



## Complexity or simplicity? Designing product pictures for advertising in online marketplaces



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### ABSTRACT

In online marketplaces, many sellers highlight product and service information directly within product pictures for advertising purposes. Such a strategy increases the visual complexity of the picture and provides more information to support buyers' judgment. However, when other sellers adopt the same method, a given picture will not be conspicuous enough to be noticed. To address this issue, the concept of complexity contrast is introduced. No prior attention has been paid in literature to the interplay between visual complexity and complexity contrast. This research proposes a theoretical model to explain the influences of visual complexity and complexity contrast on buyers' pleasantness in shopping, while perceptual and conceptual fluency act as mediators. Results from a lab experiment suggest an entangled effect of complexity contrast and visual complexity, indicating that buyers are influenced more by the conspicuousness of a product picture, rather than the information conveyed by a product picture when it is visually overwhelming.

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### 1. Introduction

In online marketplaces, buyers receive a list of sellers when they search for a certain product. Within the list, a few alternatives will be selected for further evaluation. Therefore, how to increase the probability of being chosen is an important consideration for every seller. Similar to search engine advertising (Gauzente, 2010), there exist many approaches for advertising in online marketplaces, such as writing accurate keywords in the product title and purchasing sponsored positions in the result list. Moreover, since the result list shows product pictures, many sellers begin to edit their product pictures by adding extra information, making the product pictures virtually complex. This advertising method makes sense for two reasons. First, the textual information in the result list only contains basic product characteristics (e.g., title, name of seller, location, and price), while many product or service specifications that are likely to be strong influences on buyers' decisions (e.g., promotions, product features, service guarantees, and rewards) cannot be advertised due to space limitation. Thus, the product pictures become a major window for displaying these highlights. Moreover, pictures can convey information more

efficiently than textual messages (Geise and Baden, 2015). Second, by directly viewing product highlights from product pictures, buyers can save much time and effort since they can learn more about the products or services without clicking into the details pages.

The situation becomes complicated when other sellers also adopt the same advertising strategy. Too many complex pictures could cause a serious visual overload problem, which makes it difficult for buyers to locate and process product information (Mazzoni et al., 2014; Taobao, 2012). To deal with this problem, some sellers use simple pictures strategy and display only product images to attract buyer's attention. Nevertheless, the advertising effectiveness remains unclear.

The objective of this study is to evaluate the effectiveness of the advertising strategy that tries to create visual salience in terms of complexity contrast of a given picture against its surrounding pictures (referred to as visual complexity contrast hereinafter). As advertising effectiveness is closely related to buyers' processing of product information, we attribute this issue to the concept of "processing fluency" (Reber et al., 2004). This concept is related to (1) the visual search of the product picture (i.e., whether buyers notice the picture among a list of pictures), and (2) the visual complexity of the product picture (i.e., whether buyers can easily process the information contained in the product picture).

This study is expected to address several gaps in current research. First, studies on visual complexity in an online context

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focus mainly on entire web pages and banner ads (Kao and Wang, 2013; Liqiong and Poole, 2010), while other web objects (e.g., search list, product picture) have earned little attention. Moreover, regarding the experiments in these studies, researchers usually do not consider the influences of environmental setting (e.g., a set of pictures). Rather, they are only concerned about participants' perceptions of a visual object (e.g., a picture) and followed responses (e.g., recall, satisfaction) (Martin et al., 2005; Michailidou et al., 2008). Second, while the effects of different forms of visual salience (e.g., color contrast and luminance contrast) have been extensively studied, little is known about the effects of visual complexity contrast. Third, previous online marketing research emphasizes the importance of processing fluency on consumers' attitudes and behavioral intentions, while limited attention has been paid to how informational features of web objects affect consumers' processing. This study also has the potential to provide practical insights regarding dynamic adjustment of advertising strategies according to environmental changes.

The rest of this paper is organized as follows: We provide a review on visual complexity, visual complexity contrast, and processing fluency in Section 2. The conceptual framework and related hypotheses are presented in Section 3, while Section 4 describes experiment preparations. We explain the formal experiments and analysis in Section 5, discuss our findings, implications, and limitations in Section 6, and finally draw our conclusions in Section 7.

