Sociotechnical Security

CS 8803/4803

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Lecture 21 – Youth Digital Safety II

Last time

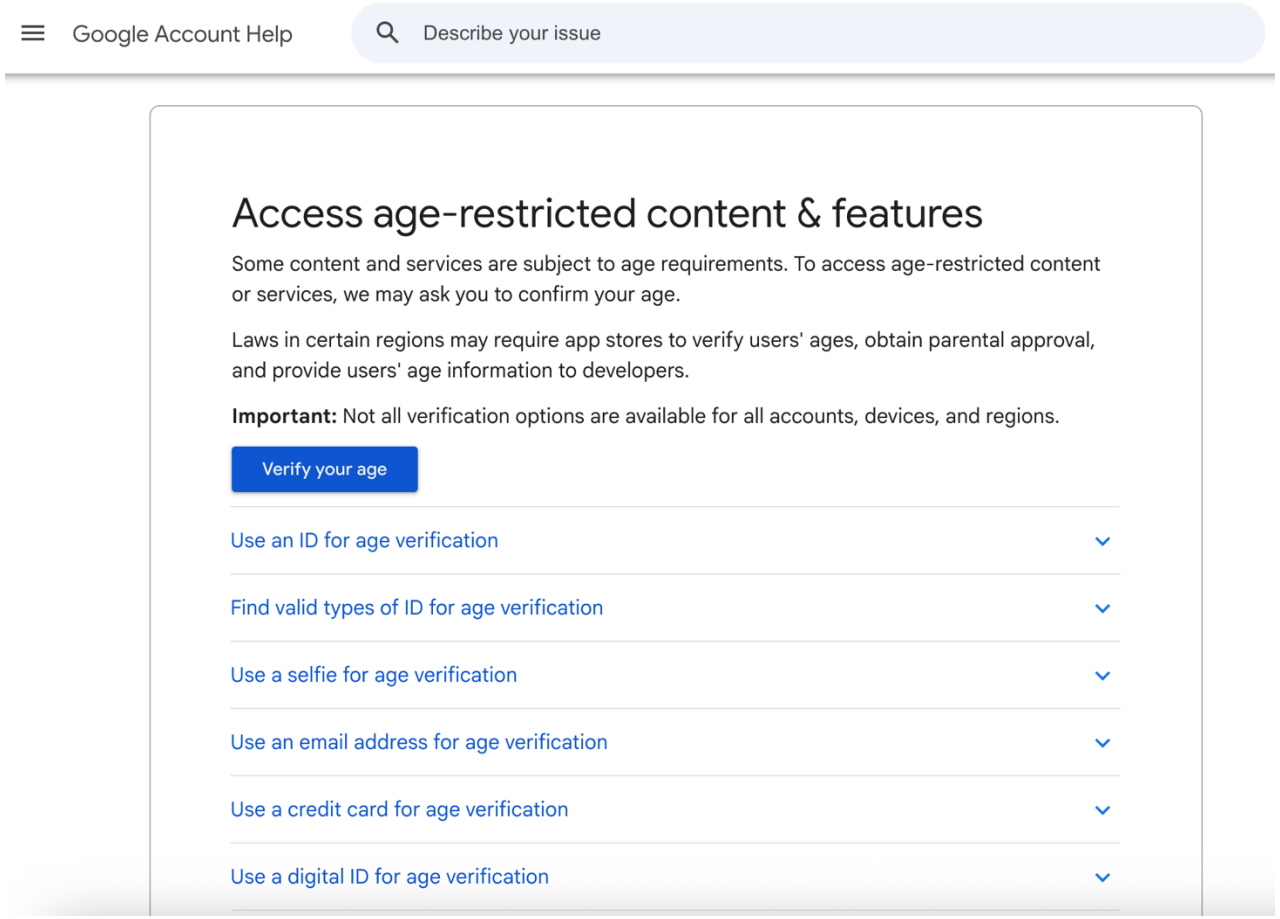
- Introduce digital safety topics around youth safety
- Brief historical context
- Research topics on children’s digital privacy
- Age verification

