SESSION ID: HUM-F03

Using Behavioral Psychology and Science of Habit to Change User Behavior

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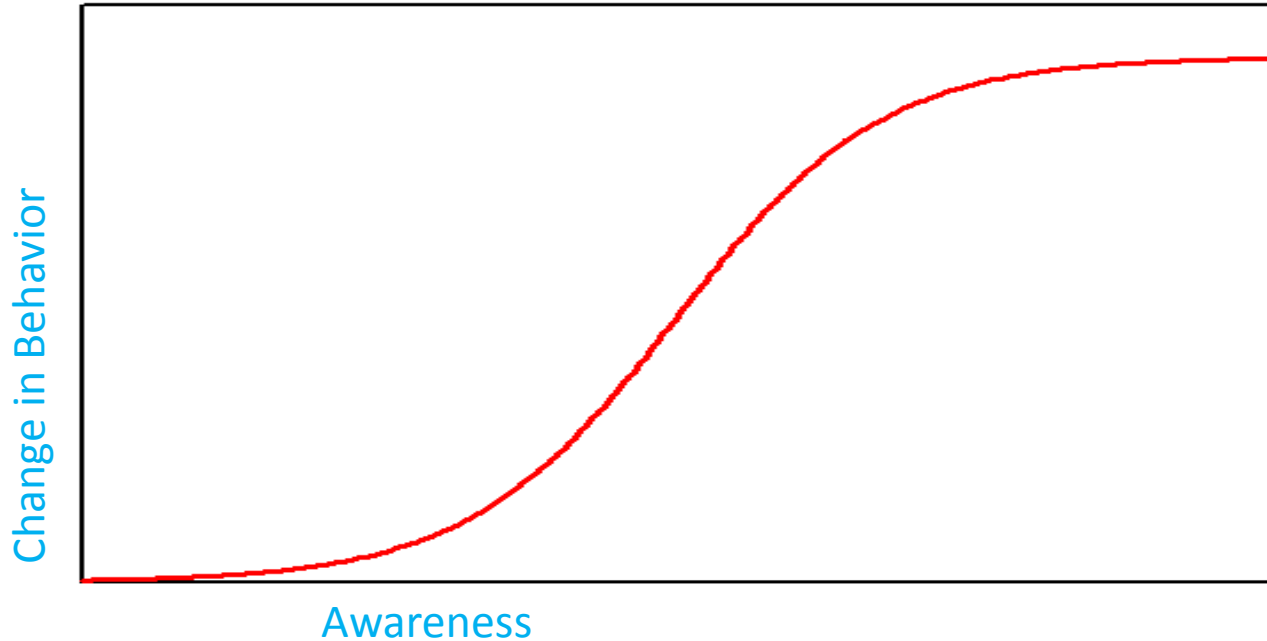
#RSAC

Is Awareness Enough To Change Human Behavior?

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Credit: Abd Allah Foteih

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Awareness vs Change Of 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?

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The Mystery of Eugene Pauly's Brain ..

Dr. Lary R. Squire
University of California, San Diego
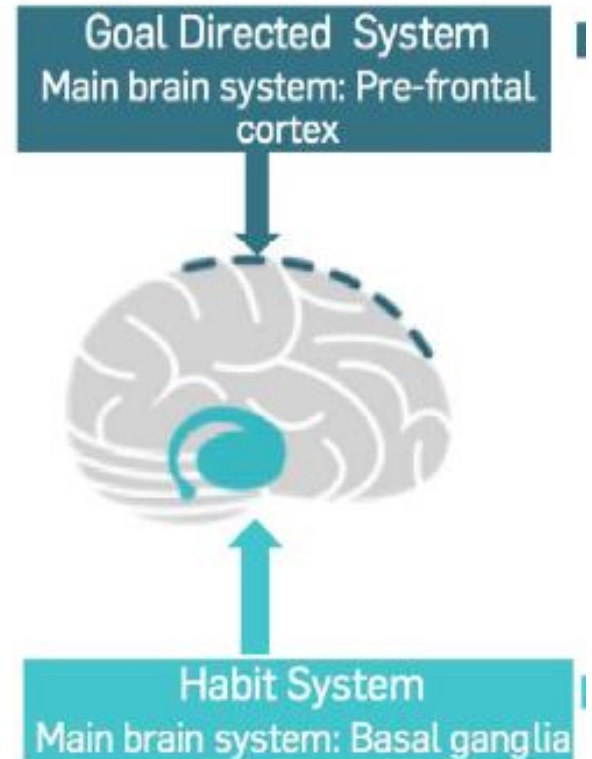
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Goal Directed and Habit System

- **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

Goal Directed System
Main brain system: Pre-frontal cortex

Habit System
Main brain system: Basal ganglia

Credit: Neal et al – The Science of Habit…

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Habits in Action..

