

Privacy and Security Threat Models and Mitigation Strategies of Older Adults



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Motivation

- Seniors often express **privacy and security concerns** in relation to technology
- Privacy preferences of older adults are **heterogeneous** and **fine-grained**
- Older adults are **less aware** of and **more susceptible** to privacy/security risks

→ **Research goal**: Inform the design of effective systems that empower older adults to make informed decisions; to have better control over their personal data; and to maintain better security practices.

Method and Participants


- Semi-structured interviews (1.5 hours, \$20)
- 46 participants from senior centers and senior residences in the San Francisco Bay Area
- Screened out those with cognitive impairments
- Ages 65-95 y.o. (mean=76)
- 64% live alone,
- 80% do not have a caregiver
- Female (65%)
- White (76%)
- Advanced (44%) or Bachelor's (33%) degree

Main Themes

Based on thematic coding, we identified:

- Common **security and privacy concerns** and **threat models**
- Behaviors and **strategies to mitigate** perceived risks
- **Usability issues** with current protections
- **Learning and troubleshooting** approaches
- **Misconceptions** regarding security and privacy





threat
models

Age-Specific Concern: Care Surveillance

- **Privacy - safety tradeoff:** exchanging privacy for safety and care

“You cede a lot of your personal privacy rights when you move into a place like this, in exchange for services being rendered to you. So I think that’s a different kind of a setting than somebody that is living in a private setting and would be using devices.” (P71)

- **Privacy - autonomy tradeoff:** accepting domestic surveillance to avoid moving to a facility

“I would probably choose [a wall sensor that detects] presence over having to share a room with somebody being in a nursing home. So if I could stay in my own abode [...] that is a concession that I would make.” (P24)

Age-Specific Concern: Targeting

Do seniors think they are attractive targets for security and privacy attacks?

Good targets

“I think [they falsified the bill] because **they think old people are stupid** or **they’re not aware** and I was there alone. **I couldn’t prove anything.**” (P5)

“Because it’s **elderly are more fallible**, or they’re **more trusting**, so **they take advantage.**” (P7)

Bad targets

“[Companies] probably look at my data—if they look at it—and say, Oh, don’t bother with her. She’s **too old to participate**, or maybe **doesn’t have enough money.**” (P110)

“This may be **a function of age** because, **at this stage of my life**, I don’t feel like I have great secrets or private information.” (P6)

Unrecognized Threats: Public Devices and Services

- Less likely to own their personal devices than younger people
- More likely to use public devices

“I don’t want a home computer. I go to the library, and if [their computers] crash, they’ll deal with it. [...] If I had one, and it crashed [...] I’d just leave it off. I don’t want to have to pay for the repairs.” (P10)

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“I go to Walgreens and other places, where they have free checks. And I got [my blood pressure] checked recently at a health fair.” (P10)

Unrecognized Threats: Second-Hand Devices

Seniors use second-hand devices from family and friends

“Grandpa gets the oldest phone. When they get upgraded, the phones trickle down.” (P121)

“My friend did give me her old Mac. [...] She wiped hers out. It’s an older one, but she was using it for school, and she did video chats and everything on it, so it’s very up-to-date.” (P36)

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- Does it work like some device I understand better?

“I guess what the smart speaker would do would be anything that the smartphone can do and then maybe more.” (P60)



management
strategies

Management Strategies



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Active



- Limit or avoid using technology
- Rely on good reputation and brand image
- Be cautious
- Accept or ignore risks

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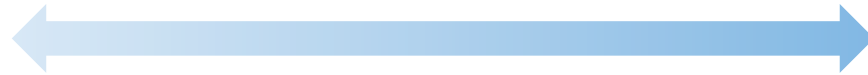
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Active



- Configure settings/authentication
- Use protective software/services
- Actively manage data
- Address consequences
- Discontinue use

“I gave money to a firm that said that they would provide some protection for my bank account. [...] I don't know whether really they would be that effective. [...] Probably a waste.” (P51)

“They persuaded me [...] I bought the service and then I was told that that service offering was a scam.” (P20)

Troubleshooting

- Providers

“I [tried to call](#) them [when my email was hacked], and all of the numbers would say, ‘Please [go online](#), type [www.yahoo.com](#) and [...] get help there.’ [...] [None of \[the help topics\] are what I want](#). [...] I finally was able to write them a note. [...] They would not, did [never answer me](#). And then [somehow after a couple of months](#) [...] it gets fixed.” (P13)

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- Self

“The instructions have to be a, b, c, d, and e. You can’t just do a and b, and skip c, and go to d and e. [...] [I have trouble with that only because it’s so complex](#).” (P35)

Sources of Information about Risks

- News media

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- Implications may be unclear

“Somebody came and talked about the cloud. What is it, what does it do. [...] I thought I don't need all this. [...] I just look things up and send a few emails. [...] I don't care about anything else.” (P5)



wrap-up

Future Work

- Quantify spread of intriguing patterns
 - e.g., How commonly do older adults use second-hand devices, vs. the general population?
- Conduct controlled behavioral studies
 - e.g., Do older adults use privacy settings more or less effectively than other age groups?
- Investigate use of emerging healthcare technologies
 - e.g., Do older adults' individual privacy attitudes affect whether they use fitness trackers?
- Evaluate recommended measures to improve privacy awareness and control

Conclusions

- Similar attitudes and concerns to general population, but amplified risks
 - Less technical knowledge, declining abilities
 - Increasing involvement in healthcare and need for monitoring
 - Reliance on data-dependent social services
 - Common use of secondhand or public devices
- Complex trade-offs of privacy, safety, and autonomy
- Misconceptions about data flows lead to blind spots in mitigation strategies
 - Special concerns and confusions about emerging sensor-based and AI technologies
- Difficulty in using technology decreases self-efficacy about privacy & security
 - Both user knowledge/skills and tech usability are implicated
 - May result in avoidance of technology

