

(Work in Progress)
**An Insight into the Authentication
Performance and Security Perception
of Older Users**



Sovantharith Seng, Rochester Institute of Technology, USA

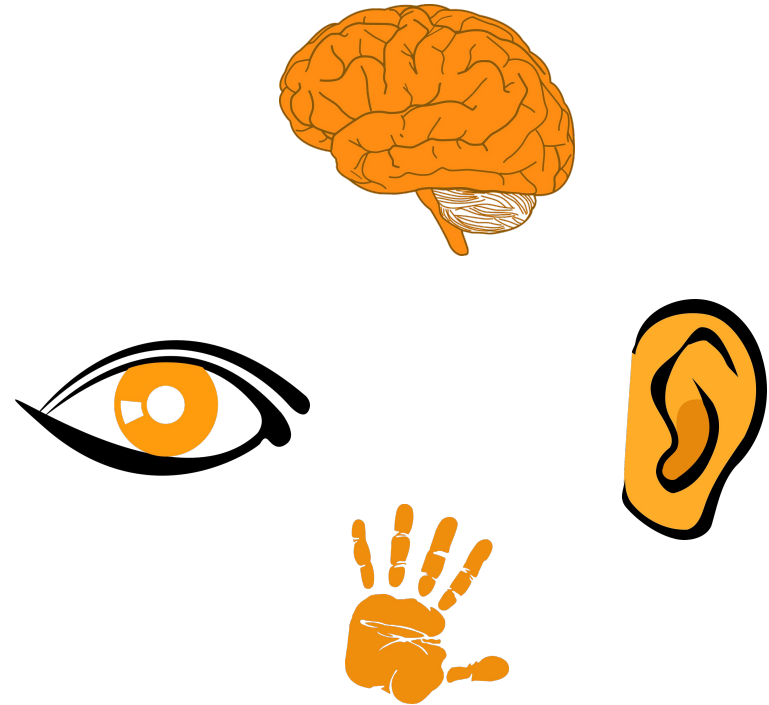
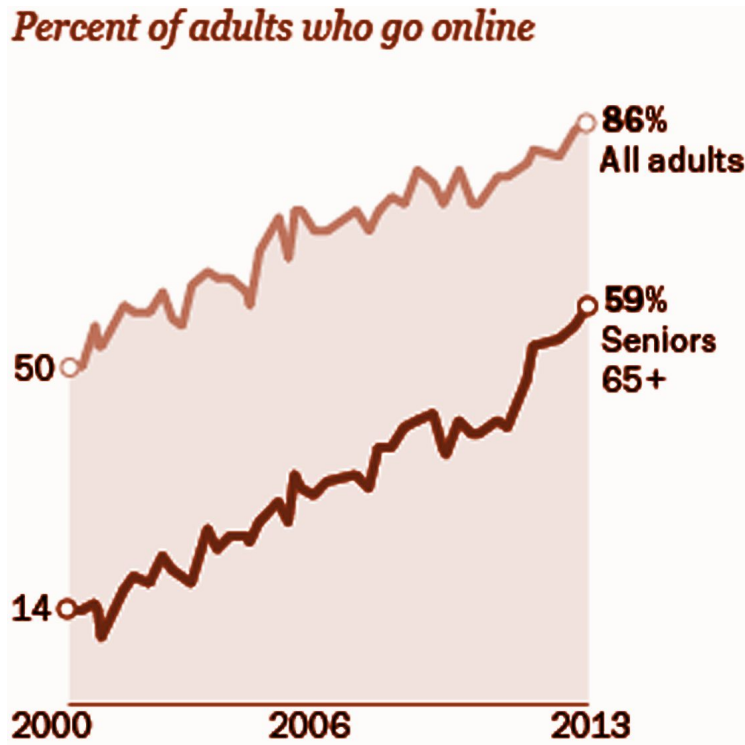
Sadia Ahmed, University of Texas at Arlington, USA

Mahdi Nasrullah Al-Ameen, Clemson University, USA

Matthew Wright, Rochester Institute of Technology, USA

USEC 2017

Motivations



Research Questions

- Authentication performance
- Security perceptions and behaviors
- Suggestions



















CuedR

- Recognition > recall
- Picture superiority effect
- Depth of processing effect
- 98-100% memorability
- Online attack



