Shopping in the Dark

Effects of Platform Choice on Dark Pattern Recognition

Christof van Nimwegen(✉) and Jesse de Wit

Faculty of Science, Department of Information and Computing Sciences, Utrecht University, Princetonlaan 5, 3584 CC Utrecht, The Netherlands
c.vannimwegen@uu.nl, j.dewit@students.uu.nl

Abstract. Dark patterns are user interfaces designed to trick users into doing things they might not otherwise do. Human psychological insights are carefully exploited by designers to craft these patterns. This study investigates the relation between dark pattern recognition and platform choice. An experiment was designed in which 54 participants performed a shopping task. In the website different dark pattern types were implemented, such as "Sneak into Basket", "Toying with emotions" and "Trick Questions". Results showed that mobile users are twice as likely to fall for one of the patterns. In addition, a significant correlation was found between falling for that same dark pattern and the age of users. The older the user, the more chance of falling for that pattern. Lastly it showed that the higher the website's "honesty" is rated, the higher the "navigability" is rated.

Keywords: Dark patterns · Design ethics · Deceptive interfaces · Mobile devices · Online trust

1 Introduction

Over the past decades information technology and the internet have become indispensable to modern society. It is embedded in cars, smartphones and our homes. Many pillars of society have gained benefit from the rise of information technology and the internet in some form or another. However, the internet also induced less desirable practices such as phishing and unethical hacking: the act of attempting to access computer systems without authorization [8]. As modern life takes place online more than ever before, organizations are exploiting human psychology and using it to their advantage. By adding misleading or deceptive interfaces to their websites they hope to gain benefit (e.g., personal information) from users. These types of design choices are called "dark patterns". With the rise of smartphones that navigate the web, specific dark patterns targeted at mobile users have been created, for example the illusion of a hair on the screen, see in Fig. 1. The expectation is that users will (try to) remove the hair by swiping the screen, and thus involuntarily visit the website it links to. Another extreme example is shown in Fig. 2: an airline making it purposely hard to NOT buy travel insurance ("Don't insure me" is hidden in the alphabetical country list).

M. Kurosu (Ed.): HCII 2022, LNCS 13304, pp. 462–475, 2022.
https://doi.org/10.1007/978-3-031-05412-9_32

Fig. 1. Mobile dark pattern: illusion of a hair on the screen

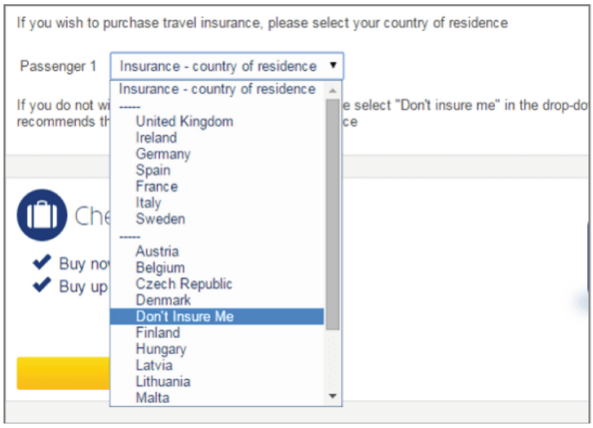

Fig. 2. Air travel web site making it purposely hard to NOT to buy travel insurance ("Don't insure me" is in country list)

One of the first articles that was published about dark patterns was on "A List Apart" by Harry Brignull, who coined the term a year earlier in 2010 [2]. In this article he introduces dark patterns by comparing honest and deceptive applications of human psychological insights. He states that A/B-tests that include dark patterns test very well, simply because users get tricked into doing something.

2 Related Work

2.1 User Interface and the User Experience

A growing number of studies have investigated User Interface (UI) and User Experience (UX) design [1, 13]. In a study set out to clarify User Experience [13] argue that the human-computer interaction process (e.g., buying something online) needs to be visual, empathic and emotionally driven to be successful or meaningful to the user. The perceived quality of the experience may decline if the interaction process fails to manifest these features. This could happen unintentionally when a designer has not enough knowledge of the mentioned features. However, sometimes practitioners create deceptive interactions intentionally, causing users to perform involuntary actions.

