KEEPING AN EYE ON HOW USERS PERCEIVE OPTIONALITY IN PURCHASING DECISIONS: A PILOT STUDY

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ABSTRACT

Previous research indicated the design of certain decision constructs could be unclear to users in the business to consumer (B2C) transactional process. This pilot study, using eye tracking and cued RTA sessions, examines potentially problematic decision constructs. It explores the impact of decision constructs on users' decision making and their cognitive processes during interactions. The key contributions of the study are the identification of improvements the researchers can make to their research design, robust experiment administration and the refinement of research instruments. Ultimately, the pilot study will contribute to a more extensive study that combines quantitative eye tracking and qualitative cued RTA data to assess some questionable website design choices made by firms.

KEYWORDS

Web design, usability, decision making, ethical design, eye tracking, opt-out.

1. DECISION CONSTRUCTS

1.1 Background

In the context of this research, the B2C transactional process is the navigational journey from once a consumer has committed to an online purchase to the conclusion by payment. In recent years this process has become crowded with an increasing number of decisions that consumers are presented with before they can conclude their purchase. These decision points are

increasingly time-invasive, with many of the decision constructs designed ambiguously. Decision constructs used in B2C transactional processes are essential or optional (Hogan et al., 2014). An essential decision is one where the user must choose from a number of variants before continuing with the transaction (e.g., selecting a payment method). An optional decision involves accepting or rejecting an option (e.g., an extended warranty) and the user may continue with the transaction, even if they do not avail of the option.

Table 1. Taxonomy of transactional decision constructs

Decision Construct	Description
Un-selected opt-in	• Default: don't receive the option • Normal presentation: un-selected • Framing: acceptance
Pre-selected opt-in	• Default: don't receive the option • Normal presentation: selected • Framing: rejection
Un-selected opt-out	• Default: receive the option • Normal presentation: un-selected • Framing: rejection
Pre-selected opt-out	• Default: receive the option • Normal presentation: selected • Framing: acceptance
Must-opt	• Default: cannot proceed • Normal presentation: multiple option variants, one of which allows the option to be declined, all variants un-selected • Framing: normally acceptance
Un-selected essential decision	• Default: cannot proceed • Normal presentation: multiple decision variants, all un-selected • Framing: normally acceptance
Pre-selected essential decision	• Default: variant selected • Normal presentation: multiple decision variants, one selected • Framing: normally acceptance

Hogan et al. (2014) produced a taxonomy identifying seven distinct, mutually exclusive decision constructs used in the B2C transactional process after users have passed the purchase committal point and are proceeding to complete the transaction (see Table 1). Optional decisions were broken down to whether they were opt-in or opt-out. Optional and essential decisions were also identified as being either pre-selected or un-selected. A final decision construct, called a *'must-opt'*, was identified. While the must-opt and the un-selected essential decision appear similar, the difference between them is explained as follows:

- Must-opt: The user cannot continue with the transactional process without explicitly choosing to accept or decline the option.

- Un-selected essential decision: The user cannot continue with the transactional process without explicitly choosing one of the variants offered.

Barry et al. (2014b) also assessed 195 decision constructs across 25 websites for clarity. The websites represented a number of different industry categories: Travel, Consumer Products, Financial Services, Accommodation, and Entertainment & Recreation with between 2 and 9 websites selected from each category. The sampling of decision constructs was conducted to confirm the taxonomy proposed by Hogan et al. (2014). While it was found that most constructs do not present problems, the opt-out was frequently presented in a way where the user could inadvertently make an unwanted choice. Variants of the opt-out decision construct are the subject of this pilot study.

1.2 Decision Construct Elements

The presentation of options to consumers in contemporary B2C interactions is made up of a number of dimensions, where choice and optionality can be greatly finessed. The presentation of an option may now have multiple, even layered, dimensions. Previous research (Barry et al., 2014a; Barry et al., 2014b; Torres et al., 2014) determined options are presented in a variety of ways. Some options are straightforward with easy to understand defaults and choices, while other options are more complicated and require effort to decipher so as to identify the default and the action required to achieve the desired outcome. Some options are simply presented to the consumer while others incorporate various levels of persuasion, presumably to encourage selection of the vendor's preferred outcome. The less straightforward decision constructs encountered were pre-selected and un-selected opt-outs, must-opts and pre-selected opt-ins. This initial stage of research examines pre-selected and un-selected opt-outs, while later stages will examine the other decision construct types. A desk analysis of 57 websites was conducted to determine the fundamental dimensions of option presentation for opt-out decision constructs in use in B2C websites. These dimensions are outlined in Table 2 and discussed below.

