

Understanding Online Interruption-Based Advertising: Impacts of Exposure Timing, Advertising Intent and Brand Image

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Jason Chan, Zhenhui Jiang, and Bernard Tan
Department of Information Systems
National University of Singapore
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Abstract

Interruption-based advertising has gained prominence in the online channel. Yet, little attention has been paid to deriving design principles and conceptualizations for online interruption-based advertising. This paper examines three novel design factors related to this phenomenon, namely, exposure timing, advertising intent and brand image. Exposure timing pertains to the time by which the ad is launched within a website. Advertising intent refers to the explicitness of ad content in portraying the desire to induce purchase behavior. Brand image relates to consumers' overall perceptions of the advertised brand. In a laboratory experiment, participants were exposed to pop-up ads that were operationalized based on these three design considerations. Results reveal three two-way interactions among the study constructs. Online interruption-based ads shown in the predecisional shopping phase are more effective when their contents are designed with implicit advertising intent compared to explicit intent. Brand image is found to moderate the effects of advertising intent on consumer's purchase intention. Participants' responses also show that ads promoting weak brands with less favourable image tend to enjoy higher purchase intention when shown in the predecisional phase compared to the postdecisional phase. Theoretical and practical implications together with suggestions for future research are discussed.

1. INTRODUCTION

Interruption-based advertising model has been used for a long time in various mediums. It is carried out through forced exposures to advertising content, thus disrupting the natural continuous flow of program content on television and radio. For instance, after a soap opera is screened for 15 minutes, the television screen is suddenly taken over by a commercial ad featuring consumer products. Another illustration of interruption-based advertising would be the airing of beer ads that interrupts the live broadcast of football matches on radio. Interruption-based advertising continues to be the most widely used advertising technique since forced exposure elicits viewers' involuntary attention, leading to greater processing and increased memory retention for the ad message [39].

With the advent of the Internet as a new advertising medium, advertisers have begun to deploy interruption-based advertising on the World Wide Web. Some common formats of online interruption-based ads include pop-ups, pop-unders and interstitials. Pop-ups are one of the most pervasive and representative forms of online interruption-based ads [14] and they interrupt users by launching in separate browser windows when web pages are being loaded. For instance, a pop-up featuring Ikea's home delivery services is shown when www.ikea.com.hk loads. Pop-under ads are similar to pop-ups but are launched behind users' Web browser. An example of pop-under can be found at the homepage of www.gap.com where it is launched beneath the currently viewed page so that users would only see it when the browser windows are closed [74]. On the other hand, interstitials interrupt users unexpectedly by appearing over the screen when users click on a hyperlink. For example, when users click to view an article at www.cnet.com, an interstitial ad filling up the webpage is shown instead of the desired article page, forcing users to view the ad for awhile before directing them to the webpage with the actual content.

Web advertisers have invested significantly in different forms of online interruption-based advertising. The Internet Advertising Bureau reports that rich media advertising¹ accounts for a revenue of \$1.6 billion dollars in 2008 [34] and the spending on pop-up ads alone in 2006 stands at 14 million pounds in UK [78]. Despite the huge amount of investment in online interruption-based ads, practitioners are relatively uninformed of the proper principles in designing such ads. Consequently, companies may suffer unexpected resentment from online viewers as they tend to see these ads as an intrusion rather than an effective means to acquire relevant product information.

The lack of clear understanding of the design of online interruption-based advertising is aggravated by the fact that online ad viewers have very different characteristics from traditional ad viewers. Unlike traditional mediums, the Internet is characterized by high user control [26] i.e., its users are often actively involved in navigating through web pages to retrieve content they desire. Furthermore, compared to audiences of television and radio ads, those of online ads tend to be more task-oriented since most web users may perform specific tasks like researching product characteristics and enquiring for service information, which are not performed by traditional ad audiences [53]. Hence, being more control-oriented and task-oriented than traditional ad viewers, online ad viewers are likely to be less tolerant of interruptions caused by ads since these ads reduce their perceived control of web navigation and disrupt them from performing their online tasks. Though from the audience's perspective, there are clear perceptual distinctions between online interruption-based ads and traditional interruption-based ads, few studies have proposed specific principles for designing online interruption-based ads. As such, there is a need for studies to examine design factors of online interruption-based advertising and explicate their effects so that design principles can be generated to guide practitioners.

¹ Under IAB's definition, rich media encompasses web ads that are executed through various types of pop-ups, pop-unders and interstitials.

From the designers' perspective, before design considerations of online interruption-based advertising can be formally explored, there is a need to conceptualize its design factors. This need arises from the fact that constructs studied in traditional interruption-based advertising may not be applicable in the online context. In particular, we note that the timing strategy of television/radio ads cannot be applied equally in the online context because online interruption-based ads can be seen anytime by any person who visits the website. For this reason, specific physical time slots, such as prime-time and late-night, cannot be used to characterize timing strategies for online interruption-based ads. A more pertinent conceptualization of exposure timing for online advertisers would be based on the webpage location of web visitors within a website. Furthermore, in contrast to easily distinguishable interruption-based ads on traditional mediums, online ads can be designed to appear like content from the website host, thus hiding the marketer's true intention to advertise and motivating website visitors to assimilate the ad content. Hence, a conceptualization of the content packaging strategy for online ads is necessary for capturing this unique characteristic of interruption-based advertising on the Web.

By and large, this study aims to make three contributions by addressing the needs described above. First, this study investigates the novel phenomenon of online interruption-based advertising, a field which is highly distinct from its offline counterpart. In the attempt to examine this phenomenon, a theoretical framework based on Fogg's principles is developed to explicate the understudied area of online interruption-based advertising. Second, this paper aims to make a contribution to the literature by identifying and conceptualizing design factors that pertain specifically to online interruption-based advertising. The constructs related to exposure timing and content packaging strategy are theorized towards online interruption-based advertising and are conceptualized to provide insights into consumers' information processing of ads. Third, though prior studies have examined the main effects of the design factors, no empirical effort has been

made to investigate their interaction effects. This study goes beyond past studies by looking into these interaction effects to provide deeper understanding of the impacts of online ad design factors on web consumers. The rest of the paper is organized as follow. The next section presents the study variables and reviews the relevant theoretical foundations. Research hypotheses are then developed in Section 3. The research methodology is elaborated in Section 4. Section 5 presents the data analyses and the final section concludes with the discussion, contributions, limitations and future research.

2. LITERATURE REVIEW

The objective of this paper is to explore the effects of several design factors of online interruption-based advertising on web consumers' behavior. Since online ads are intended as a form of persuasive tool to spur web users in making purchases, the choice of the design factors for this study is guided by the design principles suggested in the *persuasive technology* literature. A review of persuasive technology reveals that factors involving “when”, “how” and “who” aspects are crucial in the design of online interruption-based advertising. Corresponding to these design factors, the *mindset theory*, *persuasion knowledge model* and *processing fluency model* are identified as theories that are relevant in predicting the effects of these design factors.

2.1 Persuasive Technology

Persuasive technology refers to information technology that is designed for changing users' attitudes or behaviors [16]. Other than online ads, examples of persuasive technology include online peer recommendation mechanisms, online conversational agents and persuasive games (see [13, 43, 11] respectively). Since persuasive technology serves the unique function of persuading, its design is guided by a specific set of principles. In particular, Fogg's principles of persuasive technology design has covered the aspects of “when”, “how” and “who” [16]. The “when” aspect states that the technology must identify the right time to persuade; the “how” aspect posits that appropriate

content should be deployed by the technology; the “who” aspect highlights that the persuader (i.e. source of persuasion) plays an important role. Each of the three aspects represents a key design characteristic of an effective persuasive technology.

