How rankings influence attribute importance: The role of complexity

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Abstract :

Rankings are an everyday phenomenon of increasing relevance. Nevertheless, research on this topic is very scarce. In this paper we show how rankings can influence the decision making of consumers. More specifically we demonstrate how rankings that include attributes of varying a priori importance influence consumers' decision strategy and the weight of attributes in the decision. We find that especially in situations of increased complexity, consumers' decisions will be more linear compensatory when sorted on a high a priori important attribute, compared to an attribute with a low a priori importance.

Résumé:

Les rankings sont un phénomène d'une importance croissante. Néanmoins, la recherche sur cette sujet est très rare. Dans cet article, nous montrons comment les rankings peuvent influencer la prise de décision des consommateurs. Plus précisément, nous démontrons comment les rankings qui incluent des attributs avec une importance différente influencent à la fois la stratégie de la décision des consommateurs et le poids des attributs dans la décision. Nous constatons que, surtout dans le cas d'une complexité croissante, les décisions des consommateurs sont plus compensatoires lorsque le ranking est trié sur un attribut très important, par rapport à un ranking trié sur un attribut avec peu d'importance

Keywords: *rankings, information sorting, decision making*

Track: *Consumer Behavior*

Introduction

When making a purchase decision, consumers often face the difficult task of collecting and processing all the necessary information, making the evaluation of all the available options almost impossible (Mick, Broniarczyk & Haidt, 2004) When no information from prior search or experience is available, customers must depend on information in the choice situation itself to make a decision (Bettman & Park, 1980). Researchers and merchants have developed a wide range of different decision aids that can help consumers in such a situation (De Bruyn, Liechty, Huizingh & Lilien, 2008). One of those decision aids is rankings. Rankings have become a part of our everyday life. From the New York Best Seller list, the Nielsen ratings and the Billboard charts, to the top 10 lists in our local video and music stores, we can find them literally everywhere (Hakanen, 2002). Especially in an online context, information is often provided in a ranking format. So-called simple decision aids are supposed to help customers when making a choice, by displaying all available options, ranked on a certain attribute. However, research on rankings and their effect on customers' decision making is still very limited.

The format of information presentation can influence the way consumers use that information in their decision processes (e.g. Bettman & Kakkar, 1977; Russo, 1977; Russo, Krieser & Miyashita, 1975). Humans' information processing abilities are pretty limited. Therefore, decision makers tend to limit themselves to the information that is explicitly displayed in a stimulus environment and process the information in the particular form in which it is presented (Slovic, 1972). Attributes that are easier to process will be more salient in judging alternatives (Creyer & Ross, 1997), and consequently will be weighted more heavily in the decision process of the consumer. This in turn has an effect on consumers' product choice (Xai & Cu, 2008).

Moreover, according to the logic of conversation, communicated information comes with a guarantee of relevance (Sperber & Wilson, 1986). Therefore we propose that the way information is presented in rankings implies a meaning of order for consumers and can influence the way they make their decisions.

The effect of rankings on decision making is yet not well understood. Previous research on information sorting is limited to changes in the post-decision evaluation of attribute importance, dependent on which attribute the list is sorted on (e.g. Cai & Xu, 2008). In contrast, the present study investigates the influence of rankings on the consumers' use of attributes *during* the decision task. The goal of this study is to show how choice task complexity has an influence on the consumers' use of product attributes and their decision strategy. Furthermore we will make a distinction between the a priori importance levels of attributes: While some attributes are prominently present in the consumers' mind even before their information acquisition begins, others are often ignored or forgotten. We will demonstrate that this difference, which is often neglected in research, can have a strong influence on the customers' choice outcome.

We tested this proposal in three studies. A pilot study shows that people are inclined to base their judgments on a readily available ranking. Our second study shows that rankings may influence the weight of attributes in a multi-attribute decision task. The third study shows the moderating effect of complexity of the decision task.

1. Study 1 (Pilot study)

In the pilot study, we illustrate the basic effect of rankings on customers' decision making. We assume that confronted with a ranking, consumers will prefer top-ranked options, regardless of

the specific brand ranked. We expect however, that this will not be the case when they are confronted with a list of the same options without a specific ranking.

