The Effect of Digital Nudging Techniques on Customers' Product Choice and Attitudes towards E-Commerce Sites

Emergent Research Forum Paper

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Abstract

Digital nudging is receiving increasing attention by academics and practitioners in recent years. In this research, our main goal is to determine the relative impact of different nudging techniques on the customers' product choice processes and their attitudes towards e-commerce sites employing these techniques. Specifically, we are interested in the interaction effects of defaulting, customer reviews (star ratings of products) and purchase pressure cues with the centrality choice bias. Prior research has predominantly investigated nudging techniques or positioning effects in separation. We try to fill this gap and explore possible interaction effects in an eye-tracking experiment. In our study, we plan to research not only the effects of digital nudging techniques on product choice, but also in how far they shape users' attitudes towards an e-commerce site.

Keywords

Digital nudging, central fixation bias, product choice, defaulting, pressure purchase, star rating.

Introduction

Digital nudging refers to designing elements of user-interfaces in a way that influences users' behaviour in digital choice environments. Choice environments require judgements and decisions to be made by their users – challenges that humans are facing every day, whether they are buying products in an online shop or filling out online forms for e-government or e-banking. Increasing usage of information technologies - social networks, e-commerce web sites, smartphone applications, etc. - has augmented our lives with constant decision making in virtual, online environments. The outcome of any choice a user makes is influenced not only by his/her rational reasoning as a homo-economicus, but also by the design of the choice environment, in which information is presented (Weinmann et al. 2016).

Until recently, research has focused on investigating nudges in offline choice environments. Today, there is an increasing interest in the topic of digital nudging in the information systems research community (Mirsch et al. 2017; Weinmann et al. 2016). Designers of online choice environments attempt to influence people's choices: for example, by encouraging people to behave more socially responsible, to protect the environment or to adopt a healthier lifestyle. During the creation of such choice environments, designers, or choice architects, use different nudging techniques such as defaulting, partitioning options based on different attributes or star ratings (Johnson et al. 2012). Mirsch et al. (2017) have identified 20 different underlying psychological mechanisms which are used in the nudging field, ranging from framing to social norms, anchoring and priming. Thus, digital nudging also relies on various cognitive stages of information processing. Consumers are exposed to a high number of stimuli, but their cognitive resources are limited (Kahneman 1973). Nudges exploit humans' natural tendency to use cognitive heuristics and decide quick and automatic, thus reducing their cognitive effort in comparison to weighting all information and making a complete conscious, slow and effortful rationale decision (Evans 2008). In this paper, we are specifically interested whether popular digital nudging techniques in e-commerce as user ratings, scarcity, limited offers and defaults interact with position effects. Position effects as the central choice bias are

rooted in differences in visual attention attributed to different places on the screen. While prior research has investigated single nudges in separation, we are interested in comparing their relative effectiveness and their interaction with positioning effects. We want to investigate their impact on product choice as well as whether they influence the users' assessment of an e-commerce site. If users are aware of specific nudging elements used in an e-commerce site, this awareness will also shape their attitudes about the persuasion strategy used by the respective marketers (Friestad and Wright 1994). Users for instance judge whether a marketer acts in his/her own self-interest or in the interest of a consumer.

Background and Hypotheses Building

Central Choice Bias

Visual attention is a central influence factor for product choice when consumers choose from an array of options online. Customers are constantly exposed to horizontally or vertically arranged arrays of products in various contexts, such as snack bars or drinks presented in a vending machine or on market shelves. Christenfeld (1995) showed that people tend to choose items which are in the middle from identical options in several contexts (i.e. products from the middle two shelves instead of the first or last row in a supermarket; the middle bathroom stalls or toilet paper dispensers in a public restroom). Similarly, Shaw et al. (2000) demonstrated that when making a choice between alternatives, participants consistently prefer the middle option.

