Trigger WARNING: Talk discusses domestic/ intimate partner violence, stalking, and harassment

# Analyzing Patterns and Behavior of Users When Detecting and Preventing Tech-enabled Stalking

Rose Ceccio\*, <u>Naman Gupta\*</u>, Majed Almansoori\*, Rahul Chatterjee University of Wisconsin-Madison

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#### Intimate partner violence (IPV)

# IPV is a form of abuse or violence by an **abusive intimate partner**

coercion through sexual, physical, verbal, emotional, or economic violence

renders the **victim-survivor** helpless and vulnerable due to power differential of an abusive relationship





\*CDC's National Intimate Partner and Sexual Violence Survey (NISVS). https://www.cdc.gov/violenceprevention/intimatepartnerviolence/fastfact.html

#### **Technology-enabled abuse**

stalking, spying, doxing by an abusive partner through the misuse / abuse of technology.

- location tracking
- abuse shared contacts, account or device
- delete evidence of abuse
- install stalkerware

Dimond et al. 2011, Woodlock et al. 2016, Matthews et al. 2017, Freed et al. 2017,2018, Levy & Schneier, 2020, Chatterjee 2018

## Apple sued by two women alleging their exes used AirTags to stalk them

209

By Samantha Murphy Kelly, CNN Business Updated 11:43 AM EST, Thu December 8, 2022

## Smartphones Are Used To Stalk, Control Domestic Abuse Victims

September 15, 2014 · 4:22 PM ET Heard on All Things Considered

AARTI SHAHANI

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We've looked a lot at privacy from the Big Brother standpoint: how the National Security Agency or corporate giants like Google track us online, say for political reasons or to make money from ads.

But there's another kind of privacy concern that is a lot more intimate. You could call it Little Brother, though it's really more like husbands and wives, lovers and exes who secretly watch their partners — from a distance. They are cyberstalking — using digital tools that are a lot cheaper than hiring a private detective.

NPR investigated these tools, also known as spyware, and

Source: NPR



Source: CNN

#### d of abusive stalkerware

try and law enforcement are working together to take on the abusers

Source: Wired

#### **Prior Work**



### Madison Tech Clinic

**TECC Clinic** 

#### TECH-ENABLED COERCIVE CONTROL CLINIC

Interventions to help victim-survivors, such as tech clinics [2] or customer support professionals [4]

#### However ...

victim-survivors and advocates find it difficult to prevent tech abuse [1,3]

All interventions require expert help and be trauma-informed [5] Tech clinics are not available to many survivors

[1] Freed et al. Digital technologies and intimate partner violence: A qualitative analysis with multiple stakeholders 2017

[2] Havron et al. Clinical computer security for victims of intimate partner violence 2019

[3] Gallardo et al. Detecting {iPhone} security compromise in simulated stalking scenarios: Strategies and obstacles 2022

[4] Zou et al.. The Role of Computer Security Customer Support in Helping Survivors of Intimate Partner Violence 2021

[5] Chen et al. Trauma-Informed Computing: Towards Safer Technology Experiences for All. 2022

#### **Threat Model**

Attacker and victim-survivor look the same

- shared account and devices in the same household
- **dubious** ownership of the device

