

# Smart Home Consumers' Privacy and Security Perceptions & Practices



Throughout the presentation, certain commercial companies or products may be identified to foster understanding. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology (NIST), nor does it imply that the companies or products identified are necessarily the best available for the purpose.



- B.S. and M.S. in Computer Science
- Cybersecurity professional for 20+ years in the U.S. government
- PhD in Human-centered Computing
- Working at NIST for 2+ years as a researcher and lead for the Usable Cybersecurity program





- Conduct research and usability testing at the intersection of cybersecurity and human factors
- Provide actionable guidance so that the human element can be considered in cybersecurity decisions, processes, and products

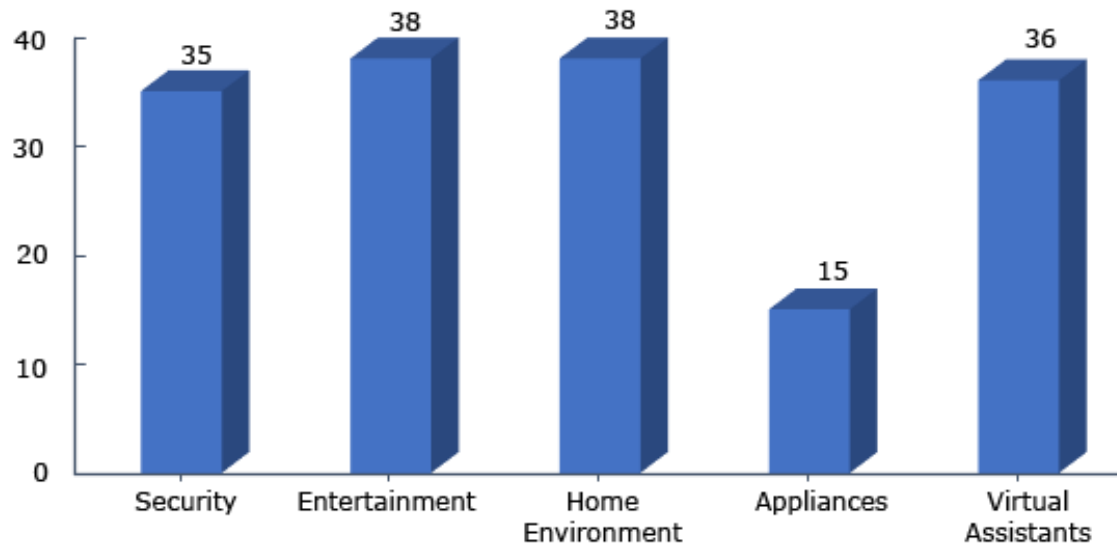
# Smart Home Technologies



Photo - Creative Commons



# Study Participants



Types of smart home devices owned by participants

- Living in the Washington, D.C. metropolitan area of the U.S.
- Majority were highly educated
- 18 females, 22 males
- Most (70%) between 30-49 years old
- 32 installers, 8 users



# Perceptions of Data Collection & Use





- Most had a decent understanding of the type of data being collected by their smart home devices
- However, a few only talked in general terms



everything it sees, everything it hears, everything you input into it, all the data you provide



- Manufacturers
- Third parties
- Government
- “I don’t know”



I kind of think that it goes nowhere...  
Who knows?



- Product improvement
- Law enforcement purposes
- Targeted ads



take that information and potentially target emails with advertisements to you, because they know where you live, they might know what type of devices you have in your house



- Privacy policies and user level agreements rarely read, vague, difficult to understand
- Perception that manufacturers do not act in consumers' best interests



I don't trust the information that's provided, so I don't really believe that when they say they're transparent, that they really are.



- Almost half didn't know or didn't think there was any way to control data
- Few mentioned concrete control options
- If opt-out is even available, can be burdensome to request



There's an opt-out thing that no one's ever going to do... I saw the address, a mailing address, and I, out of curiosity, was like, “What is this mailing address for?” It was the opt-out.