Also, recent eye-tracking studies found that a product located in both vertical and horizontal centres is more likely to be chosen and to attract the consumers' attention. Atalay et al. (2012) demonstrated the (horizontal) centrality choice bias via eye-tracking and their results were later replicated by Greenacre et al. (2016). The product in the centre receives more attention through the gaze. Humans tend to give higher visual attention to the middle of a computer screen, irrespective of other image features and often start information processing from the centre (Tatler 2007). One possible explanation why the (visual) central fixation bias leads to a higher probability to choose a product placed in the centre is that "the more the individuals look at a stimulus, the more they like it" (Atalay et al. 2012, p. 851).

Our aim in this research is to determine the strength and relevance of the central choice bias in combination with other nudging techniques when users are choosing from products presented in arrays on the screen in an e-commerce site. We expect nudging techniques as user ratings to carry higher informational value on the quality of a product in the consumers' point of view and thus expect them to guide users' attention and choice more strongly than central choice bias.

- Hypothesis 1: Star ratings (H1a), purchase pressure cues (H1b) and defaults (H1c) will affect product choice more strongly than central choice bias.

User Ratings

Online consumer reviews and ratings of products are widely used and significantly influence consumers' purchase decisions (Babić Rosario et al. 2016). Because of that, they have attracted high attention from both researchers and marketers. Customers do not have to solely rely on advertising messages to acquire information about products anymore, but they can include online reviews of other buyers in their decision-making process.

Burnkrant and Cousineau (1975, p. 214) have demonstrated the effect of informational social influence in shopping situations and concluded that "people use others' product evaluations as a source of information about the product". Influenced by positive ratings of others they perceive a product to be better.

A study based on real sales data (in comparison to proxy measures as intention to buy) found that purchases increased for products rated up to 4.2-4.5 stars, but then slightly decreased for even higher ratings from 4.5 to 5 points (Maslowska et al. 2016).

- Hypothesis 2: Products with higher star ratings will be chosen more often.

Based on the additional information reviews provide for consumers, we expect them to influence users' evaluation of e-commerce sites positively.

- Hypothesis 3: E-commerce sites using consumer ratings will be evaluated more favourable than e-commerce sites that are not using consumer ratings.

Purchase Pressure Cues

Purchase pressure cues are used to motivate customers to complete a purchase by signalling them that either time left for a deal or availability of a product are limited. We are constantly surrounded by sale events and reduction offers, special deals, hot deals, etc. Prominent examples that include scarcity are e.g., deal of the day offers and warnings like "In high demand - only 1 room left!" at booking.com or the countdown clock at eBay. Amirpur and Benlian (2015) have found that limited time pressure cues increased the probability to choose an option, while limited availability did not have such an effect. One possible explanation is that while limited product availability heightens the value of a product in offline settings (Byun and Sternquist 2012), it does not to have the same credibility online. Thus, we focus on time-related pressure in our study, as it has been proven to be an effective online nudging technique.

- Hypothesis 4: Products with time-related purchase pressure cues will be chosen more often than products without time-related purchase pressure cues.

Amirpur and Benlian (2015) explain the significant effect of time pressure on buying behaviour by the users' arousal and perception of stress and their anticipated loss of not buying. Therefore, we hypothesize that such negative emotions are likely to lower users' evaluation of e-commerce sites.

- Hypothesis 5: E-commerce sites using purchase pressure will be evaluated less favourable than e-commerce sites that are not using purchase pressure.

Defaulting

Defaulting is a widely used and powerful nudging technique. A default is defined as the "the alternative the consumer receives if he/she does not explicitly request otherwise" (Brown and Krishna 2004, p. 530). The "default effect" (also referred to as default heuristic) was experimentally proven in a variety of experiments, showing that by making something a default option one can increase its chances to be chosen (Steffel et al. 2016). Defaults have strong effects on real-world choices, as demonstrated in various domains including investments, insurance, and organ donation.

