

AirTag-Facilitated Stalking Protection

*Evaluating Unwanted Tracking Notifications
and Tracker Locating Features*



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What are Bluetooth Location Trackers?

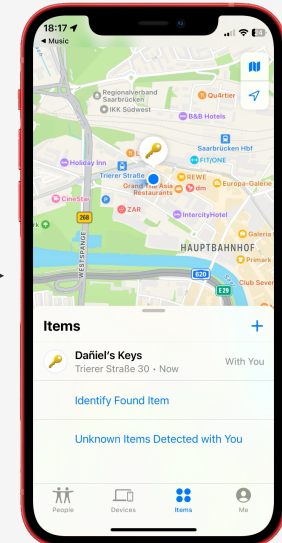
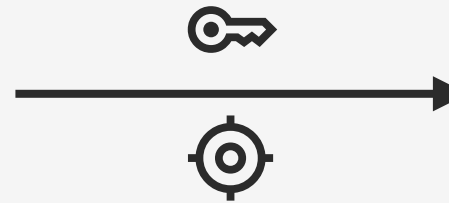
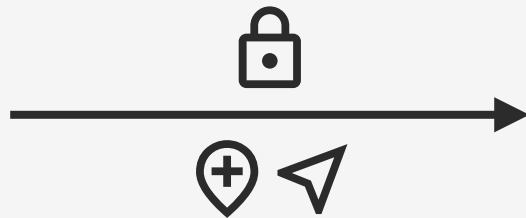




What are Bluetooth Location Trackers?



Any enrolled device

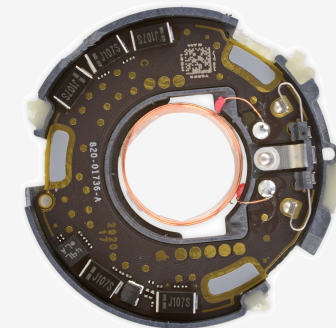
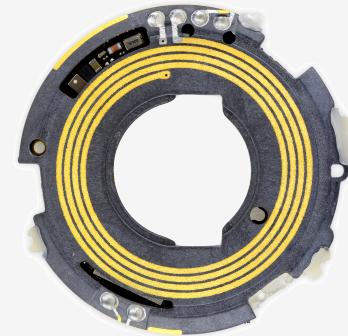
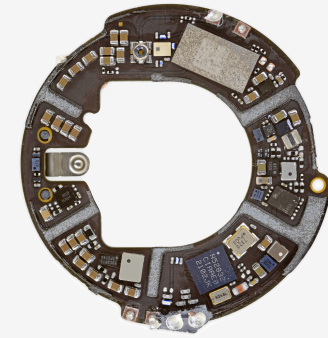


Device paired to tracker



Anti-Stalking Features

- **SOUND**: Speaker plays sound when separated
- **NOTIFICATION**: Alert on iOS and Android when tracked
- **FINDING**: Locating features to find tracker
 - **SOUND**: Manually play a sound to find AirTag
 - **PRECISE LOCATING**: Ultrawideband to locate



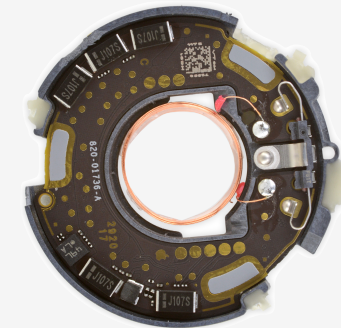
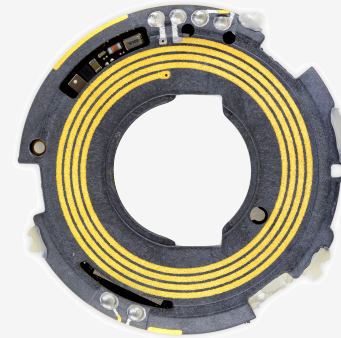
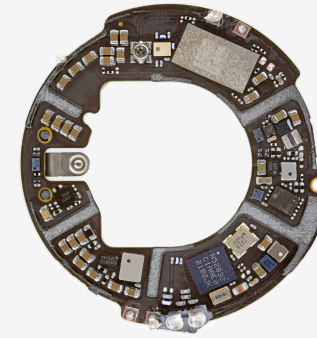


