Influencing Mental Models of Security

Challenge

- Home computer users have to make many security-sensitive decisions every day, such as "do I click on this suspicious link?" or "should I install this software update?"
- Mental models are simplified understandings of socio-technical systems that people use to make a wide variety of everyday computer security decisions.
- How do people learn these mental models? And how does this learning impact future security decisions?

Solution

- To understand learning, we collected a variety of materials that people can learn from, and then asked people for additional information about how they learned and what they learned.
- To understand decision-making, we collected a wide variety of self-report data from users and compared it to log data from those users' computers.
- This allowed us to examine real-world decisions made after learning, and compare them with beliefs and knowledge of the users.

Scientific Impact

- Learning about security is a social activity that involves hearing stories from friends and family and generalizing that knowledge across systems.
- This learning creates two forms of socio-technical interdependence:
  - What one person learns about security can spread to other people through stories
  - What one person learns can influence how they use other systems
- When done poorly, this interdependence spreads vulnerability through bad user decisions. If done well, this can enable systems to make the other systems around them more secure.

Broader Impact

- Trained 25 undergrads, 2 graduate students, and 1 postdoc in the conduct of interdisciplinary research around cybersecurity.
- Over 50% of the team are women, and 3 research assistants are members of demographic groups that are underrepresented in STEM research
- Trained 2000 end users in phishing prevention
- Spread knowledge about the challenges of protecting yourself online, and what can be done about it, to the general public through public speeches and news interviews

Award number: CNS-1115926 and CNS-1116544
PI: Rick Wash (wash@msu.edu) and Emilee Rader (emilee@msu.edu)
Institution: Michigan State University
Project URL: https://bitlab.cas.msu.edu/securitymodels/

January 2017

MICHIGAN STATE UNIVERSITY