Table 2. Dimensions of option presentation

Dimension	Presentation
Default Value	Pre-selected or Un-selected
Question/Information Framing	Acceptance, Rejection or Neutral
Additional Persuaders	Yes or No

In relation to default value, website designers may choose to present a decision construct in an un-selected (e.g. unticked checkbox) or pre-selected (e.g. pre-ticked checkbox) manner. In the last section, we identified: opt-in, opt-out and essential decisions that can be presented in either way. Presenting the construct as un-selected or pre-selected is a conscious choice by the firm. The construct may be framed variously and may or may not be accompanied with a degree of persuasion.

Decision framing is important, as it can significantly influence decision making (Belman et al., 2001; Tversky and Kahneman, 1981). Decisions may be framed using acceptance, neutral or rejection framing (e.g., acceptance - 'I want an Extended Warranty'; neutral - 'Extended Warranty - tick Yes or No'; rejection – 'I do *not* want Collision Damage Waiver'.) There is

often a 'natural' frame for a type of decision construct. For example, opt-out decisions normally appear as a pre-selected tick in a checkbox with associated acceptance framing (e.g., 'I want Express Delivery') and opt-in decisions are normally presented as an un-selected checkbox with acceptance framing (Barry et al., 2014b). However, firms and systems designers sometimes design constructs in a counterintuitive manner. For example, an opt-out construct can be designed as un-selected with rejection framing, appearing like a 'normal' opt-in decision, and possibly misleading or confusing users.

Firms may encourage consumers to select an option by adding additional persuasion to the decision construct, which may vary from a brief statement of benefits to more emphatic persuaders. This study examines different variants of opt-outs, which can be either un-selected or pre-selected. The latter can use acceptance, neutral or rejection framing, while un-selected opt-outs can only be presented using rejection framing (Barry et al., 2015). Each of these variants may or may not include additional persuasion.

2. EYE TRACKING RESEARCH

Eye tracking technology works on the principle of focusing a light and a video camera on a person's eye to track where they are looking on screen (Nielsen and Pernice, 2009). When an individual wants to pay attention to something, they fix their gaze on it and it comes into sharp focus. A person typically moves their eye across items of interest. These movements are jerky and happen so quickly we are not aware of them. When the eye is focused on an area of interest, it is referred to as a fixation, while the movements between items of interest are called saccades (Nielsen and Pernice, 2009). The saccades are rapid, lasting between one-hundredth and one-tenth of a second, while fixations last between one-tenth and a half second.

Eye tracking has been employed extensively in web usability studies (Djamasbi et al., 2011; Di Stasi et al., 2011; Huang and Kuo, 2011; Sivaji, et al., 2011; Djamasbi et al., 2010). By studying what users do and do not look at, it is possible to determine where they are concentrating their attention (Pernice and Nielsen, 2009). Through the examination of eye movement patterns, conclusions may then be drawn regarding the decision-making strategies users adopt (Glockner and Herbold, 2011; Huang and Kuo, 2011; Day et al., 2006).

3. RESEARCH APPROACH

This pilot study seeks to validate the research design for an extensive eye tracking and cued retrospective think-aloud (RTA) study to comprehensively analyse all the constructs within the taxonomy described above. Its purpose is twofold: to learn from the process of constructing an eye tracking experiment and to fine-tune the research instruments (Barry et al., 2014a). The more extensive study seeks to confirm the key dimensions influencing a user's decision-making in B2C transactional processes. Hence, the following research question emerges:

RQ: *How are users impacted by differently designed opt-out decision constructs?*

The study has two parts:

