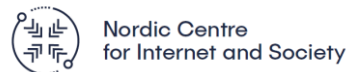


ISCA SIG-SPSC  
Webinar  
SEPTEMBER 6, 2021

# Privacy and Smart Speakers: A Multi-Dimensional Approach

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## Privacy and smart speakers: A multi-dimensional approach

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### ABSTRACT

Over the last few years, smart speakers such as Amazon Echo and Google Home have become increasingly present within British households. Yet, privacy remains a prominent concern in the public discourse about smart speakers, as well as in the nascent academic literature. We argue that privacy in the context of smart speakers is more complex than in other settings due to smart speakers' specific technological affordances and also the axial relationships between users, the device, device manufacturers, application developers, and other third parties such as moderation contractors and data brokers. With survey data from Amazon Echo and Google Home users in the UK, we explore users' privacy concerns and privacy protection behaviors related to smart speakers. We rely on a contextual understanding of privacy, assessing the prevalence of seven distinct privacy concern types as well as three privacy protection behaviors. The results indicate that concerns about third parties, such as contractors listening to smart speaker recordings, are most pronounced. Privacy protection behaviors are uncommon but partly affected by privacy concerns and motives such as social presence and utilitarian benefits. Taken together, our research paints a picture of privacy pragmatism or privacy cynicism among smart speaker users.

### ARTICLE HISTORY

Received 21 March 2020  
Accepted 25 November 2020

### KEYWORDS

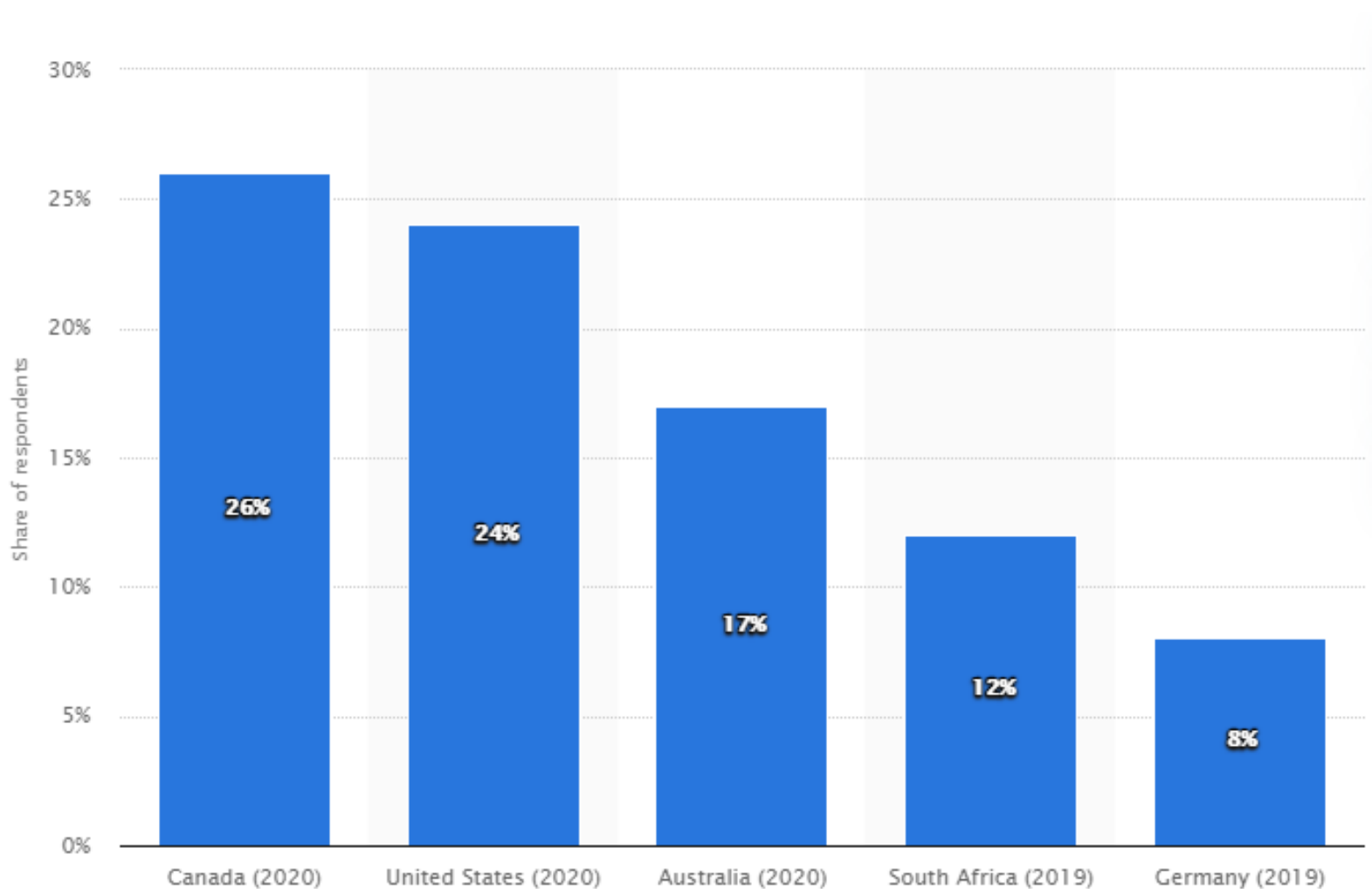
AI; emerging technologies;  
Amazon; privacy;  
smart speakers