Today

- Closer look at age verification
  - Mechanics of verifying age
- Perception of different age verification methods
- Research directions in digital safety on age verification

Recall: Age verification

- Age verification required in:
  - UK
  - Australia
  - Some US states (implementation varies across states)
- Risks and concerns
  - Data collection from everyone
  - New breach targets
  - Accuracy and bias
  - Easy to evade
  - Access and equity



Age assurance

- Self-attestation
- Age estimation
- Verification against third-party records
- Infrastructure-level verification

Age estimation

- Facial age estimation
- Email
- Behavioral or account-signal inference



Image credit: https://www.eff.org/deeplinks/2025/12/age-assurance-methods-explained

Verification against third party records

- Credit card check
- Open banking framework
- Commercial database matching
- Government ID



Image credit: https://withpersona.com/blog/what-is-government-id-verification/

Infrastructure-level verification

- OS and app-store age signals
- Digital identity wallets
  - Longfellow: Zero-knowledge

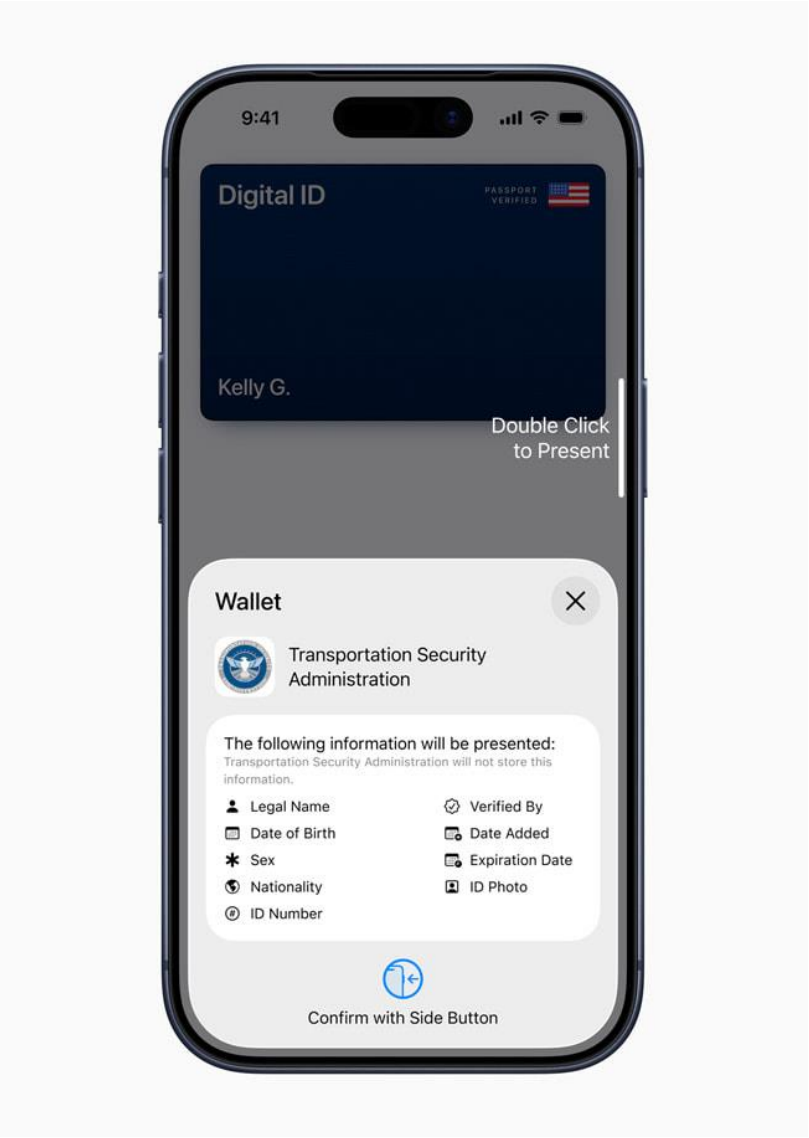
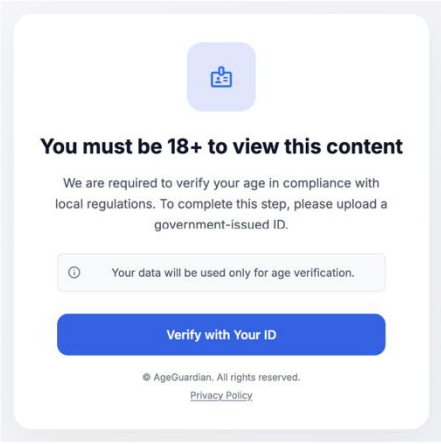
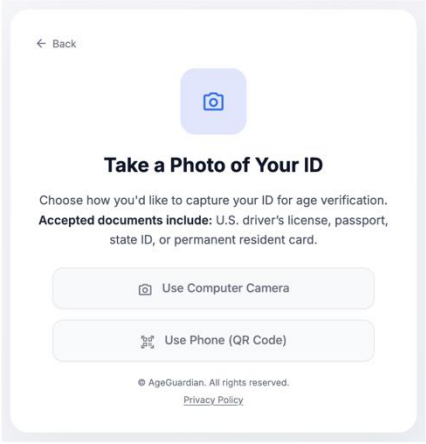


