

Literature Review and Competitive Analysis

Social Influences

There are six principles of social influence from social psychology literature.

Principle	Description	Citations
Reciprocity	People feel indebted to those who do something for them or give them a gift.	Cialdini, (1993); Cialdini & Trost, (1998)
Social proof	When people feel uncertain about an action they look to others around them to guide their actions.	Cialdini, 1993; Cialdini et al. (1999)
Consistency and commitment	People are more likely to do something after they've agreed verbally or in writing.	Gudadagno & Cialdini (2010); Cialdini, (1993)
Liking	People are more influenced by people they know and like, people who are physically attractive, similar to themselves, or give them compliments.	Cialdini & Goldstein (2004); Wood (2000)
Authority	People want to follow the lead of experts and are influenced by others with signals of authority.	Cialdini & Goldstein (2004); Milgram & Gudehus (1978)
Scarcity	People perceive items that are more rare or uncommon as more valuable.	Suri et al. (2007); Nelson & Morrison (2005)

Everyday Micro-Interventions: Augment Login Pages with Security Information

Using everyday opportunities to disseminate security information and change people's behaviors through a common login page using different social interventions.

Social influence tactic	Design intervention	Dependent variables
Experiment 1. Consistency and commitment	Participants will be asked to semi-publicly pledge to a message that they are committed to their own security. Their name will be shown to other people in a similar group (e.g., freshman computer science majors)	Optional security tool adoptions and password changes. Follow-up survey of changed behaviors.
Experiment 2. Scarcity	Afford participants access to a limited-space beta of a novel security tool (e.g., a novel password meter, ghost tales, trusted contacts) if they commit to using the tool.	Opt-ins; click-through rate; and novel tool usage.
Experiment 3. Social proof	Participants will be shown attributed or anonymous stories of past insecure behaviors and their consequences. Participants will also be given the opportunity to share their own story (anonymously or not) to the next person who will log in.	Engagement with story; follow-up survey of changed behaviors; decision to share their own story
Experiment 4. Social proof	Participants will be given an opportunity to anonymously share their own security behaviors with other people logging in. In return, they will be shown aggregate statistics of other people's security behaviors.	Opt-ins, follow-up survey of changed behaviors.
Experiment 5. Liking	Participants will be grouped into year-major groups (e.g., freshman CS majors, senior Design majors) who have a collective security goal (e.g., cumulative password entropy, number of password resets within 14 days). Progress towards the collective goal for each group will be publicly rank ordered upon each log in.	Participation (progress towards collective goal), discussion, follow-up survey of changed behaviors.

We will conduct a series of experiments (summarized in Table 3) that make use of the loading screen just after the account sign-in page. We will recruit participants for each experiment in cooperation with the university information security office at CMU. Participants will be randomly assigned to our design intervention, a security information screen, or a control condition loading screen with university news items.

For each study we will contrast the effectiveness of our social influence design with the security information screen on behaviors changed, and security communication measured in post-experimental surveys (one month after the social influence interventions). We will also interview a subset of participants in each study to probe in more detail on their experiences with the social influence design interventions.

Competitive Analysis – Chrome Extensions

HabitLab

This is an extension that helps users spend less time on distracting sites like Facebook and YouTube through interventions called “nudges”. Some of these nudges are pretty heavy handed like “1 Minute Assassin”, which closes the tab of a site after 60 seconds, or “Gatekeeper”, which freezes the screen after a certain amount of scrolling is done. Others are a bit more in the background like “The Supervisor” which fixes a timer displaying the time spent on the site at the top of the screen.

Another feature of HabitLab is a reminder system to encourage the user to visit certain sites that they can pick. This is something as simple as “Remember your goal to visit example.com more often” at the top of the page when you visit it. I think that we can learn a lot from this extension in terms of ideas for the microinterventions. A lot of them will need to be toned down a bit, but I think there are some really great ideas here.