Anti-Stalking Features

- **SOUND**: Speaker plays sound when separated
- **NOTIFICATION**: Alert on iOS and Android when tracked



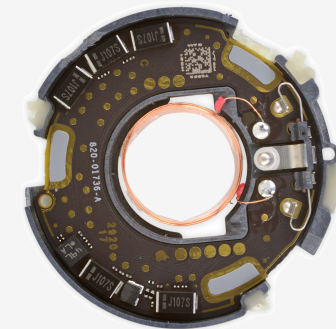
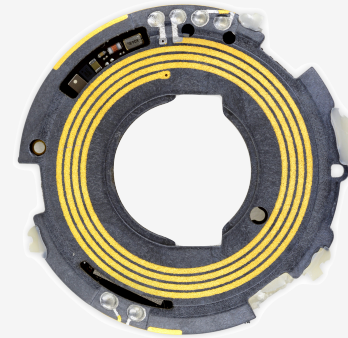
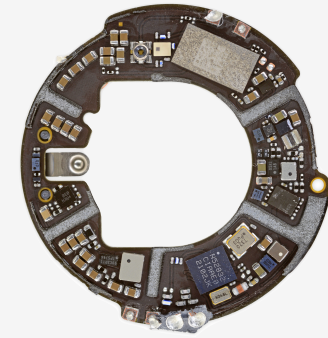
AirTag Found Moving With You 3m ago
The owner can look up its location. Tap to open Find My for available actions.





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Methodology

RQ1 Reliability of Unwanted Tracking Notifications

RQ2 Users' Understanding of and Reaction to Unwanted Tracking Notification

RQ3 Effectiveness and Usefulness of Locating Features

RQ1

Take AirTag
Home



AirTag Found Moving With You 3m ago
The owner can look up its location. Tap to open Find My for available actions.

RQ2

Deception
Study



RQ3

Locating
Task





Methodology

RQ1 Reliability of Unwanted Tracking Notifications

RQ2 Users' Understanding of and Reaction to Unwanted Tracking Notification

RQ3 Effectiveness and Usefulness of Locating Features

Statistical Analysis → **RQ1**

Take AirTag Home



AirTag Found Moving With You 3m ago
The owner can look up its location. Tap to open Find My for available actions.

RQ2

Deception Study



RQ3

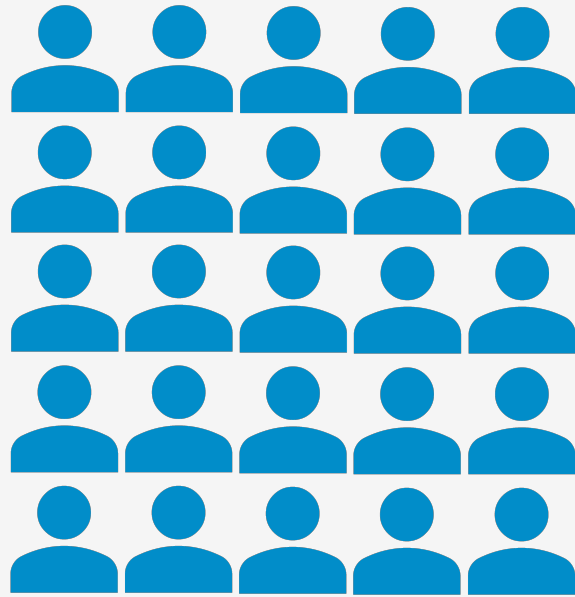
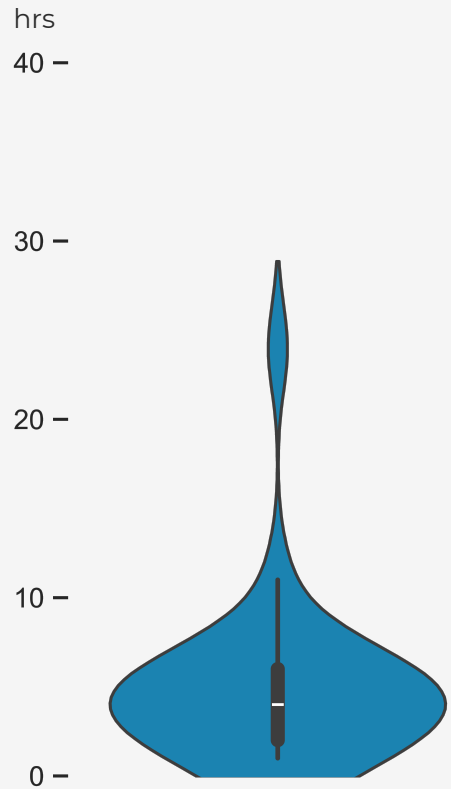
Locating Task



