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# Impact of Information Presentation Format on User Decision-making: A Format-stage Fit Perspective

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# Impact of Information Presentation Format on User Decision-making: A Format-stage Fit Perspective

*Completed Research*

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## Abstract

With the growing popularity of online videos, understanding the role of information presentation format in online decision-making becomes crucial. Existing research in information systems and marketing have looked at information presentation formats and online reviews but very little research has considered the fit between online review presentation format and decision-making stage. In this research we are primarily interested in developing the novel concept of format-stage fit, based on the notion that reviews' presentation formats have a varying impact on users' perceptions when users are in different decision-making stages. Accordingly, we propose that a review in pallid format (e.g., text) may be a better fit in choice-reduction stage whereas a review in vivid format (e.g., video) may be a better fit in choice-selection stage. We conduct a lab study to test the research model. The findings are expected to enhance our understanding of information presentation and decision making in online commerce.

**Keywords**

Information processing, information presentation format, purchase decision-making, video reviews, online reviews, YouTube

## Introduction

Social and electronic media, powered by recent advancements in technology in mid to late 2000s, has not only increased information exchange but it has also changed the way humans generate and consume information (Gursoy 2019; Liu and Karahanna 2017; Zhou and Duan 2016). Latest improvements in mobile technologies and internet bandwidths in addition to making information more accessible and less costly are enabling the consumption and production of information in various formats including resource-intensive ones like video (Susarla et al. 2012). As a result, video has become a vital format and in many situations preferred over other formats such as text, pictures, and their combination (Jiang and Benbasat 2007a; Xu et al. 2015). Companies have already noticed the opportunities provided by the increased video consumption trend and are trying to incorporate professionally-produced and user-generated product videos, which have synergistically lead to higher sales effectiveness (comScore 2012).

Existing literature, however, does not fully address the implications of videos (especially in the form of user-generated reviews) in consumer purchase decision processes. Literature in consumer behavior shows that when consumers are faced with an important purchase decision involving a large number of alternatives, they use a two-stage decision making process (Jacoby et al., 1977; Punj and Stewart 1983). The first stage involves shortlisting viable options from all the available alternatives and the second stage involves making a purchase decision from the shortlisted options. Recent research in Information Systems (IS) has shown that information requirements and task processes differ in both stages (Li et al. 2017). However, the reviews considered so far in such studies have only been presented in textual form. Our aim in this study is to examine the role of information presentation formats (video vs. text) in the consumer purchase decision

process. Our research question is: Do presentation formats of online reviews impact users' perceptions differently depending on the decision-making stage?

Based on theoretical and empirical work in IS, marketing, and psychology we propose format-stage fit as a novel construct that captures how well a presentation format of online reviews matches with the purchase decision stage. We incorporate theories of cognitive-fit (Vessey 1991) and information foraging (Pirolli and Card 1995), which help us understand how users may prefer different types of information as they progress through the purchase decision-making process. We conduct an empirical study that validates format-stage fit and shows that review presentation format may influence users' perceptions differently in the two stages of their purchase decision process. We hope that our work will provide some useful guidance to IS researchers and practitioners and help them design better systems focusing on deploying various presentation formats at different purchase decision stages.

## Literature Review

This research primarily draws from the information presentation, cognitive processing. and consumer behavior literatures. Information presentation formats such as video, audio, picture, and text differ across various dimensions that influence meaning and understanding. Video includes both visual and auditory stimuli, which leads to a better message comprehension as compared with other formats (i.e., audio, picture or text) that uses either stimuli alone (Day and Beach 1950). Cue-summation theory (Severin 1967) elaborated on why video helps in better message comprehension by explaining that a higher number of cues or stimuli increased information gain and learning. A video would lead to a better information gain because visual and auditory stimuli are simultaneous, relevant to each other and may also incorporate more cues such as body language, vocal tone, and the environmental setting. Building on the perspective of number of cues, vividness considers breadth i.e., number of different sensory channels utilized e.g., visual, auditory, smell etc. as well as depth i.e., resolution or detail of a particular sensory channel (Hess et al. 2005). Vividness theory (Nisbett and Ross 1980) argues that vivid information, which is emotionally interesting, proximate and provokes imagery and concreteness, draws more attention and highlights the task representation. Vividness in computer-mediated environments helps technologies "produce a sensorially rich mediated environment" (Steuer 1995, p.10). Vividness induces involvement (Li et al. 2003) and helps in better visualization of the usage experience (Nowlis et al. 2004; Shiv and Huber 2000).