Image credit: https://www.apple.com/newsroom/2025/11/apple-introduces-digital-id-a-new-way-to-create-and-present-an-id-in-apple-wallet/

Adult responses to age verification methods

1. How do different age verification methods affect users' decisions to access R-rated romantic media?
2. How do data handling reassurances affect those decisions?
3. What are users' perceptions of and attitudes toward different age verification mechanisms?

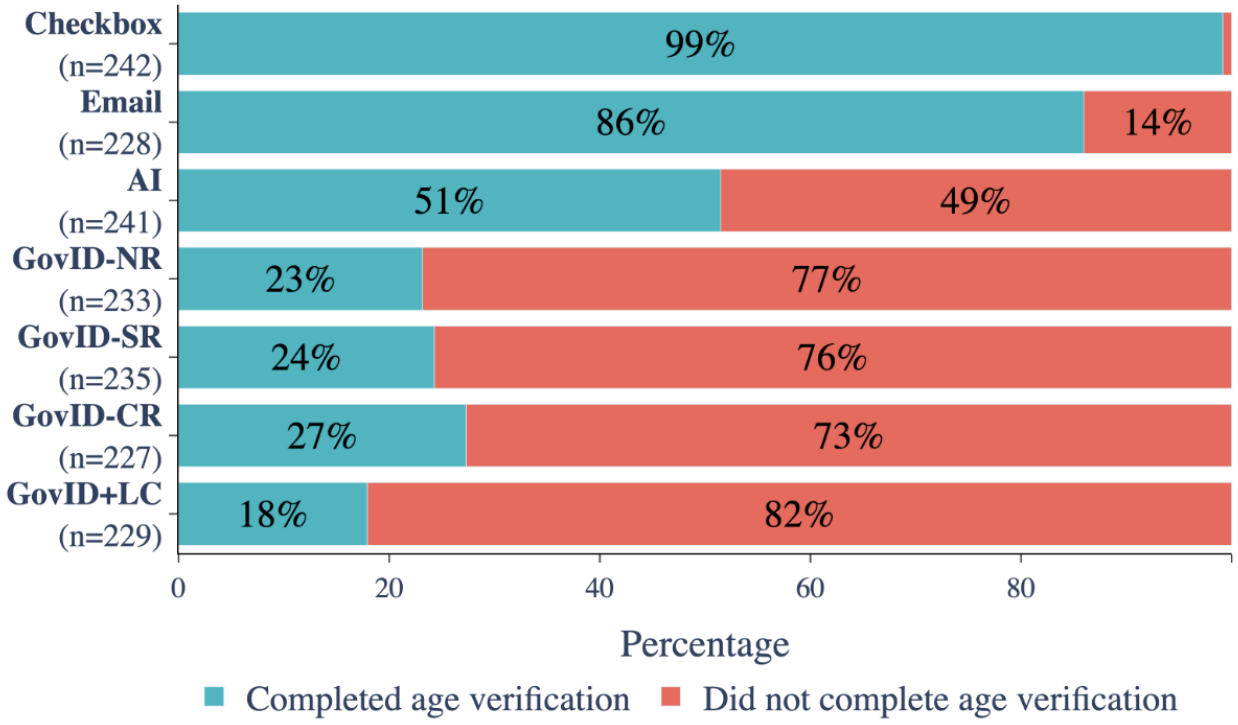




Yanzi Lin et al., What Adults Will (and Won't) Do to Prove Their Age: Empirical Evidence from a Deceptive Web Experiment, USENIX Security 2026

Completion

Checkbox Self-Attestation (Checkbox). *Prompt:* "I certify that I am 18 years of age or older and am legally permitted to view R-rated content."
Government-Issued ID with No Reassurance (GovID-NR). *Prompt:* "Please upload a government-issued ID. Accepted documents include: U.S. driver's license, passport, state ID, or permanent resident card."
Government-Issued ID with Simple Reassurance (GovID-SR). *GovID-NR Prompt:* (+) "Your data will be used only for age verification."
Government-Issued ID with Compound Reassurance (GovID-CR). *GovID-NR Prompt:* (+) "Your data will be used only for age verification. We will delete your identifying information after access has been granted."
Government-Issued ID and Liveness Check (GovID+LC). *GovID-NR Prompt:* (+) "Please upload a government-issued ID and complete a liveness check to verify your identity matches your ID."
