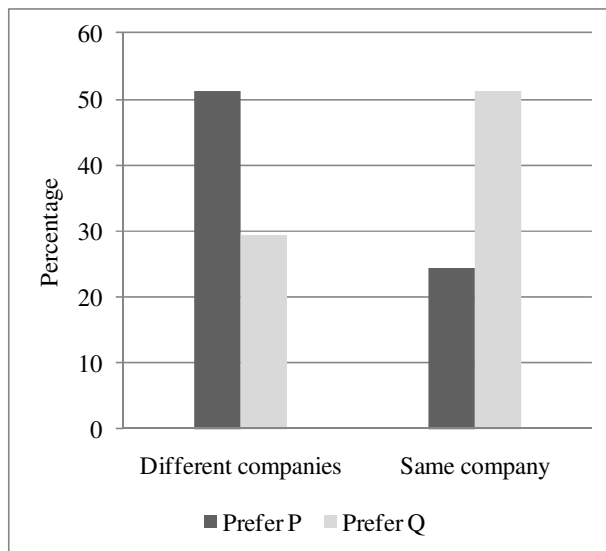
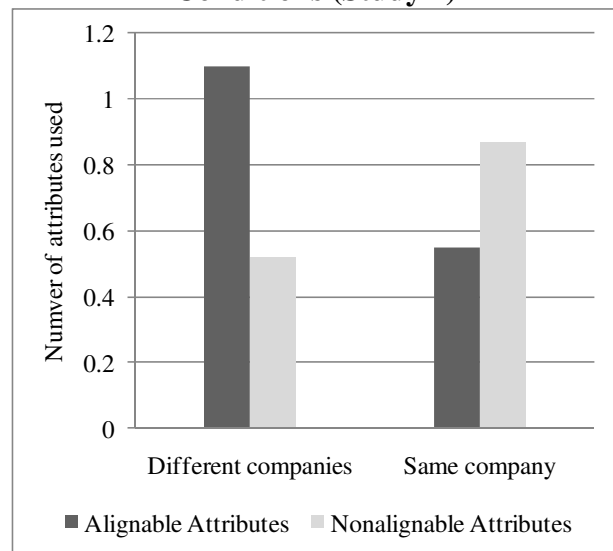


Figure 2
Number of Alignable and Nonalignable Attributes Used by Participants in Two Conditions (Study 1)



STUDY 2: CHOOSING A HOTEL FOR A TRIP

Design, participants, and procedure

Study 2 aimed to test the hypothesis from a different perspective. Specifically, Study 2 differed from Study 1 in 1) manipulation of between-alternatives heterogeneity; 2) decision context; and 3) measurement of choice. Again, study 2 involved a between-subject experiment with two conditions (i.e., low vs. high level of between-alternatives heterogeneity). Participants were asked to choose a hotel between two alternatives (P and Q) for a trip. Each hotel had two alignable and two nonalignable attributes. P was designed to be superior in the nonalignable attributes, while Q in the alignable attributes. The level of between-alternatives heterogeneity was manipulated by the number of commonalities between the two hotels. In the low heterogeneity condition, P and Q shared 12 commonalities; in the high heterogeneity condition, however, only 2 commonalities were shared (Appendix B). The order of alignable and nonalignable attributes was counterbalanced.

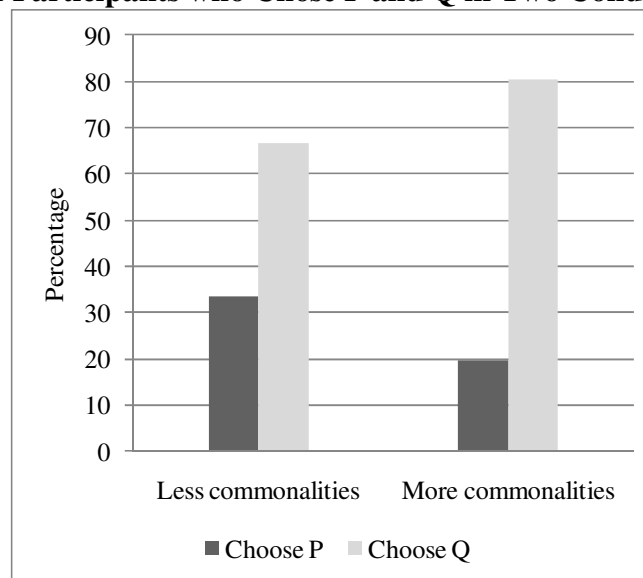
Fifty-eight undergraduate students in the same university participated in the study. After reviewing the scenario (i.e., choosing a hotel for a trip) and information about the two hotels, participants were asked to choose a hotel. In addition, they were asked to indicate how different the two hotels are using a 9-point scale (1 = not at all different; 9 = extremely different).

Results

Participants in the “more commonalities” condition perceived a lower level of between-alternatives heterogeneity than those in the “less commonalities” condition, suggesting that the manipulation was effective ($M_{\text{more}} = 4.0$ vs. $M_{\text{less}} = 5.3$; $t(55) = 3.338$, $p < .01$). Consistent with

the results of Study 1, participants in the low heterogeneity condition (i.e., more commonalities) were more likely to choose the alternative superior in nonalignable attributes (i.e., Hotel P) than those in the high heterogeneity condition (i.e., less commonalities) (33.3% vs. 19.7%) (Figure 3). However, the difference was not statistically significant, most likely due to the small sample size ($\chi^2(1, N=58) = 1.809, p = .179$).