People use information from multiple cues including visual and auditory, which helps them in accumulating knowledge regarding a task or an object (Mayer and Gallini 1990). This is a form of active learning or actively processing of information to construct mental representation (Mayer 2003). Jiang and Benbasat (2007a) showed that video and virtual-reality presentation in comparison to static-picture presentation lead to better actual product understanding and better website diagnosticity i.e., the degree to which a website can be evaluated. This finding was also supported in later research, which showed that virtual-presentation and 360 degree spin rotation increased product diagnosticity (Verhagen et al. 2016). In contrast, product presentation videos helped increase positive attitude towards the product and its purchase intentions by enhancing the ease of imagining the product (Flavián et al. 2017). This indicates that a vivid information format might be more useful where consideration of usability or usage experience of a product or service (both also referred with the economic term of "good") is salient. On the other hand, another study showed that although pictures appearing together with text (if presented in a tabular form) increases the information stored in memory and the ease to memorize information, text only information (in tabular form) allows higher information recall and the ease with which information is recalled (Blanco et al. 2010). Thus, the same presentation format may have different consequences depending on the task requirement and decision-making strategy. It is worth noting that these studies compared different forms of product presentation, instead of online reviews (which is the focus of this research).

Information presentation formats have been shown to impact the strategies people use to acquire information (Jiang and Benbasat 2007a; Kim and Dennis 2019). For instance, information presented in text-based table form, either broken down by brand or by attributes, led to processing by brand or by attributes accordingly (Bettman and Kakkar 1977). The way information is encoded (attribute vs. brand based) has an effect on how the information is organized and retrieved (Biehal and Chakravarti 1982), which also impacts decision-making process and purchase intentions (Kamis et al. 2008). Cognitive-fit theory (Vessey 1991) showed that the efficiency and effectiveness of a task performance depends on the fit between the information presentation and the problem-solving task. The better the fit the more consistent and

accurate the mental representation of the task leading to quicker and accurate task performance. As we are concerned with the task of purchase decision-making, the next section explains how users make purchase decisions, which helps us understand the nature of task requirements involved in such decisions.

### *Purchase Decision-Making*

Prior research indicates that consumers who are faced with a large number of product alternatives often find difficulty in reaching a decision (Anderson et al. 1966; Jacoby et al. 1974). Therefore, using some form of elimination criteria (usually a non-compensatory method) helps consumers in shortlisting the alternatives that allows for much easier and more thoughtful decision making in the later stage (Westbrook et al. 1978). As number of alternatives increases, consumers tend to shift from a one-stage compensatory strategy to a two-stage decision making process (Jacoby et al., 1977; Punj and Stewart 1983). This two-stage decision process is also called pre-purchase information search (Westbrook et al. 1978), which is initiated in order to fulfil the need to purchase a product/service, involves all the activities that a customer performs before a purchase transaction including gathering information about the product/service, considering them, and evaluating available product alternatives. The goal of the first stage, which is also sometimes termed as exploration stage or screening phase, is *choice-reduction* and is characterized by the processes of reducing the number of alternatives available for consideration. The goal of the second stage, which is also sometimes termed as evaluation stage or confirmatory phase, is *choice-selection* and is characterized by a thoughtful comparative analysis of the shortlisted alternatives, which leads to the final decision (Beach 1993; Johnson and Payne 1985).

