Security Awareness and the Ebbinghaus Effect

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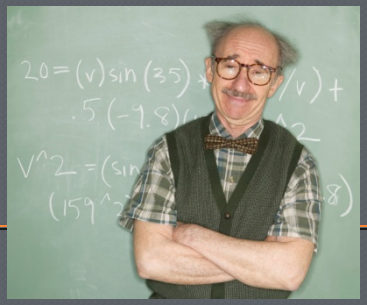
Abstract

- You've worked really hard and focused on *their* needs and realities in putting together a security awareness program for a specific target audience segment in your organization. They were very receptive when you delivered the training: laughing at your jokes, smiling in recognition at your carefully crafted real-world examples and learning parables, nodding in agreement with your business-related reasoning, even offering solid suggestions for improvement to the new security procedures you detailed. But when you go back a month later to measure progress against behavioral goals of the awareness and training program, everything is operating just as it was before you did the training. They've forgotten everything. It's as if you'd never been there. What happened?



Abstract

- Blame Herman Ebbinghaus. While teaching in Berlin in the 1870's, he analyzed retention of learning and produced a "Curve of Forgetting" that empirically demonstrated that only one-third of an audience retains a delivered message after one hour and only 28% remember it after 2 days. Advertisers deal with the Ebbinghaus Effect by repeating the same message over and over again, risking annoyance for the effect of having the product stick in memory. Can we afford to do that in security?

- We will analyze the Ebbinghaus effect as it pertains to our profession and give some recommendations to help change the shape of the curve of forgetting. We'll also look at some more of his relevant findings and try to apply them to our current and future training situations.

Presenter Bio

- John O'Leary, CISSP, is President of O'Leary Management Education. His background spans four decades as an active practitioner in information systems, IT Security and contingency planning. John has designed, implemented and managed security and recovery for networks ranging from single site to multinational. O'Leary has trained tens of thousands of practitioners, and regularly conducts on-site programs at major corporations and government facilities worldwide. He has also facilitated meetings of Peer Groups, where security professionals from diverse corporations share ideas, concerns and techniques. John was the recipient of the 2004 COSAC award and the EuroSec 2006 Prix de Fidelite. He has yet to fall for a Nigerian money scheme, but will almost always divulge a password for chocolate.

Agenda

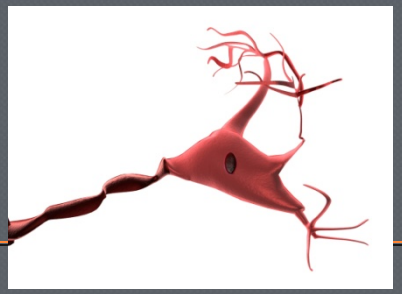
- Herman Who??
- Curve of Forgetting
- Relevance to Security Awareness
- Memory Enhancement

Herman Who??

- Herman Ebbinghaus
- 1850-1909
- German Psychologist
- Smart dude
  - Entered University of Bonn at 17
- Studies interrupted by Franco-Prussian war
- PhD in 1873 (at 23)
- Prof. of Philosophy in Berlin and Poland

Herman Who??

- Pioneered experimental study of human memory
  - Learning Curve
  - Curve of Forgetting
  - Serial Position Curve

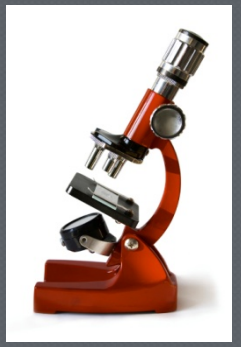


Herman Who??

- Helped start experimental psychology
  - Programmatic experimental research on higher mental processes
  - Very precise techniques in research on learning and retaining – still used today
  - Used himself as sole subject
    - Obviously not enough college sophomores around
- Advertising types tend to know who he is; so should we

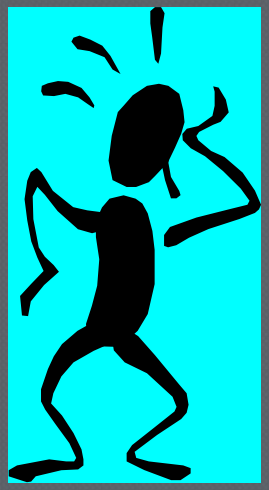
Herman Who?

- When he began to study human memory, psychological approaches were closely aligned with philosophy
- Introspection and self-observation were all the rage
- Ebbinghaus's rigorous attention to detail and systematic methodologies for studying memory changed this and brought such studies into the scientific arena