2.2 User Interface Stakeholder Values vs. User Values

The actions mentioned in the previous section benefit the business, while the same actions hinder or take advantage of users. Amazon for example makes it extremely difficult for users to delete their account. First, users must reach a page that is intentionally difficult to find. Second, when users finally manage to reach this page, it is impossible for them to delete the account themselves. The user has no choice but to chat with an employee to delete the account. It is assumed that Amazon strategically designed this as a retention strategy to discourage the user from going through with account deletion. Another big

player, Facebook, prompts users to review and manage their data sharing settings, but whenever users click "Accept and continue", the setting is automatically turned on and Facebook can show users ads based on data from third parties. In the same way, Google requires users to actively look for advertisement personalization settings. [10] refer to this kind of interaction design as "asshole design" because the interaction purpose can be perceived as unethical or manipulative.

2.3 Persuasive Technology

Designers of interaction technology design strategically so that their designs result in predefined user behavior. In the context of interaction design, [9] views persuasive technology as "designing for behavior as something we cause to occur and/or preventing a target behavior from happening". In other words, interaction designers have the ability and the responsibility to induce behavioral change in a positive or negative manner. Persuasive technology is known for the potential benefit it can have on the lives of individual users as well as society. Mobile smoking cessation applications are examples of how persuasive technology can be used for self-improvement. In parallel with the aforementioned claim the possibility of ethical persuasion and defined a set of guidelines so practitioners can apply these in an ethical manner. By following these guidelines designers use persuasive technology to enhance the usability of applications instead of decreasing it. However, [9] warns that persuasive technology is a controversial topic and that there should be awareness of its negative applications.

2.4 Dark Patterns

UX designer consultant Harry Brignull coined the term dark patterns and introduced a set of 12 different types of dark patterns, which he published on his website [2]. Meanwhile several (online) newspapers have published articles where they address the issue of dark patterns in interaction design [3, 4, 15]. This gives reason to assume that many UI and UX practitioners are familiar with manipulative or deceptive design practices. A study by [5] showed that student UX designers valued stakeholder-focused outcomes over human values in their decision making, even when their initial design activity was user-focused. An extensive study investigated the presence of dark patterns on shopping websites [14]. A total of 11,000 websites were crawled, 1254 websites contained dark patterns and 1,818 instances of dark patterns were found. Another study [8] in which the researchers scraped twitter for the hashtag "#darkpatterns" found that practitioners are using social media to generate awareness about dark patterns. Twitter users most frequently used the hashtag to publicly shame companies for using dark patterns.

Dark Pattern Strategies. A study by [12] focused on identifying, categorizing and evaluating various types of dark patterns. They argue that there are five main types of dark pattern strategies. Table 1 shows an overview of the types and subtypes. The subtypes contain 9 of 12 patterns from Brignull's initial list.

Table 1. Dark pattern strategy types [12].

Type	Description	Subtypes
Nagging	Redirection of expected functionality that persists beyond one or more interactions.	-
Obstruction	Attempting to hide, disguise, or delay the divulging of information that is relevant to the user.	Roach Motel (Bignull), Price Comparison Prevention (Brignull) and Intermediate Currency
Sneaking	Making a process more difficult than it needs to be, with the intent of dissuading certain action(s).	Forced Continuity (Brignull), Hidden Costs (Brignull), Sneak into Basket (Brignull) and Bait and Switch (Brignull)
Interface Interference	Manipulation of the user interface that privileges certain actions over others.	Hidden Information, Preselection, Aesthetic Manipulation, Toying with Emotion, False Hierarchy, Disguised Ad (Brignull) and Trick Questions (Brignull).
Forced Action	Requiring the user to perform a certain action to access (or continue to access) certain functionality.	Social Pyramid, Gamification and Privacy Zuckering (Brignull)

Nagging. Nagging is a redirection of expected functionality. They include interruptions such as pop-ups or other distractions within the interface that interfere with the user's focus. An example is Fig. 3 in which Google prompts and encourages the user to enable its location services, but when the 'Don't show this again' checkbox is checked, the 'Disagree' option is greyed out. A pre-selection favoring Google is made, but not by the user, who must invest effort to choose what he might want ('Disagree').