In a dynamic context such as purchase decision-making, however, the task requirements and hence the information needs may change (Li et al. 2017). Information foraging theory (Pirolli and Card 1995), provides support to the dynamic decision-making process by arguing that people gather information in sequence to forage and build their information reservoir. The type and amount of information collected is directed by the task requirement. Although prior research has conceptualized consumer purchase decision-making in different ways (Choudhury and Karahanna 2008; Kotler et al. 2018), the context of our research involves a part of the complete decision-making process where a consumer begins by shortlisting a large number of alternatives, which are already made available to the consumer, and then chooses one from the shortlisted alternatives. This conceptualization has been used in both marketing (Beach 1993; Johnson and Payne 1985) and IS literatures (Li et al. 2017).

## Format-Stage Fit

Building on the cognitive-fit (Vessey 1991), vividness (Nisbett and Ross 1980) and information foraging (Pirolli and Card 1995), we put forth the concept of format-stage fit, which represents the level of fit between review presentation format and decision choice stage. We consider reviews in pallid or vivid formats (Jiang and Benbasat 2007b) across the two decision choice stages: choice-reduction and choice-selection stage. A vivid format incorporates multiple sensory channels and more detail as compared to a pallid format that incorporates single sensory channel with relatively less detail, so a video-based review maybe considered as more vivid whereas a text-based review as more pallid (Jiang and Benbasat 2007b).

Choice-reduction stage involves high information load thereby making it difficult to incorporate a thorough comparison involving elaboration on each aspect of the alternatives (Anderson et al. 1966; Moe 2006). As the goal in this stage is to eliminate the undesirable alternatives and reduce consideration set size, users focus on attributes (such as weight, color, performance etc.) of the alternatives and make decisions based on decision rules that maybe compensatory or non-compensatory (Coupey 1994; Moe 2006) or based on heuristics (Khan et al. 2011). So, a format that facilitates attribute-based processing and allows an efficient scanning (or exploration) of attributes may be a better fit for choice-reduction stage. As pallid format such as text may be better suited for easier and faster attribute-based information search as compared to reviews in vivid format (Dennis et al. 2008), we argue that pallid format is a better fit in the choice-reduction stage rather than in choice-selection stage.

Choice-selection stage, in contrast, involves much fewer number of alternatives due to prior shortlisting (Beach 1993; Johnson and Payne 1985; Li et al. 2017). The alternatives in this consideration set are now thoroughly compared because they are fewer and the information load is also less (Moe 2006). The goal in this stage is to choose one alternative. Based on the information foraging theory, it has been shown that

consumers try to obtain information that is more valuable i.e., provides them with information that they do not already possess in order to make their decision (Pirolli and Card 1995). Therefore, consumers in choice-selection stage prefer usage-based information as opposed to attribute-based information (Li et al. 2017). This usage-based information may include information such as how a product looks and feel in the hand, how easy it is to use and so on. So, a format that facilitates usage-based information and makes it easier for consumers to compare usage of the alternatives may be a better fit for choice-selection stage. As vivid information provokes more imagery (Nisbett and Ross 1980) and increases the ease of imagining the product (Flavian et al., 2017) it may be more suitable in providing usage-based information. Based on these arguments, information in a vivid format will be a better fit in the choice-selection stage as compared to the choice-reduction stage (Table 1).

| **Format-Stage fit** | **Choice-reduction Stage** | **Choice-selection Stage** |
|---|---|---|
| **High Fit** | Pallid Format | Vivid Format |
| **Low Fit** | Vivid Format | Pallid Format |

**Table 1: Format-stage Fit Conditions**

We therefore propose format-stage fit based on the argument that when review presentation formats match with the decision stage the task performance will be improved. In our study, task performance is reflected by the consumers' perceptions of the decision-making process and purchase intentions.

# Hypotheses

We argue that designing a system i.e., identifying what type of information is presented at what stage of the decision process is the critical factor that not only impacts the decision performance but also helps users in making the purchase decision. To that effect, we consider the decision process to culminate in a purchase decision captured through purchase intentions, which measures the likelihood that a customer will complete the purchase (Jiang and Benbasat 2007b) and has been widely established as a useful dependent variable in research involving consumer purchase (Benlian et al. 2012; Jensen et al. 2013).