1. An eye tracking study where the user's gaze is tracked while completing a simple task using different types of opt-out decision constructs. The data gathered includes the user's pattern of eye movement, as well as tracking how long a user focuses on a particular part of the screen. These data allow the researchers to determine how long a user focuses on each of the decision constructs before taking action.
2. Cued RTA sessions where the user talks about the task just completed. The user describes the thought process followed during the task, providing rich, contemporaneous, qualitative data to enhance the quantitative data obtained from eye tracking. It is important the eye tracking data is supplemented with additional qualitative data (Hyrskykari et al., 2008), as eye movements simply show the user's eye movement pattern with no information on why a user is fixating on a particular part of the screen (e.g., a long fixation could be due to interest or difficulty understanding the information).

There are two think-aloud approaches: concurrent think-aloud (CTA), where an end user thinks out loud while carrying out tasks on a system, and RTA, where the user provides a description of their thought processes after the tasks have been completed (Hyrskykari et al., 2008). This verbalisation helps the evaluator to understand the user's attitudes towards the system and to identify aspects of the design that are problematic for the user (Holzinger, 2005). The sessions are taped and a separate note taker may also write detailed notes of the user's comments and actions (Monk et al., 1993). For this study, CTA was considered to be an inappropriate approach, as it can bias the user's first impression and may impact on their visual fixations (Kim et al., 2007). RTA also has potential problems, as the user is relying on memory to describe their cognitive processes and may forget information or attempt to justify their actions, leading to erroneous data (Ball et al., 2006). However, the use of cued RTA, where the user is shown a playback of their interaction has been found to be more effective at eliciting comments than un-cued RTA (Ball et al., 2006) while Goh et al. (2013) compared a number of usability testing techniques for an e-commerce website and found the use of cued retrospective think-aloud (RTA), identified significantly more usability problems than un-cued RTA, observation or feedback capture after task (FCAT). While van den Haak et al. (2003) found RTA and CTA identified comparable numbers of usability problems, combining eye tracking with cued RTA allows the researcher to effectively combine quantitative and qualitative data.

Pernice and Nielsen (2009) recommend six users for qualitative eye tracking (i.e., watching gaze replays). As this pilot tested the approach before conducting a larger scale study, six users carried out the tasks while their gaze was tracked using eye tracking equipment. A cued RTA was then conducted where the participant was shown a replay of their interaction with the gaze pattern superimposed on the screen (Ball et al., 2006). While watching the replay, participants described why they made their decisions and what they were thinking while interacting with the decision constructs. The tasks presented to the users involved making certain selections using a variety of opt-out decision constructs.

The webpages presented were based on real interactions encountered on B2C websites. However, as most of these decision constructs were on pages that included multiple decisions, it was decided to create webpages, using anonyms, similar to the original but containing only a

single decision construct. While this approach reduced the realism of the user interaction, it minimised the effects of extraneous variables on the validity of the experiment.

The participants were brought into the laboratory and the experiment explained. The equipment was calibrated for each participant before the experiment began. The first screen presented to the participant was a test screen (see Figure 1). The purpose of this page was to explain to the participant what was required of them in the experiment. They were shown the area in which the decision construct was located and told they would be instructed what decision they were required to make (i.e., to either accept or decline the option). For the test page, participants were told the required decision was to agree to participate in the experiment. The correct course of action was, in this case, to press the 'Leave Checkbox' button.

Figure 1. Test page with decision construct and checkboxes

The participants were then presented with each of the opt-out website variants. The presentation order was randomised to minimise bias in the results. For each screen, the participant was told what decision to make and they should press the appropriate button corresponding to the correct action. Once the eight screens were completed, the cued RTA was conducted while playing an animation of the interaction. The test screen was initially shown in order to familiarise them with the way in which the eye movement was superimposed on the screen. The process of cued RTA was also explained, and participants asked to articulate the thought process they followed during the interaction with each webpage. Prompts were used in order to facilitate the verbalisation. Once the RTAs were complete, a de-briefing was conducted to gather feedback on the conduct of the experiment and the RTA. This de-briefing was employed to improve the experiment design.