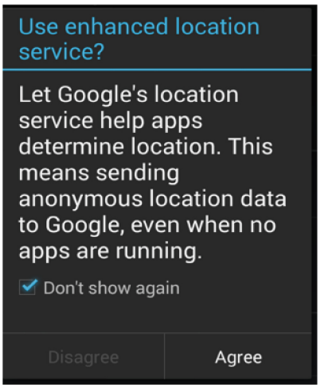

Fig. 3. Nagging: 'Don't show again' is selected, 'Disagree' is greyed out

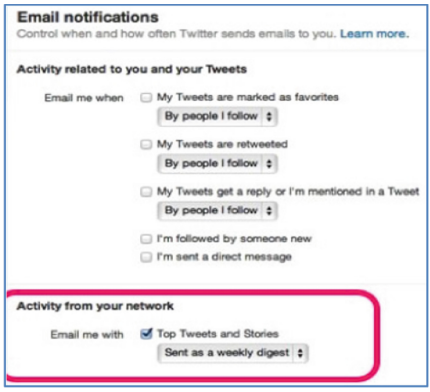

Fig. 4. Twitter using Interface Interference: Automatic opt-in after email notification update.

Obstruction. Whenever a user's task flow is intentionally interrupted while trying to accomplish a given task, one speaks of Obstruction. Within this primary category, various subcategories exist. They are Brignull's Roach Motel, which is defined as making a situation easy to get into, but hard to get out of (e.g., Amazon makes it easy to create an account but extremely difficult to delete them). Another subtype is Brignull's Price Comparison Prevention, which makes it hard for users to compare prices of products. The final subtype of Obstruction is Intermediate Currency. This subtype tries to make users spend money on virtual currency (e.g., in-app purchases within mobile games). The pattern distorts the view of the user's value spent, making the user spent their virtual currency differently than they would have if it was real money.

Sneaking. Sneaking is defined as attempting to hide, delay or disguise information that is relevant to the user. Often, this pattern is used to make users perform actions they may object to if they had knowledge of it. Within Sneaking, four subtypes exist. First, Brignull's Forced Continuity makes users pay for services after their initial service has expired. Second, Brignull's Hidden Costs pattern fails to inform users about costs in a reasonable time span, i.e. hidden tax or shipping. Third, Brignull's Sneak into Basket pattern secretly adds items into the user's basket. Fourth, Brignull's Bait and Switch pattern suggests a certain action will happen, only for users to find out that a different action happens. A common situation includes the manipulation of muscle memory. For example, the mobile game "Two Dots" repositions a button to buy more moves to the position previously used to continue to the next level.

Interface Interference. This occurs when interfaces privilege certain specific actions over others. A subtype of Interface Interferences is "Hidden Information" (actions that are relevant to the user but are not made visible or accessible). There is also "Preselection" (when an unfavorable option to the user is preselected), e.g., when Twitter updated e-mail notifications in 2018, they automatically opted all their users into the service (Fig. 4). Another subtype is Toying with emotion, where emotions are evoked with language, color, style or any other element to persuade users into certain actions, see as Fig. 5. The first option reads 'Keep me in the loop' and the second option 'No thanks, happy to be the last to know'. The former is associated with positive emotion, while the latter is rather negative. The user is manipulated to stay subscribed.

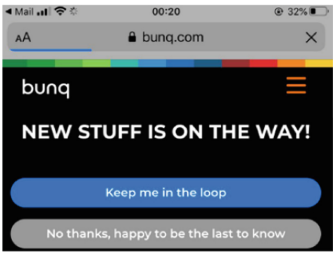

Fig. 5. Fragment of screen of Dutch bank "bunq", manipulating emotions of users.

Other instantiations of Interface interference are Aesthetic Manipulation and Brignull's Disguised Ad. The latter is used to make users think an advertisement is a game. When users click to interact with the 'game', they get sent to a different page. A last instantiation of Interface interference is Brignull's "Trick Questions", used to confuse with double negatives, confusing wording or other types of language manipulation.

Forced Action. These patterns feature in situations where users are required to perform an action in order to proceed. A well-known example is found in Windows 10; when a system update is made available, there is no option for users to shut the computer down without updating. Three subtypes of Forced Action were identified [12]; Social Pyramid, Gamification and Brignull's Privacy Zuckering. The Social Pyramid pattern requires users to recruit other users to the application or service in order to gain advantage on the platform. Gamification is used where platform specific benefits can be earned through repeated (sometimes unwanted) use of the service. Lastly, Privacy Zuckering refers to being tricked into sharing more information about themselves than they want.