Liu and Karahanna (2017) showed that the type of information included in the reviews swayed consumer's attribute preferences. This indicates that review characteristics may have an effect on consumer purchase intentions. When users get the right information at right decision stage their decision-making performance improves (Li et al. 2017), which makes them more likely to complete the purchase (Benlian et al. 2012). We expect that a higher format-stage fit will likely lead to higher purchase intentions. Thus,

*H1: Higher format-stage fit will lead to higher purchase intentions*

While online reviews are generally evaluated using multiple criteria, we conceptualize perceived review quality as a formative construct that captures the reviews' perceived helpfulness (Mudambi and Schuff 2010), credibility (Jensen et al. 2013) and persuasiveness (Zhang et al. 2010). It is important to note here that our research is not at a review-level i.e., comparing helpfulness, persuasiveness or credibility of individual reviews or their formats (Mudambi and Schuff 2010; Xu et al. 2015). Instead we consider multiple reviews at each stage of the decision-making, arguably a more realistic purchase context, allowing us to compare the role of review presentation formats.

As reviews in vivid format, such as video-based reviews, combine multiple cues and facilitate imaginative thinking they are perceived as more helpful, credible and persuasive as compared to text-based reviews (Hu et al. 2017; Kumar and Benbasat 2006; Xu et al. 2015). However, we suggest that these perceptions of reviews in vivid format may vary by the decision stage i.e., reviews in vivid format will be perceived as higher quality when they are in choice-selection stage as compared to choice-reduction stage. In the same vein, reviews in pallid format may be perceived to be of higher quality when they are in the choice-reduction stage as compared to choice-selection stage. Consequently, we expect that a higher format-stage fit will lead to higher perceived review quality:

*H2: Higher format-stage fit will lead to higher perceived review quality*

Effort-accuracy tradeoff (Christensen-Szalanski 1978) indicates that users are less likely to devote effort if decision accuracy is not a prime concern. Users generally try to reduce their cognitive effort or the amount of cognitive resources needed during the purchase process (Cooper-Martin 1994) but they devote more cognitive resources when they intend to make an accurate decision (Huang et al. 2013). We consider perceived cognitive effort, which reflects the level of concentration or cognitive resources users devote in making the decision (Cooper-Martin 1994), and argue that high format-stage fit will lead to higher perceived cognitive effort.

We argue that in high format-stage fit, users will devote more cognitive resources to the decision task i.e., they will consider the cognitive processing more rewarding and concentrate more on the task at hand because the information presentation is conducive to the task. On the other hand, in low format-stage fit, users will concentrate less because the information is not presented in a format conducive to cognitive processing. Accordingly, we expect that when format-stage fit is high, users are likely to devote more concentrate on the decision and expend more cognitive effort as compared to when format-stage fit is low. Hence:

*H3: Higher format-stage fit will lead to higher perceived cognitive effort*

We focus only on relationships arising from format-stage fit construct and do not hypothesize previously established relationships. In previous research, the quality of reviews has been associated with cognitive effort (Huang et al. 2013) and intention to purchase (Grewal and Stephen 2019; Xu et al. 2015). Moreover, cognitive effort has been linked with satisfaction with the decision process (Bechwati and Xia 2003), which leads to intention to purchase (Benlian et al. 2012; Kamis et al. 2008). These relationships are denoted with dotted paths in our research model (Figure 1) but will be tested for significance.