AI Facial Age Estimation (AI). *Prompt:* "Please upload a photo of your face. We will use AI to estimate your age."
Email Age Estimation (Email). *Prompt:* "You must provide a valid email address, which we will check to determine if it is likely associated with someone aged 18 or older based on usage. Our verification process analyzes the email's registration source, associated employer information, and linked financial activities such as mortgages, credit cards, educational records, and consumer behavior patterns."



Comfort and perceived risk

- Low comfort for non-check box methods
- Older adults were more likely to report higher comfort across all methods
- Prior experience with ID-based verification was associated with higher comfort
- Common reasons for discomfort:
  - Distrust in third party verification providers
  - General privacy concerns
  - Concerns about anonymity being compromised
- GovID and AI methods perceived as risky due to data security and misuse concerns
  - Concerns about long-term data exposure and secondary use (e.g., AI training)
- Some resignation too (“My personal information is already available through data brokers”)

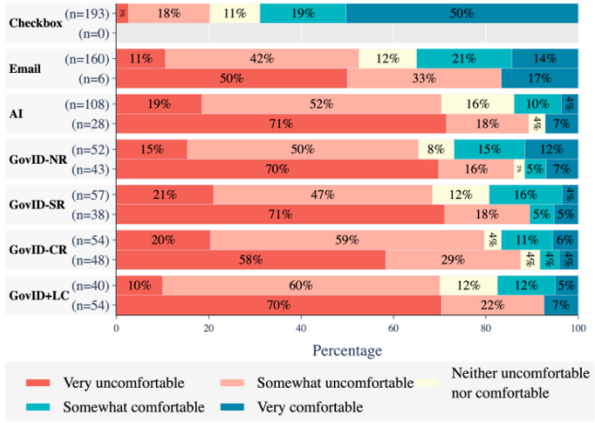


Figure 4: “How comfortable were you with certifying your age through [method]?” Two bars are shown for each condition: the top bar represents completers, and the bottom bar represents non-completers.