4. FINDINGS

4.1 Data Analysis

Tables 3 and 4 below lay out the detailed analysis of the eight webpages used in the experiment. The eye tracking data were analysed in a number of ways. Reports were produced based on total interaction and on interactions with the interest areas. Data such as dwell time (i.e., summation of fixation times), fixation counts for individual interest areas and interaction duration were analysed. Table 3 outlines the eight firms (anonymised) that were used as the basis for each decision construct. The construct type, type of framing used, whether persuasion is used and the word count for each are specified. The first step in the analysis was to define interest areas (IAs) on the webpages. These are the areas of the screen where the number of

fixations is tracked. For each webpage, the decision construct was located within the same rectangular area on each screen, declared the decision construct interest area. Two additional interest areas were defined for the buttons: 'Change Checkbox' and 'Leave Checkbox'.

The trial analysis is shown in Table 4, outlining: the duration of the interaction; the total dwell time (the sum of all fixation times); and the number of fixations during the interaction for each interest area. All times are in milliseconds. AnzAir had the longest mean duration and dwell time of all the decision constructs, followed by Aer Seamróg, TheatreTix, Blue Daisy Hotel, BestInsure, Balkan Blue Air, RS Sports and Auto Assist. The decision construct on AnzAir was a pre-selected opt-out with neutral framing and additional persuasion. This particular example, taken from a real website, was longer than the other constructs due to having considerably more persuasion, which may explain the longer dwell time and the higher number of fixations associated with the construct.

Aside from AnzAir, the longest dwell times were associated with constructs using rejection framing. Rejection framing involves the use of negative language, such as "Please untick this box if you do not want to receive our newsletter that gives you the week's top news, features and hot tickets" (TheateTix). These constructs tell the user what action they need to take if they do not want something. The dwell time and number of fixations required to understand the wording suggest more cognitive effort was required on the part of the participant to make a decision on the action necessary to achieve their goal. The level of cognitive effort required is reinforced by comments made by participants during the RTA.

Table 3. Decision construct types

Website	Construct Type	Framing	Persuasion	Word Count
Aer Seamróg	Un-selected opt-out	Rejection	Yes	29
AnzAir	Pre-selected opt-out	Neutral	Yes	79
Auto Assist	Pre-selected opt-out	Neutral	None	5
Balkan Blue Air	Pre-selected opt-out	Acceptance	None	13
BestInsure	Un-selected opt-out	Rejection	None	17
Blue Daisy Hotel	Pre-selected opt-out	Acceptance	Yes	44
RS Sports	Pre-selected opt-out	Rejection	None	13
TheatreTix	Pre-selected opt-out	Rejection	Yes	26

The number of words in each of the constructs using rejection framing ranged from 13 to 29 words (see Table 3). The construct with 26 words had the highest number of fixations and the longest dwell time, which suggests the word count may not be the deciding factor in the interaction duration. This finding is further reinforced by the fact that one of the constructs using acceptance framing (Blue Daisy Hotel) had a considerably higher word count (44 words), but had the second shortest dwell time. The decision constructs, except for AnzAir's

wordy construct, using acceptance or neutral framing had shorter dwell times and fewer fixations, suggesting less cognitive effort. This finding is supported by comments during the RTA.

The analysis continued by examining the fixation count and dwell time for each of the interest areas. As can be seen from Table 4, the dwell time and fixation count were, unsurprisingly, considerably higher on the decision construct interest area than on the change or leave checkbox interest areas, as participants spent much more time considering the text of the decision construct that the buttons. Participants did also spend time fixating on the buttons deciding which one to press. In all cases, they spent more dwell time on the correct button, rather than the incorrect button. However, for three of the decision constructs using rejection framing (i.e., Aer Seamróg, TheatreTix and RS Sports), participants divided their dwell time more evenly than for constructs that used neutral or acceptance framing. This finding suggests the correct course of action was less obvious in these cases, requiring participants to spend time considering both options before making a final decision. In the case of BestInsure, the final construct using rejection framing, the language used, while phrased negatively, was relatively straightforward (i.e., "Quote valid for 30 days. If you do not wish to receive email reminders, please tick here"), in comparison to the other constructs using rejection framing. In this case, while less time was spent fixating on the 'wrong' button relative to other constructs using rejection framing, the overall dwell time for the areas of interest was still higher than for the constructs using neutral or rejection framing, suggesting this decision required more cognitive effort. This effort, while relatively brief, imposes not merely a little more thought on the part of the user, it introduces some level of confusion as users are forced to contemplate the negative language that must be associated with framing that solicits users 'not' to get or receive something. The time spent analysing the negative framing is at a juncture in the transactional process and is the antithesis of a smooth, easy navigational route to a successful purchase.