Figure 3
Percentage of Participants who Chose P and Q in Two Conditions (Study 2)



DISCUSSION, LIMITATION, AND FUTURE RESEARCH

This study contributed to the attribute alignment literature by identifying a new factor that affects consumers' use of alignable/nonalignable attributes: between-alternative heterogeneity. The results of the two experiments supported the hypothesis. When consumers choose between alternatives with a high level of heterogeneity, their uncertainty avoidance goal is activated. As a result, consumers attach more relative importance to alignable attributes because alignable attributes are more capable of reducing uncertainty. When consumers choose between alternatives with a low level of heterogeneity, however, their discrimination goal is activated. The discrimination goal then drives consumers to focus more on nonalignable attributes because nonalignable attributes are more distinctive and discriminative. The differentiated foci in turn affect consumers' preference and choice.

In addition, this study highlighted the role of process goals in consumer decision making (Carlson et al., 2008; Osselaer et al., 2005). Process goals are the goals directing how consumers process information. As shown by this study, consumers may prefer a product more if the attribute information of the product is presented in a way that fulfills consumers' process goal. This study also confirmed the importance of attribute alignment in consumer decision making. This means that the importance of an attribute for a product is not fixed, but is influenced by whether the attribute is matched by other products in the comparison (i.e., alignable vs. nonalignable) (Medin et al., 1995).

This study is not without limitations. First, although the choice difference in Study 2 was in the hypothesized direction, a larger sample is needed for a more significant test. Second, this study manipulated the between-alternatives heterogeneity using two different approaches (i.e., 1) same vs. different brands; 2) small vs. large number of common attributes). The between-alternatives heterogeneity, however, may be induced by other contextual factors in the decision making environment, for example, the way alternatives are assorted on the website. Therefore, future studies should explore new factors that influence consumers' perception of between-alternatives heterogeneity to enrich the understanding of this topic. Third, future studies should make a more in-depth investigation by directly measuring the process goals and their mediation effect on choice. Finally, this study tested the hypothesis with student samples. While experiments with student samples have been widely used for theory testing and development in consumer decision making (e.g., Carlson et al., 2006; Fishbach & Dhar, 2005; Lynch & Ariely 2000; Mattila, 2002; Tversky and Kahneman 1981; West, Brown, & Hoch, 1996) and could enhance the efficiency of statistical testing by reducing the random error in the experiments (Kruglanski, 1975; Kuehl, 2000), it is desirable to replicate this study using more diversified and representative samples to ensure the generalizability of the finding.

MARKETING IMPLICATION

This research has important marketing implications. In general, this study suggests that the level of between-alternatives heterogeneity will influence the importance of attributes in decision making. When the level of between-alternatives heterogeneity is high, marketers should develop or promote superior alignable attributes. When the level of between-alternatives heterogeneity is low, however, marketers should shift more attention to nonalignable attributes, making sure that they have appealing attributes not possessed or presented by competitors. This is particularly important when consumers are able to compare the attributes of multiple products on the same platform (e.g., the website of third-party intermediaries).

The two experiments also provide specific implications. First, products of different companies (e.g., a Carnival cruise vs. a Prince cruise) are usually perceived to be more heterogeneous than products of the same company (e.g., two Carnival cruises), particularly when consumers have limited knowledge about the companies. A company may improve its attractiveness against other companies more efficiently by focusing on alignable attributes. For example, a company could compare itself with competing companies on its strength alignable attributes in the advertising. On the other hand, a company may level the market share of its own products more easily by adjusting the nonalignable attributes. Second, marketers may even control the presentation of attribute information in favor of target products. When a company is superior in nonalignable attributes, it may identify and present more commonalities attributes with their competitors. In this way, consumers will perceive a lower level of heterogeneity and focus more on the nonalignable attributes. If a company excels in alignable attributes, however, it may promote their products in the platforms that limit the number of commonalities presented. For example, some websites only provide a limited number of product attributes for consumers to compare on. In summary, with the help of information technology, consumers today can easily compare products directly based on various attributes. It is crucial that marketers understand consumers' perception of between-alternatives heterogeneity in their decision making and adjust the promotion and information presentation of the products accordingly.

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APPENDICE

Appendix A Popcorns P and Q in Study 1

P	Q
Calories equal to a slice of bread	Calories equal to a table spoon of sugar
Crunchiness lasts longer	Crunchiness lasts shorter
Slightly low in corn and grain flavor	Not likely to burn
Has some citric acid	Kind of crispy
Low level of sodium	Low level of sodium

Appendix B Hotels P and Q in Study 2

P	Q
26" LCD TV	37" LCD TV
Regular air-conditioning	Advanced climate control system
Nice in-room fridge	Bathroom is a bit small
Very nice view	No food service after 8pm
Wireless Internet	Wireless Internet
From \$ 120 per night	From \$ 120 per night
Hair dryer	Hair dryer
2 Chairs and a love seat	2 Chairs and a love seat
Digital alarm clock	Digital Alarm clock
Work/writing desk	Work/writing desk
Iron and ironing board	Iron and ironing board
Coffee maker/tea service	Coffee maker/tea service
1 phone	1 phone
Cable channels including HBO	Cable channels including HBO
Pay-per-view movies	Pay-per-view movies
Non-smoking	Non-smoking

Note: Only the first two shaded attributes are shown for high heterogeneity condition.