The Problem of Implicature
in "Do Not Track" Choice Design

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Abstract. In an observational study using an eye-tracker, subjects were presented with a modeless cookie choice dialog preceding a short survey on Internet privacy. Subjects were later asked whether they believed ad trackers were present on the site or not. 41% believed there either were or were not ad trackers on the site based on *not* clicking "allow" or "block", respectively. These results suggest that a pragmatic implicature is in play – information is suggested though not explicitly stated.

1 Introduction

The W3C Tracking Protection Working Group (TPWG) has been working toward a "Do Not Track" (DNT) policy intended to allow users to signal their intent with regard to browser-based tracking. DNT is not designed as a general purpose tool for communicating privacy practices. It is intended to simply communicate a user's preference not to be tracked.

The current Tracking Preference Expression draft specifies three possible states: DNT:1 (do not track), DNT:0 (allow tracking) and unset. In this third case, tracking preference is not enabled. The TPWG draft posits a number of reasons for why a user agent may not have tracking preference enabled:

1. The browser user agent does not implement DNT;
2. The user has not yet expressed a specific preference; or,
3. The user has not chosen to transmit a preference.

User preference mechanisms specified by the TPWG represent an earnest attempt to place some burden of policy implementation on browser developers rather than publishers: instead of forcing the user to make a choice for every website, the idea is that a user specifies choice in browser preferences and sets exceptions as desired. Nonetheless, it is conceivable that any given website may still offer a tracking preference choice.

2 Privacy Choice Design Problem

Though the TPWG intent is to provide a machine readable preference expression mechanism and not a user interface (UI) specification, the three options above map to common UI pattern: **modeless dialog control**.

The research described in this paper raises the question: if a user is presented with a dialog control presenting a choice between opt-in, opt-out and dismiss, what does the user believe is the consequence of choosing to dismiss? One way to consider this problem is as a choice design problem (fig 1):

1. If I click "allow", I choose "allow" cookies
2. If I click "block", I choose "block" cookies
3. I can do neither ("dismiss")

Fig. 1. Cookie dialog control from cookieguard.eu

Fair and unbiased choice design is a tricky problem. Default choices have a dramatic impact on user action [1]. Heuristic and bias reasoning theories account for a number of different situations leading to systematic bias. Biases including loss aversion (e.g., change from status quo), framing, and evaluation of options in relation to reference points (e.g., expectation and social comparison) have been well-described by Tversky and Kahneman [2,3].

Whether intentional or not, designers – both standards architects and web designers – have tremendous potential to influence choice [4].

3   Implicature

Previous work of decision-making in privacy research has focused on the effectiveness of communicating privacy risks to consumers [5], and confusability in user interface design [6]. This study concerns whether users confronted with a non-forced choice dialog box understand the meaning of their choices in the context of interaction.

Pragmatics is concerned with reasoning processes that go beyond conventional meaning. It is founded on the notion of language as action with communicative goals [7,8,9]. A common pragmatic phenomenon in linguistic understanding is implicature. An implicature represents a gap between what is expressed and what is communicated. Importantly, whether an implicature is true or not, does not affect the meaning of the message itself. For example,

1. Harry and Sally are married.

2. Tell a friend or colleague.
3. If you mow the lawn, I'll give you five dollars.

In (1) the implication is that Harry and Sally are married to each other. But, if they were not, and both married to someone else, this statement is still true. (2) exemplifies implicature derived by considering "or" as inclusive or exclusive. (3) is an *invited inference* [10] or *conditional promise* [11]. In (3), hearers understand the conditional relation between getting five dollars and mowing. But they may also infer "not to mow" means they will "not get five dollars." Fillenbaum [12] showed that the obverse of a conditional promise (in the example above, "I won't give you five dollars, if you don't mow the lawn") was an accepted inference for 85% of subjects tested.

In this study, we are concerned with whether a non-forced choice dialog has the potential to generate an implicature in user understanding. One way to view the choice problem above is as a discourse reasoning task where more than one conditional is given for interpretation in a single turn. In the cookie dialog choice decision described in this paper, not only must subjects interpret the meaning of each conditional independently, but they must do so in the context of choice between an additional explicit conditional and graphical third choice ("dismiss"). The particular question addressed here is what a user believes his choice to mean when he neither selects "allow" nor "block" – does he believe there are cookies present on the website? Why or why not?