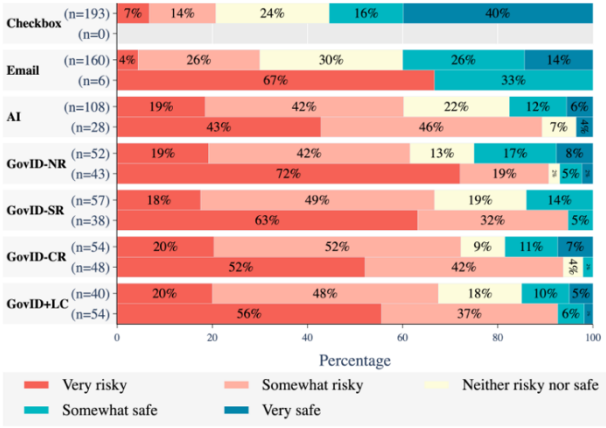


Figure 5: “How risky did you feel it was to verify your age through [method]?” Two bars are shown for each condition: the top bar represents completers, and the bottom bar represents non-completers.

Results: Perceived effectiveness

- Participants thought all methods are pretty ineffective
- Government ID + liveness check was rated the most effective
  - 47% of those who verified and 35% of those who declined rated at least somewhat effective
- Reasons for perceived ineffectiveness
  - Minors could circumvent these or find alternative sites without verification.
- Some participants thought added friction might deter access
- Others thought these methods could help if parents were more involved
  - “Any barrier helps, and if parents are careful about keeping their ID away from their kids it could be even more effective”

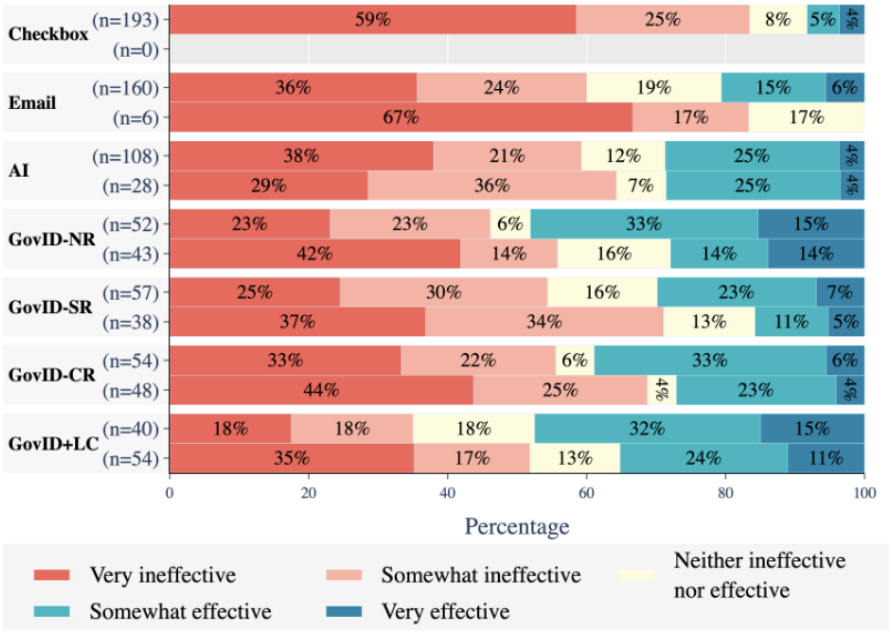


Figure 6: “How effective do you think this verification method is at preventing underage users from accessing R-rated media content online?” Two bars are shown for each condition: the top bar represents completers, and the bottom bar represents non-completers.

Other research on age verification

- Behavioral studies of what users actually do
- Attitudes of teens, parents, and young adults
  - CDT report on teen and parent perspectives of age verification from 2025
- Youth getting around parental controls
- Measuring deployment
  - Shreyas Minocha et al., Papers, Please: A First Look at Age Verification on the Web, IEEE S&P 2026