 amazon alexa



# Percentage of Individuals Who Own A Smart Speaker



**Details:** Australia; Canada; Germany; South Africa; United States; Edison Research; Triton Digital; Q1 2020; 1,065 respondents; 18 years and older

Technology

# Amazon Workers Are Listening to What You Tell Alexa

A global team reviews audio clips in an effort to help the voice-activated assistant respond to commands.

By [Matt Day](#), [Giles Turner](#), and [Natalia Drozdiak](#)

April 11, 2019, 12:34 AM GMT+2

## GIZMODO

AMAZON

# Your Worst Alexa Nightmares Are Coming True



Adam Clark Estes

5/25/18 2:10PM • Filed to: AMAZON ALEXA

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# *An Emerging Stream of Literature*

- Research has only started to investigate smart speakers and the AI embedded within them (Hoy, 2018; Smith, 2018)
- Considerable amount of research in HCI and computer science (Feng, Fawaz, & Shin, 2017; Geeng & Roesner, 2019; Lau et al., 2018; Luger & Sellen, 2016; Malkin et al., 2019; Zheng et al., 2018)
- Less research in sociology and communication/media studies (Brause & Blank, 2020; Pridmore et al., 2019; Pridmore & Mols, 2020)
- Nissenbaum's privacy as contextual integrity theory offers a promising perspective due to the complexity of data flows (Nissenbaum, 2004, 2010, 2019)

*To what extent do users of smart speakers have different privacy concern types?*

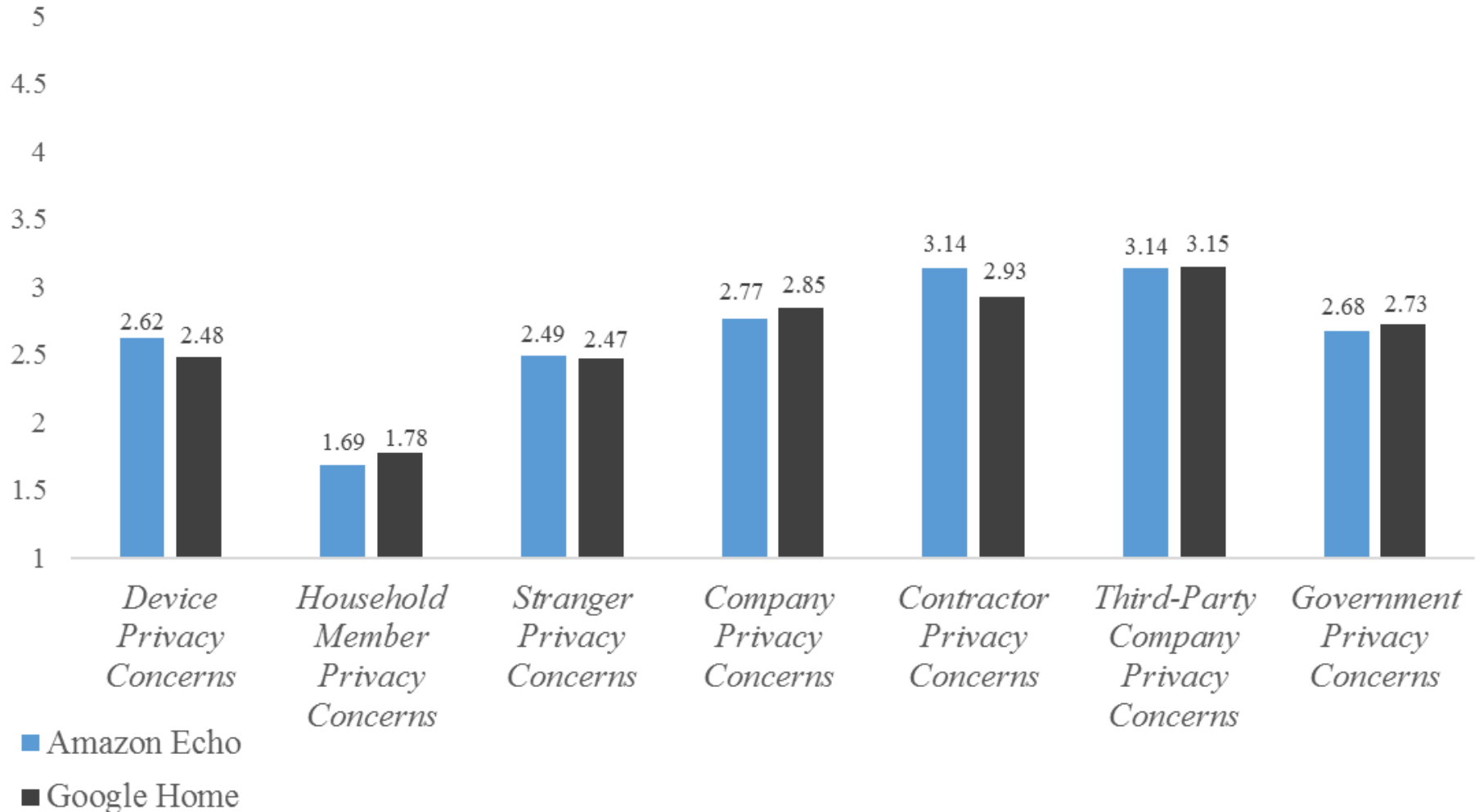
*How do different privacy concern types relate to privacy protection behavior?*

