Abusing HTML5 permissions on browsers

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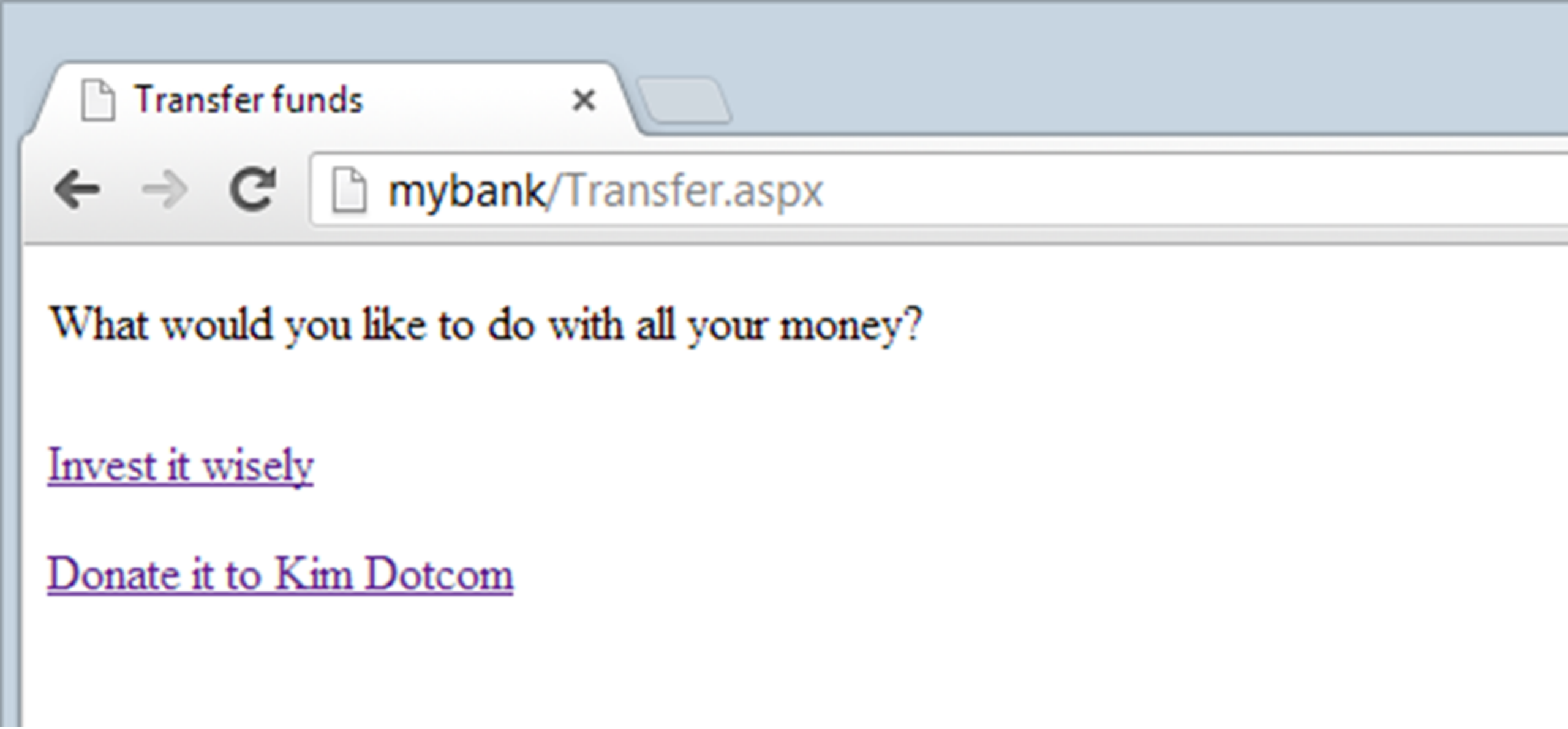
SCG Software Composition Seminar

Win an iPad Mini!!!

winipad/

Hey - we're giving away iPad minis!!! Just click the WIN button and it's yours!!!