2.5 Research Question

As mentioned in the introduction, there are dark patterns that are created specifically for mobile devices. This ties in with the significant number of mobile dark patterns found in the UXP2 dark pattern corpus. Therefore, this gives reason to investigate which platform performs better in terms of dark pattern recognition. Although studies have recognized that dark patterns are used widely in practice, research has yet to investigate the effects of them in a controlled setting. This project aims to fill this gap by performing an experiment where dark patterns are presented to participants in an online shopping environment, where distinction between desktop and mobile users is made. This research project consequently aims to answer the following research question:

> *What are the differences in dark pattern recognition between desktop and mobile users in an online shopping environment?*

3 Method

3.1 Experimental Design

An online between-subjects experiment was designed. Participants are assigned to one of two groups in almost equal numbers: a group that carries out tasks on a desktop computer and a group that carries out that same task on a mobile phone. Also the possible relation between the age of participants and dark pattern recognition will be analyzed.

3.2 Variables

The dependent variable of this study is "Platform": **desktop or mobile** (see Table 2). A choice had to be made concerning *which* dark patterns to implement. As the first dependent variables we chose the recognition of "**Sneak into Basket/Toying with emotion"**

dark pattern**.** These are actually *two* subtypes, falling under *two different* main dark pattern types: "Sneaking" and "Interface" interference (see Table 1). However, we treat the score as 1 score, the labels are combined here. The reason is that the way we implemented it here (see Fig. 6) applies to both; something is "sneaked into the basket" *using* "toying with emotion". The second dark pattern is "**Sneak into Basket"** recognition. Scores on these both variables are binary; their values can be "clicked" or "not clicked" and "checked" or "unchecked", respectively. Furthermore, dependent variables 3 and 4 are "**Perceived honesty"** and "**Perceived navigability"** of the website. This will be scored after completing the task with the website. Finally, "Age" variable is collected as a continuous variable.

Table 2. Experimental design and the variables of this study.

	Independent Variable = Platform	
	Desktop	**Mobile**
	Group A 28 participants	Group B 26 participants
Dependent Variable 1	Sneak into Basket recognition	
Dependent Variable 2	Trick Questions recognition	
Dependent Variable 3	Perceived honesty	
Dependent Variable 4	Perceived navigability	
Covariate	Age	

3.3 Material

A shopping website was constructed for both platforms, the Dark patterns were implemented as follows:

Dependent Variable 1: "Sneak into Basket/toying with emotions"

On the cart page, the "Sneak into Basket" pattern is implemented using two buttons. "*Checkout as gift*" is easily recognized because of its shape and color. However, the text "*No thanks I don't like pretty gifts*" is also clickable, but this is not very clear (Fig. 6). Users tend to click the default option when presented with a choice. Designers of dark patterns happily use this tendency to their advantage. Once participants clicked the 'Checkout as gift' button, a 5 Euro gift wrap was added ("sneaked") to their shopping cart. In addition, the suggestive language applied can be seen as the "Toying with Emotion" pattern. The clickable text, in grey was "*No thanks, I don't like pretty gifts*". The goal of this specific design choice is to make participants feel as if they are missing out (toyed emotion) on something. In this case, a gift wrap.

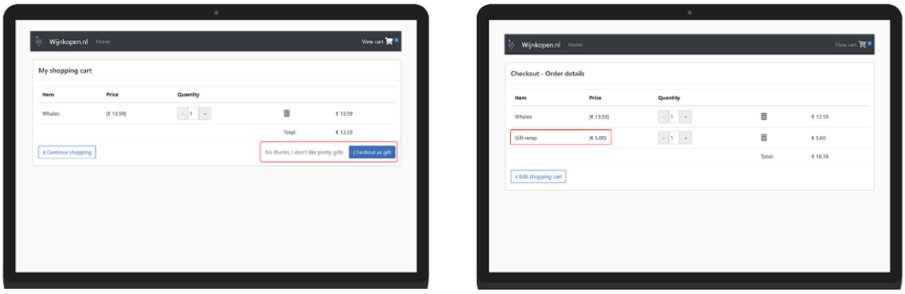

Fig. 6. Dark pattern "Sneak into Basket/Toying with emotions": Gift wrap is added on the checkout page after clicking 'Checkout as gift'. The other option (not buy gift wrap) is chosen when clicking grey text "*No thanks, I don't like pretty gifts"* (both marked in red). (Color figure online)

