Cookie Monsters on Media Websites

Dark Patterns in Cookie Consent Notices

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Abstract–The EU's General Data Protection Regulation attempts to improve the protection of user's privacy by demanding that website operators have legitimate reason to process personal data. In the context of the use of cookies, therefore, usually consent is needed. The use of dark patterns stands in the way of valid consent and can be classified as unethical design. This contribution explores the occurrence and frequency of dark patterns in cookie consent notices for media outlet websites in Germany and the United States. Each examined cookie consent notice contained at least one dark pattern and 4.8 dark patterns on average. The dark pattern Privacy Zuckering is present on most researched websites in Germany and the U.S. The dark pattern Preselection is present on a quarter of German and U.S. American websites. The findings indicate that there are dark patterns which could be more prevalent in cookie consent notices. One newly described dark pattern could be specific to the context of consent notices on media websites.

Keywords-cookie consent notice; dark pattern; ethical design; media websites.

I. INTRODUCTION

In an attempt to maintain compliance with the EU's General Data Protection Regulation (GDPR), and at the same time to fulfill their own interests as uncompromisingly as possible, website operators resort to dark patterns when designing cookie consent notices. The concept of dark patterns was introduced into the discourse by Brignull in 2010 and describes design patterns within any kind of user interface that "trick users into things they wouldn't otherwise have done" [1]. In a more recent definitional approach with a legal focus, Martini et al. reject definitions based on users' agency or website operators' intent and speak instead of user interface design that "exploits the design power (...) unilaterally in the interest of website operators" [2]. This exploitation could result in cookie consent forms generating invalid consent under the GDPR, due to the non-voluntary or uninformed nature of the user's decision, as demonstrated in a legal assessment by Kuehling [3].

To improve both compliance and user experience in the context of cookie consent banners, it is important to deepen the public understanding of dark pattern occurrence and mechanisms. Previous research on frequency of dark patterns within cookie consent notices has focused on different aspects: Consent management platforms [4], specific categories of websites [5] or specific countries [6, 7]. This work contributes to dark pattern research insights for cookie consent notices by evaluating a set of 100 media outlet websites in the U.S. and Germany for the occurrence and frequency of different dark patterns. The analysis showed that there is indication that some dark patterns might be more prevalent in the context of cookie consent banners, and that there is one dark pattern that could be specific to consent notices for media websites. In Section 2, previous findings for the context of dark patterns in cookie consent notices are explored. Section 3 describes the methods that were used to examine the cookie consent notices on media outlet websites for dark patterns based on the dark pattern taxonomy suggested by Bösch et al. [2]. In Section 4, a frequency analysis for those dark patterns is performed and three further dark patterns specific for cookie consent notices are described. The conclusion in Section 5 completes this paper.

II. RELATED WORK

In 2016, Bösch et al. described and investigated dark patterns with an explicit tie to privacy concerns occurring on digital user interfaces, to form a framework that facilitates the documentation of dark patterns [8]. Gray et al. developed a taxonomy for Brignull's initial dark patterns in 2018 and enriched this collection with dark patterns that they found while examining their corpus of 118 examples from various websites [9]. Gray's taxonomy is based on five categories that were formed according to the influence that the design patterns included have on a user. Another classification, established in 2019 by Mathur et al., is based on a corpus of approximately 11000 shopping websites, from which they derived seven categories which are also based on how a set of patterns influences users [10].

There are also several papers, which focus specifically on dark patterns within cookie consent notices: Nouwens et al. compared consent management platforms for frequency of dark patterns and testing the influence of the most occurring patterns on user's consent decisions in 2020. They found out that the willingness to consent is increased by over 20 % if there is no option to decline on the first view of a consent notice. If there are more options to modify the extent of the consent on the first view, consent is reduced by 8 to 20 %.