>> WIN <<


Transfer funds
mybank/Transfer.aspx
What would you like to do with all your money?
Invest it wisely
Donate it to Kim Dotcom

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WIN

Relevance

HTML5 browsers **available on all major platforms**

HTML5 supports numerous **sensitive data providers**
(geolocation, camera, microphone, etc.)

potential victims: **billions**

Motivation

Exploration of technical possibilities

In-depth **victim assessment**

Threats & Attacks

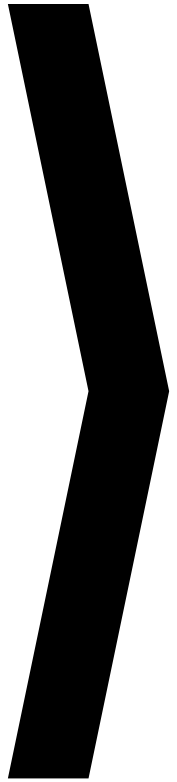
Threats

Risks

- Revelation of confidential information
- Hostile computer takeover
- Unintended participations of any kind

Gains

- **Blackmailing** as business model
- **Increasing** Twitter reach
- **Influencing** Facebook community
- **Generating** Google AdSense revenue
- **Gaining** popularity on YouTube



Spoofing:

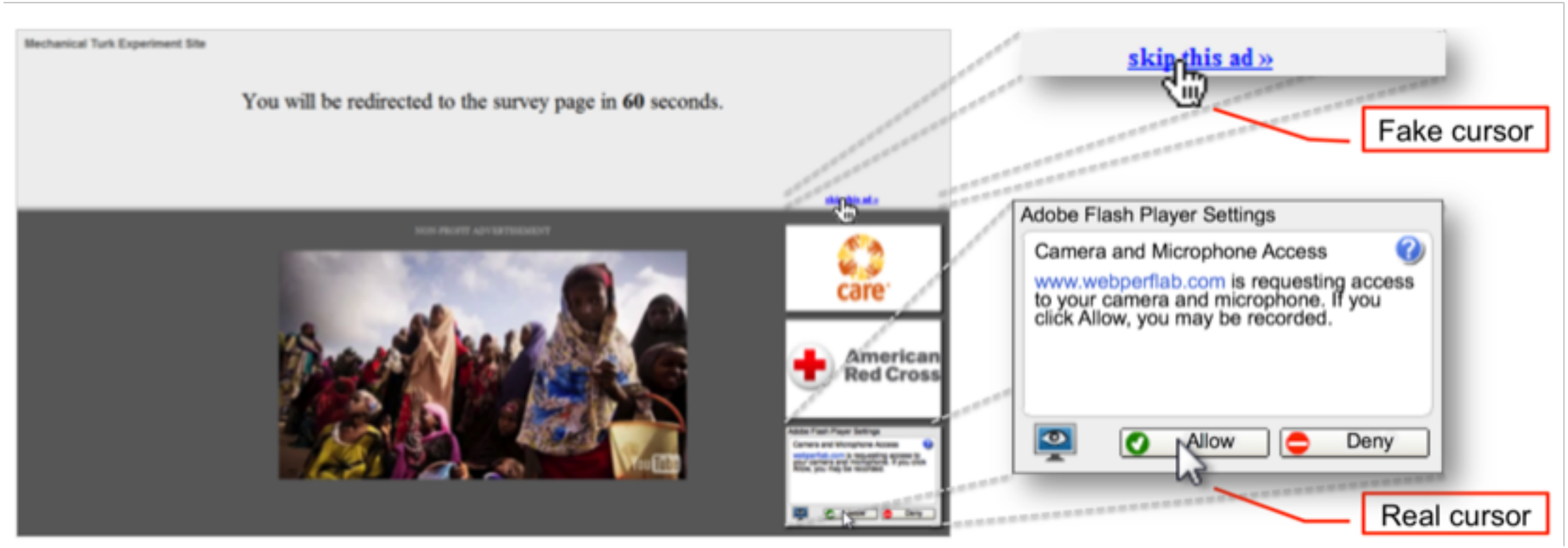