CuedR

Key: Next >>

 <p>Chimpanzees (a) For chimpanzees, grooming is an important social behavior.</p>	 <p>Golden Gate Bridge (b) The <i>Golden Gate Bridge</i> is a suspension bridge located in San Francisco.</p>	 <p>Eagle (c) <i>Eagles</i> have excellent eyesight</p>	 <p>Laptop (d) Many tired people use their <i>laptop</i> as pillow & sleep on it</p>
 <p>Robin Hood (e) <i>Robin Hood</i> is one of the very final films Walt Disney directly touched</p>	 <p>Forget-Me-Not (z) <i>Forget Me Not</i> is very fragrant at night</p>	 <p>Cake (g) <i>Cakes</i> were a part of strange rituals million years ago</p>	 <p>Police Officer (h) All Federal <i>police officers</i> in U.S. must have a college degree</p>
 <p>Clock (k) The very first alarm <i>clock</i> would ring only at 4 am</p>	 <p>Bubble eye fish (m) <i>Bubble eye fish</i> is originated in China</p>	 <p>Basketball (n) In <i>basketball</i> Michael Jordan scores maximum points in playoffs</p>	 <p>Onion (s) <i>Onion</i> paste is a home remedy for insect stings</p>
 <p>Sports Car (v) <i>Sports car</i> is typically a roadster constructed with precision engineering</p>	 <p>Rabbit (u) <i>Rabbits</i> have a nearly 360-degree field of vision & can see behind them.</p>	 <p>Mango (w) <i>Mangos</i> are the most popular fruit in the world</p>	 <p>Shark (x) 'Great whites' are the deadliest <i>shark</i> in the ocean</p>



CuedR

 Zebra (z) Every zebra has unique pattern of stripes.	 White House (h) The construction of White House started in 1792.	 Chicken (c) Four cities in U.S have the word chicken in their name.	 CD Disk (d) CD disks are made mostly of polycarbonate plastic.
 Cheetah (a) Cheetahs are faster than any other land animal.	 Monsters, Inc. (e) 'Monsters University' is the sequel of Monsters, Inc.	 Mums (z) Mums are considered the Queen of Fall flowers.	 Pizza (g) The longest pizza delivery was from South Africa to Australia.
 Wreck-It Ralph (r) Wreck-It Ralph is the story about a video game character, Ralph.	 Aquarium (k) Maintaining home aquarium is a favorite hobby of many people.	 Whale (m) Most of the whales don't have teeth.	 Soldier (h) The soldier was in charge of exploring & mapping much of America.
 Elephant (a) Elephants can get sunburned.	 Limousine (v) The limousine of U.S. President is known as 'The Beast'.	 Giraffe (a) A giraffe can weigh as much as a pickup truck.	 Jalapeno (s) Drinking water after eating jalapenos will do nothing to reduce the heat.
 Pinocchio (e) The Pinocchio puppet built for the film was lost for over 50 years.	 Vaccum Cleaner (k) The world's first vacuum cleaner was invented in 1860.	 Watermelon (w) Watermelon is 92% water.	 Octopus (x) Octopuses are deaf.
 Horse (a) Horses can sleep standing up.	 Battle Ship (v) Montana is the only U.S. state that does not have a battleship carrying its name.	 Pineapple (w) Each pineapple plant only produces just one pineapple per year.	 Potato (t) Potato is the world's fourth largest food crop.
 Chimpanzees (a) For chimpanzees, grooming is an important social behavior.	 Mickey Mouse (e) Mickey is the first cartoon character having star on Hollywood Walk of Fame.	 Panda (j) The panda is a symbol of peace in China.	 Dolphin (v) Compared to other animals, dolphins are believed to be very intelligent.
 Robin Hood (e) Robin Hood is one of the very final films Walt Disney directly touched.	 Candle (k) Scented candles help to eliminate odor from the room.	 Cauliflower (w) Cauliflower can be white, orange or purple in color.	 Lobster (x) Lobsters navigate using their antennae.
 Dining Table (k) People started to use dining table during 16th century.	 School Bus (v) School buses are yellow as it gets human attention faster than other colors.	 Banana (w) Bananas can be found in other colors, including red.	
 Clock (h) The very first alarm clock would ring only at 4 am.	 Cat (a) On average, cats spend 2/3 of each day sleeping.	 Sea lion (x) Sea lions can hold their breath up to 15-20 minutes.	
 Bicycle (v) Before 1840 bicycles did not have cranks.	 Penguin (u) Penguins lost the ability to fly millions of years ago.	 Grape (w) Wine has been made from grapes since 5200 BC.	
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Eagle (c)
<i>Eagles have excellent eyesight</i>

Keyword


Eagle (c)
<i>Eagles have excellent eyesight</i>

















Graphical cue


Eagle (c)
<i>Eagles have excellent eyesight</i>

Verbal cue




Key: Next >>

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Spatial cue




















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Key



CuedR

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Modifications

- Incremental learning
- Audio cue
- Interface changes



Modifications - Part 1

Play Audio

Continue

Eagle



Play Audio

Continue

Eagle





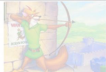









Eagles have excellent eyesight.