Through a study with a set of 300 cookie consent notices that were collected from online news websites in 2020, Soe et al. found indications for seven dark patterns specific to cookie consent notices [5]. The research was also based on Gray's taxonomy. Soe et al. give two reasons for focussing on news websites: These websites are intended to appeal to a broad target group and therefore they expect that the consent notices are quite generic in design. In addition, compared to social networks, news websites are not expected to be primarily interested in the advertising suitability of the processed data. In 2021, Kampanos and Shahandashti focused their research on the comparison of cookie consent notices on Greek and British websites in terms of interaction options [6]. Therefore, dark patterns were only addressed implicitly. They found that most of the investigated websites for both countries did not offer direct decline options. UK websites were more likely to violate the GDPR by not including cookie consent notices, even though there was use of third-party cookies. Krisam et al. examined 389 German websites in 2021 for frequency of choice options in consent notices [7]. They provide an analysis on which choice options have to be seen as dark patterns, but refrain from connecting them with existing taxonomy. Out of 389 websites, 69 would not be legally compliant. As Krisam et al. are more focussed on compliance than ethics of design, they do not offer a total for dark patterns within their research set.

III. METHODS

The set of 100 media outlet websites (50 German, 50 U.S. American) that this research is based on, was obtained manually. Using U.S. American websites was a deliberate choice to enable a comparison of an EU country with one outside the EU, as the GDPR is still applicable if a non-EU website is accessed by a person within the EU. However, it can be assumed that the GDPR's requirements for cookie consent notices are not as well-known and strictly enforced outside the EU as within the EU. Also, this could lead to different solution approaches for obtaining consent.

In contrast to the consideration made by Soe et al. concerning media websites as subjects, the decision for media outlet websites was based on an attempt to achieve better comparability of the subjects and to possibly find industry-specific dark patterns.

The set of websites was manually obtained and fixed before starting the analysis. The following research hypotheses were formed:

- RQ1: Which already described dark patterns can be found in consent notices on media websites?
- RQ2: Are there dark patterns that have not yet been described and could therefore be specific to cookie consent notices or to media websites?
- RQ3: Are there country-specific differences in which dark patterns occur in cookie consent notices on German and U.S. American websites?

This study is based on the taxonomy by Gray et al. because its context is more generic than the taxonomy by

Mathur et al., which is based only on the analysis of shopping websites. Nevertheless, after further reviewing the dark patterns contained in the classification of Gray et al., it became obvious that not all dark patterns made sense in the context of cookie consent notices. Some dark patterns were tied to a specific context, e.g. online shopping. Therefore, each category within the taxonomy was reduced to a set of dark patterns that seemed to be applicable to cookie consent notices. This set of dark patterns formed the basis for the quantitative visual analysis of cookie consent notices within the set of media websites. As Nagging is a category that does not contain any dark patterns, the category itself has to be analysed, counted and measured against other dark patterns rather than other categories.

TABLE I.   CATEGORISATION OF DARK PATTERNS

Category	Contained dark patterns
Nagging	(Nagging)
Obstruction	Roach Motel
Sneaking	Bait & Switch, Hidden Costs
Interface Interference	Hidden Information, Preselection, Toying with Emotion, False Hierarchy, Misdirection
Forced Action	Privacy Zuckering

Before starting the analysis, it was necessary to establish a sound research environment. Any network measures, such as IP obfuscation and network-wide tracking blockers were deactivated for the course of the quantitative analysis. Then, the cookie notices were visually evaluated for the occurrence of dark patterns. In case of ambiguities, for example when determining whether a contrast ratio is sufficiently low for the information or button to be considered hidden, the provisions of the WCAG 2.1 (Web Content Accessibility Guidelines) were used to set limit values.

IV. RESULT

Out of all 100 websites, 67 contained a cookie consent notice. However, the existence of cookie consent notices was not distributed evenly for German and U.S. American websites. While 80 % of German websites contained a consent notice, only 57 % of American websites did.

Out of the 67 websites that did contain a cookie consent notice, all 67 consent notices contained at least one dark pattern each. On average, each cookie consent notice contained 4.8 dark patterns. These are the cases for which the existence of a dark pattern within a consent notice was confirmed:

TABLE II.   OCCURRENCE OF DARK PATTERNS

Dark pattern	Properties
Hidden Information	(1) The relevant information is set in a very small font (less than 12 pt). (2) Or the contrast ratio of the text to the background is too low (less than 3.5:1).
Preselection	Checkboxes are already checked or toggles are already set to "confirmed".