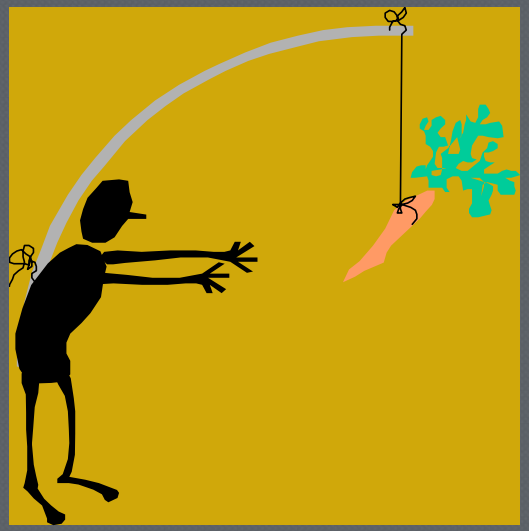
Curve of Forgetting

- Published in 1885
  - A given piece of learning (in his case – a nonsense syllable) is forgotten by more than half its audience in one hour
  - Forgotten by about 2/3 in one day (66.3%)
  - Nearly 3/4 in two days (72.2%)
  - About 4/5 in a month (78.9%)



Curve of Forgetting

- Found that meaningful stimuli were more likely to be remembered than items without apparent meaning
- Obvious to us now, wasn't obvious then



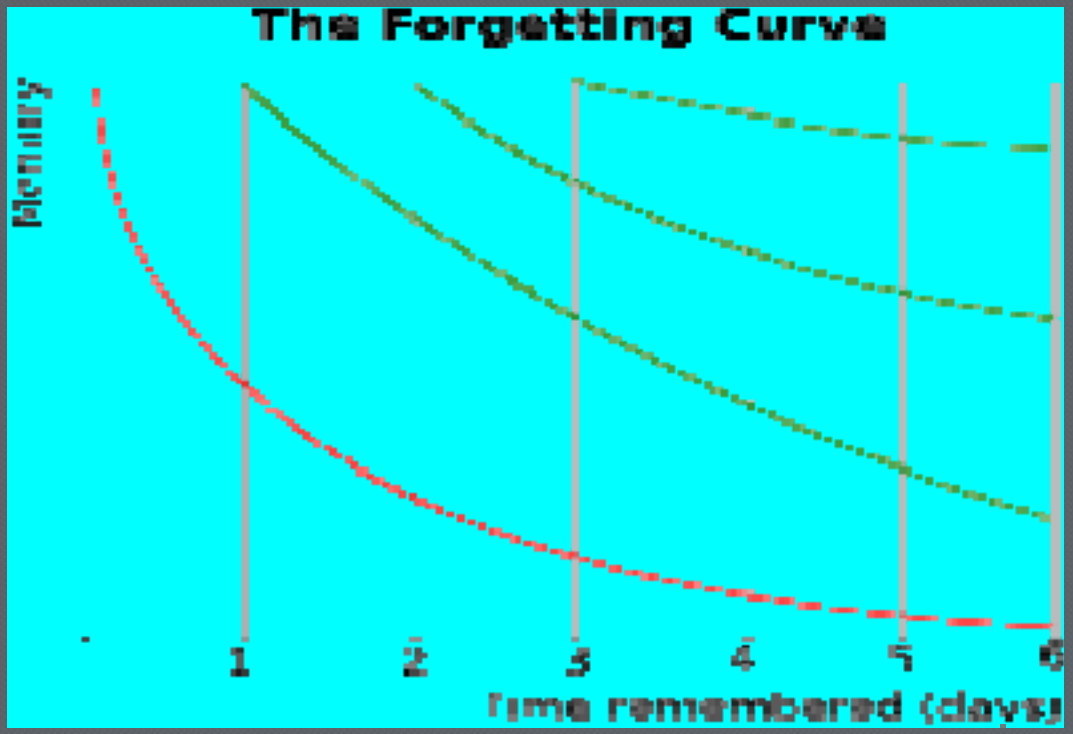
Curve of Forgetting

- *Ebbinghaus invented several tests of retention*
- **Recall**
  - Free
  - Serial (where order is important)
- **Recollection (recognition)–** given a large list, which items were on a previously studied list
- **Savings** – try to re-memorize; even if recall and recognition don't work, a smaller number of tries to achieve memorization would indicate effective prior learning

Curve of Forgetting

- He also was the first to explain a ***Serial Position Curve***
- It was u-shaped
  - ***Primacy*** – items earlier in the list tend to be remembered
  - ***Recency*** – items at the back end of the list also tend to be remembered better than those in the middle

Curve of Forgetting



From Wikipedia

Relevance to Security Awareness

- *They will forget*
- Much more quickly and more often than we realize
- It doesn't mean that they're stupid, lazy, uncaring, ornery, difficult, inattentive, unappreciative, …., just human
- To them, our security messages might resemble nonsense syllables

Relevance

- It doesn't mean that our program is wrong or that we're giving them bad information
- It doesn't mean that they're not trying
- It might mean that we need to shift our focus

Relevance

- We need to examine the style of delivery
- We need to analyze the delivery vehicle to see if it's effective for that audience
- We may need to re-order the sequence of material covered
- We very probably need to create examples that will be relevant and meaningful to the particular group we're targeting

Relevance

- Maybe we need to look at IT security from their perspective
  - It might differ significantly from ours
  - They might view it as just another box to be checked, not something important enough to be recalled or even recognized
  - We have to address their diverse perspectives, or single-minded adherence to what they remember as being important
  - Our stuff doesn't always make the grade

