



# The paradox of simplicity: Effects of role on the preference and choice of product visual simplicity level

Eleanor Eytam<sup>a,\*</sup>, Noam Tractinsky<sup>b</sup>, Oded Lowengart<sup>b</sup>

<sup>a</sup> Shamoon College of Engineering, 84 Jabotinski Street, Ashdod 77245, Israel

<sup>b</sup> Ben-Gurion University of the Negev, P.O.B. 653, Beer-Sheva 8410501, Israel

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## ABSTRACT

Human-computer interaction (HCI) experts advocate simplicity as a key factor in designing usable products. Some observations, however, suggest that people actually prefer complex interfaces to simpler ones. This gap between advocated design guidelines and observed behavior, referred to as the paradox of simplicity, can be explained by the person's role vis-à-vis the interactive product. Role, i.e., whether the person involved is in the capacity of a user or a consumer, influences motives for interacting with visually simple or complex products and in turn influences preference and choice of these products. We examine how interactive products, different in their visual simplicity levels (VSLs), are evaluated for ease of use, functionality, and aesthetics – while the simple end of the continuum is perceived as easier to use, the more complex end of the continuum is perceived as more functional. Role affects preference and choice of a design. In their role as users, participants chose simplicity more often than those in the role of consumers. Aesthetics was a consistent predictor of preference regardless of VSL or role. The contribution of this work lies in unravelling the effect of VSL on the perceived quality of interactive products, and in the effect of role on preference and choice of these products. The implications of this analysis suggest that simplicity of interactive products is not necessarily a required or appreciated design feature.

## 1. Introduction

Simplicity in human-computer interaction (HCI) has proven to be a successful marketing strategy for interactive products, led mainly by Apple's "aesthetic revolution" and the apparently simple interface of the Google search engine. The Philips Electronics slogan promising "sense and simplicity" echoes this sentiment. Still, the inherent complexity of interactive products stands at odds with the simplicity advertised by the manufacturers and marketers of those products. Anecdotal evidence and a growing body of research suggest that consumer products sell better if they appear complex and feature-laden. Consumers pay higher prices for products with many features (Goodman and Irmak, 2013) even though they do not use all the features of the products they buy (Ammirati, 2003). This trend was also reported by Norman (2007), based on anecdotal findings, for South Korean consumer electronics.

People often times prefer complexity over simplicity because adding each additional feature to an interactive product makes it look more capable (Brown and Carpenter, 2000). Still, business experts warn

against a *Complexity Crisis* (Mariotti, 2008). They argue product features proliferation that happens because manufacturers and retailers are trying to maximize their initial sales, is harmful to consumers' long-life value when a complex system is no longer innovative in the eyes of consumers but remains complicated to use (Collinson and Jay, 2012). Complexity is suggested to have a significant influence on users' attitudes and intentions (Bruner and Kumar, 2000; Reinecke et al., 2013; Stevenson et al., 2000). Complexity was found to be the most widespread concern among respondents (Higgins and Shanklin, 1992). It was suggested to cause feature-fatigue because feature-laden products frustrate users and damage satisfaction (Goodman and Irmak, 2013; Thompson et al., 2005). These negative feelings towards complexity may reduce repurchase probabilities.

In this paper, we try to unravel how simplicity and complexity influence preference and choice of interactive products. We refer to the conflict between what some experts advocate that people need and what people actually choose in the marketplace, as *the paradox of simplicity*. The paradox of simplicity states that while simplicity supposedly enhances performance and helps people achieve their

\* Corresponding author.

E-mail addresses: [elinoet@sce.ac.il](mailto:elinoet@sce.ac.il) (E. Eytam), [noamt@bgu.ac.il](mailto:noamt@bgu.ac.il) (N. Tractinsky), [odedl@bgu.ac.il](mailto:odedl@bgu.ac.il) (O. Lowengart).

goals, they may not necessarily prefer or choose the simplest alternative. Simplicity constitutes one end of a Visual Simplicity Level<sup>1</sup> (VSL) continuum. Complexity is at the other end of this same continuum. We argue VSL is a potent design element that influences the evaluation process of products. We further suggest that motivation, i.e., whether the person involved is in the capacity of a user or a consumer, influences VSL preference and choice, thus creating what seems to be a paradoxical design choice. Because users and consumers have different goals and expectations from products (Coates, 2003), they have different preferences regarding the interaction with visually simple or complex products.

We organize this work as follows: first we explore the theoretical background of the concepts used in this paper, and suggest three possible resolutions for the paradox of simplicity. We then propose a model to explain how the simplicity or complexity of the design influences attribute perception, which in turn influences preference and choice of an interactive product. Next, we describe the study's method, including the results of a pilot study that helped in constructing research stimuli and measures. Section 5 reports the study's results and the findings are discussed in Section 6. Section 7 discusses research limitations and future research.

