Using Behavioral Psychology and Science of Habit to Change User Behavior

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Is Awareness Enough To Change Human Behavior?
Example: Continued security training beyond the baseline are unlikely to be effective - “Modifying Smartphone User Locking Behavior” – by Dirk et al (ACM – 2013)
What Else Do We Need?
The Mystery of Eugene Pauly’s Brain ..

Dr. Lary R. Squire
University of California, San Diego

Image Source: http://whoville.ucsd.edu/about.html
Goal Directed and Habit System

- **Goal Directed System (Pre-Frontal Cortex)**
  - Responsible for new or infrequent behaviors
  - Guided by attitudes, goals, values, knowledge
  - Conscious and deliberate
  - Slow

- **Habit System (Basal Ganglia)**
  - Very fast. Does not require thought or attention
  - Less conscious. More automatic

Credit: Neal et al – The Science of Habit...
40% of our daily actions are driven without thinking

Examples of Habits in action
- Changing gears
- Getting out of elevator in wrong floor
- Tying Shoe knots

Bad habits in action
- Checking phone/blackberry during the middle of sleep
- Clicking phishing links
- Writing down passwords in open
How To Build A New Habit?
Story of Pepsodent ..

Trigger – Routine – Reward ( & Craving )

Trigger:
Feel Tooth Film with tongue

Routine:
Brushing Teeth

Reward:
Great Smile

Image Credit: Seth Lemmons

https://i.ytimg.com/vi/rf1Bs2XpwFI/maxresdefault.jpg
Steps for Building New Habits

- Step 1: Find a Predictable and Recurring Trigger
- Step 2: Devise the new Routine/Habit
- Step 3: Find the Reward

- Practice, Practice, Practice without exceptions
How To Change A Habit?
Old Habits
Never Die
Example – Changing A Habit

Trigger: Boredom
Routine: Have a Whisky
Reward: Feel Happy

Image Credit: Wiki
Example – Changing A Habit

Trigger: Boredom

New Routine: Talk to a friend

Reward: Feel Happy

Image Credit: Wiki
3 Steps for Changing Old Habits

- Identify and Deconstruct the Habit
  - Find the Trigger
  - Find the “real hidden reward” – Experiment to discover
  - Find the Trigger-Routine-Reward-Craving model
- Find an alternative routine to satisfy the “real hidden reward”
- Practice. Practice. Practice.
“Hard Thing” about “Easy Things”..
Understanding Buffer Overflow - Easy
Finding A vulnerability - Hard
Writing A “Reliable” Exploit- Very Hard
Hard or Easy?

- Coke, McDonalds campaigns..

What is hard about it?
- Finding a “Reliable” trigger and reward
- Creating craving and making it stick
Applying The Science Of Habit
In Information Security & Life..
Example 1: Create Habit of Locking Computer Screen.

- Goal: Locking system while leaving desk
  - Trigger – Getting up from chair/Leaving the system
  - Routine – Lock your computer
  - Reward – Feeling of security

- Rehearse or Repeat at least 20 times
- If you forget then go back to seat and repeat the routine
Example 2: Change the Habit of Writing Down Password in Open Areas

- Goal: Stop the habit of writing down password areas
  - Trigger – New password setting request
  - Old Routine – write down the password
  - New Routine – “write down the clue” or “Use a Scheme to generate new passwords”
  - Reward – Feeling of security

- Rehearse or Repeat
Example 3: Preventing Phishing

- Old Habit
  - Trigger: Legitimate entity asks for personal details
  - Routine: Share the details

- New Desired Habit
  - Trigger: Legitimate entity asks for personal details
  - New Routine: Validate the legitimacy of the entity

- Practice. Practice. Practice
Example 4: Create Secure Coding Behavior

- Goal – Ensuring coders use secure coding functions
  - Trigger – Typing a function
  - Old Routine – Type insecure function
  - New Routine – Use intervention method to prompt secure function
  - Enough practice
  - Automatic use of secure function
Habits in Day to Day Life..

- Playing/Exercise everyday
- Controlling anger outbursts..
Driving organizational change
7 Learning for Driving Organizational Change

- Augment Awareness with a Habit Strategy
- Utilize “Keystone Habit”
- Certainty of negative incentive and not Severity has high impact
- Group sharing has positive impact
- Reduce friction or Create friction based on goals
- Leverage a disaster
- Start with a why
Current State of Research
Research on Habits and Beyond..

- Research on Habits
  - Significant studies in the field of psychology, marketing, sports etc
  - Little or No research in areas related to IT security
References and Other Studies ..

- Balleine et al – Goal directed instrumental action: contingency and incentive learning and their cortical substrates
- Kahneman – Thinking fast and slow
- Duhigg - The power of habit
- Neal et al – The pull of the past when do habits persist despite conflict with motives?
- Rothman et al- Reflective and automotive processes in the initiation and maintenance of dietary change
- Sheeran et al – Implementation intentions and repeated behavior.
- Wood et al – A new look at habits and habit- goal interface
- Wood et al - The habitual consumer
- Wood et al- Habits in everyday life: thought emotion and action
Apply What You Learned..
Apply What You Learned

■ **Next Week**
  - Choose 1 habit that you want to change or build
  - Identify a small group for experiment
  - Experiment

■ **First 3 months**
  - Find the most important habits to change in your organization
  - Create an organization wide plan for habit change drills
  - Make people practice at least 20 to 30 times in a short time frame. (Group activities, Simulation exercise, Wargames etc)
  - Measure the success of the program
- After 6 months
  - Assess the success of the program based on the metrics defined
  - Reassess the risky and secure behavior and create a new program
Awareness Is Not Enough
Invest In Forming Lasting Habits
Practice Does Not Make Perfect
“Perfect Practice” Makes Perfect
Want To Engineer A Habit?
Let’s Meet At The Bar ..
Questions please..

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