Thematic Analysis

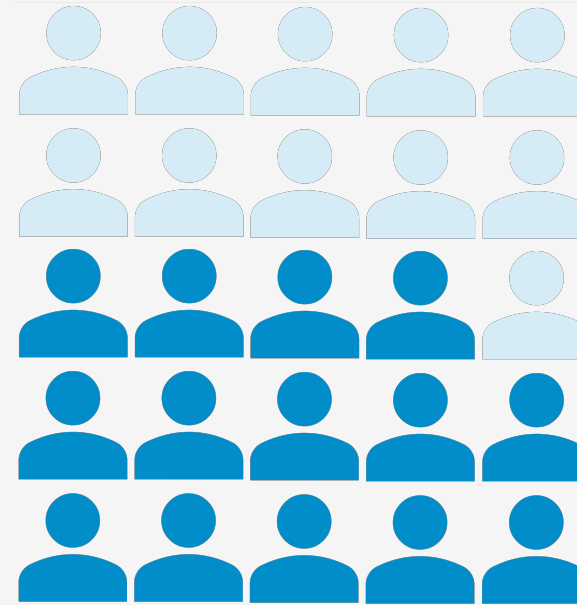


Results - RQ1 Reliability of Tracking Notifications



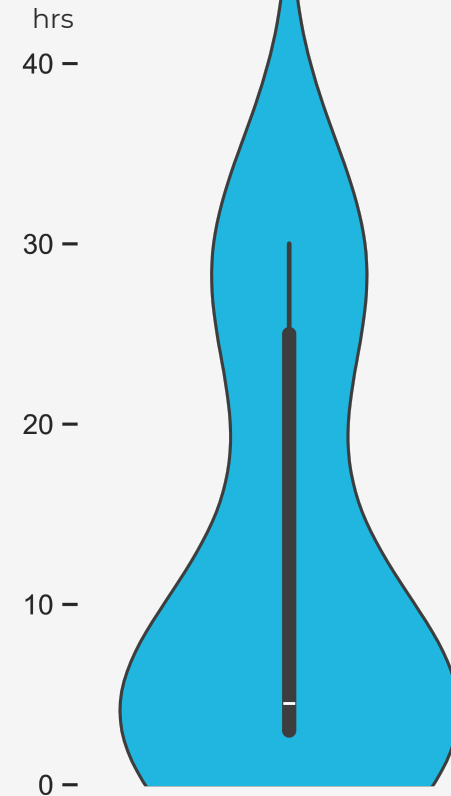
25 of 25 cases

iOS



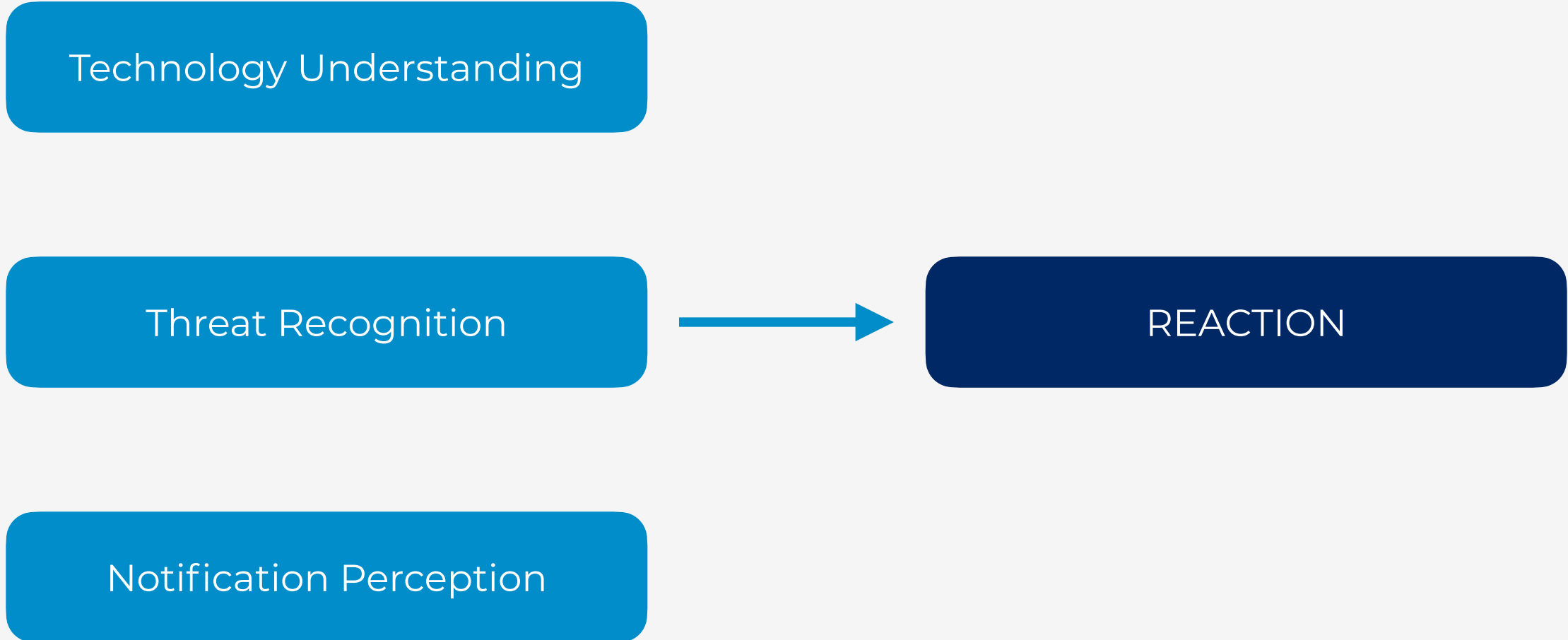
14 of 25 cases

android





Results - RQ2 Reaction to Tracking Notification





Results - RQ2 Reaction to Tracking Notification

Technology Understanding

→ Higher technology understanding often resulted in more effective reactions - lower understanding in less effective reactions.

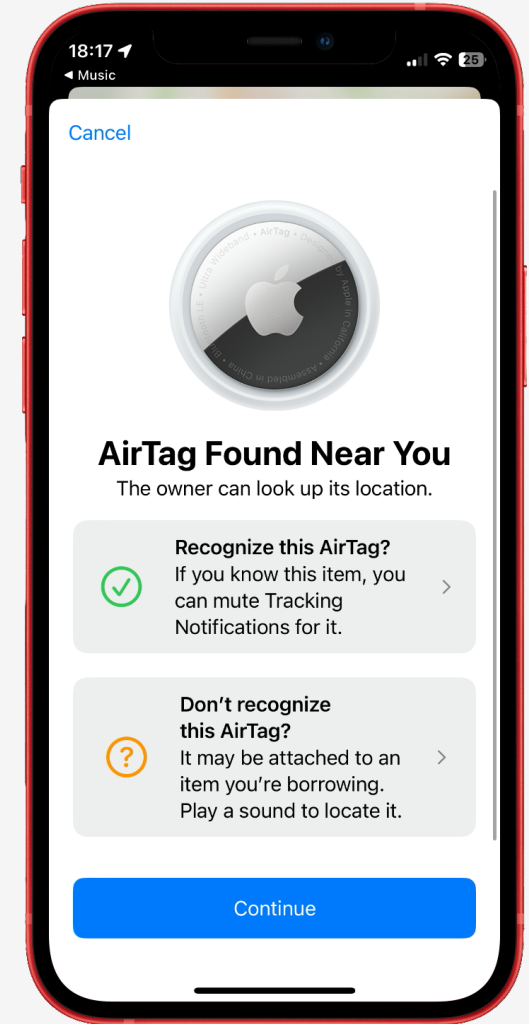
"Yes, maybe switch off the Bluetooth and maybe switch off the Internet."



Results - RQ2 Reaction to Tracking Notification

Threat Recognition

→ Some participants could not recognize the potential threat from the notification.



AirTag Found Moving With You 3m ago
The owner can look up its location. Tap to open Find My for available actions.



Results - **RQ2** Reaction to Tracking Notification

Notification Perception

→ **The alert conveys no sense of urgency or importance compared to other notifications.**



Results - **RQ2** Reaction to Tracking Notification

REACTION

Investigate

- Use the available features, research, change settings.
- Effectiveness varies greatly.