First, choosing the opportune timing to launch persuasive efforts is crucial for a persuasive technology to be effective. Consider a toy bear that sings jingles about french fries whenever it is brought near a McDonald’s outlet. Such a persuasive technology can be apt at persuading consumers to patronage the fast food restaurant as it sends out cues at the most appropriate timing [16]. Hence, for the “when” aspect, it is suggested that persuasive technology should identify the right moments to launch appropriate cues to be persuasive [16]. Second, the content packaging strategy reflects the pertinent design principle of “how”. The content of successful ecommerce sites, such as Amazon.com, uses a warm and welcoming tone to encourage visitors to maximize their online purchases. Specifically, the Amazon website greets visitors by name at every page, offers recommendations and lists the various stores that are tailored to users’ preference [16]. Third, the persuasion source represents the “who” aspect and is capable of influencing the perceived credibility of the persuasive technology. When users view the source’ brand favorably, they are more likely to be convinced by the claims of the persuasive technology. For instance, consumers may trust the accuracy of the delivery time stated by Barnes and Noble (www.bn.com) more than that stated by BoomerangBooks.com.

Hence, following the principles of persuasive technology design, this study examines the exposure timing of online interruption-based advertising (“when”), the way to shape advertising intent (“how”) and the image of an advocated brand (“who”). Specifically, exposure timing concerns when online interruption-based ads should be launched, advertising intent relates to the explicitness of ad content in portraying the intention to persuade, and brand image involves the study of the source characteristics of the ad message. The evaluation of persuasive technology effectiveness is

based on how well the technology persuades individuals in fulfilling its goals. Since the main goal of online advertising is to spur purchase, we investigate the effects of these factors on consumers' purchase intentions.

2.2 Exposure Timing and Mindset Theory

Exposure timing is recognized as a key design factor in advertising research [46]. The role of exposure timing becomes even more crucial in the context of interruption-based advertising where the act of disrupting audiences at wrong instances would not only lower ad persuasiveness but also lead to negative attitude formation [25] or avoidance of ads altogether [70]. Past research in interruption-based advertising examined the effects of timing by placing ads at different timeslots during the day, at different days of the week, at different types of program, in-between programs and within-program [9, 18]. These comparisons are however invalid in the context of online interruption-based advertising since web advertisers cannot control the physical timing by which online ads are viewed. Thus, exposure timing should be conceptualized and studied differently in online interruption-based advertising.

In contrast to the exposure timing in traditional interruption-based advertising, web advertisers are able to manipulate exposure timing by selecting the time to present ads within the website, i.e., choosing the specific webpage within the site to launch ads. In particular, the exposure timing of ads hosted on ecommerce websites (e.g. Amazon.com, Expedia.com and Hmv.com) can be tailored according to the different stages of online shopping [71]. For instance on Expedia.com, online ads launched on the homepage and flight selection page are reflective of early and intermediate shopping stages respectively. In an effort to capitalize on this peculiar ability of the Web to control online ad delivery timing, this study attempts to conceptualize and examine exposure timing of online interruption-based ads based on the viewers' webpage location within ecommerce sites.

The *consumer decision making process* [3, 15, 33] is used to assess the phase consumers are in during their pursuit of product purchase. It has four distinct stages of *information search*, *alternative evaluation*, *purchase decision* and *post-purchase evaluation*. In particular, Olsen [56] asserts that ecommerce pages can be mapped to the stages as follows: home and search pages relate to information search; product list page maps to alternative evaluation; checkout page matches to purchase decision and receipt/acceptance page corresponds to post-purchase evaluation. In the first two stages, shoppers are browsing through the website's products and are in the midst of evaluating and deciding which product(s) to purchase. Since shoppers at these two stages have yet to arrive at a decision, this study defines these stages to be the *predecisional* phase. Shoppers will then enter the last two stages (purchase decision and post-purchase evaluation) after deliberating among product choices. This study defines the last two stages to be the *postdecisional* phase as shoppers have decided upon which product to purchase and are making their purchases.

The psychological state of ad viewers in predecisional and postdecisional shopping phases can be understood with tenets from the mindset theory. Mindset is defined as a cognitive set created in an individual to solve a specific task that has been accepted [19-21]. The *mindset theory* seeks to explain cognitive processes and orientation at different phases of goal pursuit. Under this theory, it is suggested that in the *predecisional* phase, individuals are involved in the task of analyzing the desirability and feasibility of wishes, leading to a *deliberative* mindset [20, 22]. Once goals are set, individuals switch to an *implemental* mindset which aids them in tackling the issues pertinent in the *postdecisional* phase. Past studies have shown that the two mindsets are characterized by different cognitive orientations which are tuned towards thoughts and information congruous to the current task to be performed [23].

Congruency between mindset and cognitive orientation causes selective attention to and encoding of congruent information. Empirical studies have shown that individuals in deliberative

mindset analyze the desirability and feasibility of goals impartially [24, 75]. Results have shown otherwise for individuals with implemental mindsets, that is, they exhibit illusions of optimism and control for the chosen goal. Also, compared to an implemental mindset, a deliberative mindset makes an individual more receptive and open-minded towards available information. Higher receptivity is evidenced by greater readiness and faster speed in processing peripheral information [22, 29]. From the discussion thus far, it can be concluded that the pliancy of one's beliefs is reliant on his/her mindset at the time of consideration. That is, the receptive characteristic of deliberative mindset prevails at the predecisional phase, while the close-minded nature of implemental mindset predominates during the postdecisional phase. The effects of deliberative and implemental mindsets influence individuals' decision making process, which in turn, affects their purchase intention towards advertised products. The persuasive impacts of other design factors of online interruption-based ads are likely to vary as a result of the difference in receptiveness of the mindsets of predecisional and postdecisional web shoppers.

2.3 Advertising Intent and Persuasion Theories

Generally, the content of advertising messages may take on the style of either "hard sell" or "soft sell". This study formally conceptualizes such content style as advertising intent, which is defined as the "explicitness in portraying desire to persuade and to induce purchase behavior". Advertising intent can either be explicit or implicit. Ad messages with explicit advertising intent reveal its desire to persuade overtly while those with implicit advertising intent hide this desire. An instance of explicit advertising intent is illustrated in the ad message: "Authorized Agent: Philippine Airlines, Book your ticket @ www.filairtravel.com, Sign Up Now".

On the other hand, implicit advertising intent advocate in a fashion that minimizes the impression that the advocated brand (product) is pushing itself to the audience in achieving the advertising goal of inducing purchase behaviors [76]. For instance at Travelocity.com, the ad

message: “Travelocity’s Favorite Cruise Line Offers, Royal Caribbean International — Strongly Recommended by Travelocity”, is packaged as the website’s recommendation to achieve an implicit advertising intent. In this message, instead of promoting itself directly, the cruise line brand (i.e., Royal Caribbean) relies on the host website, Travelocity, to advocate it.

The construct of advertising intent is particularly applicable in the context of online interruption-based advertising but not in the offline counterpart. With the sudden change from television/radio programs to commercial contents, it is obvious to viewers that they are going to view advertising-related contents, making it difficult to operationalize implicit advertising intent in traditional interruption-based ads. With the advent of the Internet as an advertising channel, ads can be embedded in web pages, thus blurring the line between editorial and advertising content [82]. Specifically, web advertisers can collaborate with website hosts in designing ad content to allow their ads to “blend” into a website. Furthermore, since ecommerce websites such as Expedia.com and Hotwire.com promote many competing brands, they are deemed not to be inclined to advocate for one particular brand. Hence, ads advocated under the names of these websites are less likely to be recognized by viewers as advertising efforts.

