Investigating the Effect of Persuasive Design on Online Users’ Persuasion Awareness

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Investigating the Effect of Persuasive Design on Online Users’ Persuasion Awareness

*Research-in-Progress*

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**Abstract**

Due to the growth of Big Data and associated technologies, persuasion practices in online settings have been increasing. However, the use of technologies is a two-edged sword. Technologies can be used to influence users without their awareness of being persuaded, making them more vulnerable to such influence. Recently this concern has been more pronounced due to the revelation of Facebook’s target ads sponsored by the Russian government during the 2016 US presidential election. Despite its importance, persuasion awareness has received less attention in IS research. As technologies have been embedded throughout online platforms and provided more insights about their users, there is a substantial possibility persuading users via the use of technology design. Thus, the likelihood of being persuaded without awareness will increase. To this end, we aim to address the two specific research questions: What are key forms of persuasive design which influence online users’ persuasion awareness? How does persuasive design form influence online users’ persuasion awareness and behavioral responses?

To answer these questions, we apply Persuasion Knowledge Model which explains persuasion awareness in the offline context and personalization literature to outline how online users perceive and respond to a persuasion attempt triggered by persuasive website design. Drawing on Decision Support System, we identify three forms of persuasive design in online settings—suggestive, informative, and supportive design. We expect that this research will provide a theoretical model to enhance understanding of online users’ persuasion awareness and inform website designers to design websites which promote users’ informed judgments and decisions.

**Keywords:** Persuasive technology, persuasion awareness, personalization, online websites
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Research-in-Progress

Introduction

With the continued growth of Big Data and associated technologies such as Artificial Intelligence (AI) (Walker 2017), persuasion practices in online settings are on the rise. For example, Facebook uses AI to gain information regarding users’ preferences and behaviors, thus providing promising ways to influence the users such as suicide prevention (Isaac 2016). As AI and personalization technologies help companies understand online users better, companies can better deliver the right content to the right users (Andrews 2017). However, there are ethical concerns associated with technology use (Bossman 2016). Of particular interest to our research is the effect of persuasive design powered by technologies on online users’ attitudes and behaviors. An attempt of technologies to influence users can be perceived either as good or as bad, depending on whether technologies serve users’ needs or their designers’ interests. If users perceive that technologies try to help them, they are more likely to accept such an attempt. Otherwise, they are more likely to resist it. However, this requires users to be aware of the persuasion attempt triggered by technologies. The important issue here is on whether users recognize and interpret technology design as a persuasion attempt. Consequently, there is a concern that technology design can influence users without their awareness.

Very recently, this concern has been more pronounced due to the revelation of Facebook’s target ads sponsored by the Russian government during the 2016 US presidential election (Solon and Siddiqui 2017). Although persuasion awareness is an important issue, such as in interactions between customers and salespersons, it has received less attention in IS research. As more and more companies are investing in technologies such as AI (Gartner 2016), there is a considerable potential of technology design to persuade online users, hence increasing the likelihood of users being persuaded without their awareness of such attempts. To better understand online users’ persuasion awareness, we aim at addressing two specific research questions: 1) What are key forms of persuasive design which influence online users’ persuasion awareness? 2) How does persuasive design form influence online users’ persuasion awareness and behavioral responses?

To answer these questions, we develop a theoretical model of persuasion awareness in online settings. We will test the proposed model in the context of e-commerce website, as many forms of persuasive design are extensively used in this context. The website serves as an agent of persuasion attempts, whereas website users are the target of persuasion attempt. Specifically, we apply Persuasion Knowledge Model (PKM) to identify the main constructs, namely perceived persuasive intent of website and perceived assistive intent of website, and to explain how persuasive website design influences online users’ perceived persuasive and assistive intent and thus behavioral responses. Next, building on Decision Support System (DSS) research, we identify three forms of persuasive design: suggestive, informative, and supportive design. We propose that persuasive design form will influence users’ perceived persuasive intent of website. Drawing on the personalization capability of technologies, we argue that a fit between persuasive design form and users’ preference will affect users’ perceived personalization and thus perceived assistive intent of website. Perceived persuasive and assistive intent of website will affect users’ attitudes and behaviors. Figure 1 depicts the theoretical model. Table 1 describes theoretical constructs. We expect that this study will enhance understanding of online users’ persuasion awareness and thus can inform researchers and website designers to design websites (e.g., e-commerce websites and social networking sites) which make users better informed.
Figure 1. A Theoretical Model of Persuasion Awareness in Online Settings