There are many different explanations of the "default effect"; possible underlying psychological mechanisms are: cognitive effort for choosing an option (effort to evaluate e.g., conflicting and seemingly equivalent options), switching costs (e.g., effort to search for additional information) or loss aversion (default acts as a reference value and other options might be perceived as a loss).

Based on the previously mentioned research and human avoidance of additional cognitive effort and potential losses, the following hypothesis is thus generated:

- Hypothesis 6: Defaulted products will be chosen more often than non-defaulted ones.

If consumers have the impression that a nudge is set to serve the default-setters interest, they may judge the online shop as less trustworthy (Steffel et al. 2016). However, if users interpret defaults as "the best choice", they may appreciate the effort of an e-commerce site designer to ease their cognitive effort and evaluate the shop more positively.

- Hypothesis 7: E-commerce sites using defaults will be evaluated more favorable than e-commerce sites not using defaults.

Future Research Plans

We plan to carry out an experimental eye-tracking study to test our hypotheses. In the eye-tracking set-up it will be important to randomize the position of pre-trial fixation markers instead of a central marker. By using eye-tracking we can get detailed insights into how gaze patterns form during the choice process and determine how the central fixation bias interacts with other nudging techniques and influences visual attention.

The study will consist of two parts. Part one of our experiment will investigate interaction effects of the central choice bias with three other nudging techniques: star ratings as a social nudge, time pressure cues (e.g. countdown timer of 1 minute) and defaults. At the beginning of the experiment, participants will be asked to take a look at the product selection page (3x3 planograms) and choose one product presented to them. We intend to use products unknown to consumers, e.g., tea bags with Asian script as inspired by Huh et al. (2014). There are too many options to use a full-factorial-design. Therefore, we will investigate whether participants switch from the middle option to products on the left/right, if a nudging technique is used. Participants in the baseline group will be presented with selection pages in which the products in the middle are nudged (group 1: a 4.5-star rating; group 2: a time pressure cue, group 3: a default product), while products on the left and right have lower star ratings, no time-pressure and are not set as default. The experimental groups will receive product selection pages in which star ratings are higher for products on the left/right than in the middle and time-pressure or defaults will be only used for either products on the left or right. Figure 1 shows two example screens of the experimental material.

Part two of the experiment will include scales for measuring consumers' attitudes towards the e-commerce site, e.g. trusting beliefs (Wang and Benbasat 2008), shopping pleasure and likelihood to make a purchase from the store (Chang 2011).

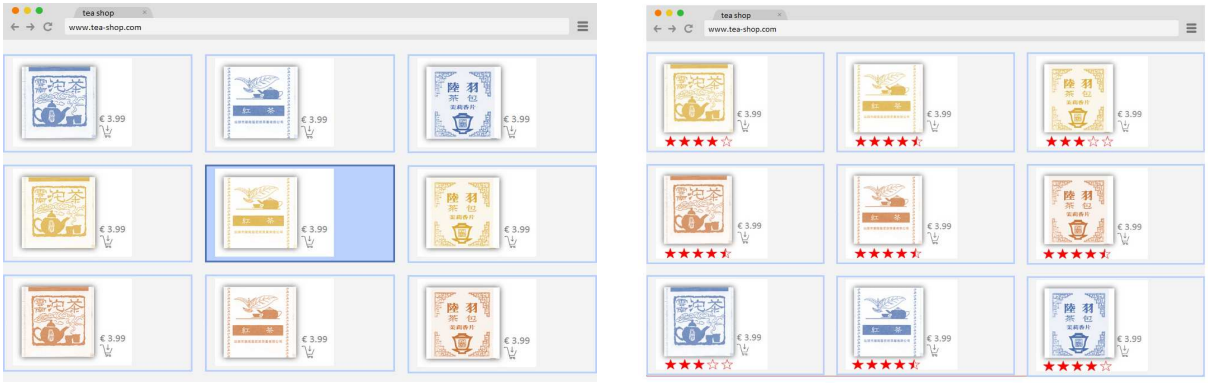

Figure 1. Examples from the Experimental Material

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