To understand the role of advertising intent in online interruption-based advertising, we draw upon the persuasion knowledge model (PKM) to explicate its effects. The PKM posits that consumers develop knowledge about persuasion and use this knowledge to deal with episodes of persuasion [17]. Persuasion knowledge pertains to consumers’ general ideas of persuasion which include beliefs about marketers’ motives, strategies and tactics, and ways of responding to persuasion attempts such that they (consumers) achieve their own goals [5, 17]. Consumers develop persuasion knowledge over time as they are exposed to marketers’ tactics and come to recognize them as such. Marketing tactics involving implicit advertising intent are less likely to be registered in consumers’ persuasion knowledge compared to those involving explicit advertising intent [17, 79].

Hence, viewers are less likely to activate persuasion knowledge when online interruption-based ads are communicated using implicit advertising intent. Generally, message content with implicit intent lowers resistance to persuasion, resulting in higher persuasion success and higher purchase intentions than that with explicit advertising intent.

In contrast to the tenets of the PKM, Reinhard et al [62] found that the use of explicit advertising intent may yield better results in the presence of other factors. Specifically, in interpersonal persuasion context, the use of explicit persuasive intent by likeable persons results in higher persuasiveness. Through a *two-step attributional process model*, Reinhard et al. explain that an individual would (i) first form an impression of the persuader and then (ii) make attributions to his/her motives when the persuader expresses a desire to persuade. The impression generated in the first step functions as a background against which the explicit persuasion intent is evaluated: the impression leads people to feel whether a persuasion source has self-interest motives in his persuasion attempt [62]. Accordingly, higher purchase intentions are solicited when a likeable person expresses explicit intent to persuade. On the other hand, a less-likeable person hiding his intent to persuade yields higher purchase intentions from his audiences [62]. Tenets from the two-step attributional process model imply that the advertising intent of online interruption-based ads should be considered along with other ad factors by which viewers may form impressions.

2.4 Brand Image and Processing Fluency Theory

Source in advertising research refers to the advocated brand in an advertising message, that is, the corporate entity which initiates the creation of ad [73]. Given that online consumers are highly influenced by product brand names [10], it is imperative for ecommerce researchers to examine the impacts of the source of ads (i.e. brand name) shown in online interruption-based advertising. Consumers often assess the ad source based on the image of the advocated brand. Following the commonly used definition of brand image [41], this study defines brand image as shoppers' beliefs

of brand-related associations. Scholars often turn to quality (a type of product attribute) as a concrete illustration for the concept of brand-related associations (e.g. [41, 55, 57]). Upon exposure to different brands, consumers attribute certain level of quality to its products. For instance, in the hotel industry, consumers associate hotel brands under Starwood (e.g. Sheraton, Westin W) to be of higher quality than those under Choice Hotel (e.g. Sleep Inn, Comfort Inn, Quality Inn).

Effects of brand image are explained by the *processing fluency model*. According to this theory, processing fluency arises because prior exposures to a target enhance the ease with which consumers can process the target in subsequent encounters [48, 65]. This is demonstrated through improved performance in perceptual identification [35], picture naming [72] and word fragment/stem completion [63] upon exposure to a target word. In the context of advertising, brand image may influence the ease of associating ad messages with purchase-related attributes and the fluency in processing ad content subsequently. Specifically, higher levels of processing fluency derived from favourable brand image reduce the uncertainty in processing the target brand [47, 48, 80], allowing consumers to easily assimilate the ad messages of these brands. As a result, these brands are more likely to be included in consumers' consideration set [54, 66], thus evoking higher purchase intentions from consumers. In online interruption-based advertising, since online viewers have short attention spans [32, 52] and are less tolerant of ads that interrupt their browsing activities [53], the processing fluency of brand names is highly crucial in determining the success of online interruption-based ads.

3. HYPOTHESIS DEVELOPMENT

3.1 Overview

Based on the body of literature that encompasses the research variables, it is predicted that interaction effects are likely to exist between these design factors of online interruption-based ads. Since the interpretation of interaction effects take precedence over main effects, this study focuses

on the interaction effects between the design factors, in particular, the three two-way interactions. Three way interaction is not examined because theories related to the three design factors do not suggest of such a presence.²

3.2 Dependent Variable

The effectiveness of persuasive technology can be assessed via its effects on individuals who are being persuaded. In the context of advertising studies, if ad viewers are persuaded by the ad, they would develop intentions to purchase the advertised product. Hence, purchase intention is chosen as an appropriate dependent variable that reflects the persuasive effect of online interruption-based ads.

3.3 Interactions between Exposure Timing and Advertising Intent

The mindset theory is deployed in extant studies to explain how cognitive processes can lead to different levels of purchase intention. For instance, Lee and Ariely [49] used the mindset theory to explain why one's purchase intention varied between initial and late stages of shopping. In the study, it was found that spending behavior of shoppers is more strongly influenced by conditional coupons in the early phase than in the late phase. This difference in behavior between the two groups of shoppers is due to the receptivity of their mindsets: shoppers in the early phase tend to be more receptive to external influences as opposed to shoppers in the late phase, thus spending behavior of shoppers in early phase are more influenced by coupons. In the present study, the mindset theory is used to account for the difference in purchase intentions arising from the exposure of interruption-based ads at different stages of online shopping. Deliberative and implemental mindsets prevail at the predecisional and postdecisional shopping stages respectively and these mindsets are tuned towards thoughts and information that are congruous with the task performed at that shopping stage. Web shoppers in different phases have different cognitive orientation and will react differently

² Findings of this study further attest to this claim (see Section 5.2 for details).

when interrupted by online ads. This difference in cognitive orientation is likely to interact with the message content since the processing of different message content requires different amount of cognitive resources [6, 58].

In the predecisional phase, the mindset theory suggests that web shoppers are receptive to product-relevant advertising information. High receptivity takes form in shoppers' readiness and speed in processing product-relevant ads shown to them [22], hence they are not irritated when they are interrupted by online ads that show them product deals. However, being cognitively ready and alert, shoppers are likely to rely on their persuasion knowledge in assessing ad messages that are shown to them. The use of explicit advertising intent in message content is likely to induce shoppers to activate their persuasion knowledge [17], which in turn, generates a tendency for web shoppers to resist persuasion, leading to lower intentions to purchase the advertised product. Conversely, implicit advertising intent disguises the advertiser's motive to persuade, thereby leading to a low likelihood of persuasion knowledge activation. Thus, predecisional web shoppers interrupted by online ads that have messages of implicit advertising intent are less resistant towards persuasion and tend to have higher purchase intentions for the advertised product.

In the postdecisional phase of online shopping, implemental mindset prevails among the web shoppers. Postdecisional web shoppers are cognitively oriented to complete their online purchases and tend to be irritated by online ads that interrupt their payment tasks, making them less inclined to process such ads. Given this characteristic of postdecisional shoppers, it is more important to enhance the ease by which message contents can be processed than to hide the advertising intent of the ad. Message content shown to postdecisional shoppers should not be too cognitively straining to process since much of shoppers' cognitive resources are spent on justifying their existing product choices and completing the online payment procedures. This reasoning is further attested by the resource matching theory [1] which suggests that the level of resources

required to process ad messages should match the amount allocated by consumers for processing to achieve maximum persuasiveness.