Modifications - Part 1

Continue

			
Chimpanzees <i>For chimpanzees, grooming is an important social behavior.</i>	Golden Gate Bridge <i>The Golden Gate Bridge is a suspension bridge located in San Francisco.</i>	Eagle <i>Eagles have excellent eyesight</i>	Laptop <i>Many tired people use their laptop as pillow & sleep on it</i>
			
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Clock	Bubble eye fish	Basketball	Onion

Key: Next >>

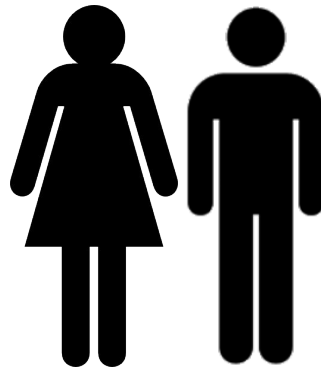
			
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Clock (k)	Bubble eye fish (m)	Basketball (n)	Onion (s)



Study Procedure - Part 1



3 sessions



7 participants
2 women
5 men
81 year-old



\$25



Result - Part 1

- Registration: 3.3 minutes
- 1st log-in: 1.4 minute, 7 out of 8
- 2nd log-in: 1.2 minute, 7 out of 7



Modifications - Part 2



Eagle (c)

Eagles have excellent eyesight



C

Eagle

Eagles have excellent eyesight



Modifications - Part 2



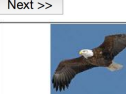





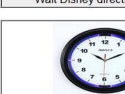



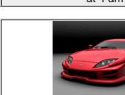



 <p>A</p> <p>Chimpanzee For chimpanzees, grooming is an important social behavior</p>	 <p>B</p> <p>Golden Gate Bridge The Golden Gate Bridge is a suspension bridge located in San Francisco</p>	 <p>C</p> <p>Eagle Eagles have excellent eyesight</p>	 <p>D</p> <p>Laptop Many tired people use their laptop as pillow and sleep on it</p>
 <p>E</p> <p>Robin Hood Robin Hood is one of the very final films Walt Disney directly touched</p>	 <p>F</p> <p>Forget-Me-Not Forget-Me-Not is very fragrant at night</p>	 <p>G</p> <p>Cake Cakes were a part of strange rituals million years ago</p>	 <p>H</p> <p>Police Officer All federal police officers in U.S. must have a college degree</p>
 <p>I</p> <p>Clock The very first alarm clock would only ring at 4 AM</p>	 <p>J</p> <p>Bubble Eye Fish Bubble eye fish is originated in China</p>	 <p>K</p> <p>Basketball In basketball, Michael Jordan scores maximum points in playoffs</p>	 <p>L</p> <p>Onion Onion paste is a home remedy for insect stings</p>
 <p>M</p> <p>Sports Car Sports car is typically a roadster constructed with precision engineering</p>	 <p>N</p> <p>Rabbit Rabbits have a nearly 360-degree field of vision and can see behind them</p>	 <p>O</p> <p>Mango Mangoes are the most popular fruit in the world</p>	 <p>P</p> <p>Shark "Great Whites" are the deadliest sharks in the ocean</p>



Modifications - Part 2

 <p>A</p> <p>Chimpanzee For chimpanzees, grooming is an important social behavior</p>	 <p>B</p> <p>Golden Gate Bridge The Golden Gate Bridge is a suspension bridge located in San Francisco</p>	 <p>C</p> <p>Eagle Eagles have excellent eyesight</p>	 <p>D</p> <p>Laptop Many tired people use their laptop as pillow and sleep on it</p>
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Key: Next >>

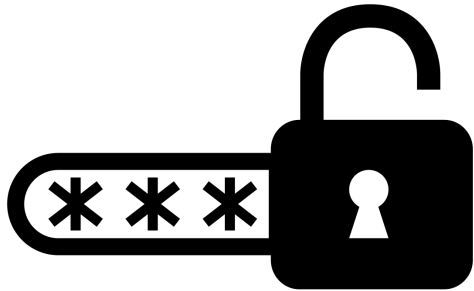
 <p>Chimpanzees (a) For chimpanzees, grooming is an important social behavior.</p>	 <p>Golden Gate Bridge (b) The Golden Gate Bridge is a suspension bridge located in San Francisco.</p>	 <p>Eagle (c) Eagles have excellent eyesight</p>	 <p>Laptop (d) Many tired people use their laptop as pillow & sleep on it</p>
 <p>Robin Hood (e) Robin Hood is one of the very final films Walt Disney directly touched</p>	 <p>Forget-Me-Not (z) Forget Me Not is very fragrant at night</p>	 <p>Cake (g) Cakes were a part of strange rituals million years ago</p>	 <p>Police Officer (h) All Federal police officers in U.S. must have a college degree</p>
 <p>Clock (k) The very first alarm clock would ring only at 4 am</p>	 <p>Bubble eye fish (m) Bubble eye fish is originated in China</p>	 <p>Basketball (n) In basketball Michael Jordan scores maximum points in playoffs</p>	 <p>Onion (s) Onion paste is a home remedy for insect stings</p>
 <p>Sports Car (v) Sports car is typically a roadster constructed with precision engineering</p>	 <p>Rabbit (u) Rabbits have a nearly 360-degree field of vision & can see behind them.</p>	 <p>Mango (w) Mangoes are the most popular fruit in the world</p>	 <p>Shark (x) "Great whites" are the deadliest shark in the ocean</p>



Internet Usage Behaviors



Security Beliefs and Behaviours



Study Suggestions



Relationship



Assistance



Time
management



Future Work

- Better performance time
- Different recruitment approaches
- Exploit their behavior



Thank You

(Work in Progress)

**An Insight into the Authentication Performance
and Security Perception of Older Users**

Sovantharith Seng | ss2816@rit.edu

