

Exploring User-Centered Security Design for Usable Authentication Ceremonies

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Problem: Users Rarely Adopt Authentication Ceremonies

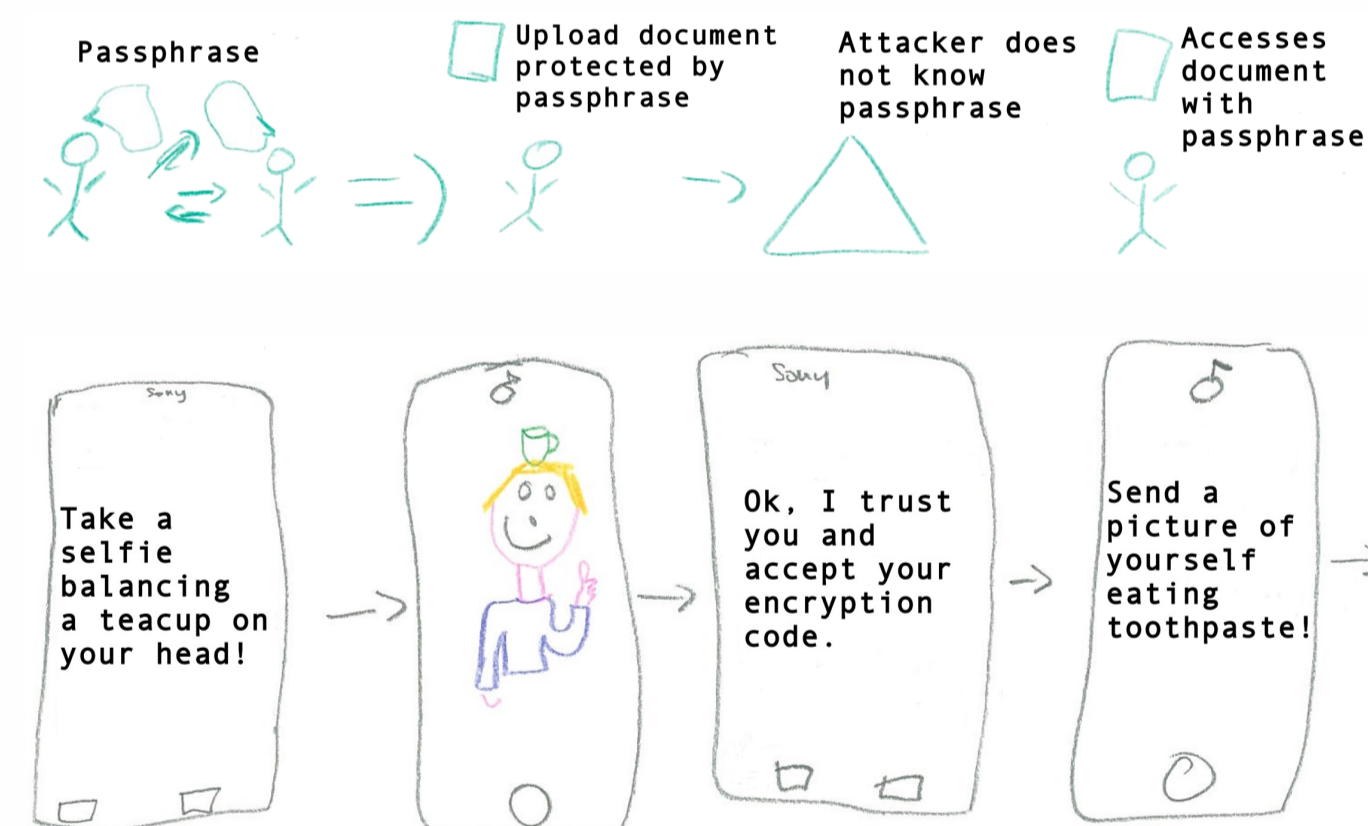
Authentication ceremonies would mitigate MitM attacks on E2EE instant messaging. However, users rarely conduct them. Prior work found that lacking user comprehension of the ceremonies' purpose and effects is a common issue. User comprehension and trust may increase if the authentication ceremonies align more closely with users' expectations.

→ We explored an iterative user-centered design process to align users' ideas of security more closely with actual security properties

Lessons Learned for Future Security Design Work

- Framing of the initial design problem affects the entire process – discuss it carefully.
- Choose a specific set of participants to design for – this makes it easier to prioritize design directions.
- Have clear expectations of what participant can contribute to the design – they are experts on their lived experience but rarely have security and user experience expertise.
- Focus on qualitative evaluation during all prototyping phases – it provides valuable insights into which parts of the design work and why.
- Aligning users' perceptions of security with the security mechanisms' actual effects is hard – we need to continuously monitor this matching throughout design iterations.