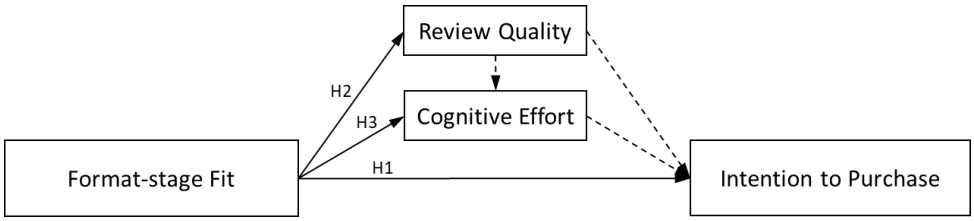


**Figure 1: Research Model**

## Methodology

We conducted a lab experiment with a single format-stage fit factor (high vs low) within-subjects design, with randomized assignment of subjects to both conditions. As proposed previously in Table 1, a high format-stage fit condition was implemented with text-based reviews in choice-reduction and video-based reviews in choice-selection stage. A low format-stage fit condition, on the other hand, was implemented with the video-based reviews in choice-reduction and text-based reviews in choice-selection stage. Following the recommended manipulation approach (Chakravarti et al. 2006; Li et al. 2017), we showed subjects a longer list of options in the choice-reduction stage where they conduct a shortlisting task to reduce the size of the choice set, whereas in the choice-selection stage subjects were shown their shortlisted options and they choose one option. The order of the stages was the same in both conditions i.e., choice-reduction followed by choice-selection. The experimental procedures are explained in detail in the next section and illustrated in Figure 2.

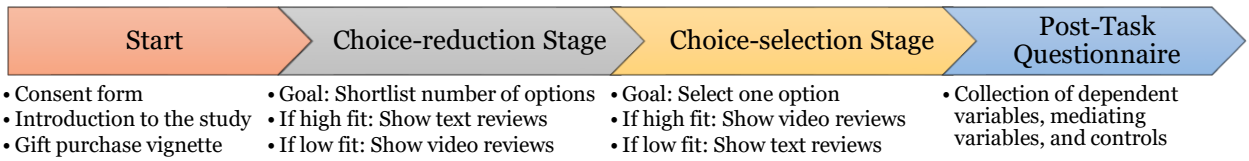


**Figure 2: Experimental Procedure**

## *Procedure*

The task scenario asks subjects to purchase a smartphone cover as gift for their best friend's birthday. Gift purchase approach is commonly used in research (Li et al. 2017) and involves more expenditure of time and money than when the same thing is bought for self (Belk 1982). We developed an interface that showed subjects the covers for a well-known smartphone "Samsung Galaxy S10+" that was released a few months before the time of the experiment. All the covers were from the same manufacturer "Spigen", and differed based on several attributes such as color, size, weight, protection etc. Subjects were instructed to read/view the reviews of each cover (listed in alphabetical order). The interface also displayed the pictures of the covers (front and back) along with the reviews. The picture sizes and viewing angle of the covers in the pictures were same to establish consistency. Also, in order to maintain equivalence of display, each text-based review was shown in a rectangular box whose size matched the frame containing the video-based reviews (see Figure 3). Subjects had to shortlist 2 covers out of 8 in the choice-reduction stage and select one of the two covers in the choice-selection stage. Subjects were allowed to freely navigate the pages, but they were not allowed to proceed to the next screen until they saw all the covers and selected the prescribed number of choices.