The use of explicit advertising intent in online ads facilitates easy comparison of the advertised brand with other brands during online shopping as the advertised brand can be easily identified in the message content of such ads [82]. With explicit advertising intent, postdecisional shoppers can easily see the relevancy between the online ad and their purchase task since the advertised brand is clearly presented to shoppers for re-evaluation with the brand chosen earlier. As a result, higher likelihood of information assimilation leads to higher levels of persuasiveness and purchase intentions. Furthermore, by having a perspicuous nature, ads executed with explicit advertising intent do not demand a high level of resource in the processing of its message content, thus matching the low amount of resource that web shoppers are willing to spend in the postdecisional phase. This match implies better ability to process ad information, leading to higher purchase intention for the advocated product. Conversely, the use of implicit advertising intent causes postdecisional shoppers to perceive that the ad information presented is irrelevant and of peripheral nature. At the same time, message content of implicit intent are more resource demanding to process, causing a mismatch of resource needed to process the ad message with that allocated by postdecisional web shoppers. These issues hindering information processing would result in lower purchase intentions. Accordingly, we propose

Hypothesis 1: For online interruption-based ads, there is an interaction effect between exposure timing and advertising intent on shoppers' intention to purchase the advertised product, i.e., explicit advertising intent results in lower purchase intention than implicit advertising intent in the predecisional phase, while the opposite holds in the postdecisional phase.

3.4 Interactions between Brand Image and Advertising Intent

In the current study of online interruption-based advertising, it is speculated that the effect of brand image is similar to that of source likeability proposed in the two-step attributional process model reviewed earlier. Consumers usually develop affection for brands with favourable image. Thus, compared to ads for brands with less favourable image, ads promoting brands of more favourable image are being sought after more actively because consumers would like to reinforce their attitudes towards these favourable brands [31].

Consumers are likely to have higher processing fluency for brands with more favourable image. According to the processing fluency model, brands with more favourable brand image are easily recognized and processed over competing brands, thus eliciting positive attitudes in consumers [47]. As such, viewers tend to be less irritated when they are interrupted by online ads which promote relevant products with a more favourable brand image than competing products. Web shoppers form favourable impressions of such ads and are willing to assimilate their contents. However, the potency of ads for brands with more favourable image will differ based on the advertising intent used in packaging its message content. The use of explicit advertising intent allows web shoppers to identify the well-favoured brand easily, facilitating them in committing positive responses towards the brand. Also, shoppers tend to evaluate explicit advertising intent from such brands favourably by attributing less self-interest motives to the persuasion attempt [62], leading to greater trust and persuasiveness, and finally higher purchase intentions for the advertised product. Implicit advertising intent, on the other hand, reduces the potency of ad by concealing the highly-favoured brand image, thus hindering web shoppers' willingness in exhibiting positive responses to the well-favoured brand.

Web shoppers are likely to be irritated when they are interrupted by online ads that explicitly advocate brands of less favourable image. Ads for such brands tend to invoke persuasion knowledge in consumers. Implicit advertising intent can be created by packaging the ad message to appear as

content from the host website. This makes the advocated brand name less apparent, invoking less persuasion knowledge and creating higher persuasiveness and purchase intentions. Conversely, using explicit advertising intent would aggravate the unfavourable impression formed from encountering the brand, resulting in lower persuasiveness and purchase intention. Hence, we posit

Hypothesis 2: For online interruption-based ads, there is an interaction effect between the brand image and advertising intent on shoppers' intention to purchase the advertised product, i.e., explicit advertising intent results in higher purchase intention than implicit advertising intent for brands with more favourable images, while the opposite holds for brands with less favourable image.

3.5 Interactions between Brand Image and Exposure Timing

As explicated earlier, brands with more favourable brand image can be processed more fluently than competing brands, resulting in less irritation when users are interrupted by ads of such brands. Given all other conditions constant, web shoppers are able to evoke the positive brand associations easily upon exposure to brands with highly favourable images at both predecisional and postdecisional phases of online shopping. Thus, shoppers interrupted at the predecisional and postdecisional phases of shopping by online ads that promote brands with more favourable image than competing brands, are likely not to differ significantly in terms of their purchase intention for the advertised product.

On the other hand, it is posited that brands with less favourable image advertised in the predecisional phase will garner higher levels of purchase intention compared to that shown in the postdecisional phase. Since brands with less favourable image do not enjoy enhanced processing fluency and do not foster positive attitudes from consumers [48], close-minded postdecisional web shoppers tend to be more irritated than receptive predecisional web shoppers when they are interrupted by online ads promoting such brands. Interruption-based ads that promote a brand with

less favourable image than that of a chosen brand are deemed to be irrelevant and disruptive to the payment tasks which postdecisional shoppers are engaged in. Thus, brands with less favourable image are ineffective in mitigating characteristics of shoppers with implemental mindset. The unfavourable characteristics of these brands together with the unreceptive and biased nature of implemental mindset result in lower persuasiveness and purchase intention in the postdecisional phase. Thus, we propose

Hypothesis 3: For online interruption-based ads, there is an interaction effect between the brand image and exposure timing on shoppers' intention to purchase the advertised product, i.e., ads shown in the predecisional phase results in higher purchase intention than ads shown in the postdecisional phase for brands of less favourable images, but not for brands with more favourable images.

4. RESEARCH METHODOLOGY

4.1 Experimental Design

A laboratory experiment was conducted to test the hypotheses. The experiment used a 2×2×2 between-subject factorial design with three independent variables: exposure timing of ads (predecisional/postdecisional), advertising intent of message content (explicit/implicit) and brand image of advertised brand (more favourable/less favourable). Since pop-ups are the most common and representative forms of online interruption-based ads, these design factors were operationalized on pop-ups launched at an experimental website.

The host website used for the experiment is created under the name “Expedia Singapore” to instill realism in the experiment. In enhancing realism, the page layout and sequencing of the host site were modeled after Expedia.com. The website was designed such that all subjects will see the same set of web pages when performing the purchase task. In particular, the website returned one fixed set of search results when subjects had correctly keyed in the search criteria specified in their

purchase task (discussed in next section). All purchase-related considerations (e.g. number of connecting flights, connecting city, ticket prices) were kept constant and subjects saw the same factual information within the pop-up ads. Only the three design factors i.e., exposure timing, advertising intent and advocated brands were varied across different treatments.

4.2 Experimental Procedures

To ensure sufficient power with a predicted medium effect size for the $2 \times 2 \times 2$ factorial design, 180 participants from different faculties were recruited from a large university for the actual experiment.³ The participants were randomly assigned to one of the eight treatments. Before starting the experiment, participants were briefed on the general task for the experiment and were asked to make a purchase on Expedia Singapore. A purchase scenario delineating the flight booking requirements (i.e. the designated airports and dates for both the departing and return flights) was provided to the participants. Transaction details such as name, username, password, credit card number, billing address and phone number were given to participants to be entered in the online purchase form. This step is necessary for two reasons: (i) reduce privacy concerns from declaring sensitive information, and (ii) simulate actual purchase procedures at an air ticket website.

To preserve a natural browsing behavior, participants could navigate within the website as they want. At the same time, no time restriction was imposed on the completion of the online purchase so as to cater for individual differences in decision-making time. The purchase was completed once the participant had paid for the airline chosen by filling up payment details and submitting the order. After making their purchase, subjects were redirected to an online questionnaire that captures the demographic information, manipulation and other variables of interest. In particular, subjects were asked to fill in the measures of purchase intention (i.e., the dependent variable) first before filling in their responses for the manipulation check items to remove

³ The sample size was calculated based on Cohen [7].

order-related bias. Each experimental session lasted about 30 minutes. To motivate the subjects to participate seriously, a token payment of \$10 was given upon completion of the questionnaire.

4.3 Experimental Manipulation: Exposure Timing

This independent variable was manipulated at two levels: predecisional and postdecisional. For the predecisional exposure timing treatment, pop-ups were shown at the webpage which displays the search results of the flights requirements. At this stage of online purchasing, consumers were likely to consider the different airlines they can fly with and have yet to make a decision. For the postdecisional treatment, each participant was exposed to the pop-up as s/he was filling up payment details such as credit card number and billing address. It was very likely that the participant had already decided and chosen an airline to fly with before proceeding to the billing and check out page. This is because prior to reaching the billing page, each participant had to check and agree to the payment amount and ticket regulations at the “flight detail review and regulations” page before proceeding. This step acts as a gatekeeper to improve the manipulation success for the postdecisional condition.