1.1 Method

Ninety-four graduate and undergraduate students participated in our study by an online questionnaire. We randomly allocated respondents into four conditions, in which they were presented ten brands of champagne. In the first and second condition (the experimental conditions), respondents were given a top 10 list supposedly set up by an expert (ranked from best to less good). The order of champagne brands in the first condition, however, was reversed in the second condition. In the third and fourth condition (the control conditions), respondents simply received a list of the brands, without any ranking implied, in the order of respectively the first and the second condition. The respondents were then asked to indicate their willingness to pay (WTP) for each of the ten brands of champagne. We also included questions measuring their familiarity with the product category and the different brands, to control for possible effects on the results. To analyze the data we estimated a regression model. Since all participants contributed data for all the 10 given brands of champagne, we essentially have repeated data. Therefore we used multilevel regression analysis. The interpretation of the parameter is the same as with ordinary linear regression; merely the standard errors of the parameters are adjusted to obtain correct test statistics (Snijders & Bosker, 1999).

1.2 Results and discussion

Our results indicate that rankings strongly affect consumer preferences. In particular we found a linear relationship between the respondent's evaluation of a given brand (expressed by their WTP) and the rank of the brand in the list ($\beta = -2.234$, $t = -7.13$, $p < .001$). Respondents are

willing to pay more for brands that are ranked higher (versus lower). This, however, was only found for the experimental conditions, were the order of the brands reflected an expert ranking. In the control conditions, no significant effect of the position of the brands on the respondents' WTP was found ($\beta = .337$, $t = 1.47$, $p = .149$). Moreover, no significant differences where found between the two experimental conditions ($\beta = -.758$, $t = -1.21$, $p = .232$) and between the two control conditions ($\beta = -.682$, $t = -1.49$, $p = .145$). These results were not influenced by the participants' familiarity with the product category and even the fact that respondents knew some of the brands presented had no significant effect.

2. Study 2

Study 1 shows that rankings with respect to a *single* attribute affect consumer evaluations. In the second study, we will investigate how consumers use rankings with *multiple* attributes. So-called simple decision aids, sort all the offered alternatives on one particular attribute, while the other attributes are still visible to the customer. So while they resemble the function of ranking lists in a certain sense, they also add a new dimension. We expect that the way information is organized influences the weight given to the different attributes and consequently customer's decision behavior (Cai & Xu, 2008; Russo, 1977). In contrast to former studies, we will look at attribute importance during the choice task and not via a post-decision scale. We expect that the choice of sorting attribute will have an influence on the weight of the different attributes. We will include attributes that differ in their a priori importance. We expect that information sorting has a stronger influence on the weight of the a priori less important attribute compared to the weight of the a priori more important attribute. Furthermore, when confronted with multiple attributes, consumers will engage in a trade-off between the different product characteristics. We expect consumers to adapt a non-compensatory decision strategy when confronted with multiple

attributes in a ranking. A poor value for one attribute will not be compensated for by a good value for another attribute. When attributes are uncorrelated, the top items in the ranking will provide options with good values for all attributes (Diehl, Kornish & Lynch, 2003). This makes the consideration of lower-ranked options superfluous.

2.1 Method

In order to test this hypothesis, respondents had to indicate how attractive they found 10 different fictional internet subscriptions. Forty-four graduate and undergraduate students participated in small groups in a consumer lab and filled out the questionnaire on a computer. The participants were randomly assigned to two conditions. While half of them were given a ranking sorted on subscription cost, the other half saw a ranking on download speed. Still, information regarding both attributes was visible. Pretesting indicated that price was by far the most prominent attribute, while download speed was usually not even mentioned. Hence, we consider price the important attribute and download speed the less important one. Across the ten internet subscriptions, the attribute scores for price and download speed were unrelated (r = .06). In each condition, the brands are ranked on one of both attributes. The data were analyzed using multilevel regression.

2.2 Results and discussion

The results indicate that, when sorted on subscription costs, there will be effects for both the subscription costs ($\beta = .512$, $t = 2.28$, $p = .023$) and the download speed ($\beta = 5.743$, $t = -14.54$, $p < .001$). When sorted on download speed, we found that download speed is having a stronger effect on perceived attractiveness compared to sorting on subscription cost ($\beta = -1.865$, $t = -3.34$, $p < .001$). There was, however, no significant difference in the effect of the subscription costs between both conditions ($\beta = -.491$, $t = -1.55$, $p = .122$). Furthermore, the data also shows an

interaction between the two attributes (β = *-.098, t = -7.64, p < .001*). There is thus a trade-off between both attributes: A more expensive subscription must be faster in order to obtain the same evaluation. However, in some cases respondents handled a conjunctive decision rule, which entails rejection of an alternative that fails to meet a minimum criterion on an attribute. When the internet is too slow, even a low price will have no influence on the perceived attractiveness and when the internet subscription is too expensive, even a high speed won't have an effect. Finally, we obtained a significant difference of the interaction between both conditions (β = *.035, t = 1.95, p = .050*). The trade-off between both attributes is less pronounced when the options are ranked on subscription cost. So, compared to when ranked on download speed, a higher price must be compensated more by a good download speed.