Display

Pointer

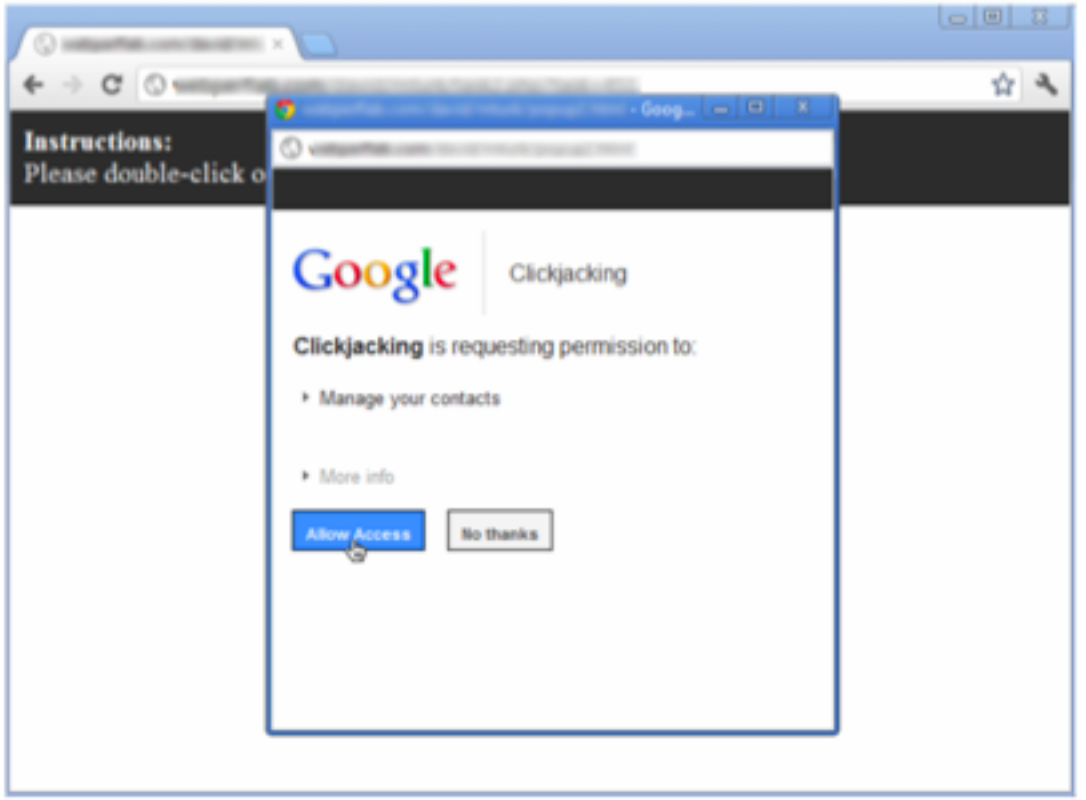
Temporal

A) Display Spoofing

B) Pointer Spoofing



C) Temporal Spoofing



Prevalence of Vulnerabilities

Google
Explorer API

Facebook
iframe

LinkedIn
AutoFill plug-in

Defense Mechanisms

Frame busting

HTTP header X-Frame options

DENY	*any embedding disallowed*
SAMEORIGIN	*only on the same website allowed*
ALLOW FROM	*allowed on the specified websites*

JavaScript (defense script / no-script add-on)

GuardedID

Technical Details

HTML5 Permission API

```
// Check for Geolocation API permissions
navigator.permissions.query({name:'geolocation'})
  .then(function(permissionStatus) {
    console.log('geolocation permission state is ', permissionStatus.state);

    permissionStatus.onchange = function() {
      console.log('geolocation permission state has changed to ', this.state);
    };
  });
```