Dependent Variable 2: "Trick Questions"

The second dark pattern strategy that was implemented was "Trick Questions" (Fig. 7). The form on the checkout page has a checkbox that includes a double negative in order to mislead participants. When the checkbox is left checked, the user opts-in for potentially unwanted e-mails. When it is left unchecked, the user opts-out. In this case, it is in the user's best interest to uncheck the checkbox.

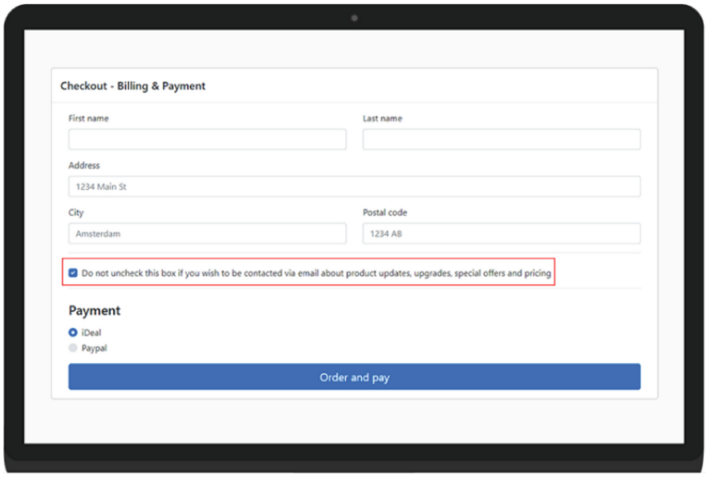

Fig. 7. "Trick Questions": Double negative implemented on the checkout page.

Technical Implementation

Both versions of the website were hosted on the Utrecht University server. HTML5, CSS3, JavaScript and the Bootstrap framework6 were used to create the website. The preliminary questionnaire on the informed consent page and the concluding questionnaire at the end used Google Forms and implemented by wrapping Google's code snippet

in an iframe element. The mobile website (the exact same content and functioning) was created using Bootstrap's grid system. Screenshots can be found in Fig. 8, the center screenshot shows the "Sneak into Basket/Toying with Emotion" pattern.

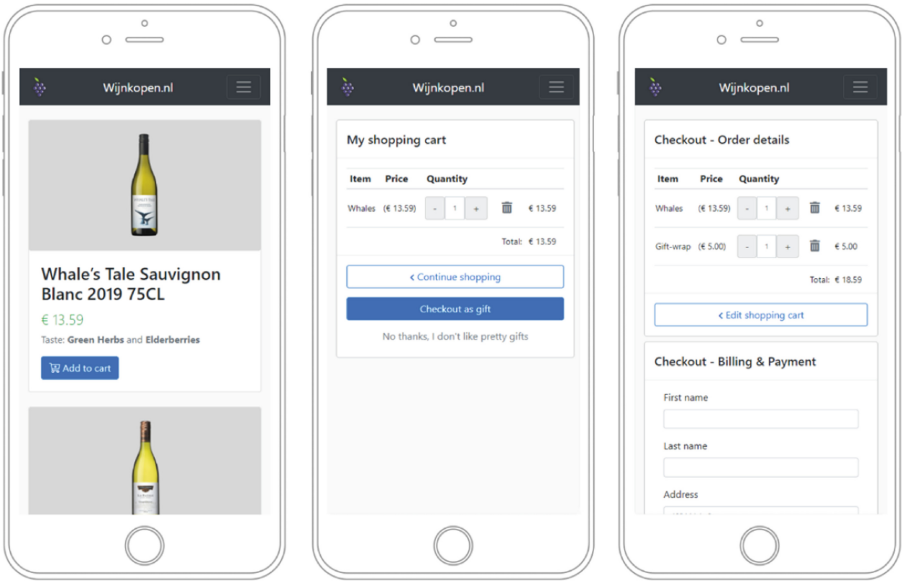

Fig. 8. Screenshots of the mobile version of the website.