# Methods

- Rich data from an online survey of 369 smart speaker users in the UK
- Conducted in October 2019 through Prolific
- Closed questions on smart speaker privacy concerns, privacy protection behavior and use modalities (motives, frequency, social influence). General section with demographic and Internet skills questions.
- Descriptive analysis, exploratory factor analysis and linear regression analysis



# Results: Prevalence of Seven Privacy Concern Types



# Results: Privacy Protection Behavior Dimensions

	Technical	Data	Social
<i>Turning off the smart speaker when not using it</i>	<b>0.95</b>	-0.00	-0.23
<i>Unplugging the smart speaker when not using it</i>	<b>0.94</b>	-0.00	-0.19
[+4 additional technical items]			
<i>Reviewing the privacy settings of your Amazon Alexa/Google/Apple account</i>	-0.05	<b>0.89</b>	0.03
<i>Changing the privacy settings of your Amazon Alexa/Google/Apple account</i>	-0.04	<b>0.88</b>	-0.13
[+3 additional data items]			
<i>Speaking quietly around the smart speaker</i>	-0.10	-0.09	<b>0.93</b>
<i>Giving misleading information to the smart speaker</i>	0.03	-0.10	<b>0.79</b>
[+3 additional social items]			
<b>Arithmetic Mean (1/5)</b>	1.76	1.64	1.44

# Results: Regression

	Technical	Data	Social
<i>Internet Skills</i>	0.01	0.22***	0.09 <sup>+</sup>
<i>Frequency of Use</i>	0.15*	-0.05	-0.10*
<i>Social Influence</i>	0.00	-0.03	-0.01
<i>Motives: Utilitarian</i>	-0.23***	0.00	-0.16*
<i>Motives: Symbolic</i>	0.01	-0.04	0.15**
<i>Motives: Social Presence</i>	0.07	0.10	0.17**
<i>Motives: Hedonic</i>	0.11 <sup>+</sup>	0.10 <sup>+</sup>	-0.05
<i>Device Privacy Concerns</i>	0.12 <sup>+</sup>	0.06	0.14 <sup>+</sup>
<i>Household Member Privacy Concerns</i>	0.03	0.18*	0.19*
<i>Stranger Privacy Concerns</i>	0.06	0.07	0.01
<i>Company Privacy Concerns</i>	0.23*	0.22*	0.17*
<i>Contractor Privacy Concerns</i>	0.02	-0.07	-0.01
<i>Third-Party Privacy Concerns</i>	-0.04	0.02	0.03
<i>Government Privacy Concerns</i>	-0.09	-0.21**	-0.04
Constant	0.02	-0.38	0.47
R <sup>2</sup>	0.23	0.23	0.31

N=332; std. regression coefficients are displayed; \*\*\* p < 0.001, \*\* p < 0.01, \* p < 0.05, + p < 0.010, no star = not statistically significant; control variables not shown

## *Discussion and Conclusion*

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- Privacy concerns are not very pronounced but levels vary based on the main source of the privacy risks.
- Institutional concerns are higher than social concerns.
- Contextual integrity offers a promising perspective for analysing smart speakers and privacy
- Privacy protection behavior is very rare across all three types.
- Overall picture of privacy apathy/resignation/cynicism

The image features a black background with white, stylized circuit board traces in the corners. The top-right corner has a dense pattern of lines extending towards the center. The bottom-left corner has a similar pattern extending from the left edge. The central text is written in a white, cursive font.

*Any Questions?*

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*@NewlandsGemma*

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