Table 4. Fixations and dwell time by interest area

Website	Interest Area (IA)	Fixation Count	Dwell Time (ms)	Total Dwell Time for IAs (ms)	Total Duration for IAs (ms)
Aer Seamróg	Change	2.67	508.83		
	Decision Construct	29.00	5594.50	6788.16	14031.67
	Leave	2.67	684.83		
AnzAir	Change	3.50	999.17		
	Decision Construct	48.50	9765.67	10897.17	17657.17
	Leave	0.50	132.33		

Auto Assist	Change	2.33	313.67	3975.50	9419.67
	Decision Construct	14.83	2794.00		
	Leave	2.33	867.83		
Balkan Blue A	Change	1.67	287.00		
	Decision Construct	18.33	3477.17	4852.67	10421.50
	Leave	2.83	1088.50		
BestInsure	Change	3.00	677.50		
	Decision Construct	25.17	5272.67	5982.17	12550.33
	Leave	0.17	32.00		
Blue Daisy Hotel	Change	2.67	794.17		
	Decision Construct	23.50	4395.00	5430.84	9977.67
	Leave	1.00	241.67		
RS Sports	Change	3.17	734.67		
	Decision Construct	22.83	4848.00	6117.00	12067.50
	Leave	1.33	534.33		
TheatreTix	Change	2.00	357.83		
	Decision Construct	28.00	5763.33	6807.83	13930.67
	Leave	1.67	686.67		

4.2 Cued RTA Analysis

4.2.1 Neutral Framing

Of the eight decision constructs, those using neutral framing (i.e., AutoAssist and AnzAir) were perceived as being the most credible. Participants believed firms using neutral framing were more honest and trustworthy, as they were *"not deliberately making* [i.e., nudging] *consumers behave in a particular way."* Further, participants were less likely to misinterpret the neutral decision constructs, and thus, less likely to make an incorrect decision. Availing of pre-selected opt-outs within the decision construct was typically not a concern among

participants. For AutoAssist, all participants found the presentation to be clear and unambiguous, and no participant misinterpreted the decision construct. Indeed, they liked the straightforward, uncomplicated phrasing, which allowed them to decide quickly whether to accept or reject the item. With respect to AnzAir, although participants found this decision construct to be verbose, they appreciated the neutral framing, which one participant commented was *"in stark contrast to the other airline."*

4.2.2 Acceptance Framing

Acceptance framing (i.e., Balkan Blue Air and Blue Daisy Hotel) was also found to be quite satisfactory, as it is consistent with participants' preference: clear, straightforward and unambiguous. Indeed, participants made correct decisions in all cases. Participants believed pre-selection correlated with agreement and if they unchecked the box, it meant they did not agree or did not want a particular action. However, participants typically perceived a pre-selected checkbox, as firms *"forcing a choice on consumers."* For example, one participant suggested Balkan Blue Air's phrasing was deliberate, as the firm was *"trying to get you to read quickly without changing the decision they have made for you."* Without articulating differences between opt-in and opt-out, participants effectively preferred opt-in to opt-out constructs. In the airline's favour, participants liked the direct and concise decision construct presentation. Regardless of framing, participants generally preferred concise decision constructs. With Blue Daisy Hotel, although a bit long-winded, the participants appreciated the courteous manner (i.e., "*Please sign-up ...*") in which the firm invited consumers to sign-up for an email newsletter. Indeed, one participant commented they were *"probably more likely to sign-up because the firm was polite"* and another participant believed the firm was "*very helpful and clear about how often they would email*" (i.e., monthly), which indicated the hotel "*cared about customer service."* Provided they were interested, participants appreciated knowing they would only receive one email per month, as many participants commented they did not like receiving unnecessary and frequent emails from firms.