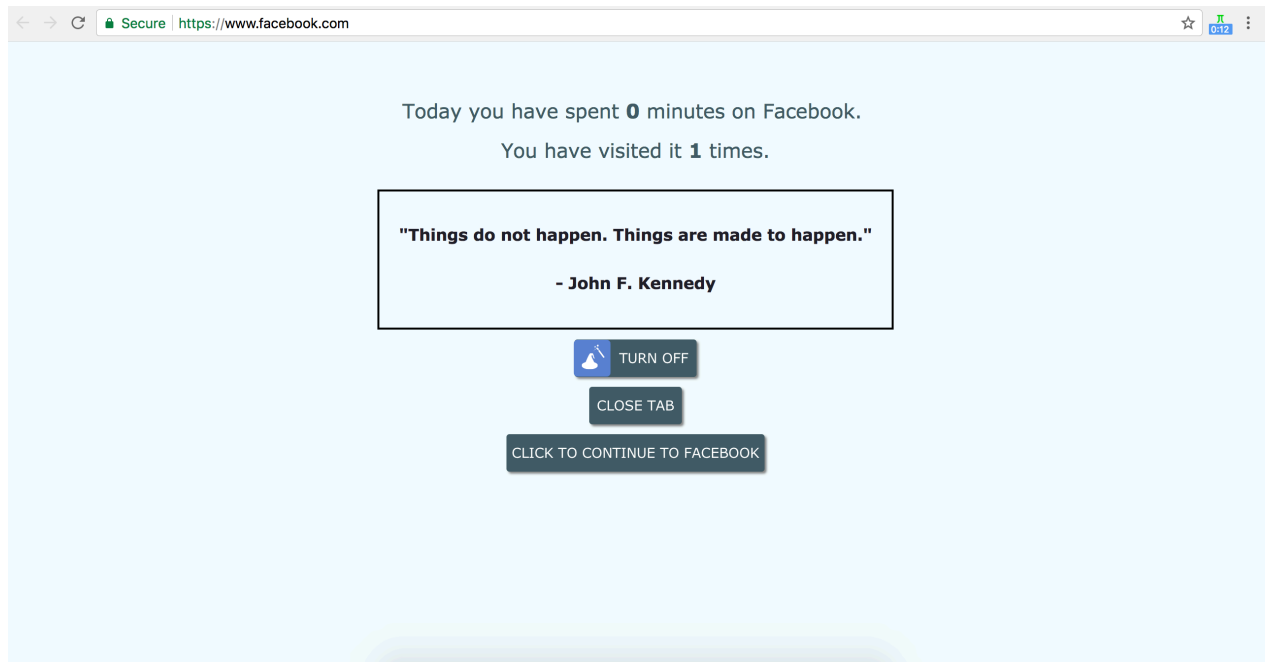
HabitLab is an open source research project run by the Stanford HCI Group. More information can be found here: <https://habitlab.stanford.edu/>

Notable Nudges

Stat Whiz

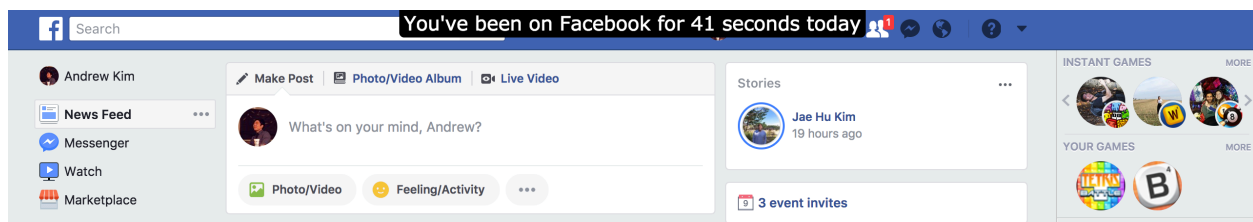
This nudge shows the time spent and the visit count to a particular website each time you visit it. These stats are shown on a screen that blocks the page until you click a button labeled “Click to continue to example.com”. There is also a button to close the tab in case you decide not to visit the site anymore and another button to turn off the Stat Whiz nudge.

Also included on the page is a quote that is meant to be inspire and promote productivity. This quote is randomized from a pool of quotes and is different each time you see this screen.

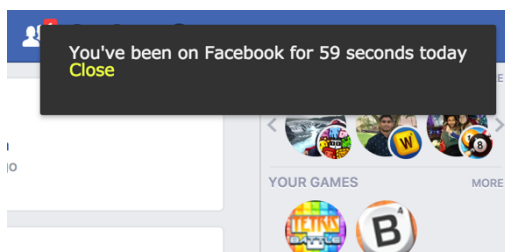


The SuperVisor

This nudge displays a fixed message at the top of the screen saying how much time has been spent on the site.



