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Consumer-based decision aid that explains which to buy: Decision confirmation or overconfidence bias?

Wee-Kek Tan [a,*], Chuan-Hoo Tan [b,1], Hock-Hai Teo [a,2]

[a] Department of Information Systems, National University of Singapore, Computing 1, 13 Computing Drive, Singapore 117417, Singapore
[b] Department of Information Systems, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon Tong, Hong Kong

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ABSTRACT

Providing explanation to justify product recommendations is critical in the online purchase decision process. Bulk of the extant literature has focused on the provision of decision aids facilitating screening of product alternatives and presenting of filtered alternatives. In comparison, few studies are conducted to examine decision aids that support the assessment and evaluation of the presented product alternatives prior to actual purchase, i.e., explanation-featured decision aid. This article conceptualizes three implementations of explanation aid differed by the forms of explanation elaboration. Experimental results indicate that a more elaborated explanation aid could heighten a consumer's decision confidence leading to lesser cognitive effort expended and inferior product choice made.

1. Introduction

Consumers habitually go through an evaluation process in which available product alternatives are assessed and compared before making a purchase decision [43]. An online consumer-based decision aid leverages on the collected information about the consumers' preferences to recommend a small subset of product alternatives that are more likely to interest them [4,25,26,45,56]. Product recommendation transpires in two forms, namely 1) the filtering of product alternatives based on the elicited preferences, and 2) the provision of reasoning based on the presented alternatives with the aim of helping consumers to make the informed choice [68]. Prior researches have ostensibly focused on the former form of product recommendation [4,5,42,45,58,61]. The second form, i.e., how a decision aid could assist a consumer in making decision after presenting a list of product alternatives, is less investigated in great details. This study seeks to bridge this knowledge gap by examining how the provision of explanation feature, i.e., a specific instance of the second form of decision aid, could affect consumers' purchase decision. More specifically, we seek to understand how the provision of different forms of explanation features impact consumers' behavior differently.

Providing explanation feature could assist a consumer in finding a reason (hence explanation) on why certain product option(s) is(are) recommended and which is to be chosen [27,55]. Research on providing explanation-featured decision aid is scare. An exception is the work by Wang and Benbasat [65] who examined a consumer's trust formation in response to the recommendations furnished by the decision aid. This view is in accordance with the conventional wisdom dictating that the provision of explanation-featured decision aid could enhance a consumer's affect towards the aid's product recommendations [18,51,66]. This general presumption has served as the driver for the development of the deluge of explanation-featured decision aid now widely found on the Internet. However, the work of Wang and Benbasat [65] only focused on input explanations, i.e., explanations that guide consumers to express their product preferences. Input explanations are more applicable to the earlier preference elicitation and filtering stage, i.e., the first form of product recommendation, and not at the latter evaluation stage, i.e., the second form of product recommendation.

Intriguingly, the Internet has witnessed an increase in the variations of output explanation-featured decision aid, i.e., the second form of product recommendation, spanning from providing simple explanations (e.g., MovieLens Movie Recommendation) to affording more elaborated reasoning (e.g., CarWale Automated Car Recommendations and Yahoo! Shopping SmartSort). Yet it is not entirely clear how the variants of the output explanation-featured decision aid affect decision performance beyond subjective assessments. This study, hence, seeks to contribute to this knowledge gap by examining the behavioral and performance consequences of variants of output explanation-featured decision aids. In this paper, we draw from the commercial implementations (e.g., CarWale and Yahoo! Shopping Smartsort) and match against the explanation literature [20] to evaluate and assess three forms of output explanation-featured decision aid, namely Trace, Justification and Strategic.

* Corresponding author. Tel.: +65 6516 6731; fax: +65 6779 1610.
E-mail addresses: tanwk@comp.nus.edu.sg (W.-K. Tan), ch.tan@cityu.edu.hk (C.-H. Tan), teohh@comp.nus.edu.sg (H.-H. Teo).
[1] Tel.: +852 2788 9720; fax: +852 2788 8694.
[2] Tel.: +65 6516 2979; fax: +65 6779 1610.

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Our overarching proposition is that the three variations of the explanation-featured decision aid could differ in their impact on the consumer decision making behavior, manifested by decision confidence, decision effort and decision quality. To this end, we anchored on the decision overconfidence paradigm [32,34,37] to posit that a more elaborated explanation aid could heighten a consumer's decision confidence (i.e., overconfidence) leading to expending lesser cognitive effort and choosing an inferior quality product option (i.e., lower decision quality). A set of laboratory experiments was subsequently conducted to verify the conjecture. Through deliberating and differentiating the effect of different explanation aids on both the subjective and objective outcomes, we are able to develop a nuanced understanding of the relationship between consumer-based explanation aid supporting the second form of product recommendation and consumer behavior [2,14].