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggestive design</td>
<td>Suggestive design offers to users a recommendation regarding what to do (e.g., algorithm-based recommendations).</td>
</tr>
<tr>
<td>Informative design</td>
<td>Informative design provides information relevant to users’ decision tasks without suggestions (e.g., topic information, social information).</td>
</tr>
<tr>
<td>Supportive design</td>
<td>Supportive design provides functionality in facilitating online users to make decisions (e.g., sort, filter).</td>
</tr>
<tr>
<td>Perceived assistive intent</td>
<td>Users’ perception that the website tries to help them to fulfill their own goal</td>
</tr>
<tr>
<td>Perceived persuasive intent</td>
<td>Users’ perception that the website tries to persuade them to fulfill its goal</td>
</tr>
<tr>
<td>Topic preference</td>
<td>Users’ prior attitudes toward a topic (e.g., a product or service in the e-commerce context)</td>
</tr>
<tr>
<td>Social preference</td>
<td>Users’ social influence susceptibility or the degree to which users’ decision are vulnerable to others’ behaviors</td>
</tr>
<tr>
<td>Decision strategy preference</td>
<td>Users’ prior attitudes toward the strategies they adopt to come up with a final decision</td>
</tr>
<tr>
<td>Perceived Personalization</td>
<td>The degree to which a website provides persuasive design form that fits online user’s preferences</td>
</tr>
<tr>
<td>Attitudes</td>
<td>Users’ attitudes toward the website</td>
</tr>
<tr>
<td>Behaviors</td>
<td>Users’ behaviors (e.g., product or service purchase decision in the e-commerce context)</td>
</tr>
</tbody>
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Table 1. Construct Definition
Literature Review and Hypotheses Development

**Persuasion Knowledge Model (PKM)**

Persuasion is defined as an attempt to influence people's attitudes and/or behaviors (Petty and Cacioppo 1981). IS research has explored the role of IT design in influencing users' attitudes and behaviors. For example, Angst and Agarwal (2009) designed the message to persuade users to adopt electronic health record drawing from Elaboration Likelihood Model (ELM, Petty and Cacioppo 1986). Although considerable research has explored how to design IT to influence users, less attention has been paid to the effect of IT design on users' persuasion awareness. The term “persuasion awareness” refers to individuals' beliefs regarding whether or not an entity is trying to persuade them. Persuasion Knowledge Model (PKM) developed by Friestad and Wright (1994) sheds light on how individuals are aware of the persuasion attempt generated by the persuasion agent. They coined the term “persuasion knowledge” which is one type of individuals’ three knowledge structure. Knowledge refers to what individuals believe, rather than objective facts, and can be developed over time through persuasion education, persuasion engagement, or persuasion observation. According to PKM, three types of individuals’ knowledge are 1) “persuasion knowledge” defined as individuals’ beliefs regarding persuasion tactics persuasion agents use, 2) “agent knowledge” defined as individuals’ beliefs (e.g., trusting beliefs) regarding the persuasion agent's competencies and goals, and 3) “topic knowledge” referring to individuals’ beliefs concerning the topic of persuasion (e.g., products, political candidates). According to PKM, when individuals are exposed to the persuasion attempt (e.g., an advertisement) created by the persuasion agent (e.g., a company), individuals do not always interpret the agent's action as a persuasion attempt. This interpretation depends on their knowledge, specifically persuasion knowledge. Individuals’ persuasion knowledge which involves lay theories about persuasion tactics has already been embedded in their mind. However, this type of knowledge requires accessibility to make individuals aware of the persuasion attempt (Campbell and Kirmani 2000; Wei et al. 2008). Without the activation of their persuasion knowledge, individuals are less likely to perceive the agent’s action as a persuasion attempt.