4.4 Experimental Manipulation: Brand Image

The brand image of the advertised airline brand was operationalized at two levels: more favourable and less favourable. The choice of airline brands was guided by an independent commercial source to provide a more successful manipulation. Specifically, the brand image of an airline was inferred from Star Rating®, an evaluation scheme by Skytrax Research. Skytrax is the global leader in air transport research and has published a large number of annual airline reports [67, 68]. Based on the professional analysis conducted by airline audit specialists, Star Ratings reflects the reality of delivered product and service supplied to customers [69]. Singapore Airlines was chosen to be the brand with a more favourable image than competing brands as it has a 5 star rating for many years including the latest year, 2008. Olympic Airline was chosen as the brand with less favourable

image as it is awarded only 2 stars. Five other airlines were chosen as dummy brands to contrast the brand image of Singapore Airlines and Olympic Airline, and also to make the purchase task appear more realistic. These airlines ranged from 3 to 4 stars under the Star Rating and consisted of American Airlines, Air Canada, Air China, Air France and United Airways.

4.5 Experimental Manipulation: Advertising Intent

The advertising intent construct was manipulated at two levels: explicit and implicit. In creating treatments with explicit advertising intent, the pop-up content is designed to advocate the brand of the airline company explicitly. Since the airline company can reap direct profits if consumers choose to purchase its air ticket, it is likely to induce consumers to associate the message with having explicit advertising intent (c.f. [79]). On the other hand, advertising intent is less explicit when the content is not packaged to have a clear profit motive. In this regard, the message content is designed such that it appears to be initiated by Expedia, the website host. Expedia is relatively unbiased towards any particular airline company since it's the online retailer for various airlines. Though Expedia may earn profits through sales commission of air tickets, its profit motive to advocate for one particular airline is less direct compared to that of the airline company itself. Hence, this allows the ad to blend in as part of the website content, which reduces the association of its content with the advertising goal.

To further strengthen the manipulation, the tone of the message was varied for different levels of advertising intent. The explicit treatment used a persuasive tone to describe its service and to instill urgency to purchase - a common feature in advertisements. Using the example of Singapore Airlines, the message shown for explicit condition is "Singapore Airlines provides TOP QUALITY air travel, 1200 customers chose to fly with us from Singapore to Heathrow at prices from \$1386, Book your flight with us Now by clicking here". In contrast, the implicit treatment lacked aggressive phrases and used a neutral tone to present its message instead of a hyped one. In addition, the

message with implicit intent was labeled as an informative message rather than one with advertising motive. This technique for manipulating advertising intent was adapted from Kim et al. [44] and Zhu and Tan [82] which labeled advertisements to create an explicit advertising intent. The message for implicit condition reads “Expedia Singapore, Site statistics: 1200 customers flew with Singapore Airlines from Singapore to Heathrow at prices from \$1386, More flight details of Singapore Airline are available here”.

4.6 Samples

It is not surprising to see past studies reporting that majority of web shoppers consist of the young and highly educated population (e.g. [40, 61]). This segment of the population grew up in the Internet era and is more receptive towards online shopping than their senior counterparts. The characteristics of university students are deemed to be similar to that of online shoppers, making the use of university students appropriate in this study. Participants were randomly assigned to one of the treatments to control for individual characteristics such as gender, age and academic major. Additionally, all participants involved in this study had prior experience in web browsing and more than 80 percent of the respondents have made at least one online purchase in the past year.

4.7 Covariates

Prior research has shown that consumer behavior can be influenced by factors of internet experience, consumer patriotism⁴ and past purchases of similar goods. It is revealed that experienced web shoppers are more focused on their online sessions and are less distracted by competing stimuli, making them harder to influence online [4, 30]. Furthermore, experienced web shoppers tend to be confident and do less information search [77], and are less likely to respond to banner ads compared to novice shoppers [8]. In addition, consumer patriotism is exhibited through favoritism towards

⁴ Four items were created to measure consumer patriotism based on a 7-point Likert scale: “I prefer to purchase merchandise produced by my country”, “I support goods that are made in my country regardless of other factors (e.g quality)”, “I must purchase products by my country whenever possible to show my patriotism”, “Everyone should support their country’s goods by buying them”.

domestic goods. Under this effect, consumers have an inclination to purchase domestic products over foreign products as a result of patriotic feelings [27, 45]. Due to the nature of the research method, consumer patriotism is used as a covariate to eliminate the alternative explanation that subjects are predisposed to purchase airlines of their native country (i.e. Chinese citizens preferring Air China while Singaporeans preferring Singapore Airlines). Furthermore, it has been widely recognized that consumers are very likely to make their purchase decisions based on the experience they have on past purchase of similar goods [28, 64]. To control for such effects, the number of past online purchase of air tickets is used as a covariate in the data analysis.

5. RESULTS

5.1 Manipulation Checks

Independent samples t-tests were conducted to examine the manipulation of the independent variables (see Table 1 for measures). Results showed a significant difference between the means for different levels of exposure timing ($t = 17.08$, $p < 0.01$): predecisional subjects did perceive themselves to be in the predecisional shopping phase at the time when the pop-up ad was shown (mean = 2.78, SD = 1.37) while postdecisional subjects did perceive themselves to be in the postdecisional shopping phase at the time when the pop-up ad was shown (mean = 5.64, SD = 0.81). Manipulation of brand image is also successful ($t = 14.56$, $p < 0.01$): subjects reported Singapore Airlines as a brand that has a more favourable image (mean = 6.18, SD = 0.57) over the other five dummy brands shown at the website. A lower mean (mean = 2.10, SD = 0.54) was observed for the treatment with Olympic Airlines.

Manipulation of advertising intent of the message content was assessed in a pilot study instead of the main experiment. This is because perceptions of the pop-up format may interfere with perception of advertising intent of the message. If the manipulation check were conducted in the main experiment, its results would be contaminated by perceptions of the pop-up format. To

prevent any priming effects, it was ensured that subjects in the main experiment had not participated in the pilot study involving the manipulation check of advertising intent. Results indicate that advertising intent is manipulated successfully ($t = 5.30, p < 0.01$): subjects assigned to the explicit advertising intent condition perceived the ad intent to be more explicit (mean = 5.13, SD = 0.92) than those assigned to the implicit condition (mean = 2.98, SD = 0.89).

5.2 Hypotheses Tests

Following successful manipulation checks, univariate ANOVA was used for hypotheses testing. Internet experience, consumer patriotism and number of past purchase of air tickets were included as covariates in running the ANOVA procedure.⁵ Our results yielded two main effects, namely from exposure timing ($F = 6.73, p < 0.01$) and brand image ($F = 48.94, p < 0.01$). There were also three significant 2-way interactions: (i) exposure timing and advertising intent ($F = 7.82, p < 0.01$), (ii) brand image and advertising intent ($F = 18.67, p < 0.01$) and (iii) brand image and exposure timing ($F = 4.25, p < 0.05$). No significant 3-way interaction was detected ($F = 1.67, p = n.s$). Results are summarized in Table 2. Since two-way interactions take precedence over main effects, simple effects analysis [42] was conducted for each pair of interacting variables.