4.2.3 Rejection Framing

The decision constructs using rejection framing (i.e., Aer Seamróg, TheatreTix, RS Sports and BestInsure) were more problematic for participants, primarily because of their lack of clarity. Consequently, participants were more likely to misinterpret decision constructs employing pre-selected rejection framing, leading them to formulate an incorrect decision. Participants generally believed firms using rejection framing were less honest and less trustworthy, as the firms were *"deliberately trying to make you do something"* (e.g., sign-up for a newsletter or purchase an ancillary product feature). The use of negative framing within decision constructs was confusing and unclear to participants, as it seemed counterintuitive to them (i.e*., "check the box if you do* <u>not</u> *want to receive newsletters..."*).

Those firms employing rejection framing in conjunction with an un-selected opt-out (i.e., BestInsure and Aer Seamróg) were perceived slightly more favourably, particularly if the construct was concise. For example, most participants found BestInsure's construct to be straightforward and brief. Some participants read this construct several times because the first sentence indicated the quote was valid for 30 days and the second sentence invited consumers to sign-up for email reminders regarding the quote. Hence, it appears this firm could increase consumer comprehension by enhancing construct clarity. Mitigating BestInsure's decision construct was its brevity as it was "*easy to make a decision quickly*."

To many participants, it is the norm to *"check a box to receive something"*, whereas in the case of Aer Seamróg's decision construct (i.e., un-selected opt-out, rejection framing) it was asking participants to do the opposite (i.e., check the box to *not* receive a newsletter). Hence, many participants read Aer Seamróg's decision construct several times to ensure they understood it correctly. Indeed, one participant did make the wrong decision. Some believed Aer Seamróg deliberately used this phrasing, hoping consumers might skim quickly, inadvertently leaving the box unchecked and thus receiving the newsletters and offers. Others suggested the checkbox placed at the end of the Aer Seamróg's decision construct (i.e., rather than at the beginning) was atypical and deliberate, where *"it might go unnoticed."*

Those firms employing rejection framing in conjunction with a pre-selected opt-out (i.e., TheatreTix and RS Sports) were using highly problematic decision constructs. Participants found the wording of TheatreTix's construct verbose, unclear and confusing. They read the construct a number of times to ensure they took the correct action. Consumers were asked to uncheck a box so as not to receive a newsletter. Participants found this double negative (i.e., *"uncheck not to get it"*) confusing. Some felt it may "*make sense for the company*" because consumers would inadvertently "*receive emails if they did not read carefully and uncheck the box*", Nonetheless, participants found the presentation to be contrived and unnecessarily confusing. Indeed, their preference was for clear, short and unambiguous phrasing (e.g., check the box to receive a newsletter).

RS Sports presented the most problematic decision construct. In this case, brevity did not confer an advantage to the firm. Indeed, half of the participants (i.e., 3 of 6 participants) misinterpreted the decision construct, thereby making the incorrect decision. Participants were asked to uncheck a box so as not to receive a newsletter; one participant found the *"double negative confusing"* and read the passage a few times to ensure they made the correct decision. Participants generally found this kind of phrasing potentially misleading, as it would be easy for consumers to misinterpret what they were being asked to do. Most participants preferred to check a box to receive something. Hence, it is counterintuitive for them *"to do something* [i.e., uncheck the box] *so as not to get something; it would be easy to choose the wrong option."*

4.3 Heat Map Discussion

Eye tracking heat maps, or fixation maps, are two-dimensional graphical representations of the fixations on a stimulus. The colours used depict fixation intensity on different parts of the stimulus, with colours ranging from green for lowest intensity to yellow for moderate intensity and to red for highest intensity (Djamasbi, 2014). The closer the colour is to red, the more fixations on that part of the stimulus. A major benefit of heat maps is the heat is superimposed on the stimulus shown to the participant and, hence, little cognitive effort is required to read a heatmap (Bojko, 2009). They also aggregate visual data for multiple participants.