3.4 Hypotheses

Based on the research question and literature the following hypothesis will be tested:

H0: Desktop users are equally likely to recognize dark patterns as mobile users
H1: Desktop users are not equally likely to recognize dark patterns as mobile users

3.5 Participants and Procedure

Participants were recruited through Facebook, LinkedIn and Whatsapp, after which they were randomly assigned to the desktop or mobile condition. The sample consisted of 54 participants (N = 54) aged 15–76 years old. The experiment had three phases.

Preparatory Phase
Here participants were shown an introductory page explaining the procedure of the experiment and participants signed the informed consent and entered their age and platform (mobile or desktop). The nature of the task implies that participants should not click the 'Checkout as gift' button and should instead click the 'No thanks, I don't like pretty gifts' button, since the purchase for evening on couch. The task instruction was:

"Wijnkopen.nl is a company that sells wine to consumers. You decide to buy wine for a nice evening on the couch".

Experiment Phase
Participants were sent to the regular or mobile version of the website where participants performed the given task. When participants were finished adding or removing products, clicking the 'View cart' button would lead them to the cart page. From here (Fig. 6) they had two options. Here dependent variable 1, the Sneak into Basket/Toying with Emotion patterns was implemented. The first option was to click '*Checkout as gift*' (Fig. 6). The second option was the gray '*No thanks, I don't like pretty gifts*' text-button. Once participants clicked one of the two buttons, they were sent to the checkout page (Fig. 7). Here, participants were presented with an overview of their basket and a checkout form. On this page, dependent variable 2, the "Trick Questions" dark pattern is implemented as a checkbox label that reads:

"Do not uncheck this if you wish to be contacted via email about product updates, upgrades, special offers and pricing".

What is being tested is whether implemented dark patterns were recognized or not and analyze this per platform. In the task, *two actions* from the user (scores on a variable) are related to this. Correct recognition of the dark patterns is demonstrated when:

- the participant chose '*No thanks, I don't like pretty gifts*' (score on variable 1)
- the participant *unchecked* the confusing sentence

Concluding Phase
Whenever participants finished the main experiment, they were sent to fill out a final short questionnaire. Participants were asked to rate the honesty and navigability of the website on a scale ranging from 1 to 5. After rating the website, the participants were asked to close the browser window in order to complete the experiment.

4 Results

Data analysis was performed using IBM SPSS version 25. Of the 54 participants 28 used the desktop version, 26 used the mobile version.

4.1 Dark Pattern Recognition

Various statistical tests were performed in order to test the hypothesis. Of the two dark patterns we investigated whether participants "fell" for the pattern or not. The dependent variable "Sneak into Basket recognition/Toying with emotions" is scored observing whether or not participants clicked the button. The dependent variable "Trick Questions"

is scored observing whether or not participants left the checkbox checked. Chi-Square tests were performed as well as Spearman rank-order tests.

Sneak into Basket/Toying with Emotions

A chi-square test was performed to examine scores on recognition of the "Sneak into Basket/Toying with emotions" pattern. The mobile users fell for this more often and yielded a higher percentage than the desktop condition (84.6% vs. 42.9%). This difference was significant, $\chi 2\ (1, N = 54) = 10.081$, $p = .001$. Desktop users are *more likely* than mobile users to correctly recognize and not fall for the "Sneak into Basket/Toying with emotions dark pattern". Results of a Spearman rank-order correlation indicated that there was a significant *negative* association between age of users and "Sneak into Basket/Toying with emotions" recognition, ($rs(54) = -.352$, $p = .009$). Younger users are *more likely* to click the button and thus *less likely* to recognize the Sneak into Basket/Toying with emotions dark pattern. Figure 9 shows the scatterplot of age and whether or not participants clicked the Sneak into Basket dark pattern.

