How Secure Is Your Vote?

Voters' Perceptions of Voting System Security

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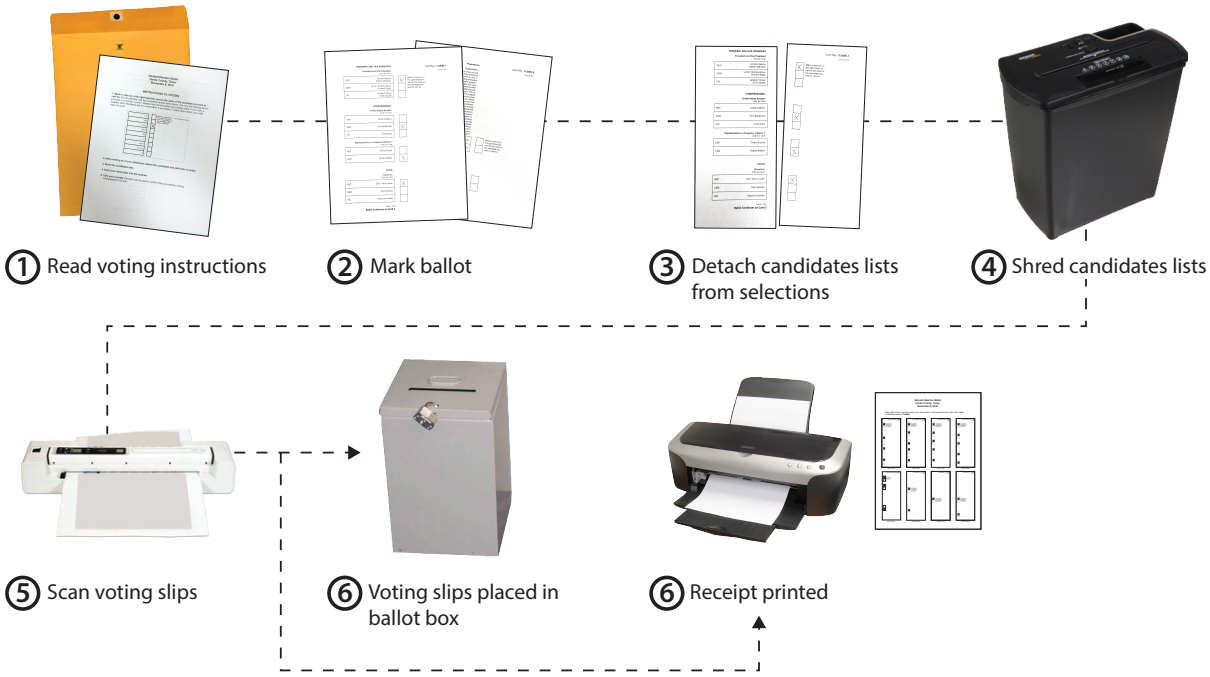
RICE

INTRODUCTION

- Why is security so important in voting?
  - Voting system attacks are a major threat to election integrity
  - Examples include:
    - Denial of service
    - Voters casting unlimited votes
    - Attacking interfaces
    - Poll workers modifying votes
    - Matching votes with voters who cast them
    - Planned miscounts

INTRODUCTION

- How can this problem be solved?
  - Cryptographically secure voting systems, which can also be audited by voters, are one solution
    - Example: Prêt à Voter (PaV, an end-to-end voting system)



INTRODUCTION

- But it is unknown how voter's might perceive voting systems' security
  - Will they think one system type is less/equally/ more secure than others?
  - Is it possible for security features to make people more or less confident in a system?
  - Will they recognize actual security features?

INTRODUCTION

Which bank lobby makes you feel more secure?