1. Collaborative Design Workshops



Workshop participants suggested authentication methods that they perceive as secure

→ 20 conceptual designs and qualitative data about security perceptions

2. Security Expert Evaluation

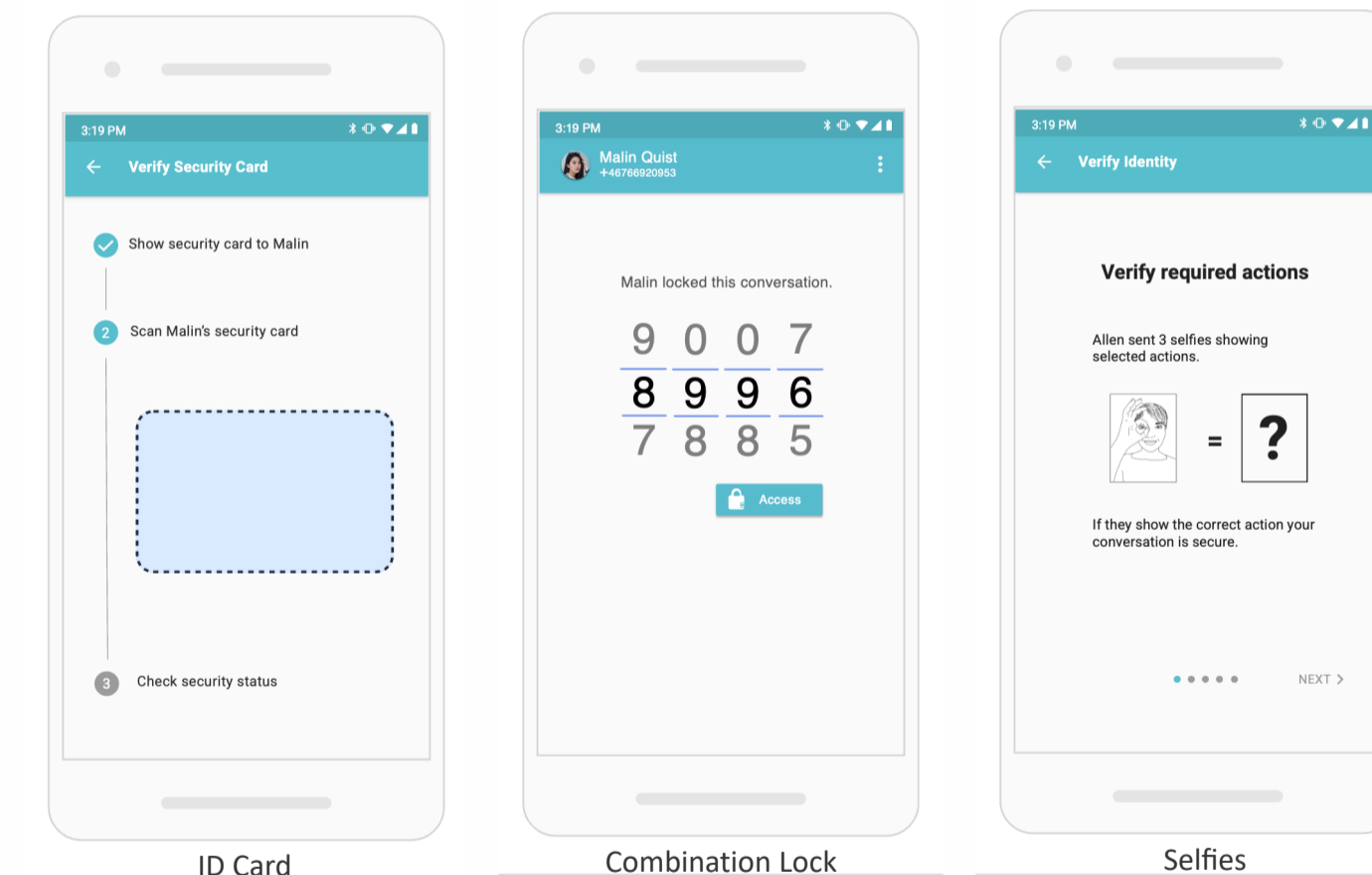


Security experts evaluated participants' design concepts:

- How common are design parts of concept?
- Is it possible to actualize perceived security?