Concept

Intention: Trick users on browser permission dialog

Procedure: 1) Accurate positioning of a fake button

2) Make the user click very fast

3) Speed dependent permission dialog box trigger

4) Distraction of the user

5) Fake end screen

Experiments

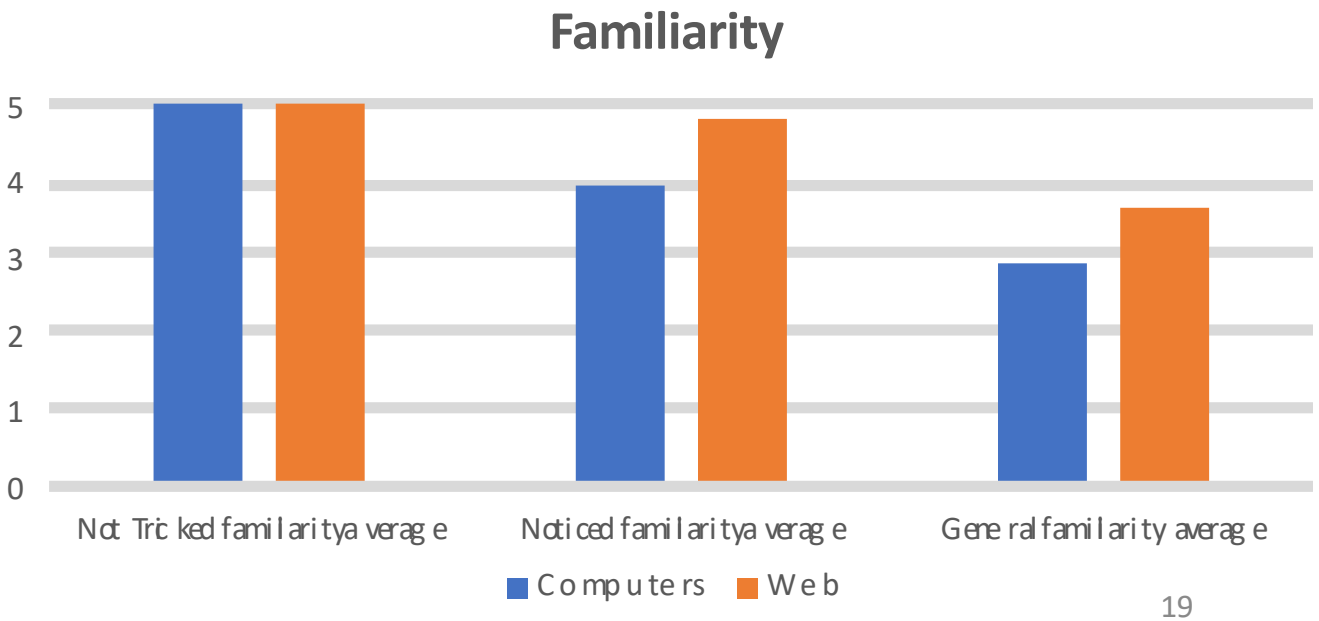
Demo #01

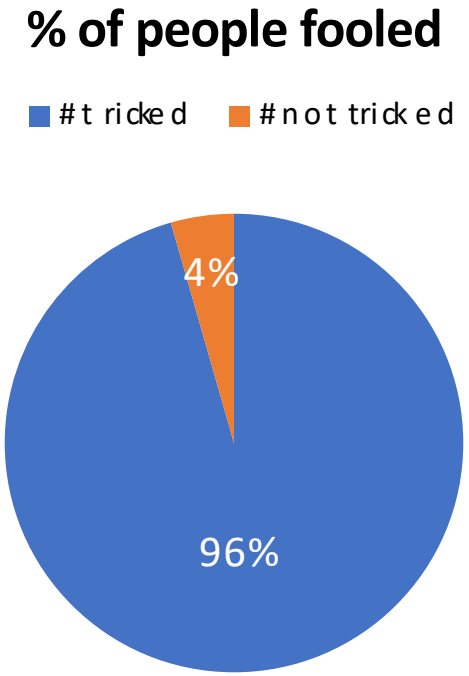
Controlled Experiment

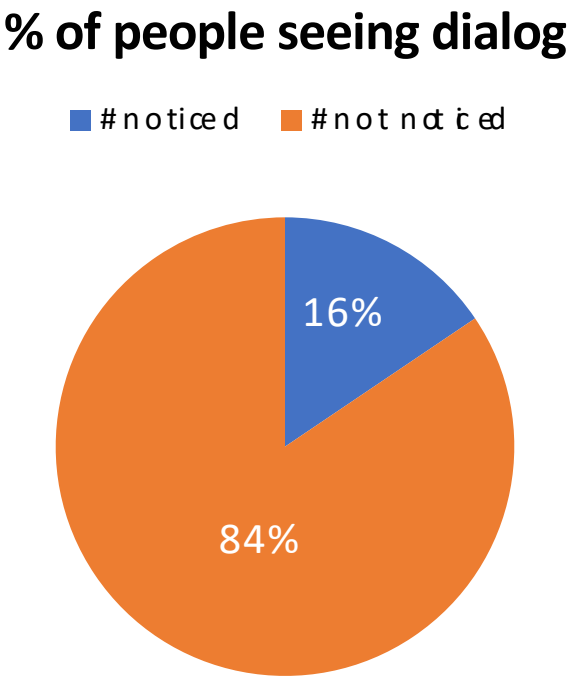
People with diverse backgrounds

Controlled environment
(same computer and browser)

The majority of people could be fooled!