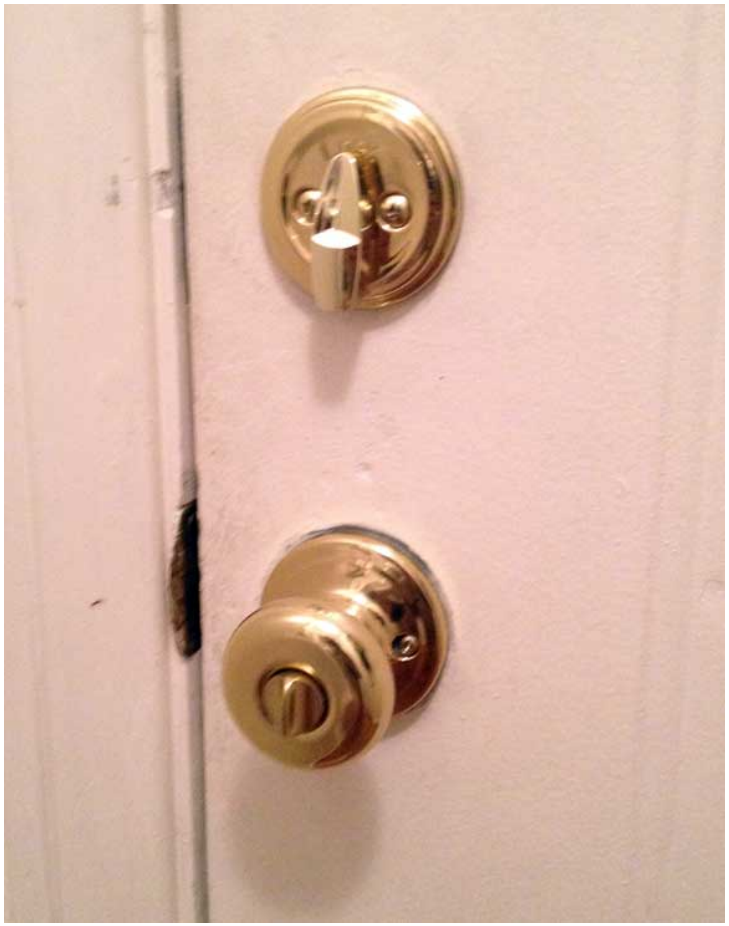
Typical Bank Lobby

VS.

Typical Lobby + Security Theater

INTRODUCTION

Which door makes you feel more secure?



Lower Security

VS.

Higher Security

INTRODUCTION

- This study aimed to begin identifying factors that may impact perceptions of voting security
- Findings could be used to leverage perceptions of security to increase system use, confidence in voting systems, and trust in election outcomes

METHODS

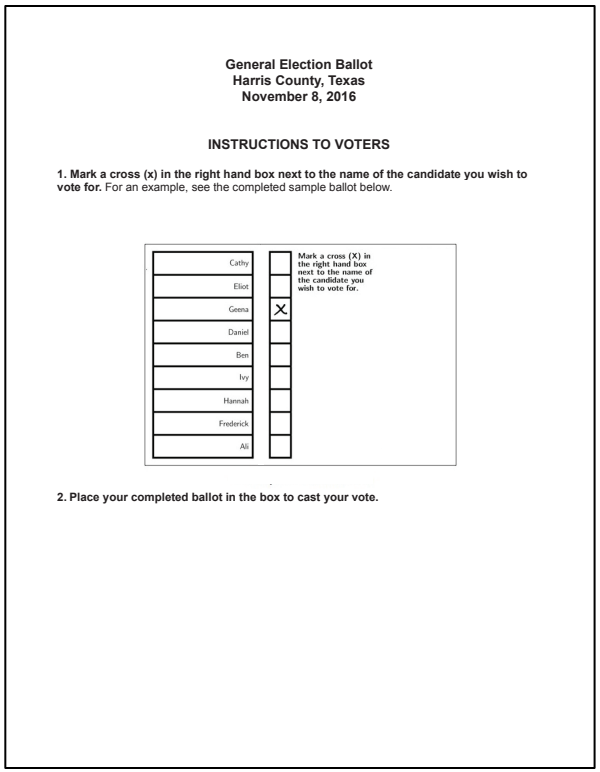
- Participants
  - 90 eligible voters were recruited through Rice University's subject pool
  - 29 male, 60 female, 1 other
  - Mean age was 19 years, with a range of 18-29 years
  - Little previous national election experience (mean = 0.4 elections, with a range of 0-3)
  - Some involvement in other types of elections (mean = 2.28 elections, with a range of 0-50 elections)

METHODS

- Independent Variables
  - Three voting systems
    - Paper ballot (one of least secure)
    - Paper ballot with “security theater” (one of least secure)
    - PaV (most secure)