4   Purpose and Procedure

The purpose of this study was to assess the feasibility of conducting a larger, online pilot. Specific questions addressed by this study addressed (1) whether the dialog was placed in such a way that subjects would likely read it; and, (2) whether subjects would consider the dialog as independent of the experiment. We needed to be confident that users were not influenced by the experiment to select a particular choice. To this end, we posed this study as a survey.

Subjects were recruited at the University of Baltimore from university business offices. Employees and students were invited to participate in a "10 minute survey" in the Information Arts and Technologies usability lab in exchange for a $5 dollar gift card. All were native English speakers who were comfortable using the Internet.

Using a Tobii T60 eye-tracker, subjects were presented with a choice banner ("This website uses cookies") preceding a short survey on Internet privacy. The choice banner was modified from the CookGuard plugin[1] designed to help website owners comply with European Union directives. A modification was made to include an "x" so that a third option – "if I click the x, I dismiss the control" – was explicit.

This banner was placed prominently on the start page of the Internet survey (fig 2). Generally, such banners are placed at the very top of a website, but we

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[1] `http://cookieguard.eu`
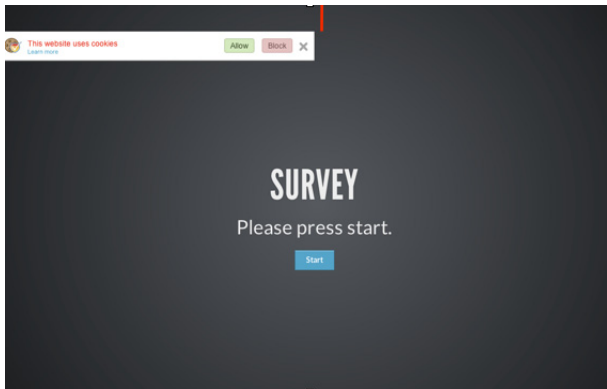
Fig. 2. User display

were concerned that subjects might not notice it there, so we positioned it in such a way to make it more visually distinct.

5   Results and Discussion

Of 17 subjects, 5 did not know what browser cookies were for, 14 reported that privacy was very important to them, and 15 reported that they would turn off tracking if it were easy. Notably, only 1 subject selected any option other than "dismiss" on the cookie banner.[2] He selected "block" cookies because "he didn't like cookies." No one clicked the provided link "learn more".

For the first goal of assessing likelihood that a subject would read the banner, we learned that, despite a sparsity of information on the start page, the first 9 subjects did not see the banner. For the remaining, subjects were verbally cued that there would be a cookie banner on the start page and that they could "choose however they wanted." Indeed, all but one did then see and read the banner.

For the second goal, we were were more successful. When presented the banner, subjects did not suspect that the cookie banner had anything to do with the following survey.

After presentation of the cookie banner and a number of demographic questions, subjects were asked whether they believed ad trackers were present on the site or not. 8 subjects believed that ad trackers were present while 9 did not. Of those that believed ad trackers were present, 1 subject believed that this was the case since he did not "block" cookies. Of the 9 that did not believe ad trackers were present, 6 believed this because they did not "allow" cookies. Accordingly, 7 of 17 (41%) believed there either were or were not ad trackers on the site based on *not* clicking "allow" or "block" cookies, respectively. These results suggest

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[2] Note also that many subjects who selected to dismiss the cookie banner later indicated that privacy was very important to them.

that a pragmatic implicature was in play – information was suggested via the cookie banner though not explicitly stated.

6   Limitations

Results in this study were derived primarily to assess the feasibility of a larger pilot. Though results suggest that implicature is of concern for the design of modeless cookie dialogs, we cannot conclude that all such dialogs will invoke implicature. Issues that apply include the effect of dialog as conditional promise [13], distinguishing between assertions and implications in memory [14], attitude or belief about privacy, and the mixed use of linguistic and graphical information.

7   Conclusions

The definition of a technical specification and mechanism intended to represent user preference is undoubtably a difficult endeavor. Though results of a follow-up pilot are not yet available, this study emphasizes the need for the TPWG and designers to consider the unintended consequence of implicature in user choice design. Despite the rather limited nature of this study, we believe implicature may be inherent to the design of modeless dialogs. A solution may be to offer visual feedback conveying the consequence of a user choice decision.

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