Apart from advancing our theoretical understanding of explanation-featured decision aid, this research is important for several reasons. In particular, industry practitioners have continued to highlight the importance of providing a highly personalized experience for online shoppers [17]. Online consumer-based decision aid has the potential to help companies reach out to their customers through personalized product recommendations, which increase purchase propensity and present an opportunity to cross-sell [30,49]. In the long term, it is possible to establish customer loyalty [49]. In gist, explanation-featured decision aid holds the promise to provide a better personalized product recommendation experience to consumers, benefiting electronic commerce websites and consumers alike.

2. Explanation-featured decision aid

Explanation is often provided by the information provider (e.g., the decision aid in this case) to clarify, justify or convince the recipient (i.e., the consumers) to accept the content or the recommendations proposed [48,63]. More elaborately, explanation is furnished when an individual is externally expected by others or internally required by him/her to justify the decisions so as 1) to enhance his/her self-esteem [23] and/or others' perception of his/her wisdom [1], and 2) to account to those who are likely to evaluate his/her choices, e.g., friends and spouse [53]. In this section, we first review the notion of explanation and then build on this to identify three forms of explanation-featured decision aid for investigation.

2.1. Theoretical background of explanation provision

Explanation reduces the anomalous in the recommendations [39] and clarifies why the decision aid believes the recommended alternatives are suitable for a consumer [20]. By exposing the underlying reasoning mechanism governing the decision aid's selection and recommendation of the product options, the product recommendation transparency increases [27]. When a consumer is able to understand and better appreciate the product alternatives recommended, consumer's decision confidence, trust and acceptance of the decision aid as well as customer loyalty are enhanced [4,18,51,65,66,68]. Conversely, a consumer may be more caution of a decision aid's product recommendations should they be perceived as lacking predictability (i.e., reasoning) with respect to his/her preferences or unclear of the steps taken by the decision aids in deriving the recommended product options [22].

It is to our contention that provision of explanation may also lead to unforeseen impact on consumer decision making. Specifically, consumers must make probability judgments on whether the products to be purchased are indeed suited to their actual preferences given the recommendations made by the decision aid. Presumably, consumers would have purchased the best products if the attribute values are mostly closely matched or better than the consumers' preferences. Unfortunately, people are prone to suffer from having excessive confidence in their knowledge and judgment, i.e., their confidence in their judgments exceeds the accuracy of those judgments [32,34]. The marketing literature provides further support for the overconfidence bias among decision makers. For instance, marketing managers are susceptible to overconfidence especially when dealing with difficult or infrequent decisions [38,40]. Overconfidence bias could be a non-trivial problem in online shopping given the increasing amount of product information being made available to consumers [56]. Even though explanation-featured decision aid can reduce the number of product alternatives that the consumers viewed and evaluated [26], there are still significant cognitive-laden tasks that still need to be performed by the consumers [28]. In particular, consumers must still delineate their preferences and deliberate on the recommendations provided by the decision aid as well as the associated explanations.

According to Griffin and Tversky [21], the root cause of overconfidence bias is that decision makers tend to give greater attention to the strength of the evidences pointing to specific uncertain outcomes. The weight or credence of the sources of the evidences and background information, i.e., base rate, are accorded far lesser importance. In spite of this, the fact remains that a piece of strong or weak evidence may come from a reliable or unreliable source. More importantly, when the ability to discriminate between the strength of competing evidences is low, consumers could suffer from overly high confidence [21]. A key implication of this supposition to our present study is that explanation is intended to clarify, justify and convince the information recipient to accept the content [31] and therefore strengthens the decision aid's recommendations. To this end, we posit that different types of explanation could increase the strength of the decision aid's recommendations to varying degree. Consequently, each type of explanation could lead to various degree of decision overconfidence that affects the decision quality directly.

2.2. Types of explanation-featured decision aid

How then should an explanation aid be designed? To answer this question, we first need to understand the underlying philosophy of explanation, which could transpire in two forms [20,39,48]. First, explanation is the associations between antecedents and consequents that accounts for the relationship between cause and effect. Second, explanation could also serve as the causal mechanism relating an individual's past experience to the present. Relating the two means of explanation to decision aiding context would suggest that an explanation-featured decision aid would need to satisfy two important objectives [31]. Specifically, the system ought to 1) provide knowledge and explanations necessary for the user to carry out his or her task, and/or 2) perform certain actions and then explains the need and rationale for doing so.

Building on the two design requirements for providing explanation, several researchers have proposed several taxonomies (see Table 1). For instance, Chandrasekaran et al. [11] conceived explanation could be inoculated into a system by implanting an information structure containing reasoning elements and then dynamically putting together appropriate elements, known as introspection. Introspection refers to the examination of a record (e.g., a product alternative) of its own problem-solving activity (i.e., using the elicited preferences to evaluate the product alternative) and picking up appropriate traces (i.e., explanations) helpful for a consumer in making the purchase decision. Building the explanation content on introspection of the system's own problem-solving behavior, several scholars proposed different explanation types [20,69].

Among the several other research expeditions, the seminal work by Gregor and Benbasat [20] receives the greatest attention due to its comprehensiveness and enduring relevance. According to the classification scheme of Gregor and Benbasat [20], there are four variations of explanation feature, namely Trace, Justification, Strategic and Terminological.