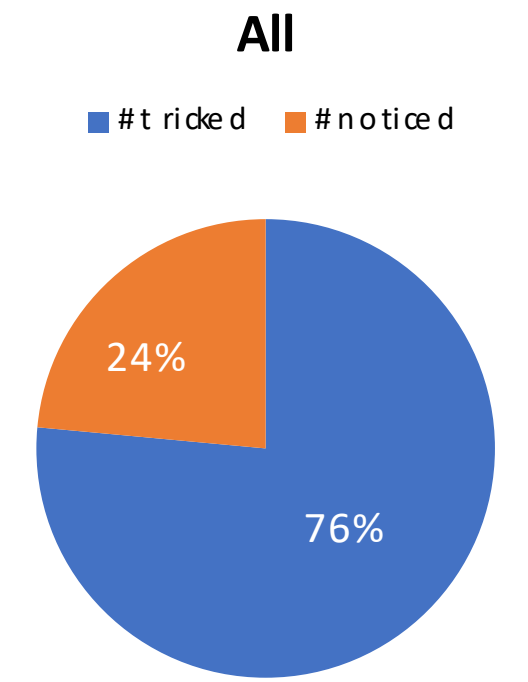


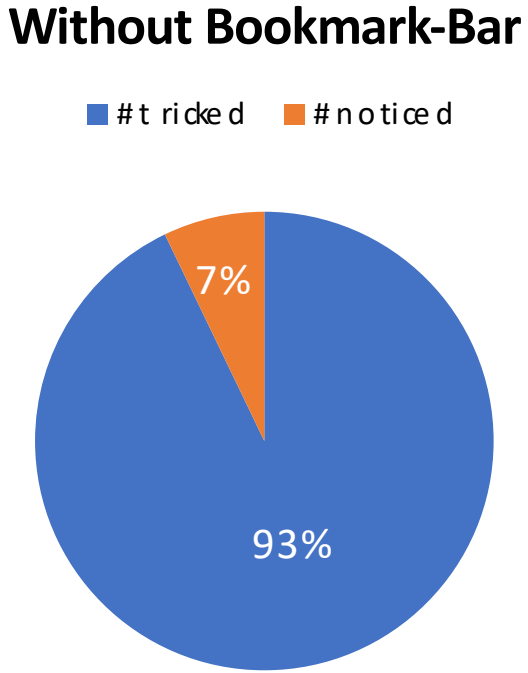
Uncontrolled Experiment

Computer Science Students

Different computers and browsers

Even people with a strong CS background could be fooled!






VIRUS

Infected System

- Permissions are stored in an unprotected SQLite database in the case of Firefox and Chrome on Windows
- Suppose a virus infected the computer:
  1. Add the necessary permissions to the SQLite database
  2. Open a hidden (Windows), minimized (Linux) browser window
  3. Navigate the malicious website
  4. Extract the sensitive information (geolocation, audio, video, etc.)

→ **Missing permission protection (against data alteration)**

Demo #02

Defenses & Future works

Limitations

Proof-of-concept status

Limited compatibility (macOS and Android)

Bookmarks bar and window resize can break attack

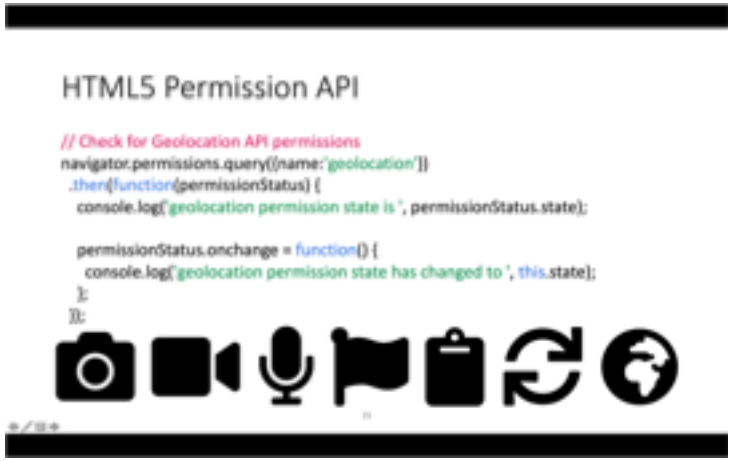
Increase the excitement of the game

- Investigate permissions on other systems (iOS, Android, etc.)

Summary

Threats & Attacks

Technical Details



Experiments