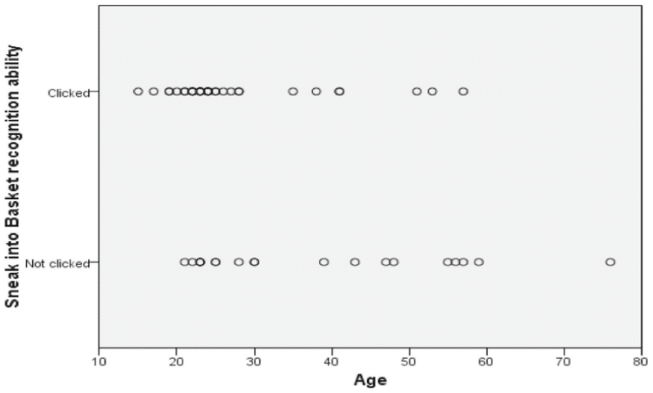

Fig. 9. Scatterplot of 'Age' and 'Sneak into Basket recognition'.

Trick Questions Recognition

A chi-square test was performed to examine the relation between platform and "Trick Questions" recognition. Although the mobile condition yielded a higher percentage than the desktop condition (42.3% vs. 28.6%), the difference between these variables was *not significant*, $\chi^2\ (1, N = 54) = 1.115$, $P = .291$. Mobile users were equally likely as desktop users to recognize the "Trick Questions" dark pattern by 'unchecking' that checkbox. Results of the Spearman rank-order correlation indicated that there was *no significant association* between age and "Trick Questions" recognition, ($rs(54) = .181$, $P = .190$). Figure 10 shows the scatterplot of age and whether or not participants unchecked the checkbox that contained the "Trick Questions" dark pattern.

4.2 Perceived Honesty and Navigability

After the task, participants rated the website on perceived honesty and navigability using 1–5 Likert scales. The variables are ordinal, therefore a Spearman rank-order correlation test was used. There was a significant positive association between perceived honesty and perceived navigability, ($rs(48) = .345$, $p = .016$). The higher perceived honesty was rated, the higher perceived navigability was rated, see Fig. 10.

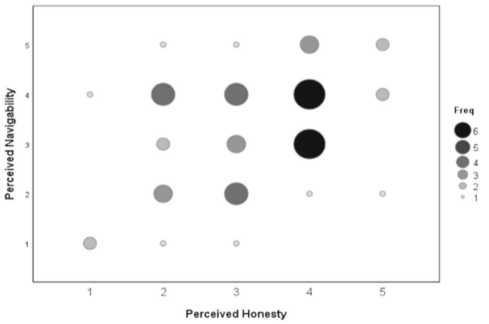

Fig. 10. Fluctuation plot of 'Perceived honesty' and 'Perceived navigability'.

5 Discussion and Conclusion

The results show that for the first studied dark pattern "Sneak into Basket/Toying with emotions" there was a significant difference between the two platforms. The number of mobile platform users fell for this pattern about twice as often as desktop users. A potential reason for this could be the setting: mobile users might not take the time to look at every single element on a webpage in detail, while desktop users may take more time to do so. Positioning, and size of buttons could also be reason why mobile users were more likely to fall for the pattern: mobile button positioning was vertical, whereas desktop button positioning was horizontal, and the buttons are smaller, scrutinizing requires more effort. This result is in line with the alternative hypothesis, stating that desktop and mobile users are *not* equally likely to recognize dark patterns in an online shopping environment. When looking at the age of the participants in relation to falling for the "Sneak into Basket/Toying with emotions" pattern, a significant correlation was found. It showed that the younger users, the more the fell for this pattern. An explanation for this could be that older users are more careful when spending money regardless of whether they are shopping offline or online. This might lead them to be more careful and precise over the whole range of actions when shopping online. In contrast, younger users are likely to be more familiar with technology, which could result in them being less careful while shopping online. Recognition of the second studied dark pattern "Trick Questions" did not differ significantly between platforms, although the same trend is visible; mobile users seem to fall for this more often. Also the age of the participants

in relation to falling for the "Trick Questions" was analyzed, but also no significant correlation was found.

With respect to the perceived honesty and navigability of the website, there is a significant correlation indicating that a user's perceived honesty of this online shopping environment has a relation with the user's perceived navigability of the same environment, in both platforms.