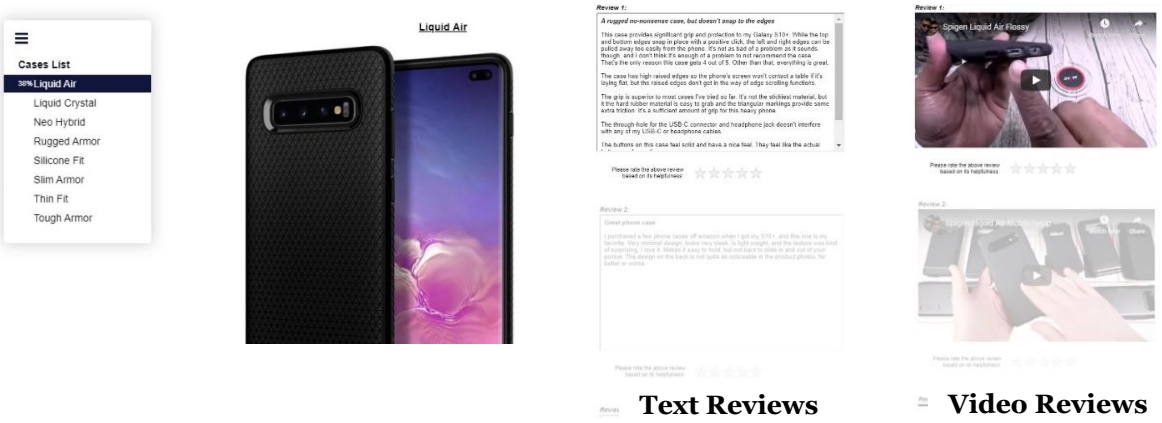


**Figure 3: Interface Screenshots**

We pre-selected three video-based reviews and three text-based reviews for each cover. The text-based reviews were sourced from Amazon. First review was the most positive review nominated by Amazon, the second review was the most helpful review (other than the first review), and the third review was the most critical review nominated by Amazon. The video reviews were selected from YouTube based on highest number of views. We used the name of the smartphone and cover brand along with "review" as the search criteria (i.e., "Galaxy S10+ spigen case review") and we sorted the results based on view count. We choose three review videos that covered all eight Spigen cases. Each of these three videos were then clipped into eight separate videos that represented the eight cases.

We used different reviews in video and text format instead of transcribing the video reviews due to three reasons. First, using a within-subject design we avoid carryover and repetition of reviews so subjects who saw video reviews in choice-reduction stage should not see the transcribed version of the same reviews in choice-selection stage (and vice versa). Second, transcribing video misses the nuances related to visual cues from the video. Third, we try to establish equivalency by selected the reviews that were most popular from their respective sources (i.e., most helpful/critical reviews in Amazon and top ranked in YouTube).

## *Measures*

The independent variable was format-stage fit (coded as 0-low fit and 1-high fit), which was the experimental manipulation. The dependent variable was purchase intentions (adapted from Jiang and Benbasat (2007b)) while the mediating variables included perceived review quality (with helpfulness (Mudambi and Schuff 2010), credibility (Hilligoss and Rieh 2008), and persuasiveness (Zhang et al. 2010) as the underlying constructs) and perceived cognitive effort (Cooper-Martin 1994). The control variables included time spent by subject, prior familiarity with the product and the brand, tendency to pay attention

to reviews, comfortability with using PC, and demographics (gender, age and pc experience). Subjects were undergraduate students who voluntarily chose to participate in the study that took less than one hour to complete and received research credits for their participation.

# Results

After removing incomplete responses, 120 subjects were considered for analysis with equal distribution to both conditions (i.e., 60 in high-fit vs 60 in low-fit condition). We first conducted principal component analysis (PCA) to obtain the underlying factors and then performed mediation analysis using OLS regressions to test the research model. Means and standard deviation for the variables, by both treatment conditions, are shown in Table 2.

| Variable (Scale) | Low-fit Condition Mean (SD) | High-fit Condition Mean (SD) |
|---|---|---|
| Review Quality (1-5) | 4.04 (0.78) | 4.46 (0.51) |
| Cognitive Effort (1-7) | 5.01 (0.99) | 5.50 (0.92) |
| Purchase Intentions (1-7) | 4.72 (0.64) | 4.92 (0.62) |

**Table 2: Descriptive Statistics by Condition**

## *Hypothesis Tests*

In order to test H1, we conducted OLS regression with format-stage fit as the predictor and purchase intentions as the outcome ($R^2$ = .145, $F(9,110)$ = 2.07, $p$ = .038). We found significant coefficient for purchase intentions ($\beta$ = .374, $p$ < .01) indicating that H1 was supported. Next, we had two regressions where we included format-stage fit as the predictor and review quality ($R^2$ = .251, $F(9,110)$ = 4.09, $p$ < .01) and cognitive effort ($R^2$ = .235, $F(9,110)$ = 3.753, $p$ < .01) as outcomes. We found significant coefficient for review quality ($\beta$ = .384, $p$ < .01) and cognitive effort ($\beta$ = .823, $p$ < .01) indicating that H2 and H3 were also supported. All the regressions included control variables.