METHODS

- Materials



General Election Ballot
Harris County, Texas
November 8, 2016

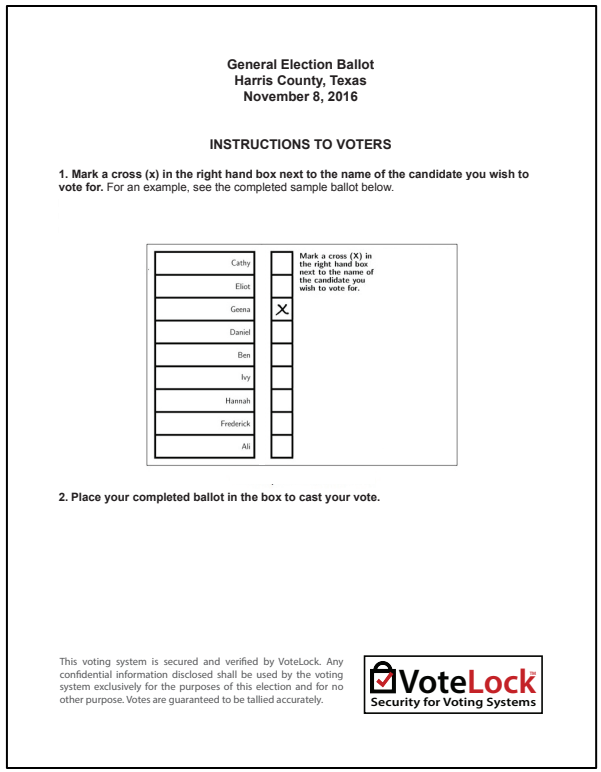
INSTRUCTIONS TO VOTERS

1. Mark a cross (x) in the right hand box next to the name of the candidate you wish to vote for. For an example, see the completed sample ballot below.

Cathy		Mark a cross (X) in the right hand box next to the name of the candidate you wish to vote for.
Eliot		
Geena	X	
Daniel		
Ben		
Ivy		
Hannah		
Frederick		
Ali		

2. Place your completed ballot in the box to cast your vote.

Paper



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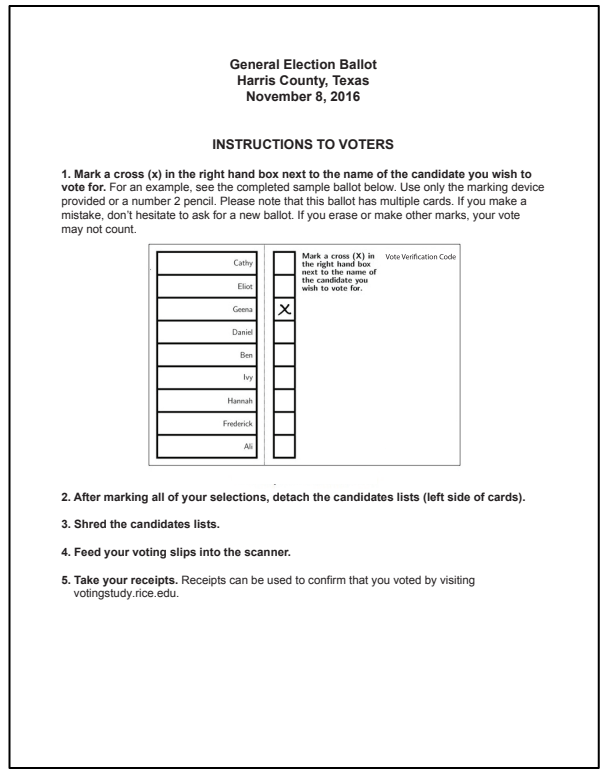
Ali		

2. Place your completed ballot in the box to cast your vote.

This voting system is secured and verified by VoteLock. Any confidential information disclosed shall be used by the voting system exclusively for the purposes of this election and for no other purpose. Votes are guaranteed to be tallied accurately.

VoteLock
Security for Voting Systems

Security Theater



General Election Ballot
Harris County, Texas
November 8, 2016

INSTRUCTIONS TO VOTERS

1. Mark a cross (x) in the right hand box next to the name of the candidate you wish to vote for. For an example, see the completed sample ballot below. Use only the marking device provided or a number 2 pencil. Please note that this ballot has multiple cards. If you make a mistake, don't hesitate to ask for a new ballot. If you erase or make other marks, your vote may not count.