Though the interaction effect between exposure timing and advertising intent (H1) is significant, results of simple effects analysis are slightly deviant from our expectations (see Table 3). When exposure timing is held at the predecisional phase, message content with explicit advertising intent (mean = 4.12, SD = 1.55) leads to a significantly lower level of purchase intention than those packaged with implicit advertising intent (mean = 4.66, SD = 1.40), ($t = 1.97, p < 0.05$). However, when the exposure timing is kept at the postdecisional phase, message content with explicit advertising intent (mean = 4.04, SD = 1.72) is not significantly different from those packaged with implicit advertising intent in terms of purchase intention (mean = 3.72, SD = 1.28), ($t = 1.33, p =$

⁵ We have also collected the data on age, gender and academic major. Statistical checks revealed no significant differences in these factors across the conditions.

n.s). Since this hypothesized relationship is not consistent with our expectations, H1 is partially supported.

The interaction between brand image and advertising intent (H2) is supported (see Table 2 and 4). In particular, it is found that when the advertised brand has a more favourable image than competing brands, message content with explicit advertising intent (mean = 5.14, SD = 1.38) results in a significantly higher level of purchase intention than message content with implicit advertising intent (mean = 4.43, SD = 1.49), ($t = 2.38, p < 0.03$). Also, consistent with our prediction, when the advertised brand has a less favourable image than competing brands, message content with explicit advertising intent (mean = 3.01, SD = 1.07) induces a significantly lower level of purchase intention than message content with implicit advertising intent (mean = 3.94, SD = 1.30), ($t = 3.53, p < 0.01$). Hence, H2 is supported.

An interaction is found between brand image and exposure timing (H3) (see Table 2 and 5). Specifically, when brand image of the advertised airline brand has a more favourable image than competing brands, pop-ups exposed at the predecisional phase (mean = 4.85, SD = 1.47) does not lead to significantly different levels of purchase intention compared to pop-ups exposed at postdecisional phase (mean = 4.72, SD = 1.49), ($t = 0.33, p = n.s$). Consistent with our prediction, in promoting brands with less favourable image, pop-ups shown at the predecisional phase (mean = 3.90, SD = 1.37) induce a higher level of purchase intention as compared to pop-ups exposed at the postdecisional phase (mean = 3.07, SD = 1.04), ($t = 3.33, p < 0.01$). Hence, H3 is supported.

6. DISCUSSION, CONTRIBUTIONS AND CONCLUDING REMARKS

6.1 Discussion of Results

The results of this study are summarized in Figure 1, 2 and 3. It is seen from Figure 1 that advertising intent can cause significant differences in purchase intentions at different online shopping phases. It is interesting to see that the tenet of the persuasion knowledge model is only

supported in the predecisional phase of online shopping, i.e. implicit advertising intent is more effective than explicit advertising intent only in the predecisional phase of online shopping. Due to effects of a deliberative mindset, predecisional web shoppers have great ease in retrieving their persuasion knowledge and are more likely to put up resistance towards online interruption-based ads that are communicated with explicit advertising messages. On the other hand, effects of implemental mindset induce postdecisional web shoppers to be cognitively orientated towards the task of completing online payment procedures. The implemental mindset inhibits the easy retrieval of persuasion knowledge, thereby weakening the effects of persuasion knowledge in the postdecisional phase. The weak influence of persuasion knowledge in the postdecisional phase is hinted by Campbell and Kirmani [5] who stated that “application of persuasion knowledge requires cognitive capacity.” Since postdecisional web shoppers dedicate less cognitive resources to process ad messages, they are less likely to invoke persuasion knowledge when viewing online interruption-based ads.

Contrary to our expectations, online interruption-based ads with explicit advertising intent were also ineffective in mitigating the effects of implemental mindset of postdecisional shoppers.⁶ A plausible reason is that the amount of voluntary cognitive resource allocated to process ads in the postdecisional phase is very scarce; using explicit advertising intent to reduce the amount of cognitive resource needed to process ads is still inadequate in improving the ability to process online ads. Another possible reason would be that closed-minded nature of postdecisional shoppers makes them impervious towards information that requires reconsideration of choices, regardless of the content packaging technique used. In other words, motivation to process conflicting new information is cannot be heightened by designing message content with explicit intent, as suggested by the results in testing H1.

⁶ In testing relationships in the postdecisional phase (i.e., H1), purchase intention garnered from pop-ups packaged with explicit advertising intent are not significantly higher than that packaged with implicit advertising intent.

The results also showed an interesting relationship between brand image and advertising intent. From Figure 2, we see that the nature of the relationship between purchase intention and advertising intent are of opposite polarity under different levels of brand image. The use of implicit advertising intent to promote brands with highly favourable image is not as effective as the use of explicit advertising intent in spurring purchase intention. On the other hand, purchase intentions are higher when ads for brands with less favourable image are promoted with implicit advertising intent. Comparing our study results with that from that of Reinhard et al [62], we find that persuasion attempts from brands via online ads share similarity with the persuasion attempts from human salesperson conducted over videos. Our result demonstrates that tenets of the two-step attributional process model holds in the context of online interruption-based advertising. As such, the study results suggest that two-step attributional process model can be used to explain the process of persuasion attempts involving inanimate persuaders (e.g. company name/brand) and conducted in online advertising formats (e.g. pop-ups). These findings extend the model's applicability beyond interpersonal persuasion to advertising effectiveness for online media.

Juxtaposing our study results with that of Danaher et al. [10] and Degeratu et al. [12], we find that web shoppers are heavily influenced by the favorability of brand image in making online purchase decisions across different studies. Beyond this observation, our results further suggest that effects of highly favourable brand image are capable of overriding the characteristics of implemental mindset in online shopping. With reference to Figure 3, we observe that purchase intentions for brands with highly favourable image remain consistently high across different exposure timings. This finding reflects the stronger effect of brand image on online purchases as compared to physical store settings where consumers are allowed to assess product quality via other means such as feeling, touching or directly experiencing products. In online environments where there are relatively fewer cues to infer product quality [36, 37], consumers tend to rely more heavily on brand names in

making purchase decisions. Brands with less favourable image, on the other hand, experience a sharp fall in purchase intention when their online ads are executed in the postdecisional phase (see Figure 3).

6.2 Theoretical Implications

In the realm of e-commerce research, there is a lack of theory development in the area of online interruption-based advertising. This paper attends to the knowledge gap in this field by theorizing the effects of several novel design factors of online interruption-based ads based on prior theoretical materials. Three theoretical implications are derived from this study: (i) identifying and conceptualizing key design factors of online interruption-based advertising, (ii) developing theoretical explanations for the impacts of various design factors of online interruption-based advertising and (iii) providing deeper insights into the underlying mechanisms of persuasion knowledge model.

First, using the principles of persuasive technology design as framework, the study has enhanced existing literature by recognizing and developing formal conceptualizations for design factors that pertain uniquely to online interruption-based advertising in contrast to its offline counterpart. More specifically, the design factors of exposure timing and advertising intent are theorized towards online interruption-based advertising. The research of exposure timing in traditional interruption-based advertising has been limited to physical times and is not directly applicable to the online context. In the current study, a distinct and novel way of associating online shopping phases with web pages within a website is used to conceptualize the exposure timing of online interruption-based ads. This conceptualization captures the psychological state of consumers based on their shopping stage at the website, a feature specific to the online shopping environment. Additionally, the design factor of advertising intent is tailored to account for the online medium's unique ability to allow ads to be designed in a fashion that "blend" in as the main content of the

website. Advertising intent has not been studied and operationalized in the context of traditional interruption-based advertising since the transition from television/radio programs to commercials prevents marketers from concealing their intentions to advertise. By examining these two design variables together with brand image, this study makes a strong contribution by providing insights into the online variant of interruption-based advertising.