Seek Help

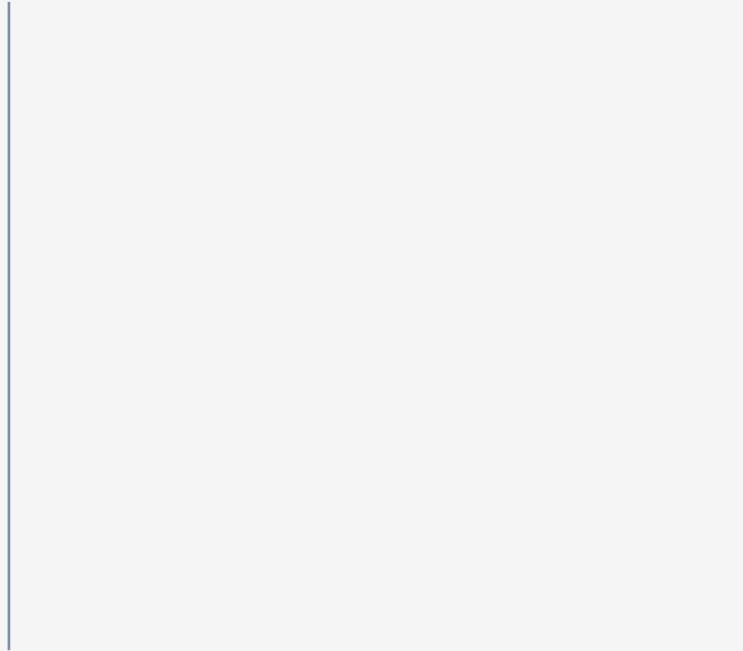
- Ask others for help with technology.
- Inquire about benign reasons for notification.

Disregard

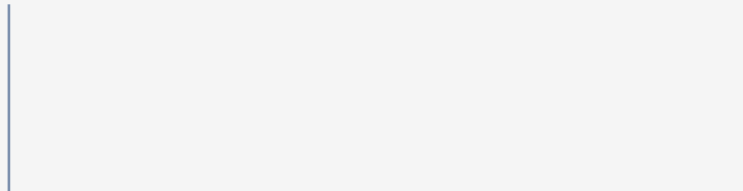
- Do not react to notification.
- Does not seem important, goes under in sea of notifications.



Results - **RQ2** Reaction to Tracking Notification



Results - **RQ3** Effectiveness of Locating Features

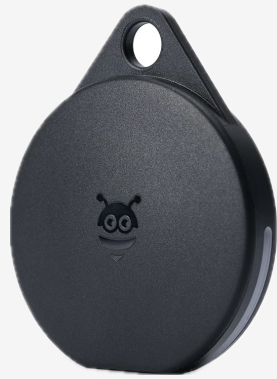




Outlook

 Works with
Apple Find My

 Works with Android
Find My Device



2020

2021

2022

2023

2024

2025

2026



USENIX

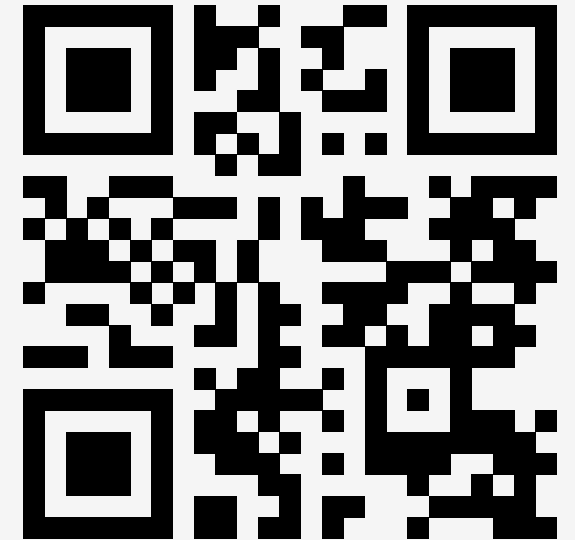
THE ADVANCED COMPUTING
SYSTEMS ASSOCIATION

AirTag-Facilitated Stalking Protection: Evaluating Unwanted Tracking Notifications and Tracker Locating Features

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