→ Three viable concepts for further storyboard prototyping: ID cards, combination locks, and verification selfies

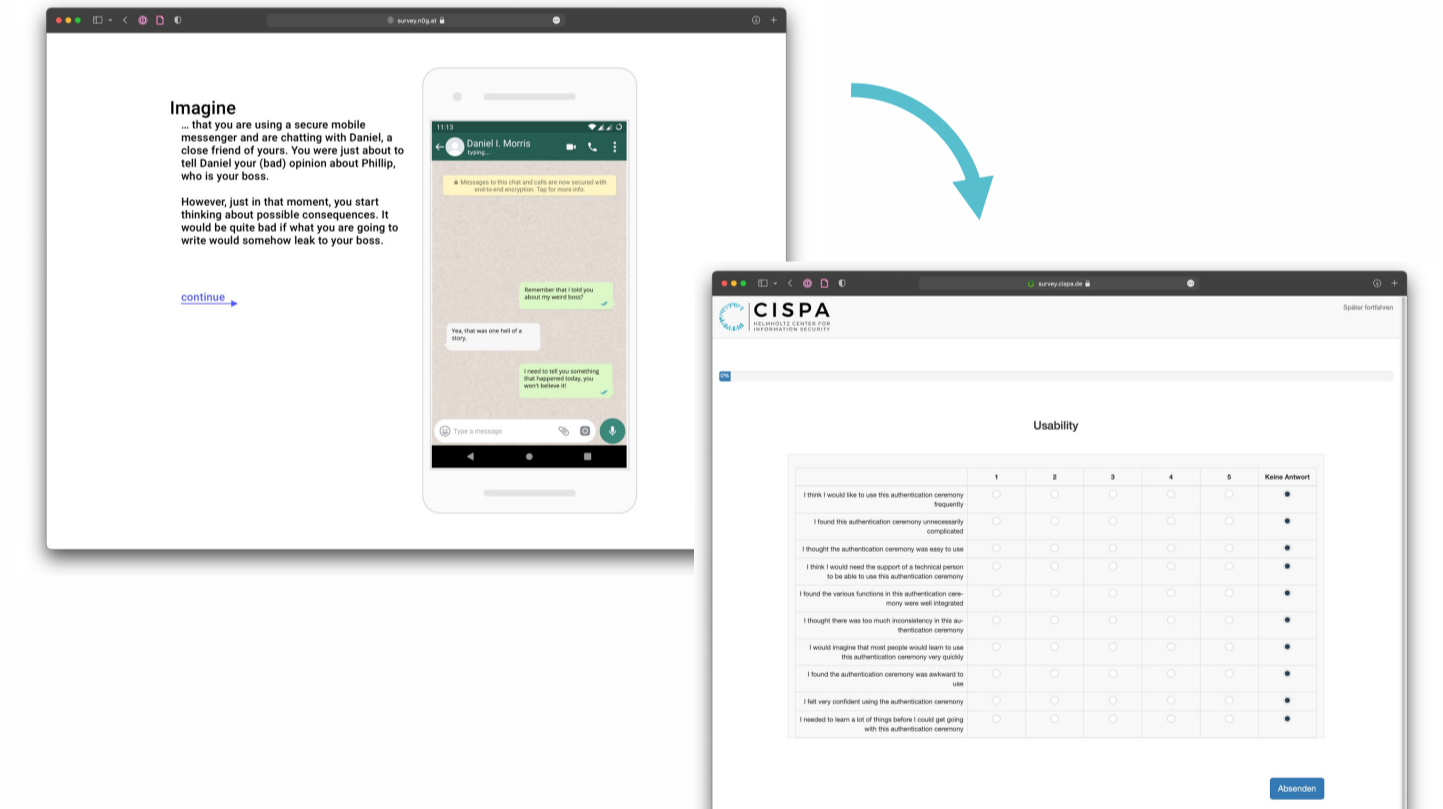
3. Iterative Storyboard Prototyping



Developed detailed storyboard prototypes to iteratively collect feedback from potential users and an UX expert

→ Detailed user interface prototypes of authentication ceremonies

4. Online Evaluation



Online prototype experience with a quantitative and qualitative follow-up evaluation survey on Amazon MTurk (N=131)

→ Combination Lock prototype seems to improve user comprehension of the purpose and effect of authentication ceremonies

This poster is based on the following publication:

1. Matthias Fassel, Lea Gröber, and Katharina Krombholz: "Exploring User-Centered Security Design for Usable Authentication Ceremonies" In Proceedings of the 2021 CHI Conference on Human-Factors in Computing Systems (CHI 2021)