In sum, while the weight of the important attribute (subscription cost) was similar when the information was ranked on subscription cost or on download speed, the weight of the less important attribute (download speed) was higher when the information was ranked on that attribute. In addition, the trade-off between both attributes was more pronounced when the information was ranked on the less important attribute than when ranked on the more important one.

3. Study 3

The third study investigates how the use of rankings is influenced by task complexity. Prior research has shown that the complexity of the decision, as given by the number of alternatives, number of attributes or the correlation between attributes, significantly influences decision strategy selection (Swait & Adamowicz, 2001). Confronted with correlations between attributes, consumers will shift to a more linear compensatory decision strategy (Einhorn & Hogarth, 1981).

We hypothesize that confronted with a more complex decision task, consumers will still use a (conjunctive) non-compensatory decision strategy when viewing a ranking sorted on a less important attribute. Customers who view a ranking sorted on an important attribute, in contrast, will switch to a linear (additive) compensatory strategy. The valuation of every attribute affects the utility of the object, irrespective of the valuations of other attributes (Elrod, Johnson & White, 2004). Decision strategies can be estimated by means of an algebraic model. Linear compensatory strategies are represented as a regression model that is linear in the attribute scores. The inclusion of interactions between the attributes in the regression model represents a decision model that is at least partly non-compensatory. Interactions imply that attributes contribute to the judgment of the alternatives partly dependent on each other (Westenberg & Koele, 1994)

3.1 Method

To explore the effect of task complexity on customers' use of rankings, 135 graduate and undergraduate students were randomly allocated into four conditions of an online questionnaire. The participants were given 10 fictional jobs, for which they had to indicate their perceived attractiveness by giving a score between 0 and 100. Respondents were given information on both the wage (in thousand Euros) and the distance to work (in minutes), respectively the important and less important attribute according to pretesting. They were also given a ranking of those 10 jobs. A two-by-two design was employed, where we distinguish between the attribute the ranking is sorted on (wage vs. distance to work) and the complexity of the decision task. The complexity was manipulated by the correlation between both attributes. When attributes are negatively correlated, the purchase environment becomes less friendly, since available options are less dominated. The number of times that consumers have to engage into trade-offs between conflicting attribute values increases, which causes conflicts in consumers and increased decision

difficulty (Luce, 1998). The two attributes correlated more strongly in the experimental condition (r = .25) than in the control condition (r = .00). When attributes are correlated, they will be dependent on each other and customers have to give up something in order to obtain something else. The data were analyzed by means of a multilevel regression analysis.

3.2 Results and discussion

We entered both the sorting of the attribute (on wage vs. on the distance to work) and the correlation between the attributes (r = .00 vs. r = .25) as factors into our model, while both attributes were entered as continuous in our model. The results for the control condition are comparable to those of study 2. When the ranking was sorted on distance, both wage ($\beta = 1.306$, $t = 9.99$, $p < .001$) and distance ($\beta = .012$, $t = 2.75$, $p = .007$) affected the attractiveness ratings. However, when the ranking was sorted on wage, wage affected the attractiveness ratings significantly more strongly ($\beta = 1.769$, $t = 11.39$, $p < .001$), while distance affected them significantly less ($\beta = .026$, $t = 5.20$, $p < .001$). Furthermore, we found an interaction between the two attributes in both conditions ($\beta = -.012$, $t = -5.12$, $p < .001$), indicating a non-compensatory decision strategy. This effect is the same across both conditions ($\beta = -.004$, $t = -.96$, $p = .338$). Thus in both conditions the trade-off between both attributes is equal.

In complex tasks (when the attributes are correlated), the results look somewhat different. When sorted on the superior attribute (wage), both wage ($\beta = .062$, $t = 9.47$, $p < .001$) and distance ($\beta = -.008$, $t = -8.22$, $p < .001$) had significant effects. As shown in Figure 1, however, there is no significant interaction between wage and distance indicating that respondents switch to an additive compensatory decision strategy when confronted with a ranking sorted on the important attribute. Perceived attractiveness increases with wage, independent of the distance. Distance

only has an additive effect. When the ranking is sorted on the less important attribute (distance), we also find significant effects of both wage ($\beta = 1.313$, $t = 9.01$, $p < .001$) and distance ($\beta = .056$, $t = 4.24$, $p < .001$). However, in contrast to when the ranking is sorted on wage, we found a significant interaction between both job attributes ($\beta = -.018$, $t = -5.35$, $p < .001$), meaning that wage has no effect on the perceived attractiveness of a job when the distance has not met a certain minimum value, and vice versa.

