

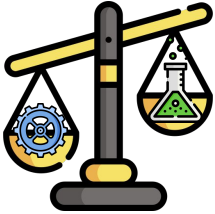
# **Position Paper: Replication Crisis in Human-Centered Security Research—Are We There Yet?**

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# Science of Security Has Been Questioned



Is security research more engineering than science?

- “SoK: Science, Security, and the Elusive Goal of Security as a Scientific Pursuit” by Herley and van Oorschot in 2017
  - criticizes HCS specifically for accepting alternative hypotheses after just one study that refutes null hypothesis

# Replication Crises Happen in Related Fields

SCIENCE

## Psychology's Replication Crisis Is Running Out of Excuses

Another big project has found that only half of studies can be repeated. And this time, the usual explanations fall flat.

## Half of social-science studies fail replication test in years-long project

'An Existential Crisis' for Science

What IPR scholars are doing to solve the replication crisis

# Replication Studies in HCS

## Interviewed HCS Researchers say:

- “I believe vibrantly and deeply in the need for replication and reproduction of research.”
- “Very valuable. It should be done. It does not happen.”

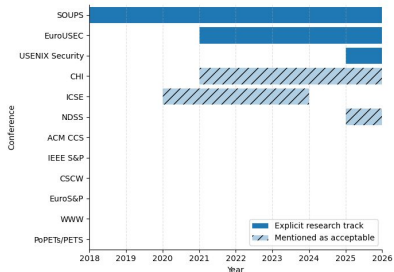
## Published Replications:

- Identified 14 HCS replication studies through a keyword search
- Almost all deviated from or extended the study design
- 5 replicated results, 4 partially replicated results, and 5 significantly differed

Jan H. Klemmer, Juliane Schmäuser, Byron M. Lowens, Fabian Fischer, Lea Schmäuser, Florian Schaub, and Sascha Fahl. “Transparency in Usable Privacy and Security Research: Scholars’ Perspectives, Practices, and Recommendations”. In: 46th IEEE Symposium on Security and Privacy, IEEE S&P 2025, May 12-15, 2025. IEEE, May 2025..



# Incentives for Replications Are Insufficient



## Replications are not incentivized:

- Few top tier venues publish them



## Interviewed HCS researchers say:

- “Often you replicate something, and you find the same results. In which case it’s hard to get the reviewers excited about it.”

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# Materials for Replication Are Missing



## HCS papers from 2018-2023 are missing:

- 25.6% of interview guides
- ~21% of survey questionnaires & experiment materials
- 87.6% of recruitment materials



## Interviewed HCS researchers say:

- “You'll want to replicate something old where the actual survey questions [...] were not included. Then you'll try to email them. [...] They were like, "Oh, I don't know if I can find that. That's really old.”

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Jan H. Klemmer, Juliane Schmüser, Fabian Fischer, Jacques Suray, Jan-Ulrich Holtgrave, Simon Lenau, Byron M. Lowens, Florian Schaub, and Sascha Fahl. “How Transparent is Usable Privacy and Security Research? A Meta-Study on Current Research Transparency Practices”. In: USENIX Security Symposium 2025, Aug. 2025.

# ? Which studies should we replicate?



**It is unclear which studies are valuable to replicate:**

- Investigated areas may change drastically with advancements in technology
- Venues are vague: “Replicating or extending important previously published studies and experiments” (SOUPS cfp)

# Replication Crisis in HCS?

## Fraudulent Scientific Behavior?

- No documented cases known in HCS

## Questionable Research Practices?

- No concrete evidence
- Meta studies find deficiencies in statistical reporting
- Lack of transparency makes them harder to detect

## Failed Replication Attempts?

- Too few true replications for meaningful conclusions
- Number of “failures” inflated by method modifications and publication bias

## → We cannot confidently know

Jenny Tang, Lujo Bauer, and Nicolas Christin, “Misuse, misreporting, misinterpretation of statistical methods in usable privacy and security papers,” in Proceedings of the Twenty-First USENIX Conference on Usable Privacy and Security, SOUPS '25.

Jan H. Klemmer, Juliane Schmäuser, Fabian Fischer, Jacques Suray, Jan-Ulrich Holtgrave, Simon Lenau, Byron M. Lowens, Florian Schaub, and Sascha Fahl. “How Transparent is Usable Privacy and Security Research? A Meta-Study on Current Research Transparency Practices”. In: USENIX Security Symposium 2025, Aug. 2025.

# Call to Action



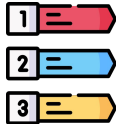
Standardizing transparent research reporting



Sharing research data



Recognizing replications as valuable contributions



Systematically guiding replication efforts

**Discussion:**  
**Is there a**  
**crisis?**  
**What's next?**