Relevance

- *Important points can be lost in the middle of a large volume of information*
  - Social engineers depend on this in their "gold in the middle" technique
  - Innocuous chatter – movies, sports, fashion, music, gossip, etc.
    - *How do the Nationals look this year?*
    - *Can't do anything without pitching*
    - *I don't think they're a last place team, though*
    - *They've got some good young players*

Relevance

- Drop a query on It or security status or personnel in the middle of the discussion
  - *Say, is that young girl who used to answer all the XP questions still around, she was good. I'd put her on my biggest project. Is that what they're doing?*
- Finish with more innocuous chatter
  - *Y'know if they were in the other league, I think they could beat a bunch of teams over there… Rangers, Rays, even the White Sox*
- Chances are the target will forget that the question was asked and that he answered it

Relevance

- *Important points can be lost in the middle of a large volume of information*
  - For security awareness, the target audience less likely to remember items in the middle of a long sequence
  - Front or back are the impact positions for the most important information
  - Ties directly to Ebbinghaus's Serial Position Curve

Memory Enhancement

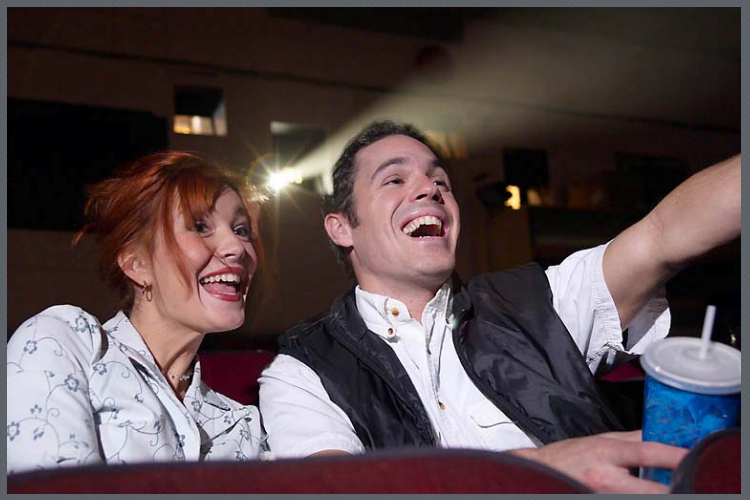
- If an important security item is in the middle of an extensive list, we must try to make it stand out
  - Different color text
  - Special relevant example
  - Highlighting
  - Change in delivery style
  - Incorporate questions or discussion

Memory Enhancement

- From Debra DeJong – Two Primary marketing concepts to create awareness
- Need a combination of
  - **Reach** - who is our target audience
  - **Frequency** - how often does your target audience need to be exposed to the same message
- Higher the frequency, higher the chance that your target audience remembers

Memory Enhancement

- Strategic mix of media and delivery mechanisms to avoid boredom and annoyance
  - E. g., - Movies
    - Songs
    - Books
    - Wearables
    - Toys
    - Games
    - Contests



Memory Enhancement

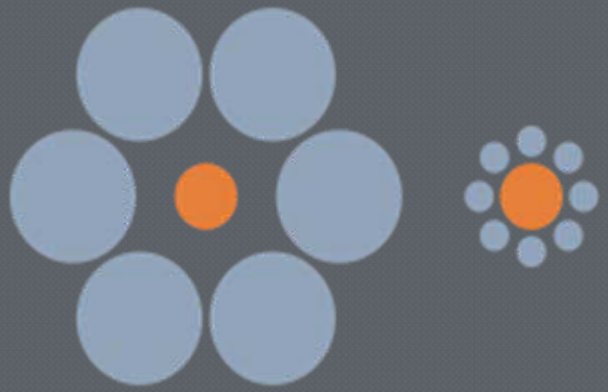
- Limitations
  - Time
  - Budget
  - Resources
  - Mandated Priorities
  - Changing Priorities
  - Hot Buttons
  - Complexity
  - Lack of "local knowledge"

Memory Enhancement

- Integrated Messaging
  - Same basic message
  - Same look and feel
    - Logo, color pallette
    - Catch phrase or motto
    - Mascot
    - Consistent wording/phrasing
  - Different avenues of approach
  - Reinforcement of primary concepts
  - Examples geared to specific area

Memory Enhancement

- Even with all we do, humans still forget
- No guarantees
- Don't succumb to the Ebbinghaus Illusion



- I had more to say, … but I forgot what it was

References

- *debradejong.blogspot.com/2005/06/ebbinghaus-effect* - very well done piece by Debra DeJong on Ebbinghaus and relation to sales and marketing. Clear and interesting examples. Much of the material in this presentation is… er, liberated from here
- Wikipedia – good stuff on bio and actual curves
- Indiana.edu/~intell/ebbinghaus - good analysis of Ebbinghaus's contributions to science and how he moved beyond old thinking

Summary

- *We have covered*
- Herman Who??
- Curve of Forgetting
- Relevance to Security Awareness
- Memory Enhancement

Final Words

- Thanks for your
  - Patience
  - Attention
  - Perseverance
- And remembering everything we covered
- Herman Ebbinghaus would be proud of how you broke the curve