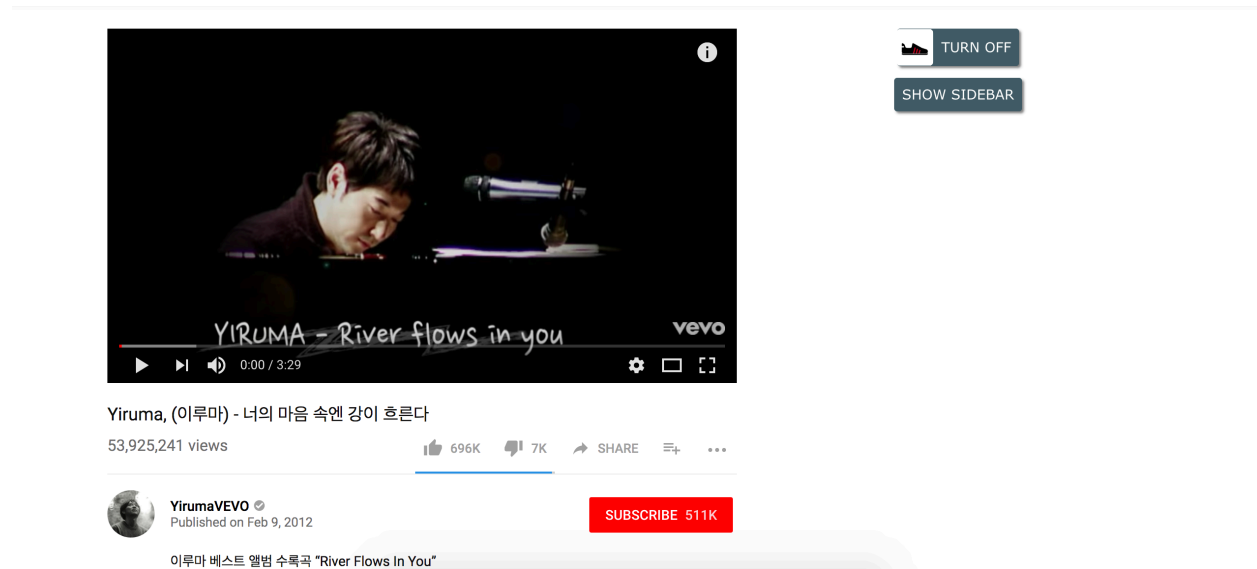
I like this one a bit better because it is a constant reminder of how much time is going by, and it doesn't make me take an extra step to get to the site I want to access. I think something like this is a bit closer to the microinterventions we are trying to design.



Similar to The SuperVisor, is **Minute Watch**. It has the same functionality, but it only shows the time every minute.

Sidekicker (Site specific)

HabitLab has some site specific nudges like Sidekicker, which removes the sidebar from video sites like YouTube. I think that the content-specific targeting that this nudge does can be further explored.



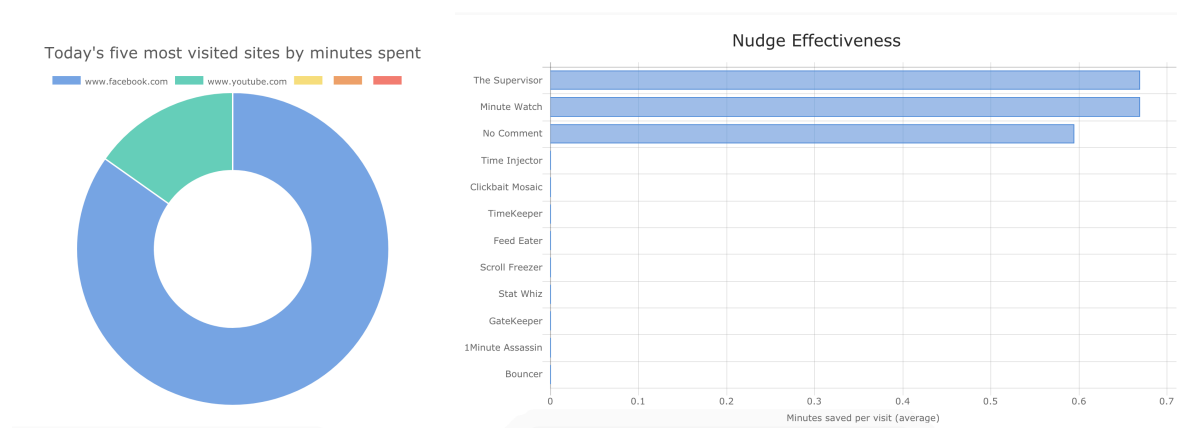
Encouragement to Visit Sites

HabitLab also has encouragement nudges which try to get the user to visit a certain site that the user selects at the beginning. This is done in a similar fashion to the StatWhiz, where a