- **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
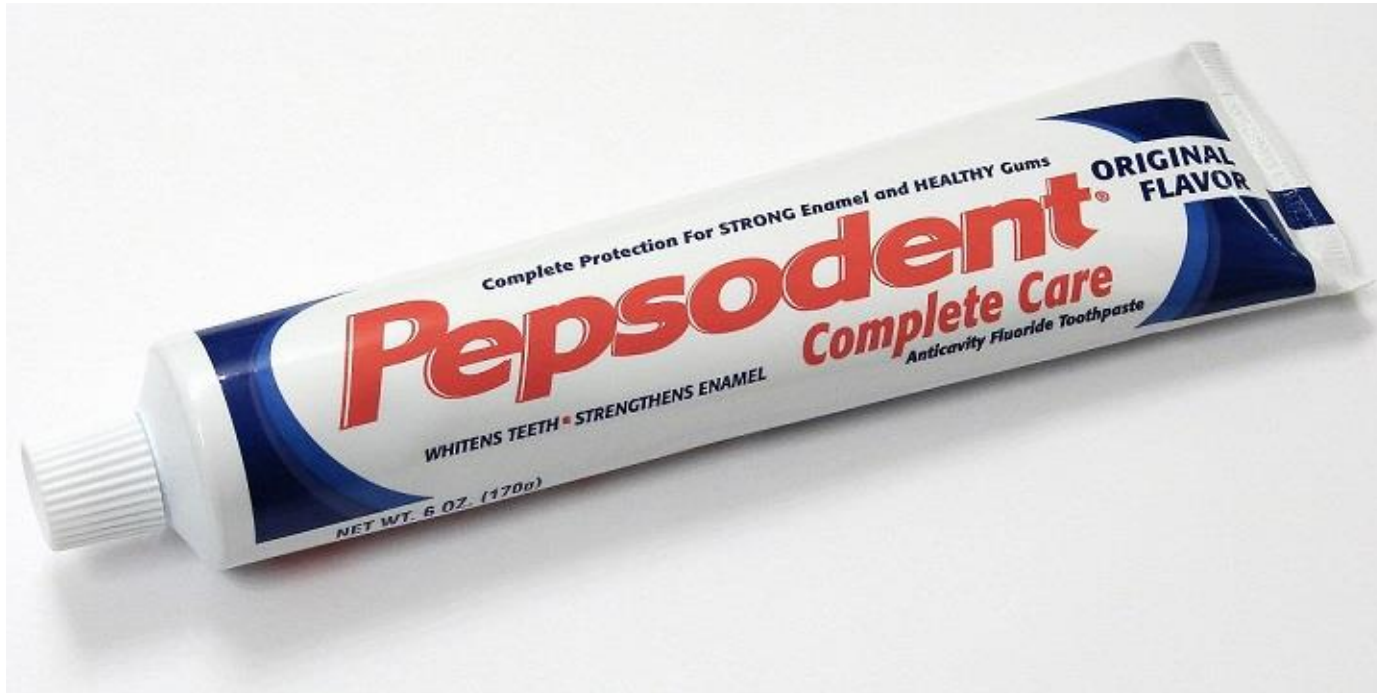 - Writing down passwords in open

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How To Build A New Habit?

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Story of Pepsodent ..

https://upload.wikimedia.org/wikipedia/en/8/88/Pepsodent-0179c.jpg

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Trigger – Routine – Reward (& Craving)

Crave for Tingling

Trigger:
Feel Tooth Film with tongue

Routine:
Brushing Teeth

Reward:
Great Smile

https://i.ytimg.com/vi/rf1Bs2XpwFI/maxresdefault.jpg

Image Credit: Wikipedia

Image Credit: Seth Lemmons

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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

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How To Change A Habit?

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Old Habits
Never Die

Example – Changing A Habit

Trigger:

Boredom

Routine:

Have a Whisky

Reward:

Feel Happy

Image Credit: Wiki

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Example – Changing A Habit

Trigger:

Boredom

New Routine:

Talk to a friend

Reward:

Feel Happy

Image Credit: Wiki

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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..

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- 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

- 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

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- 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

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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

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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

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Apply What You Learned..

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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

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Practice Does Not Make Perfect
"Perfect Practice" Makes Perfect

Want To Engineer A Habit?
Let's Meet At The Bar ..

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Questions please..

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