## 2. Literature review

### 2.1. Visual complexity

Visual complexity of an object (e.g., a web page or an image) refers to the number of elements presented in the object and the level of information detail conveyed by these elements (Liqiong and Poole, 2010). Currently, researchers have not reached consensus on measuring visual complexity. Some studies treat visual complexity as a first-order construct (Michailidou et al., 2008; Orth and Wirtz, 2014; Tuch et al., 2009), while others divide visual complexity into several sub-dimensions (e.g., feature and design complexity) (Pieters et al., 2010). The categorization of sub-dimensions is also different across different studies. Following these

previous studies (Tuch et al., 2012), we are primarily interested in visual complexity as subjectively perceived by users.

There has been a long debate about whether to use complex or simple design (Putrevu et al., 2004). The logic of using simple design is that consumers have limited processing ability and they seek to minimize the cognitive effort used on processing visual objects. Meanwhile, the reason for using complex design is that rich information cues facilitate the evaluation of visual objects. The literature shows results to be mixed, as some studies suggest that simple ads are better (Anderson and Jolson, 1980), while others advocate complex ads (Lowrey, 1998).

Compared with offline channels (e.g., print media and TV), consumers are more likely to be exposed to excessive information in an online context. Besides, the cost of context switching online (e.g., changing website, closing web pages) is relatively low. Therefore, it is important for designers to consider the visual complexity of web objects as it influences multiple aspects of human cognition and emotion, such as satisfaction, memory, and task performance (Geissler et al., 2006; Tuch et al., 2009).

A summary of recent work in the online context is shown in Table 1. The effects of visual complexity have been explored from various aspects, including different types of websites (e.g., general or commercial) and different web elements (e.g., the whole web page or a single web page element). However, there exist two points that require more attention. First, the majority of work is devoted to evaluating the complexity of web pages and banner ads, while study on other web objects is limited. Specifically, no studies have examined on how to determine the level of visual complexity of a web object according to its context on the page (e.g., a seller's product picture in a list of competitors' product pictures). Studies on human attention suggest that the salience of a visual object is not only determined by its own design, but also by its contrast to other objects in the same setting (Gauch et al., 2007; Matt et al., 2014). Second, most studies tend to evaluate human responses to an object (e.g., a banner ad) with a given level of visual complexity. Since sellers in online marketplaces use product pictures to highlight product attributes, it is reasonable to take the buyer's attitude towards the product into account, rather than only considering her affective response (e.g., perceived beauty) to the product picture.

**Table 1**  
Summary of recent studies on visual complexity in online context.

Study	Context	Complexity variable	Level of analysis	Descendant variables
Mosteller et al. (2014)	E-commerce website	Perceptual fluency (Information Intensity)	Page	Satisfaction, Cognitive Effort, Positive affect
Mai et al. (2014)	General website	Website Complexity	Page	Perceived speed, Ease of navigation, Perceived control, Focused attention, Enjoyment, Attitude
Kao and Wang (2013)	E-commerce	Complexity	Banner ads	Preference
Tuch et al. (2012)	Company website	Visual complexity	Page	Perceived Beauty
Cui et al. (2012)	News & E-commerce	Complexity (Component, Coordinative, Dynamic)	Page	Satisfaction, Cognitive Style
Liqiong and Poole (2010)	General	Visual Complexity	Page	Arousal, Pleasantness, Approach-Avoidance Behavior
Tuch et al. (2009)	General	Visual Complexity	Page	Arousal, Valence, facial expression, nervous system
Jala Krishen et al. (2008)	General	Actual complexity Perceived Complexity	Page	Satisfaction, Website Liking
Michailidou et al. (2008)	Various Type	Visual complexity	Page	Aesthetic appearance (5 dimensions)
Nadkarni and Gupta (2007)	Various Types	Complexity (Component, Coordinative, Dynamic)	Page	Satisfaction, Familiarity, Task Type
Guo and Scott (2006)	E-commerce	Complexity(overall, presentation, navigation)	Page	Flow experience (7 dimensions)
Geissler et al. (2006)	E-commerce	Complexity	Page	Attention, Attitude, Purchase Intention
Yun Yoo and Kim (2005)	General	Animation	Banner ads	Attitude, Memory, Recall
Martin, et al., (2005)	E-commerce	Visual Complexity	Page	Need for cognition, Sensation seeking, Attitude, Intention
Huhmann (2003)	General	Visual Complexity	Banner ads	Recall

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