Second, the current study has enriched literature by offering theoretical explanations to expound the novel phenomenon of online interruption-based advertising. The underlying theories used in the paper suggest that individual's effort in processing ad information plays a role in shaping the success of online interruption-based ads. Through the use of mindset theory, this study puts forth a reasoning to explicate how various exposure timings can affect consumers' willingness to expend cognitive effort in processing ad content. In addition to exposure timing, advertising intent of the ad content can also trigger different reactions towards online interruption-based ads as a result of persuasion knowledge activation. Finally, we theorized how brand image can alleviate the processing of online interruption-based ads by drawing upon the tenets of the processing fluency model. The careful integration of these theoretical materials provides a thorough understanding of the phenomenon of online interruption-based advertising. By reconciling the various cognitive-related theories, this study goes beyond past research by accounting for the interaction effects between the design factors since extant studies have focused mainly on their main effects and have not empirically examined the higher order effects embedded within the constructs.

Third, the present work has enhanced the literature in persuasion knowledge. In particular, our results have provided new and interesting insights into the mechanisms of persuasion knowledge activation by identifying the conditions in which persuasion knowledge is activated. Study results suggest that the activation of persuasion knowledge takes place for web consumers who are in the predecisional phase of shopping, i.e., individuals who have sufficient cognitive resources for

processing persuasion attempts. Persuasion knowledge is unlikely to be invoked in the postdecisional phase of online shopping since consumers devote relatively less cognitive resources for processing ad information at this stage.

6.3 Practical Implications

This study provides specific guidelines for several stakeholders in ecommerce, including website hosts, clients of online advertising services and online ad designers. These guidelines are useful for guiding the design of online interruption-based ads. The various two-way interactions found in this study imply that the effects of different design factors are to be considered simultaneously. In the attempt to make our discussion relevant to practitioners, we would expound the practical implications of the interaction effects for two business scenarios: (i) advertising clients with reputable brand names and (ii) advertising clients with unknown or less-known brand names.

Facing clients who have market leadership or highly established brand names (e.g. Apple), online advertisers should focus on designing their ads with explicit advertising intent. By doing so, not only would consumers attribute less self-serving motives to the ad, but it would also help consumers to recognize and process the positive brand associations that it has. Currently in practice, there are some instances of online interruption-based ads that are designed with explicit advertising intent to promote reputable brands (e.g. Duracell and Olay)⁷. Our study results suggest that the content packaging strategy used by these companies is indeed appropriate for their online ads. It is recommended that online interruption-based ads for reputable brands should be designed with an explicit approach. Furthermore, it should be noted that practitioners serving clients with reputable brands have the flexibility of deploying their ads at both the predecisional and postdecisional phases of online shopping.

⁷ Screenshots of these ads are available upon request.

When designing online interruption-based ads for clients who have a new presence to the market, it is imperative to deploy a content packaging strategy with implicit advertising intent. When designing ads for such clients, online advertisers should mask the intention to persuade within the ad content in order to reap better results. It is seen that some online ads from less-known firms such as Easy-Forex⁸ and Natively⁹ are designed with implicit advertising intent and our results affirm that these ads were aptly designed to maximize the effectiveness in spurring consumers' purchase intention. In addition, online advertisers should note the importance of launching online interruption-based ads in the predecisional phase of online shopping, i.e. web pages that appear early in ecommerce sites. This is necessary because consumers have yet to establish strong positive associations with brands that are new to the market and are likely to discount their ads once they enter the postdecisional stage of online shopping.

In sum, the practical implications stated above require online advertisers to collaborate closely with the advertising clients and website hosts in order to garner success in the design of online interruption-based ads. As an important first step, online advertisers should work closely with the client to understand the standing of the client's brand image. Based on this understanding, a content packaging strategy is selected. Next, online advertisers should coordinate the exposure timing (i.e. webpage location) with the website host. Thus, practitioners should be wary that reaping positive results in online interruption-based advertising is not the sole responsibility of the ad designer but a combined effort that requires commitment from the client and website host.

6.4 Limitations

Apart from the usual caveats of experiment design, a limitation of this study is that only one product type is considered hence our findings may not be generalized to other products [38]. In our

⁸ An online trading platform that provides complementary trading service, <http://www.easy-forex.com>, screenshots of ads are available upon request.

⁹ A provider for language learning software, <http://www.natively.com/>, screenshots of ads are available upon request.

experiment, since participants were asked to purchase air tickets, a product which typically requires relatively high involvement from consumers, more attention and cognitive effort may be demanded in processing its information than other products [59]. The difference in willingness to process product-related information is likely to interact with the mindset prevalent in different shopping phases, resulting in behavior that may differ from that in this study when other products are being advertised.

Second, this study is conducted in the context of online retail stores. Care should be taken in generalizing study results to other types of websites (e.g. news website, forums, gaming sites, social network sites). Individuals visiting other sites may have different characteristics compared to individuals visiting online retail stores. In particular, visitors to retail sites are prepared to purchase merchandise and are more receptive towards product-relevant ads. This may not apply to visitors for other sites.

Finally, our study is conducted on the same website host throughout. It is highly possible that the reputation of host site can affect shoppers' perception of online ads seen. Different websites have different reputations. For instance, Amazon (www.amazon.com) is a more well-known online bookstore compared to Collins Bookstore (www.collinsbooks.com.au). The variation in website reputation may influence online consumers' trust for the information presented at the websites [4], thus affecting the persuasiveness of ads hosted on them. As such, care should be taken in generalizing results to all ecommerce sites.

6.5 Future Research

The current understanding of design factors of online interruption-based advertising is still very limited and future studies of other design factors are needed to complement the existing results. To do so, it is suggested that future work should further examine design factors based on the theoretical framework of persuasive technology design principles. While the aspects of “when”,

“how” and “who” have been studied in this current paper, future research could examine the contextual factors alluded by the principles of persuasive technology design. According to the principles, contextual factors represent the environment in which users interact with [16], and such factors are able to influence users’ behaviour. In online interruption-based advertising, contextual factors pertain to the website in which ads are being launched.

First, the website type should be noted in the ad design process since heterogeneity in web content can result in varying perceptions towards ads hosted on different sites. For example, different types of website (e.g. news website, product review sites, forums, bulletin boards) attract different groups of web visitors, thus affecting the effectiveness of ads hosted on these sites. Second, the design of online interruption-based ads should consider the reputation of the host website. More specifically, website reputation may affect the effectiveness of the ad hosted on it especially when the host website is involved in recommending the product to its viewers. In such cases, ad effectiveness may only be heightened when the website reputation is high.

6.6 Conclusion

The amount of advertising dollars spent on online advertising increases steadily over the years [51]. Subsequently, online interruption-based advertising and other forms of online advertising become more prevalent in future. The move from traditional advertising medium to newer media implies that the line of research examining the effects of different web advertising formats is increasingly important to practitioners. As such, there is much value in developing theories to account for the effects of online advertising. These theories aid academics and practitioners to understand effects of new advertising media (blogs, social network sites, in-game ads, etc.) and to formulate design guidelines.