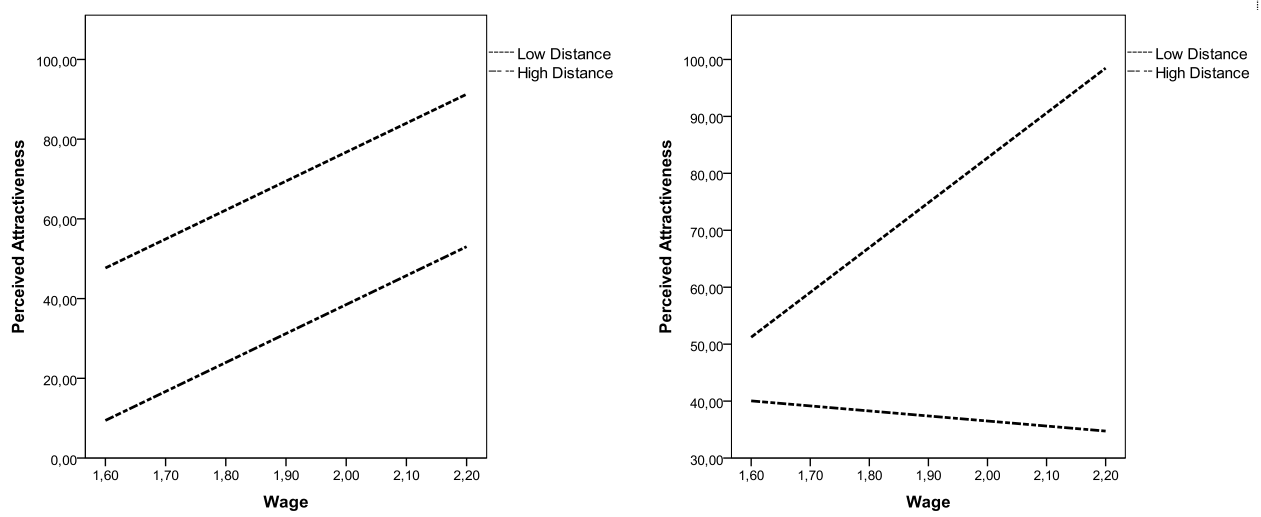

Figure 1: Interaction between wage and distance in the experimental conditions: sorted on wage vs. sorted on distance

In sum, we found that when the decision task becomes more complex, consumers may change their decision strategy, even though this is only true when the ranking is sorted on the a priori most important attribute. In this case they will employ a linear (additive) compensatory decision strategy. When sorted on an inferior attribute, however, consumers will persist in using a compensatory decision strategy with a conjunctive decision rule.

4. General Discussion

Rankings have become an important decision tool for customers over the last decades. Especially with the rise of the internet and e-commerce, rankings are ubiquitous in the form as so-called simple decision aids. However, research on this topic is still very limited. The current study delivers a valuable contribution by illustrating the influence of rankings on the weights given to attributes during consumers' decision making and the influence of task complexity. We may conclude that in a more complex decision environment, rankings sorted on a "top of mind" attribute (such as the wage in the case of a job) will cause customers to engage in a more additive compensatory decision strategy. This is in accordance to studies such as the one by Einhorn and Hogarth (1981), who stated that a correlation will lead to the use of this strategy.

These results have strong implications for choice environments, in which rankings or similar decision aids are common. Consumers will almost always have certain product attributes in the top of their mind before starting their information acquisition. Since other attributes might also be strongly important for the alternatives' quality, the decision outcome might be influenced. Earning a high wage, for example, might not be sufficient to compensate for the disadvantages of working too far away from home. Consequently, rankings can both lead and mislead customers in their decisions. A good understanding of this phenomenon might therefore help to prevent negative impacts on the quality of a decision outcome.

Future research could provide further evidence of the strength of this effect. Also, further research can test the influence of rankings on other dimensions of decision strategy, such as whether the processing of information happens alternative - or attribute- wise and whether this

will be influenced by various task characteristics. Furthermore, the role of customers' characteristics in their use of rankings can be explored.

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