In order to check for mediating effects (Baron and Kenny 1986), we ran another regression with all the independent and mediating variables as predictors and the purchase intentions as the outcome ($R^2$ = .239, $F(11,108)$ = 3.093, $p$ < .01). We found significant coefficient only for cognitive effort ($\beta$ = .216, $p$ < .01). This indicated that the effect of format-stage fit on purchase intentions was partially mediated through cognitive effort.

We also tested the effect of both mediators on the dependent variable by running separate regressions for each mediator. We found that review quality had a marginally significant positive effect ($\beta$ = .173, $p$ = .04) whereas cognitive effort had a significant positive effect ($\beta$ = .282, $p$ < .01) on purchase intentions, which supported prior literature. We also found that review quality had a significant positive effect on cognitive effort ($\beta$ = .416, $p$ < .01).

# Discussion

We proposed and tested the concept of format-stage fit by showing that reviews presented in video formats at later stages of consumer decision process lead to higher purchase intentions whereas reviews presented in text format are ideal in the earlier stages. We showed that the reviews are perceived to be of higher quality when they are presented in a high format-stage fit order as compared to a low format-stage fit order. We also found that users devote more cognitive effort in their decisions when format-stage fit is high, and that this cognitive effort drives their purchase intentions.

We combine and build on cognitive fit and information foraging theories to better understand the implications of information presentation format in the context of consumer purchase decision making. Although much research has dealt with how consumers process information related to their purchase decision, this research has looked directly at why consumers may get more benefit from reviews in a one format over another depending on the decision stages.

Online videos are gaining popularity according to YouTube where about 100 hours of video is uploaded every minute. We can already observe that many reviewers (YouTubers) are now producing video-based reviews (instead of text-based reviews) of products that they have used or currently using. Many companies have realized the efficacy of online reviews in video formats (especially on YouTube) and send their products to famous YouTubers so that they will produce a video-based review of those products and share on YouTube or similar video-sharing systems. To the best of our knowledge, our study is the first that attempts to highlight the efficacy of online review formats in a dynamic purchase decision-making process. This study has implications for e-commerce industry in general and online consumer purchase context in particular. We also add significant practical implications for companies and managers by highlighting the need for promoting user reviews in different formats. Finally, we believe that this research opens new avenues of research as it highlights the importance of information presentation formats of online reviews in the context of online consumer purchase decisions.

## Limitations

In this research, we used smartphone covers, which is an instance of an experiential good in the task scenario. Results may vary for search goods (e.g., camera) because they have many more attributes that can be evaluated before consumption (Murray and Schlacter 1990; Zeithaml 1981). Although we controlled for familiarity with product and brand, we selected a product that is used by people on a daily basis. Therefore, the findings should generally hold for products with similar usability characteristics. Nevertheless, it is possible that results may vary for new innovations, disruptive goods or technologies, or even goods that people have never used or encountered before. In addition, the nature of our experimental manipulation implemented as a hypothetical gift-buying scenario, suggest caution when generalizing these results to other situations. Although a field experiment is recommended to determine real purchase behaviors, we think that by using perceptual measures our study can be considered as a valid proxy of actual behaviors in real life. Finally, we recruited college students as subject participants, and therefore the results might not be applicable to other populations. Despite the caveats associated with the use of college students as subjects (Peterson 2001), we think that subjects are representative of our target population because 1) our study is not assuming any prior knowledge about the products, 2) our study is also not considering behaviors specifically in an organizational context, and 3) our student subjects have enough experience with using computers and websites to be able to take part in the study

## Conclusions

Based on cognitive fit and information foraging theories, we propose a new construct (format-stage fit) to articulate the fit between presentation format of online reviews and purchase decision-making stage. Specifically, our theoretical development indicates that more vivid reviews, such as videos, are better suited to the choice-selection stage, while pallid reviews via text are more appropriate for the choice-reduction stage where users are shortlisting the number of alternatives. Experimental results provide support to this notion of fit and suggest that reviews are perceived to be of higher quality, stimulate higher levels of cognitive effort and lead to higher purchase intentions when their format fits the decision stage in which they are used. These findings underscore the importance of recognizing the role of review format by decision stage and pave the way for further research.

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