PKM argues that when individuals are aware of the persuasion attempt, they will engage in coping behaviors ranging from acceptance to reactance. The underlying reason of coping behaviors is to achieve individuals’ own goals. If the individuals who are aware of the persuasion attempt perceive that this attempt can help them achieve their goals, they will be more likely to accept it. Otherwise, they will engage in resistance to the persuasion attempt. Extant research clarifies this notion. For example, Robertson and Rossiter (1974) demonstrate that there are two types of attribution of the persuasion attempt—perceived assistive intent and perceived persuasive intent. In their study, they focus on how children perceived the TV commercial programs and examine the effect of developmental factors and cognitive factors on children's perceptions. Drawing on attribution theory, they specify perceived assistive intent reflecting perceptions that the program aims at helping the audience to understand the agent or the topic and perceived persuasive intent aligning with the PKM's persuasion awareness. They found that perceived assistive intent of the program increased its positive impact on children’s attitudes and behaviors, while perceived persuasive intent decreased its positive impact. As another example, Campbell (1995) demonstrates that individuals’ balance between their own benefits/costs and the agent's benefits/costs. Personal benefits and the agent’s benefits align with perceived assistive and persuasive intent respectively. He found that when the individuals’ benefits outweighed the agents' benefits and the individual’s costs were less than the agents’ cost, the individuals perceived less persuasive intent and had positive attitudes toward the agent's actions and the agent, and higher purchase intentions. Following this, “perceived assistive intent of the agent”, defined as individuals' perception that the agent tries to help them to fulfill their own goal, and “perceived persuasive intent of the agent”, defined as individuals' perception that the agent tries to persuade them, will have positive and negative effects on their attitudes and behaviors, respectively. Thus, the persuasion attempt can be perceived as more, less, or equally assistive or persuasive, thereby influencing individuals’ attitudes and behaviors. In our study’s context, the agent is the website. Specifically, the website design is hypothesized to trigger users’ perceived persuasive and assistive intent of website. In the next section, we propose persuasive design form which serves as a technological determinant of persuasion and thus persuasion awareness.
Decision Support System (DSS) as a Basis for Persuasive Technology Design

IS researchers have paid increasing attention to persuasive technology (Fogg 2003) which refers to an interactive system designed to change attitudes and/or behaviors of users without using coercion or deception (Oinas-Kukkonen and Harjumaa 2008). Decision Support System (DSS) is one stream of IS research which explains how IT can be designed to facilitate users’ decision making and thus can provide useful insights for specifying forms of persuasive design. According to Silver (1990, 1991), DSS can serve as a change agent by providing to users decisional guidance which is “the degree to which and the manner in which a Decision Support System guides its users in constructing and executing decision-making processes, by assisting them in choosing and using its operators” (Silver 1990, p. 57). Silver (1990) classified decisional guidance on several dimensions. Of particular interest to persuasive design is the motive of the system designer and the form of decisional guidance. There are two motives of the system designer: 1) a support motive which facilitates users to perform their tasks without giving a direction of influence, which we refer to as supportive guidance, and 2) an influence motive which shapes users to a given direction. While the motive focuses on why DSS provides decisional guidance to users, the form indicates how DSS provides decisional guidance to users. The first form is informative guidance that presents relevant information to inform users without recommending what to do. The other form is suggestive guidance that gives recommendations regarding what to do to users. Both forms can be used to support or influence. Extant research shows the positive effect of the form of guidance on users’ decisions (e.g., Al-Natour et al. 2006; Parikh et al. 2001). Thus, the form of guidance is one factor driving persuasion.

To identify the form of persuasive design in our study, we combine supportive guidance with the two forms of decisional guidance (informative and suggestive), as supportive guidance holds promise in enabling persuasion as well. Although this guidance serves as a facilitator and allows users to make their own decisions without giving a specific direction (Silver 1990), Fogg (2003) contends that technology can persuade users to perform a target behavior by simplifying how to perform it or guiding users to perform it step-by-step. Following this, supportive guidance which provides users with supporting-decision functionality is applicable to persuade users as well. Consequently, there are three forms of persuasive design in online settings: 1) “suggestive design” which offers to users a recommendation regarding what to do (e.g., algorithm-based recommendations), 2) “informative design” which provides information relevant to users’ decision tasks without suggestions (e.g., topic information, social information), and 3) “supportive design” which provides functionality in facilitating online users to make decisions (e.g., sort, filter). Similar to persuasive messages a human agent provides to influence an audience (O’Keefe 1997), persuasive design form can be used to influence users’ judgments and behaviors. However, unlike persuasive messages, the website can offer supporting-decision functionality. Also, with technologies, the website has better knowledge about online users which helps it personalize the right design to influence them more effectively, compared with traditional persuasive messages.