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TABLES

Table 1: Measures for Construct		
Construct (Source)	Scale	Measures
Mindset at Time of Exposure (Adapted from Gollwitzer et al, 1990 and Gollwitzer and Kinney, 1983)	7-point Likert Scale Strongly disagree (1) Strongly agree (7)	Just before the pop-up appears, 1. I am already sure of which airline to fly with. 2. I have already made up my mind to travel with an airline. 3. I have already selected an airline to fly with. 4. I am STILL deciding which airline to fly with. (rc) 5. I feel determined with respect to the decision on which airline to fly with.
Brand Image (Adapted from Yoo and Donthu, 2001)	7-point Likert Scale Strongly disagree (1) Strongly agree (7)	1. Positive characteristics of that airline come to me quicker when I see the brand shown in the pop-up as compared to other airlines at the website. 2. The overall quality of that brand of airline (shown in pop-up) is higher than other available airlines at the website. 3. The overall quality of service provided by that airline (shown in pop-up) is lower than other available airlines at the website. (rc)
Advertising Intent (Self created items)	7-point Likert Scale Strongly disagree (1) Strongly agree (7)	The message 1. attempts to persuade me to buy my air ticket from a specific airline. 2. obviously wants to convince me that the advocated airline is the superior option. 3. is apparently motivated by the airline company to induce purchase. 4. shows me facts rather than persuades me to buy from the airline. (rc)
Purchase Intention (Adapted from Li et al., 2002)	7-point Semantic Differential scale	How likely/probable/certain/definite are you going to purchase a ticket of that airline shown in pop-up? 1. unlikely (1) / likely (7) 2. improbable (1) / probable (7) 3. uncertain (1) / certain (7) 4. definitely not (1) / definitely (7)

Table 2: ANOVA Result for Purchase Intention

Treatment Variable	df	F	Sig	Observed Power
Exposure Timing	1	6.725	0.01**	0.73
Advertising Intent	1	0.168	0.68	0.07
Brand Image	1	48.939	0.01**	1.00
Exposure Timing * Advertising Intent	1	7.824	0.01**	0.79
Brand Image * Advertising Intent	1	18.672	0.01**	0.99
Brand Image * Exposure Timing	1	4.253	0.04*	0.54
Brand Image * Exposure Timing * Advertising Intent	1	1.670	0.20	0.25
Covariates				
Consumer Patriotism	1	5.992	0.02*	0.69
Internet Experience	1	5.897	0.02*	0.68
No. of Past Purchase of Air Tickets	1	0.018	0.90	0.06

*p < 0.05, **p < 0.01

R Squared = 0.38 (n = 180)

Table 3: Descriptive Statistics for Exposure Timing × Advertising Intent

Mean (Std Dev)		Exposure Timing	
		Predecisional	Postdecisional
Advertising Intent	Explicit	4.12 (1.55) N = 45	4.04 (1.72) N = 45
	Implicit	4.66 (1.40) N = 45	3.72 (1.28) N = 45

Table 4: Descriptive Statistics for Brand Image × Advertising Intent

Mean (Std Dev)		Advertising Intent	
		Explicit	Implicit
Brand Image	More Favourable	5.14 (1.38) N = 45	4.43 (1.49) N = 45
	Less Favourable	3.01 (1.07) N = 45	3.94 (1.30) N = 45

Table 5: Descriptive Statistics for Brand Image × Exposure Timing

Mean (Std Dev)		Exposure Timing	
		Predecisional	Postdecisional
Brand Image	More Favourable	4.85 (1.47) N = 46	4.72 (1.49) N = 44
	Less Favourable	3.90 (1.37) N = 44	3.07 (1.04) N = 46

FIGURES

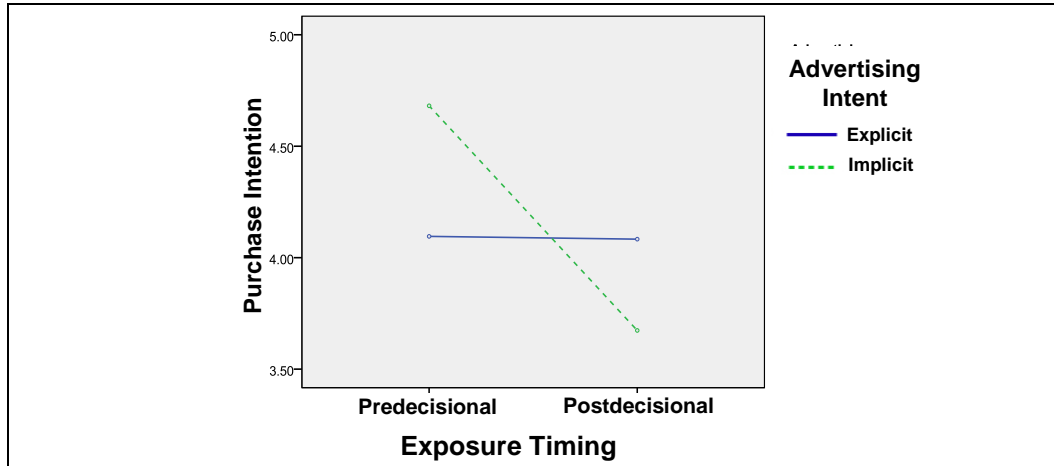


Figure 1: Graphical Presentation of Results for Exposure Timing \times Advertising Intent

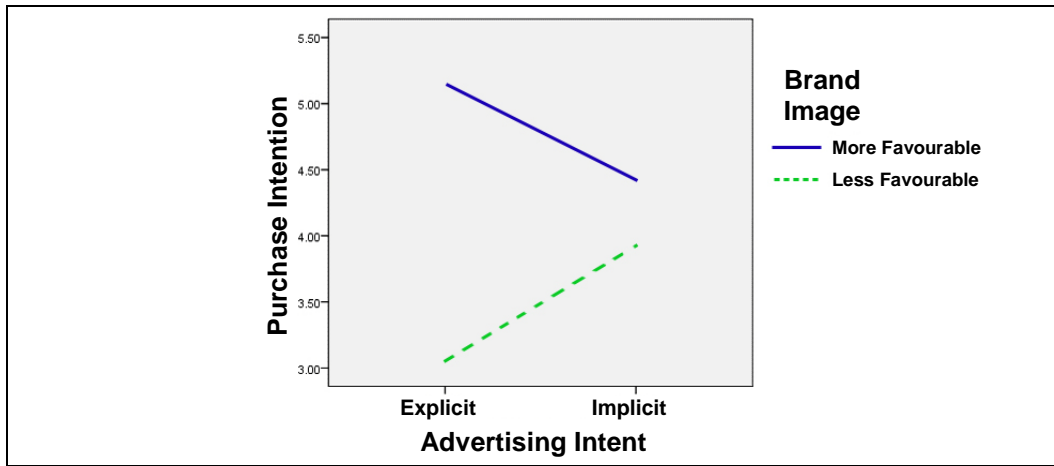


Figure 2: Graphical Presentation of Results for Brand Equity \times Advertising Intent

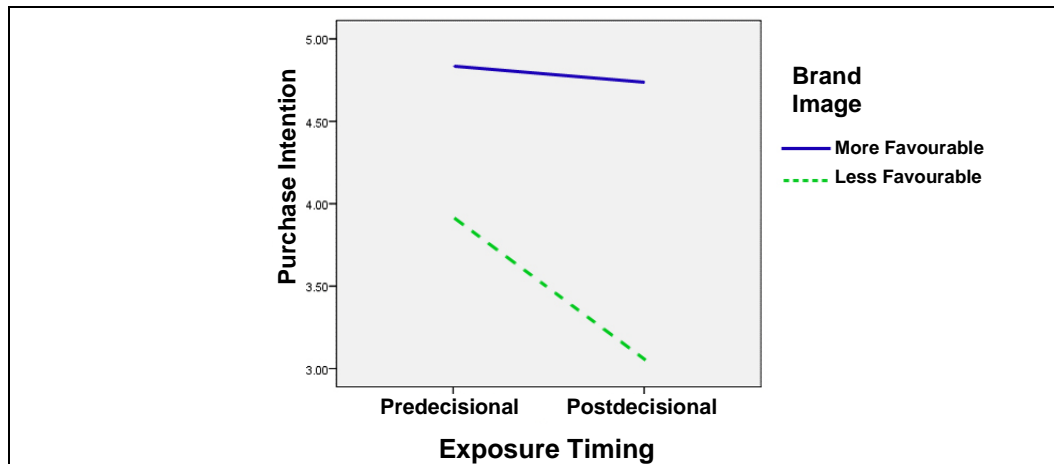


Figure 3: Graphical Presentation of Results for Brand Equity \times Exposure Timing