Other Features

HabitLab also lets you access a dashboard of sorts where you can set a goal for how much time you spend on a site. You can also create your own nudges if you have experience with JavaScript, or you can suggest and vote on new nudges through the HabitLab subreddit.

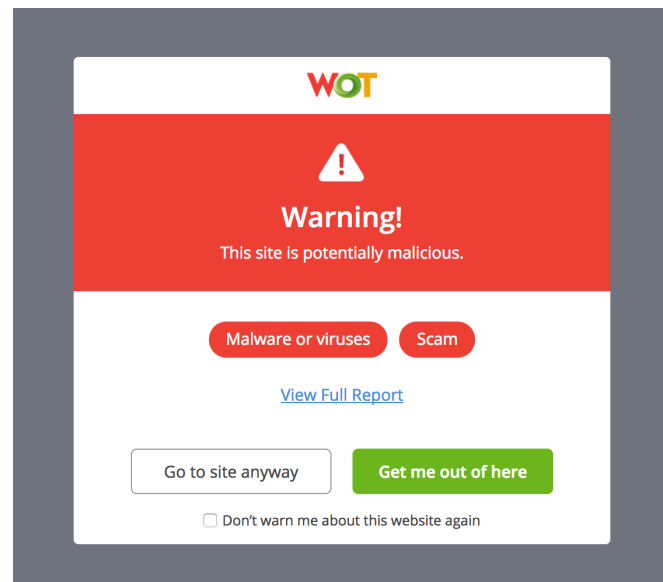
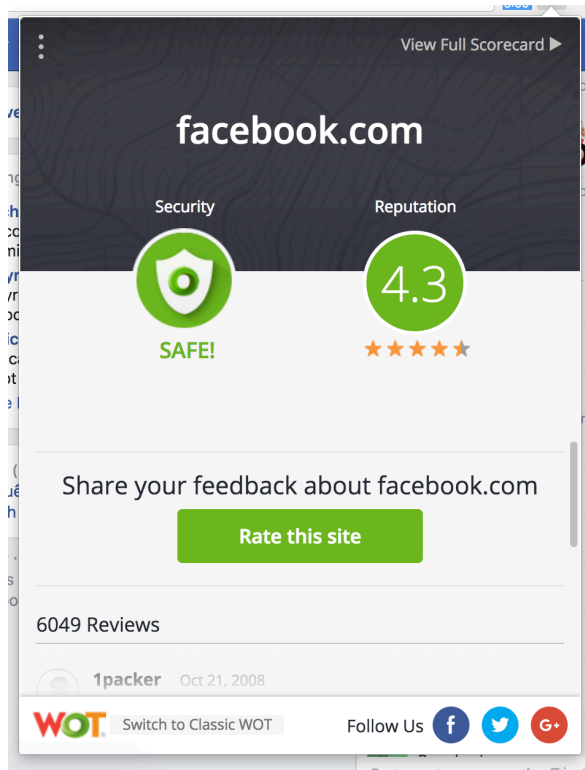
Lastly, you can see some data visualization on how much time you've spent on websites and how effective the nudges you've activated are.



WOT: Web of Trust, Website Reputation

This is an extension that provides information about a site's safety rating and its reputation. A colored icon in the top right of the browser gives you instant information about the reputation of the site and if the site is extremely low rated, there is an intervention page that confirms that you want to enter it. This is an extension for usable security while having an intervention aspect to it through the color coded icon and the warning page.

I think the color coded icon is a good thing to maybe draw some ideas from. A simple, always visible icon detailing something related to your friends or people you know could be effective.



Above are some examples of a good rated site and a poorly rated site. They can be viewed by clicking the colored extension icon.