Poster: Content and Context for Browser Warnings

Achieving Security using Cartoons and Humor

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1. INTRODUCTION

Changing user behavior is paramount to providing a complete security package containing a balance of technical and human intervention strategies. One problem in achieving this are the notoriously insecure browsing practices exhibited by users. For example, users are known to circumvent security mechanisms in order to achieve a goal.

Another problem are habitual actions taken by the user when confronted with a popup notification or warning message. These notifications and warning messages are issued from a variety of sources like mobile devices, new mail notifications on the desktop and software update notifications, just to name a few. Browser warnings are also included in this list and arguably may could contain the most relevant notifications and warnings that are designed to protect the user. This constant barrage of notifications and warnings has habituated some users into ignoring them to return to their task; this is a critical point of failure.

Popup notifications and warnings are essential to a relatively unobtrusive user experience and until another convention is adopted, users and popup warnings shall continue forward in a deplorable marriage. One solution then, is to provide the user with a popup notification that is interesting, creative, and funny in the form of a cartoon. Using cartoons to make text more enjoyable is common practice for test publishers and they can even be found in scholarly and educational publications [7].

Cartoons can provide the user with visual and direct messages in a humorous way [7]. One component of cartoons are humor, which has been studied in education and learning since at least 1961 [10]. Schmidt states the positive influence humor has on memory and goes on to report "that humorous sentences were recalled better than non-humorous sentences" [8].

Providing a novel approach to enable more conscious decisions based on new warnings, we propose the following:

1. Cartoons and Humor used to convey security information can be used to change user behavior.
2. Using Cartoons and Humor to convey browser security warnings will reduce the habituation effect.
3. Cartoons and Humor can teach users about secure browser behavior.
4. Cartoons and Humor can teach users about secure behavior better than standard warnings.

2. MOTIVATION

Work by Bartsch et al. show that users are more receptive to contextualized browser warnings than standard warnings [4]. Exploring what it means to "contextualize" something from the user's perspective, we posit that a psychological and emotional connection is made when this occurs therefore making it more appealing to the user. It was the idea of contextualizing information to the user that sparked interest in humor and security but before arriving at the final decision, two other avenues were first hypothesized.

First, we hypothesized that by adding social networks to the intervention strategy warning information could be personalized, would originate from a known source, and leverage social network resources (advice from friends and known experts, and crowd intelligence) to provide information back to the user. For example, a security warning following this scheme would present statistics on how many other people in the user's social network also encountered a given warning the action they used to mitigate the situation.

Second, we hypothesized that reporting statistics in a readable, clear, and concise way would give the user a clear picture of their security status, history, and mitigation strategies taken to avoid becoming a victim. Such a dashboard would take two forms. First, as a browser plugin similar to Ghostery [2] or DoNotTrackMe [1]. Another approach would resemble the Google Privacy Dashboard [1]. In the last example, given liberal space restrictions we would display social network information (mentioned previously), security history, and other information that would help the

[1]Any user with a Google + account has access to this by simply visiting https://www.google.com/settings/dashboard

user understand and learn about their security position. Using the dashboard approach, the goal is to inform, educate, and empower the user using their own data plus data from their social network aggregated and presented in a meaningful way.

Recognizing the limitations of using social networks and dashboards plus the high potential of using humor and cartoons to provide security warnings, we decided that cartoons and humor would provide the greatest value to the user.

3. HUMOR & LEARNING

Educators have taken notice that using cartoons to teach is novel and effective. Evidence of this can be found at Carnegie Mellon University where Iliano Cervesato created a class centered on a comic book [3]. The course titled *Discovering Logic*, offered for first-year computer science students [6], was taught using the bestselling graphic novel titled *Logicomix* [3].

Others too have also noticed the value of humor in education. For example, a work by Srikwan et al. focuses on creating cartoons aimed at teaching the user to be more secure [9]. Calman, in a paper titled *A study of storytelling, humor and learning in medicine*, states, "the physiological effects of laughter are considerable. Both story telling and humor are important for learning and are complementary to the more formal learning from text books and lectures" [5].

In a paper titled, *Humorous cartoons in college textbooks: Student perceptions and learning*, Özdoğru and McMorris report "the effects of humorous cartoons on students perceptions and learning of psychological concepts with sense of humor as a moderator" [7]. In one example, they state the positive experience by students when learning statistics that integrated humor into the instruction; these students showed higher achievement and lower anxiety as a result [7].

4. PLANNED WORK

Currently, we are making selections for appropriate cartoons to use in security interventions. This is a multi-step process by which design principals for e-learning, cognitive science, psychology, learning science, and proven work by others are used as a guide. After making final selections, we will pilot our recommended set of cartoons to a small user group in Germany and the United States to ensure our message is clearly communicated and abides by cultural norms.

Because of the subjective nature of cartoons, we are striving for clarity in the message we communicate. So following the pilot, selected cartoons will be modified as necessary and tested again. At this point, we will have four separate user groups (two in Germany and two in the United States) plus an expert group assess the cartoons before initiating the user study.

Our other study materials will also filter through the same process to ensure adherence with e-learning, cognitive science, psychology, learning science, design principals, and acceptance to cultural norms. It is only after a rigorous approach and validation period that we plan to launch the user study.

A convenient side effect of this work is the ability to study cultural differences and perceptions between a Germany and American population. To achieve this, the user study will be conducted simultaneously in Germany and the United States. The study population shall include users who have no domain knowledge in Usable Security and Privacy or any related field. In short, our target audience is the average user.

The user study will consist of a pre-survey followed by an interaction period with the prototype then closing with a post-survey. We are providing the user with a set of tasks they must complete while using the prototype and this allows us to capture data points and interaction behavior. Specifics related to the prototype and survey materials will be provided at a later point in greater detail.

5. LIMITATIONS

We expect cultural challenges specifically about designing cartoons that are receptive, humorous, and convey a clear message across cultures. To this effect, we also face unknown barriers to providing humor possibly stemming from religious and language barriers. We recognize this as one of the interesting details found when working with in a diverse culture.

Further work and investigation into the psychology of humor, cognitive science, and learning science will be conducted for this study. These areas are a cornerstone on which our work is based so proper acknowledgement and application of this material is paramount.

We further acknowledge that other contributing factors may be discovered in the process of conducting the pilot study and subsequent formative evaluations leading to the user study.

6. REFERENCES

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