

Larger Screen, Inaccurate Perceptions: Investigating Visual Framing Effects on Online Shoppers' Product-Size Estimation

ABSTRACT

Incorrect size is often a principal reason behind e-commerce returns. This research investigates the visual framing effects of screen size on e-shoppers' accuracy of product-size estimations. Three experiments reveal the mechanism behind screen size effects and inform practical recommendations about optimization of e-retailers' websites.

Keywords: consumer confidence, device type, online shopping, product size evaluation, screen size, visual perception

HONOR STATEMENT

The authors confirm that (a) the presenting author is not listed as a presenter in more than two sessions in total, and (b) that the submission has not been submitted to multiple tracks, has not been previously presented at ACR, and has not been published or accepted for publication in any journal (including online publications and full-paper publications in conference proceedings).

INTRODUCTION

As size issues are a common complaint for returns of online purchases (Reagan 2019), accurate product-size evaluations emerge as a key challenge for consumers and retailers, particularly as consumers nowadays use various devices for online shopping. We believe that the size of consumers' digital space, which varies by device type, may influence their accurate product-size estimations. However, screen-size research on the accuracy of online shoppers' visual information processing remains scant. Screen-size effects have been studied mostly in non-e-commerce environments, where a larger screen has been shown to positively influence consumers' emotional responses toward TV clips (Lombard et al. 2000; Reeves et al. 1999) and advertisements (Kim and Sundar 2016). In three experiments, we examine the impact of screen size on consumers' product attitudes, confidence, and product-size estimation errors, in e-commerce settings.

THEORETICAL BACKGROUND & HYPOTHESES

According to visual frame theories (Künnapas 1955; 1959), the larger a square-shaped frame surrounding an object is, the shorter and thinner the object is perceived to be (Künnapas 1955). As a computer screen may work as a visual frame, we propose instead that larger-screen (e.g., PC) users perceive products to be larger than small-screen (e.g., smartphone) users (**H1**), as most websites tend to proportion the size of product images automatically.

Larger screens induce higher levels of excitement (Lombard et al. 2000) and arousal (Reeves et al. 1999) when viewing TV content. Similarly, online shopping using a large screen may lead to more positive product attitudes (**H2a**). We also expect that hedonic motivations (vs. utilitarian) strengthen the positive screen-size effects on attitudes (**H2b**) because hedonic-driven shopping experiences are perceived more positively (Childers et al. 2001; van Noort et al. 2012). As a larger screen leads to more positive affect in non-ecommerce settings (e.g., Lombard et al. 2000), large-screen users may pay less attention to product details, resulting in less accurate estimations (**H3a**), and this heuristic, rather than cognitive, effect may be stronger with hedonic shopping motivations (**H3b**).

Furthermore, a larger display holds more information (Dilon et al. 1990), making it easier to review lengthy product specifications, which may increase consumers' confidence about their decisions (Wang et al. 2015), as does product fluency (Deng et al. 2016; Tsai and McGill 2011). Therefore, in online shopping, a large screen may increase confidence about product size (**H4a**), and familiarity with products may strengthen the effects of screen size on the accuracy of product-size estimations (**H4b**). Finally, we propose that large-screen users' positive product attitudes and stronger confidence about the product size mediate the impact of screen size on product-size estimations, resulting in less accurate product-size estimation (**H5**).

EXPERIMENT 1: BASIC SIZE ESTIMATION

Experiment 1 involved a one-way between-subjects design (small 14"/large 22" screen), with 93 individuals (49.5% women; 83% aged 18–24). To test base effects, participants estimated sizes (in inches) for an identical set of basic black-colored shapes (rectangle, oval, triangle, line) and indeed perceived them all to be longer in the large screen condition ($F(1, 92)=22.37, p<.0001$), confirming H1.

EXPERIMENT 2: PRODUCT FAMILIARITY

To examine screen-size effects when evaluating product sizes, we used a 2 (screen size: small/large)×2 (product familiarity: familiar/unfamiliar) between-subjects design, with 150 individuals (42% women; 37% aged 25–34). The product familiarity manipulation was successful ($p < .0001$). Large-screen users were less accurate only in unfamiliar conditions ($p = .024$), supporting H4b. They were also more confident about their estimations ($F(1, 146) = 25.20, p < .0001$), supporting H4a, in both familiar ($p < .001$) and unfamiliar conditions ($p = .01$). The mediation analysis (PROCESS; model 6; 10,000 bootstrap samples; Hayes 2018) showed a significant serial mediation effect ($b = .45, CI 95\% [.002, 1.25]$) of attitudes and confidence between screen size and product-size estimation, supporting H5.

EXPERIMENT 3: SHOPPING MOTIVATIONS

To test the role of shopping motivations, we used a 2 (screen size: large/small)×2 (shopping motivation: hedonic/utilitarian) between-subjects design with 169 individuals (53.3% women; 48% aged 35–44). The manipulation was successful; the hedonic condition found the task more fun ($p = .008$). Large-screen users displayed more positive attitudes ($F(1, 165) = 11.28, p = .001$), and even more so with a hedonic motivation ($p = .001$), supporting H2a and H2b. Large-screen users made less accurate product-size estimations ($F(1, 165) = 7.95, p = .005$); this was significant in hedonic conditions only ($p < .003$), supporting H3a and H3b. Large-screen users also felt more confident about their estimations ($F(1, 165) = 20.72, p < .001$) in both hedonic ($p < .001$) and utilitarian conditions ($p = .018$), supporting H4a. The proposed serial-mediation analysis (PROCESS; model 6; 10,000 bootstrap samples; Hayes 2018) was not significant.

GENERAL DISCUSSION AND IMPLICATIONS

Overall, this research introduces screen sizes as online retail cues that influence the accuracy of product-size evaluations in e-commerce. Larger screens led to more positive attitudes, stronger confidence, and less accurate size estimations. Moreover, our findings are also in line with the previous findings on the positive associations between screen size and emotional responses in non-e-commerce settings (e.g., Chae and Kim 2004; Lombard et al. 1997; Kim and Sundar 2014, 2016).

The findings highlight that screen size functions like a visual sensory cue, influencing customers' emotional status and ultimately product evaluations. Businesses should improve the experience of consumers using smaller screens by providing tools to improve their confidence. Providing more videos may enable businesses to better promote products to small-screen users while advanced technologies (e.g. AR) may also help businesses in reducing negative screen-size effects and increasing consumer confidence.

Future research may want to examine visual framing effects on different visual measures such as volume estimation, whether such screen size effects are consistent in VR/AR environments, and whether they have spill-over effects on offline product evaluations.

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