Sample heat maps from this study are shown in Figures 2 to 4. As can be seen, the majority of the fixations focussed on the decision construct. The heat maps provide a visual illustration of the data previously discussed regarding dwell time in the interest areas. However, heat maps can also be generated to illustrate fixation count, per cent of fixations or per cent of dwell time. While heat maps representing dwell time show the areas to which participants attended and the level of cognitive processing required, they can be misleading, as there is no indication of the number of fixations. Thus, one fixation lasting 900ms has the same impact as

nine fixations lasting 100ms (Bojko, 2009). Similarly, heat maps showing fixation counts can be misleading, as two areas with the same fixation count could have very different dwell times. Thus, Bojko (2009) suggests using heat maps to accompany a quantitative analysis rather than on their own. In addition, it is suggested using them for data visualisation rather than analysis. Djamasbi (2014) also suggests heat maps can be useful for visualising viewing patterns on webpages, as well as comparing viewing behaviour for different groups of users. They too recommend supplementing heat maps with additional analysis such as context and data points (e.g., surveys and interviews), as the heat maps indicate dwell time or fixation count, without any indication whether the attention was positive or negative (i.e., interest or confusion).
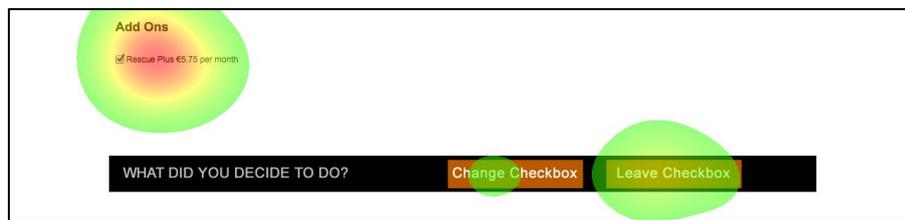
Figure 2. Heat map for Auto Assist

The researchers found the heat maps generated to be an extremely useful tool in visualising the data before approaching the analysis. The heat maps indicated what factors might warrant closer scrutiny. For example, a quick examination of the heat maps showed participants spent more time examining the two buttons for the decision constructs using rejection framing (i.e., TheatreTix and Aer Seamróg – see Figure 3) than for those using acceptance (Figure 4 Blue Daisy Hotel) or neutral (Figure 2 Auto Assist) framing. The heat maps also showed where participants fixated within the interest areas. For example, on the Aer Seamróg website, the 'hottest' parts of the map were centred on two separate sections of the text, namely: *"would rather not"* and *"please tick this"*. This information reinforced the data gathered from the cued RTA as participants referred to the confusion caused by the wording of the constructs. Heat maps will, therefore, be a useful tool in the main study to reinforce data from the cued RTA and to illustrate the points raised in the analysis as well as suggesting which variables should be examined as part of the analysis.
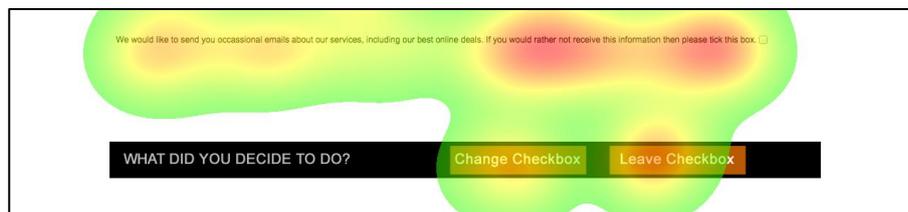
Figure 3. Heat map for Aer Seamróg

The heat patterns can also be used in planning further research, such as analysis of reading patterns of participants for different types of constructs. As suggested by Djamasbi (2014), the researchers will also examine heat maps for different groups, such as gender, in order to visualise quickly differences that may warrant further analysis using statistical techniques.
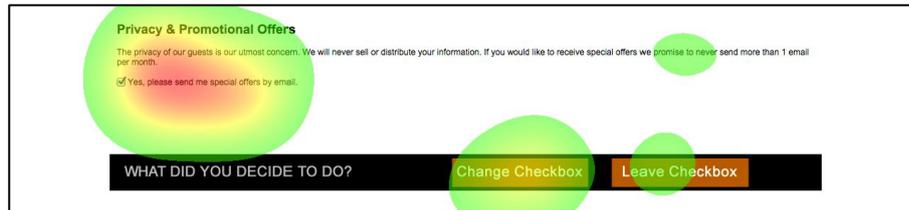
Figure 4. Heat map for Blue Daisy Hotel