Cathy		Mark a cross (X) in the right hand box next to the name of the candidate you wish to vote for.	Vote Verification Code
Eliot			
Geena	X		
Daniel			
Ben			
Ivy			
Hannah			
Frederick			
Ali			

2. After marking all of your selections, detach the candidates lists (left side of cards).

3. Shred the candidates lists.

4. Feed your voting slips into the scanner.

5. Take your receipts. Receipts can be used to confirm that you voted by visiting votingstudy.rice.edu.

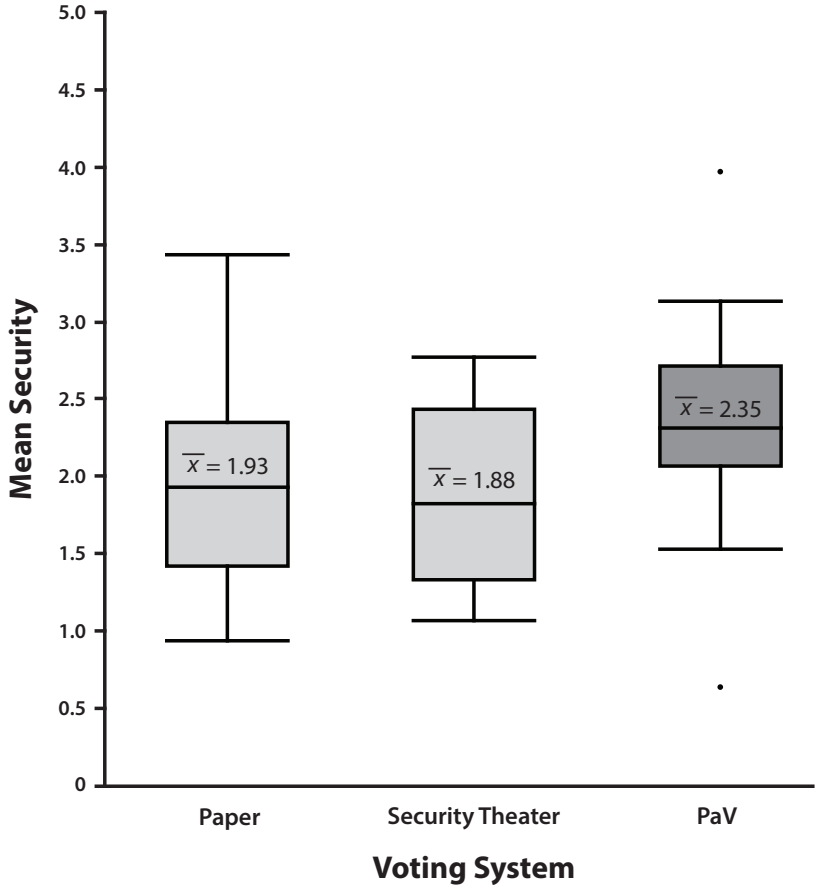
PaV

METHODS

- Dependent Variable
  - Voters' perceptions of voting system security
    - 30 Security Items, covering all facets of voting security
    - 5-point Likert Scale
    - Mean of all ratings = overall security measure
  - A couple of open ended-questions
    - While voting, did you notice any voting system security features? If yes, what were they?
    - Are you more confident or more suspicious in voting security after using this system?

RESULTS

- Security (mean of all security items)



Security as a function of voting system

RESULTS

- While voting, did you notice any security features? If yes, what were they?
  - Paper
    - Locked ballot box
    - None
  - Security Theater
    - None
  - PaV
    - Shredding candidates list
    - Scanning

RESULTS

- Are you more confident or more suspicious in voting security after using this system?
  - Paper
    - Most participants felt more suspicious, because there are multiple ways to tamper with votes
  - Security Theater
    - Most subjects felt more suspicious because of “few safeguards” to prevent tampering and fraud
  - PaV
    - Both more confident and more suspicious
      - Anonymity of ballot and system can be audited by voters
      - “Kind of more suspicious. What is wrong with the current systems?”

This question might be too leading and administered at the wrong time. Yet, it is still informative!

DISCUSSION

- The findings were not what we were expecting!
  - What might have happened?
    - Voters recognized secure voting systems
    - Physical processes might impact security perceptions more than visual cues
    - Voters trust computers more than people
    - Security theater implementation not sufficient
    - Sample was not representative of all voters

CONCLUSION

- Participants found the PaV method to be the most secure, and the paper and security theater methods to be the least secure. This is a good thing!
- Future research needs to follow-up on this study to determine if the findings are applicable to all voters, identify the specific factors that impact subjective security, and understand potential implications for system design and policy.

ACKNOLEDGEMENTS

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