Abuser has access to intimate physical and social knowledge

Guess passwords and security questions

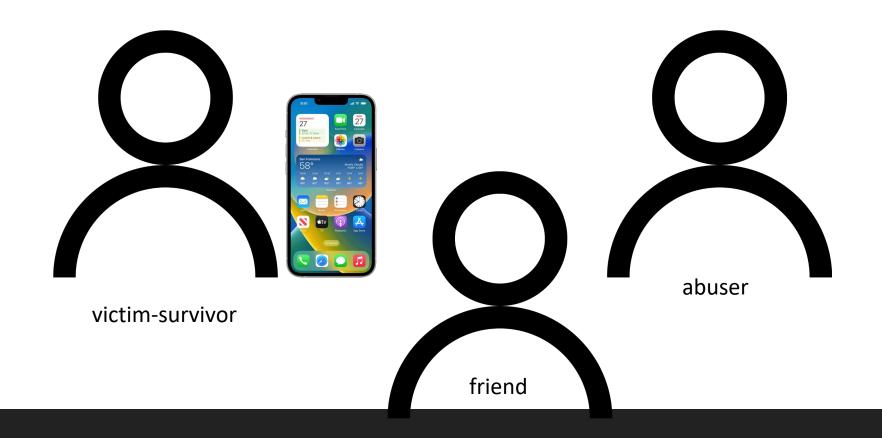
#### **Threat Model**



victim-survivor



## **Social Support Scenario**

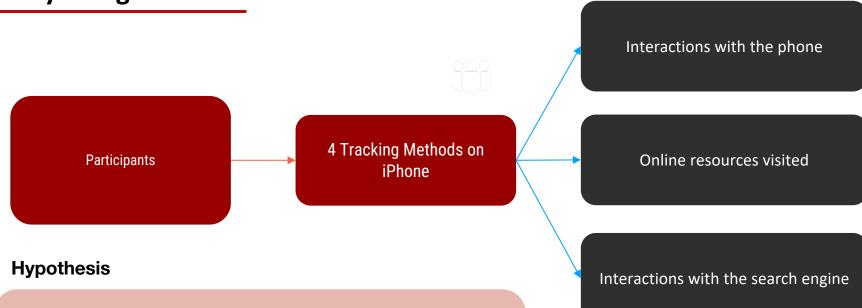


- How do people use smartphone and search the internet while helping their friends detect and prevent tech-enabled abuse?
- How does familiarity with technology affect their behavior?

### **Study Design**



#### **Study Design**



Tech-savvy participants will write more complex queries, navigate through the phone, search engine and the online resources more effectively than non-tech savvy participants.

#### **Participants and Demographics**

- 1. consent form and risks
- 2. demographic information
- 3. self-report on familiarity with technology
- 4. divide into groups using a threshold
- 5. anonymized and deleted

Inclusion criteria:

- at least 18 years old and fluent in English
- iPhone user

Exclusion criteria:

- people who have experienced IPV in the past; avoid re-traumatization
- no online interviews/study

Group 1: Tech-savvy participants

Group 2: Non-tech-savvy participants

#### Data analysis: mixed-methods study

#### **Qualitative:**

- Notes for all recording taken *independently* by all members.
- Create themes using *structural coding*.
- Follow *Collaborative Qualitative Analysis* [1,2] to ensure coding reliability.

#### Quantitative:

- Independent Samples T-Test: are there differences between the means for both groups? e.g., number of tracking methods mitigated
- *Pearson Correlation Coefficient:* how are different correlated with each other

e.g, number of search queries correlated with number of tracking methods mititgated?

<sup>[1]</sup> KAR Richards and MA Hemphill A practical guide to collaborative qualitative data analysis. 2018. [2] J. Saldaña. The coding manual for qualitative researchers. 2021.

- Improve the mobile OS: inform design to balance between the privacy and the usability perspective
- Improve the search result: placement of resources in the search result (for e.g., Covid-19 or mental health resources)
- Improve the online resources: inform design of resources to make them available and more accessible
- Awareness and Call to Action: train people on preventing tech-abuse with principles of trauma-informed care

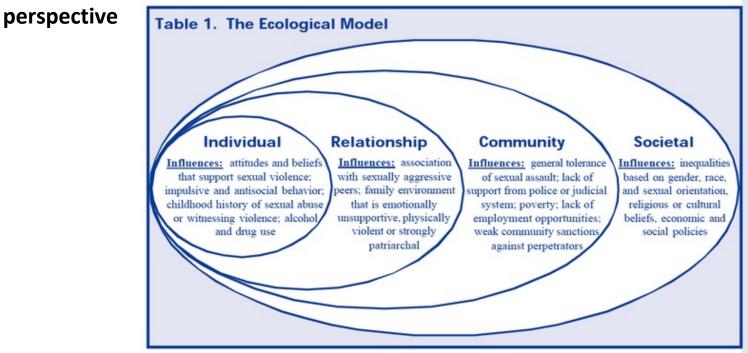
We believe: the support process is divided into

- 1. friend navigates the phone to redress the tracking methods and
- 2. interacts with victim-survivor

Open Q: How do we capture the social interaction between the the victim-survivor and their friend?

#### **Future Work**

Role of social support in helping the victim-survivor of tech-abuse from a sociological



source: http://www.cdc.gov/violenceprevention/pdf/SVPrevention-a.pdf

#### **Future Work**

Victim-survivor of tech-abuse

- feel isolated, alone and paranoid
- lack of technical expertise
- 1. What role does social support play in helping the victims?
- 2. Can we identify ways to improve social support?
- 3. Do people become conscious or readjust their idea of privacy after a negative experience?
- 4. How do the privacy mental model of the victim-survivor and their friends evolve over time?

Can we extend social support and mental model for at-risk populations?

- Incarcerated populations
- Victims of Sex Trafficking
- Non-western populations

Questions? Contact <u>n@cs.wisc.edu</u> Website: **naman.github.io** More relevant research at **techclinic.cs.wisc.edu**.

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