## 2. Theoretical background

Simplicity is considered a leading design principle (e.g., Karvonen, 2000; Maeda, 2006; Mollerup, 2006, 2015). As such it is suggested as a paramount criterion for good design. In psychology, Gestalt theory suggests simplicity as a key law for visual design. American aeronautical engineer Kelly Johnson, when suggesting that simplicity facilitates most systems, coined the KISS acronym, encouraging political campaigns, as well as corporate management, to “Keep it simple, stupid!” (Rich, 1995). This precept follows the philosophical principle of Occam's razor, which states that entities are not to be multiplied unnecessarily (Moody, 1967). The interpretation of simplicity in design is to remove as many unnecessary elements as possible (Maeda, 2006).

Human Computer Interaction (HCI) experts (e.g., Colborne, 2010; Maeda, 2006; Nielsen, 1999; Norman, 1988; Segall, 2012) embrace simplicity as a leading design guideline for interactive products. They advocate designing simple user interfaces (UIs), as these promote ease of use (e.g., Nielsen, 1999; Norman, 1988). Still, removing elements from the design in order to make it simple to use, often requires removing some of its features. The reduced functionality, though, is not always appreciated by people (Thompson et al., 2005). In Section 2.1 we elaborate on the different facets of simplicity in interactive products' designs. We start with the visual meaning of a simple interactive product design, we elaborate on the effect of simplicity on instrumental product attributes, and explore the aesthetic implications of VSL. Finally, we depict how role may influence preference and choice of interactive products.

### 2.1. The subjectivity of visual simplicity level (VSL) of interactive products

Nadkarni and Gupta (2007) differentiate between objective and perceived complexity in websites. Objective complexity relates to cues in the stimulus itself, whereas perceived complexity relates to the individual's subjective perception of the design. Relying on this differentiation between objective and perceived VSL, we suggest that in pre-use situations, people tend to rely on perceived VSL in order to determine their preference and choice of products. Pre-use situations are those in which people do not have a chance to try the product, and

therefore have to rely on its visual design for evaluation. These situations are frequent, for example, when consumers are in an electronics shop examining several models of the same product they plan to buy, or when users have several models of the same product to choose from in order to complete a task. In these situations, because people do not directly interact with the product, we argue that the information available for evaluation is retrieved from design elements. It is therefore the perceived complexity of the product that influences the evaluation process rather than objective measures that can be acquired by trying the product out.

### 2.2. The instrumental implications of VSL

Ease of use and functionality are key determinants that comprise the pragmatic quality of a product, which is the product's perceived ability to support the achievement of do-goals (Hassenzahl, 2003). Similarly, ease of use and functionality comprise the instrumental dimension in artifact analyses suggested by Rafaeli and Vilnai-Yavetz (2004). By functionality we refer to the number of features included in the product. The product's functionality bears upon its perceived usefulness, a key component of the technology acceptance model (TAM). Together, perceived ease-of-use and perceived usefulness explain IT usage and individual technology adoption (Davis, 1989).

The visual simplicity level of the products' design can be analyzed from two perspectives, *structural* and *behavioral*. Each perspective influences the perception of ease of use and functionality of interactive products in a different manner. The *structural* perspective (see Fig. 1A) follows Mollerup's (2006, 2015) analysis of simplicity. Mollerup relates to the number of elements included in the design as a qualitative measure of VSL. From this perspective, simplicity is achieved by reducing the number of controls to the necessary minimum (Maeda, 2006). The ideal design in that sense is the one-button design where the use of one control fully supports completing a task goal (Antwood, 2012). The *behavioral* perspective (see Fig. 1B) follows Nadkarni and Gupta's (2007) definition of perceived dynamic complexity, and relates to the clarity of action outcome. Because each control can be mapped to more than one action by different use of that control (e.g., a click, a double click, a slight or a full turn), the behavioral analysis relates to the number of actions required to complete a task goal. From this perspective, simplicity is achieved by reducing the number of actions to the necessary minimum, even at the price of adding more controls to the product's design (Norman, 1988).

We suggest that in pre-use situations, because usage considerations are less salient when people do not have the opportunity to try the product, people tend to rely on a structural analysis as a cue to the instrumental qualities of the product (e.g., Creusen and Schoormans, 2005).

### 2.3. The aesthetic implications of VSL

VSL is a potent factor in determining aesthetic appeal (Mollerup, 2006, 2015). Its effect on aesthetic appraisals takes place within a split second of seeing the design (Lindgaard et al., 2006; Tractinsky et al., 2006). The number of controls included in a product's design influences the aesthetic perception of that product because VSL has aesthetic implications (Karvonen, 2000). Because the aesthetic value of either simplicity or complexity is influenced by cultural context, both simplicity and complexity can be perceived as having high aesthetic value, depending on the attitude and perception of the beholder. For example, minimalism is an art and design movement that argues that the simplest and fewest elements create the maximum effect (Asencio Cerver, 1997). The idea of the high aesthetic value of simplicity appears in many cultures, most notably in Japan (e.g., Saito, 2007) and Scandinavia (e.g., Mollerup, 2006, 2015). In contrast, in other cultures, such as some Asian cultures, it is complexity and dense visual activity that are considered aesthetic (Wroblewski, 2006). Reinecke and Gajos

<sup>1</sup> Other papers focusing on the simplicity-complexity continuum relate to VSL as visual complexity (VC) (e.g., Reinecke et al., 2013; Tuch et al., 2012). We focus on the simplicity of the product we refer to and stress the simplicity end of the continuum.

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