# Concerns & Mitigations

# Privacy & Security Concerns



**Audio/video access**



**Data breach**



**Government surveillance**



**Selling data/data collection unknowns**

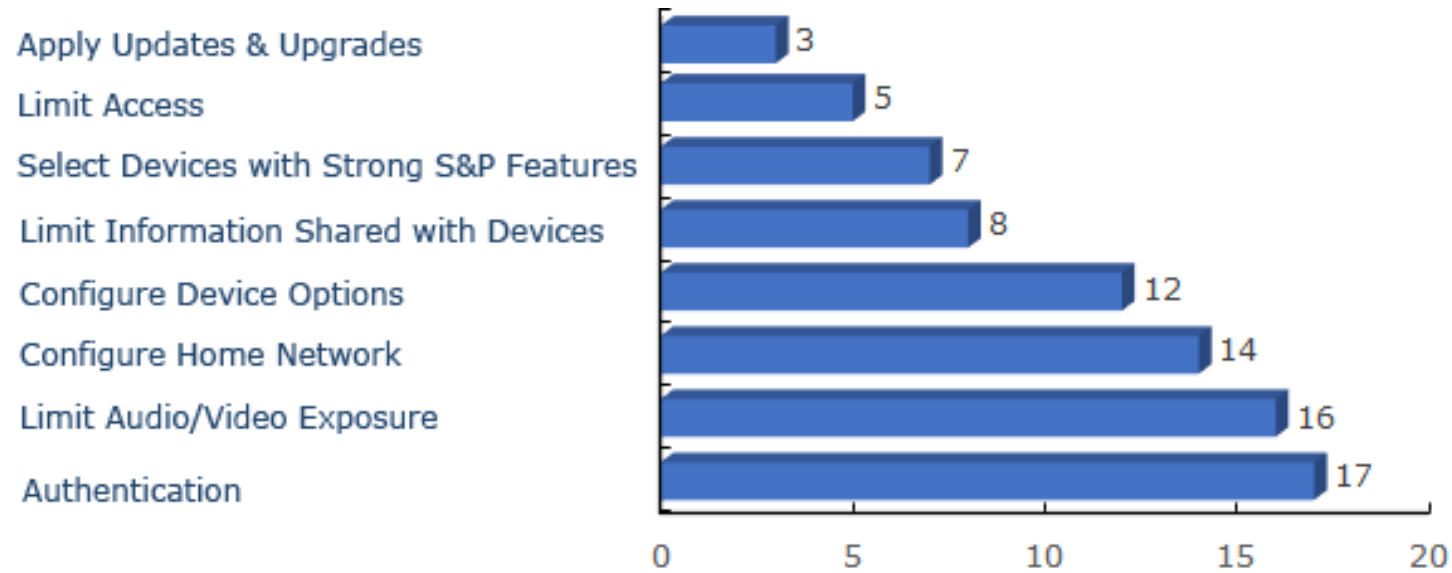


**Household profiling**



**Physical safety**

# Privacy & Security Mitigations



**Most mitigations mentioned by participants were simplistic or non-technical in nature**



# Lack of Concern & Action



# “I’m not that interesting”



I feel like you've got people who are pretty talented with computers and can get this stuff... I'm of the mindset, have at it. We don't do anything cool in my house, anyways.



# “I don't know if or how I can”



I've been given very little methods to alleviate the concerns. Usually the description of the controls aren't specific enough.



I'm not going to educate myself on network security... This stuff is not my forte. I'm very accepting to the fact that it is what it is.



# “There’s nothing I can do”



I do dislike having all of my information out there. But I think that, regardless of these smart devices, it’s already out there.



I wish we could [limit data collection], but I don’t think there’ll ever be a way to control it.



# “It’s a tradeoff”



I know that it's collecting personal data,... and I know there's the potential of a security leak, but yet, I like having the convenience of having those things.



# Addressing Consumers' Wishlists



Transparency about what data is being collected, where it is going, and how it is being used



We've got to do something to protect people's information, or at least make them aware of what exactly is being utilized and sold.



**Secure-by-design and increased visibility regarding the types and strength of security mechanisms provided by the devices**



It would be nice to know what security features are already there because they're not advertised or transparent at all.





More control over the devices and data, e.g., opt in/out of data collection, configurable security options



There would be some of these products that I have been avoiding purchasing that I might purchase if they provided more granular control.



## Tips and instructions on how to better protect data and secure devices and home networks



I think I need to be advised on good practices that I could take...and then I would probably implement them.



- Many participants had privacy and security concerns, but displayed a willingness to accept risks in favor of smart home benefits
- Feeling limited responsibility for mitigating concerns due to constrained options or lack of knowledge to enact more sophisticated countermeasures
- Need for manufacturers and third parties to aim for more secure and privacy-respecting devices out-of-the-box and empower users to make informed decisions and take protective actions

# Thank You!

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<https://csrc.nist.gov/usable-cybersecurity>

