Work in Progress:
A Comparative Long-Term Study of Fallback Authentication

Philipp Markert, Maximilian Golla, Elizabeth Stobert, and Markus Dürmuth

San Diego, CA, USA | Workshop on Usable Security and Privacy | February 24, 2019
Forgot your password?
Social Question

1. What is the last name of your favorite elementary school teacher?
2. What is the name of the street where you grew up?
3. What is the name of your high school?
4. What is your city of birth?
5. What is your favorite sports team?
6. What is your mother's maiden name?
7. Who was your favorite film star or character in school?
Security Question

- What is the last name of your favorite elementary school teacher?
- What is the name of the street where you grew up?
- What is the name of your high school?
- What is your city of birth?
- What is your favorite sports team?
- What is your mother's maiden name?
- Who was your favorite film star or character in school?
Ask Your Trusted Contacts for Help

1. Call your trusted contacts or talk to them in person.
   
   [Reveal My Trusted Contacts]

2. Ask them to visit:
   
   [https://www.facebook.com/recover]

3. Each friend will give you a code. Enter them below:
   
   Enter code
   Enter code
   Enter code

[Continue] [Cancel]
[1] "Secrets, Lies, and Account Recovery: Lessons from the Use of Personal Knowledge Questions at Google" Bonneau et al. (WWW '15)
Research Questions

Which scheme performs best given realistic recall times?

Which usability issues arise after 6/12/18 months?

How do the schemes perform when compared directly?
What Is Important?
What Is Important?

(1) Recall Rate
What was your favorite character in school?
What Is Important?

(1) Recall Rate
(2) Convenience
What Is Important? The Convenience!

1 + 1 = 2
What Is Important?

(1) Recall Rate
(2) Convenience
(3) Recall Time
What Is Important? The Recall Time!

How Do We Want To Do It?
How Do We Want To Do it?

1st Stage
Enroll

2 Weeks

2nd Stage
Recall

6/12/18 Months

3rd Stage
Long-Term

2 Weeks

6/12/18 Months
How Do We Want To Do it?

1st Stage
Enroll

2nd Stage
Recall

3rd Stage
Long-Term

2 Weeks
6/12/18 Months
1st Stage

Enroll
1st Stage

Enroll

Same

Different
How Do We Want To Do it?

1st Stage: Enroll

2nd Stage: Recall

3rd Stage: Long-Term

2 Weeks

6/12/18 Months

How Do We Want To Do it?
How Do We Want To Do it?

1st Stage

2 Weeks

Enroll

2nd Stage

Recall

6/12/18 Months

3rd Stage

Long-Term

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1 + 1 = 2
Did You Conduct A Pilot Study?
Did You Conduct a Pilot Study? Yes!

1st Stage
Enroll

2 Weeks

2nd Stage
Recall

6/12/18
Months

3rd Stage
Long-Term
Did You Conduct a Pilot Study? Yes!

1st Stage
Enroll

2 Weeks

2nd Stage
Recall

3 Weeks

3rd Stage
Long-Term
Results?

(1) Recall Rate
(2) Convenience
(3) Recall Time
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- Email: 12/12 (100%)
- SMS: 11/12 (92%)
- Security Question: 10/11 (91%)
- Social: 9/12 (75%)
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- **Email**
  - 12/12 (100%)
  - 11/12 (92%)

- **SMS**
  - 10/11 (91%)
  - 9/12 (75%)

**Security Question**
- What is the last name of your favorite elementary school teacher?
- What is the name of the street where you grew up?
- What is the name of your high school?
- What is your city of birth?
- What is your favorite sports team?
- What is your mother’s maiden name?
- Who was your favorite film star or character in school?
Name three trusted contacts:

trustedContact1@gmail.com

trustedContact2@yahoo.com

trustedContact3@hotmail.co.uk
Resetting my password was:

- **Email**: 33% Very Difficult, 67% Easy
- **SMS**: 27% Very Difficult, 73% Easy
- **PKQ**: 10% Very Difficult, 30% Easy, 30% Neutral, 30% Easy, 30% Very Easy
- **Designates Trustees**: 33% Very Difficult, 33% Easy, 22% Neutral, 11% Very Easy
<table>
<thead>
<tr>
<th>Method</th>
<th>Ø: 34s</th>
<th>Ø: 98s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø: 16min</td>
<td>Ø: 6h</td>
<td></td>
</tr>
</tbody>
</table>

Security Questions:
- What is the last name of your favorite elementary school teacher?
- What is the name of the street where you grew up?
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## Overall Results

<table>
<thead>
<tr>
<th>Position</th>
<th>Recovery Rate</th>
<th>Convenience</th>
<th>Recovery Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Email</td>
<td>SMS</td>
<td>Email</td>
</tr>
<tr>
<td>2</td>
<td>SMS</td>
<td>Email</td>
<td>SMS</td>
</tr>
<tr>
<td>3</td>
<td>PKQ</td>
<td>PKQ</td>
<td>PKQ</td>
</tr>
<tr>
<td>4</td>
<td>Trustees</td>
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## Overall Results

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So, Email It Is!??
Forgot your password?

Sign In

1st Stage
2 Weeks
Enroll

2nd Stage
6/12/18
Recall

3rd Stage
Long-Term

Security Question
- What is the last name of your favorite elementary school teacher?
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Social
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