These results of this study should be interpreted with some caution as the sample size ($N = 54$) of the study is limited. Also the age distribution among participants was suboptimal, there were not as many elderly participants as desired. Regarding ecological validity, there is of course the fact that participants did not experience any negative outcomes (such as losing money or sharing personal information unwillingly) when they fell for one of the dark patterns. The results of this study could have been different if *real* negative consequences were tied to dark pattern recognition failure. Lastly, the number of dark pattern types that were evaluated was limited to two. This is only a small portion of the total number of identified dark pattern types, in future research it is recommended that more subjects, and more/other dark patterns.

Resuming, this research aimed to identify the differences in dark pattern recognition between desktop and mobile users in an online shopping environment. Based on a quantitative analysis of dark pattern recognition in response to platform, it can be concluded that, to some extent, mobile users are more likely to fall for at least certain dark patterns in online shopping environments. The results indicate that age also plays a role in the dark pattern identification process, but this should be taken with caution due to the limited number of older participants.

It is important that this knowledge is spread, so that internet users can eventually make better informed decisions when they encounter dark patterns 'in the wild'. When looking at this study from a broader perspective, the outcomes of this research are part of a wake up call that is heard more and more these days.

References

1. Benyon, D.R.: Designing Interactive Systems: A Comprehensive Guide to HCI, UX and Interaction Design (No. 1). Pearson, Harlow (2014)
2. Brignull, H.: Dark Patterns (2010). https://www.darkpatterns.org/. Accessed 07 May 2020
3. Brignull, H.: Dark Patterns: Deception vs. Honesty in UI Design (2011). http://alistapart.com/article/dark-patterns-deception-vs.-honesty-in-ui-design. Accessed 01 May 2020
4. Brignull, H.: Dark Patterns: inside the interfaces designed to trick you (2013). http://www.theverge.com/2013/8/29/4640308/dark-patterns-inside-the-interfaces-designed-to-trick-you
5. Chivukula, S.S., Brier, J., Gray, C.M.: Dark intentions or persuasion? UX designers' activation of stakeholder and user values. In: Companion: Proceedings of the 2018 Designing Interactive Systems Conference (DIS 2018), pp. 87–91 (2018)
6. Chivukula, S.S., Watkins, C.R., Manocha, R., Chen, J., Gray, C.M.: Dimensions of UX Practice that Shape Ethical Awareness. In: Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems, pp. 1–13 (2020)
7. Dhamija, R., Tygar, J.D., Hearst, M.: Why phishing works. In: Proceedings of the Sigchi Conference on Human Factors in Computing Systems, pp. 581–590 (2006)

8. Fansher, M., Chivukula, S.S., Gray, C.M.: #Darkpatterns: UX practitioner conversations about ethical design. In: Proceedings of the Conference on Human Factors in Computing Systems 1–6 April 2018 (2018). https://doi.org/10.1145/3170427.3188553
9. Fogg, B.: Computers as persuasive social actors. Persuas. Technol. 89–120 (2003)
10. Forbrukerrådet. Deceived by Design (2018). https://fil.forbrukerradet.no/wp-content/uploads/2018/06/2018-06-27-deceived-by-design-final.pdf
11. Friedman, B., Kahn Jr., P.H., Borning, A.: Value Sensitive Design: Theory and Methods. Technical Report (2002)
12. Gray, C.M., Kou, Y., Battles, B., Hoggatt, J., Toombs, A.L.: The dark (patterns) side of UX design. In: Proceedings of the Conference on Human Factors in Computing Systems, pp. 1–14 (2018)
13. Hassenzahl, M., Tractinsky, N.: User experience - a research agenda. Behav. Inf. Technol. **25**(2), 91–97 (2006)
14. Mathur, A., et al.: Dark patterns at scale: findings from a crawl of 11K shopping websites. In: Proceedings of the ACM on Human-Computer Interaction, 3 (CSCW), pp. 1–32 (2019)
15. McKay, T.: Senators Introduce Bill to Stop 'Dark Patterns' Huge Platforms Use to Trick Users (2019). https://gizmodo.com/senators-introduce-bill-to-stop-dark-patterns-huge-plat-1833929276. Accessed 07 May 2020
16. Mirnig, A.G., Tscheligi, M.: (Don't) Join the Dark Side: An Initial Analysis and Classification of Regular, Anti-, and Dark Patterns. In: Proceedings of the 9th International Conference on Pervasive Patterns and Applications, pp. 65–71 (2017)