Persuasion Awareness in Online Settings

Online users are exposed to the website design form which serves as a persuasion platform. Following PKM, they can perceive the website design form either as more assistive, as more persuasive, or as both, thus driving their judgments and behaviors. Note that perceived assistive intent of website is similar to perceived usefulness of Technology Acceptance Model (TAM, Davis 1989), defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (p. 320). The distinction between the two constructs is that perceived assistive intent emphasizes users’ perceptions regarding why the website is designed in such a way that helps them with the task at hand, while perceived usefulness focuses more on users’ perception concerning the usefulness of using the website. Costs of persuasion attempts (e.g., unsolicited recommendations) are not transparent and minimal in online settings due to the advance of technologies. In this context, costs include effort users required to receive persuasive design and effort websites required to create such persuasive design. This differs from an offline context under which consumers have better idea regarding their effort (e.g., time spent on requesting recommendations from salespersons) and companies’ effort (e.g., companies investment in salespersons) required for persuasion attempts. Thus, unlike Campbell (1995) which focuses on both benefits and costs, we expect that users’ behavioral responses will result more from the balance between perceived assistive intent and perceived persuasive intent than the balance between users’ effort and the
website’s effort. Behavioral responses include attitudes toward the website which is a persuasion agent and behaviors (e.g., product purchase decisions)

**H1:** Perceived persuasive intent of website will negatively influence behavioral responses.

**H2:** Perceived assistive intent of website will positively influence behavioral responses.

**Effects of Persuasive Design Form on Online Users’ Persuasion Awareness**

Online users would be less likely to be aware of persuasion attempts (e.g., Facebook’s target ads) in online settings. One reason would be information overload in this specific context. Unlike limited number of persuasive messages given at a time in an offline setting, a website has lots of contents which are applicable for persuasion. In our study’s context, suggestive design provides information regarding products recommended to users. According to social influence literature, social information (e.g., how others perform) can serve as an informational influence (Burnkrant and Cousineau 1975). Thus, our informative design provides information regarding how others make decisions on a particular product (e.g., the number of others viewing this product right now). The website can also provide supportive design such as filter and sort functionality. Prior research demonstrates that individuals with limited cognitive capacity were less likely to be aware of a persuasion action (Campbell and Kirmani 2000; Williams et al. 2004). As information overload can limit online users’ cognitive capacity, exposure to the website is less likely to induce their persuasion knowledge. However, suggestive design which reveals information regarding what the website expects users to do will trigger users’ persuasion knowledge and thus decrease users’ cognitive ability required to process the persuasion attempt more than informative and supportive design which do not offer such information which helps activate persuasion knowledge. Hence, we hypothesize:

**H3a:** Suggestive design will enhance perceived persuasive intent more than informative and supportive design.

**H3b:** There will be no difference in perceived persuasive intent between informative and supportive design.

Perceived personalization is the degree to which a website provides persuasive design form that fits online user’s preferences. As argued above, technologies such as AI have improved personalization in online settings which positively affects users’ attitudes and actual behaviors. This can be explained by reactance theory (Brehm 1966) which posits that when individuals experience a threat to their freedom through a constrained choice, they will engage in psychological reactance. Influencing individuals in the way that runs counter to their initial preferences can induce reactance. In online settings, recommendations which match users’ prior preferences are key. Fitzsimons and Lehmann (2004) found that for unsolicited product recommendations, those who were given product recommendations which ran counter to their existing attitudes resisted such recommendations. Thus, a fit between online users’ prior product preferences and design form of the website, which in this case is suggestive design, will increase their perceived personalization and persuasion acceptance. With the power of technologies, persuasive design can give personalized suggestion, information, and support to users without solicitation. This will increase the fit between persuasive design form and users’ preferences even further.