Dark pattern	Properties
False Hierarchy	(1) "Accept" and "decline" or "options" are unevenly sized. (2) Or One the options is a button, the other is solely a text link. (3) Or options are unnecessarily stacked on top of each other.
Misdirection	(1) The colour scheme of the option buttons does not match usual colour schemes; usual meaning of colours is reversed (green is used for declining instead of accepting). (2) Or a consent option is offered in legitimate interest, although this reason for permission does not depend on user's consent.
Hidden Costs	Information about data processing is non-existent or not detailed enough.
Roach Motel	Rejecting cookies cannot be done via the consent notice itself, but only via a more complicated way (for example by email).
Privacy Zuckering	If data is transferred to third parties for ordered data processing or for sale.
Nagging	The website is impossible to navigate without responding to the consent notice.

These already described dark patterns were present in the research set: Privacy Zuckering (59 instances), Nagging (42), False Hierarchy (40), Hidden Costs (37), Hidden Information (18), Preselection (16), Misdirection (14) and Roach Motel (11). There were no instances of either Toying with Emotion or Bait & Switch.

The occurrence of a category was affirmed for a website as soon as a dark pattern of this category was found. Forced Action occurred for almost every website (60 instances) and the remaining categories were found on more than half of the websites: Interface Interference (55 instances), Obstruction (47) and Sneaking (35). It is noticeable that the four most frequently found dark patterns belong to different categories. Since the categories in Grey et al.'s taxonomy are based on the effect that design choices have on the way that they influence a user, this is not surprising. After all, if dark patterns are supposed to persuade users to consent, why not work multiple angles? The results of this study are merely a small contribution to answering the first research question, as it was too broad to begin with. However, this indication could be a starting point for comparing these results with a larger set of media websites.

In addition, three dark patterns were found and described, for which no existing dark pattern definitions could be found in the reviewed papers. These dark patterns are:

Unclear Directions, which is a form of Sneaking and shall be defined as the concealment of a path which is required by the user. This is the case when the cookie management button is not recognisable because it is misleadingly named, e.g., "show purposes", or if the link for more specific information on data processing is not sufficiently labelled, e.g., with "here" or "more".

Denial Maze, which is a form of Obstruction and which shall be defined as an interface design where it is more difficult to express disagreement than agreement. For this study, this was the case when more clicks were needed to reject than to accept the use of cookies.

Conditional Access, which is a form of Forced Action and which shall be defined as a situation in which access can

only take place if one accepts undesirable consequences. This means that users were only informed about the use of cookies without the possibility of interaction and, above all, the possibility of refusing the use of cookies or if the use of cookies is part of the business model and therefore only possible to refuse by paying for it. This business model approach could only be found on German websites. These results can only be seen as indications. In order to actually arrive at an answer to the second research question, it would be necessary to compare all three dark patterns with user interfaces other than consent notices in order to find out whether this mechanism is specific to consent notices. Furthermore, for the dark pattern Conditional Access, it would have to be examined whether this mechanism also applies to non-media websites.

For this research set, the dark pattern that occurred most for both countries was Privacy Zuckering, which appeared on 85 % of German websites and on 92.6 % of U.S. American websites. The dark pattern Preselection occurred on almost the same percentage of websites for both countries: It could be found on 22.5 % of German websites and on 25 % of U.S. American websites.

There were notable differences for the occurrence of two dark patterns concerning the German and the U.S. American websites: The dark pattern False Hierarchy occurred on 70 % of German websites and on 44 % of U.S. American websites. The dark pattern Roach Motel occurred on 10 % of German websites but on 25 % of U.S. American websites. For all remaining dark patterns, the difference in occurrence was lower than 15 %.

V. CONCLUSION

Starting with an already small sample size and then further limiting it, minimizes the significance of the results. For a further attempt, it would be useful to either choose a bigger set of websites in the beginning or to filter the set, so that every website contains a cookie consent notice. Research questions should be more specific to generate valid results. With regard to the fact that only 67 percent of the selected research objects contained a cookie consent notice, the following should be noted: It can be legal and in compliance with the GDPR to operate a website without a consent notice. However, the low percentage of U.S. American websites that contained a consent notice and the presence of dark patterns within every consent notice that was examined, indicates that the research set at least partially contained websites on which the absence of a cookie consent notice might not be lawful. Whether this is actually the case, however, would require a deeper technical and legal analysis.

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