4.4 Discussion of Findings

The data analysis suggests the deciding factor in the duration and dwell time for the interaction with an opt-out decision construct is the framing of the construct. Those using rejection framing generally had longer interaction times, longer dwell times and more fixations than those presented using either neutral or acceptance framing. The RTA reinforced this finding, as rejection framing was more problematic, primarily due to the lack of clarity. Participants found the use of double negatives confusing and typically read the passages several times to ensure they made the correct decision. They were also more likely to misinterpret decision constructs using rejection framing. Participants generally believed firms using rejection framing were less honest and less trustworthy, as they were *"deliberately trying to make you do something."*

Neutral framing was deemed to be more credible during the RTA; participants believed firms using neutral framing were more honest and trustworthy, as the firms were not nudging *"consumers to behave in a particular way*." Acceptance framing was also considered to be clear, straightforward and unambiguous. None of the participants misinterpreted the acceptance decision constructs while one misinterpreted a neutral framing construct, which is in contrast to four errors on constructs using rejection framing. Regardless of framing, participants preferred brevity in decision constructs because it is "*easy to make a decision quickly*." It is the contention of the authors (which we intend to test in the main study) that users prefer more straightforward framing (either neutral of acceptance) to rejection framing which they find either confusing or highly problematic. Furthermore, it is contended that rejection framing is often deliberately chosen to confuse and make ambiguous the decision making process.

The default value (i.e., whether pre-selected or un-selected) did not seem to impact on interaction times, dwell times and the number of fixations. The two un-selected opt-outs, which by their nature must use rejection framing, had the third and fourth longest interaction and dwell times whereas the two longest were pre-selected opt-outs. However, the default value did influence participants' attitude, who typically perceived a pre-selected checkbox as firms *"forcing a choice on consumers."* Participants also believed pre-selection correlated with agreement and if they unchecked the box, it meant they did not agree or did not want a particular action. Conversely, in some cases, they appeared to misunderstand the un-selected opt-out, as they seemed to believe a checked box indicated they would be getting something while an unchecked box indicated they would not be getting something. While the terms opt-in or opt-out were not articulated in the experiment, some participants said they preferred the un-selected version, as they believed they needed to take action in order to receive the option.

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These constructs were typically the ones where the participants made the wrong decision, presumably believing that since it was un-selected, it was an opt-in.

With persuasion, there would appear to be less of a pattern in interaction times. The two constructs using rejection framing and persuasion had longer interaction times than the two that did not use persuasion while the construct using neutral framing and persuasion had a longer interaction time that the construct using neutral framing and no persuasion. However, the construct using acceptance framing and persuasion had shorter interaction times than the construct using acceptance framing and no persuasion. Thus, it would appear that all other things being equal, persuasion might impact the interaction times. Naturally, confirming this finding requires many more participants than used in this pilot. Persuasion did, in some cases, appear to influence the likelihood of the participant wishing to avail of the proffered option. Several participants commented on the politeness and courtesy of the Blue Daisy Hotel construct. This finding was the only case where participants appeared to be persuaded by the phrasing of the construct, suggesting only certain types of persuasion may be effective.

5. CONCLUSIONS AND FURTHER RESEARCH

It is clearly not possible to draw strong conclusions from this pilot study. However, it has proven useful in alerting the authors to aspects of the main study that will need elaboration and refinement. The study was conducted to learn from the process and improve the research instruments for a more extensive study. The key lessons ascertained were to ensure participants: are fully briefed before commencing the test; perform the interaction as instructed working with neither haste nor labouring the tasks; and are de-briefed after the test to ascertain insights into their behaviour. The authors are confident the pilot was sufficient preparation to ensure the main study will be both robust and reliable. It is planned to employ a post-trial questionnaire to measure construct features such as clarity and ease of use. The authors also expect to compare and contrast different types of constructs, e.g., pre-selected versus un-selected; negative versus positive framing; and additional persuaders versus no persuaders.

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