In our study, three types of users’ preferences are topic, social, and decision strategy preference. Topic preference is defined as users’ prior attitudes toward a topic which is a product or service in the e-commerce context. Social preference refers to users’ social influence susceptibility or the degree to which users’ decision are vulnerable to others’ behaviors. According to social influence literature (e.g., Bearden et al. 1989), individuals can learn about topics (e.g., products and services) from observing others’ behaviors. That is, observing such behaviors provide the individuals with valuable information regarding the topics. The social influence research indicates that the individuals who are susceptible to social influence are more likely to observe others’ behaviors and perceive these behaviors as a source of information, compared with those who are less susceptible to such influence. Therefore, informative design which provides information regarding others’ behaviors (i.e., the number of others who are viewing this product) will be helpful to users who are susceptible to social influence more than those who are not. Decision strategy preference is users’ prior attitudes toward the strategies they adopt to come up with a final decision. Prior research found that decision strategy similarity between systems and users had positive effects on users’ judgments and decisions (Al-Natour et al. 2011; Al-Natour et al. 2008). However,
unlike prior studies which focus on the similarity between systems and users, supportive design in our study aims to provide functionality which matches users’ decision strategy. Since users generally adopt either a good-enough choice, called a satisficing strategy, or a best choice, called a normative strategy (Schwartz et al. 2002). Supportive design such as product filter is more helpful to those who adopt the satisficing strategy, since they prefer to specify acceptable thresholds for the products and select a choice which passes the specified thresholds. On the contrary, supportive design such as product sort benefits those who adopt the normative strategy, as they prefer to select a choice with highest values. Thus, if a user is exposed to persuasive design form which aligns with her preferences, a fit between design and users’ preferences appears. However, a misfit exists if what the website provides runs counter to users’ preferences. Therefore, we propose:

H4a: A fit between suggestive design and topic preference will increase perceived personalization.
H4b: A fit between informative design and social preference will increase perceived personalization.
H4c: A fit between supportive design and strategy preference will increase perceived personalization.

H5: Perceived personalization will have a positive impact on perceived assistive intent.

Proposed Methodology

The hypotheses proposed will be examined through an online experiment. We will recruit participants from Amazon Mechanical Turk Prime. A 3 (form: suggestive vs. informative vs. supportive) x 2 (form–users’ preference fit: misfit vs. fit) between-subjects design will be conducted. We will develop experimental e-commerce websites which vary in terms of the three persuasive design forms and the form–preference fit. To manipulate the form, we will select a subset of design cues used in online websites (e.g., suggestive–product recommendation, informative–the number of others viewing a product, supportive–filter/sort) and adapt them for our study. To manipulate the fit, we will capture participants’ product preference, social preference, and decision strategy preference using existing scales in advance and then provide their preferred product recommended, social information, or functionality which fits their decision strategy accordingly. To manipulate the misfit, we will exclude their preferred product, social preference, or functionality which fits their decision strategy. Participants will be randomly assigned to evaluate and use one experimental website to select one product. We will ask participants to complete a questionnaire survey meant to gather their perceived suggestive design, perceived informative design, perceived supportive design, perceived personalization, perceived persuasive intent, perceived assistive intent, and behavioral responses which include attitudes toward the website, and product decisions (whether a product with the persuasive design cue is selected). Website activity log will be analyzed to understand how participants use the website. As control variables, participants’ persuasion, website, and product knowledge, and prior website experience will be captured at the end. Upon completion of our experiment, participants will receive the product they select. ANOVA will be performed to evaluate the effects of persuasive design form and the fit on perceived personalization and persuasive intent. To test the structural model, we will use SmartPLS.

Conclusion and Contributions

Our study specifies three key forms of persuasive design—suggestive, informative, and supportive design—and explains how these forms of persuasive design influence online users’ persuasion awareness and thus behavioral responses. The theoretical contributions of our research are two-fold. First, building on the literatures on DSS, we offer persuasive design as a technological determinant of persuasion awareness. Unlike traditional DSS literature, we propose an additional form of technology design, supportive design which can enable persuasion and has an impact on users’ interpretation of persuasive design of website. Secondly, with the increasing potential of technologies in understanding users’ preferences, we expect that perceived personalization will play a critical role and affect users’ perceptions of persuasive design. Additionally, from a practical viewpoint, the results of our research will provide a useful guideline to develop a website which facilitates users being better informed about a persuasion attempt generated by the website. Although we choose the e-commerce website as a context of our empirical study, we expect that our proposed model will explain persuasion awareness in other types of websites such as social networking sites. As Facebook has developed and tested its transparency tool to
increase users' persuasion awareness (Dua 2017), our theoretical model will be helpful to inform design of such website. Thus, this study serves as an initial step toward understanding of persuasion awareness in online settings.

References


