
Symposium on Usable Security and Privacy
(USEC) 2023

Do Privacy Labels Answer Users' Privacy Questions?

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Privacy Notice



A “Nutrition Label” for Privacy

Bell Group

information we collect	ways we use your information				information sharing	
	to provide service and maintain site	marketing	telemarketing	profiling	other companies	public forums
contact information		opt in			opt out	
cookies						
demographic information		opt in			opt out	
financial information						
health information						
preferences						
purchasing information		opt in			opt out	
social security number & gov't ID						
your activity on this site		opt in			opt out	
your location						

Access to your information

This site gives you access to your contact data and some of its other data identified with you

How to resolve privacy-related disputes with this site

Please email our customer service department

bell.com

5000 Forbes Avenue
Pittsburgh, PA 15213 United States
Phone: 800-555-5555
help@bell.com

Standardizing Privacy Notices: An Online Study of the Nutrition Label Approach

Privacy as Part of the App Decision-making Process

Apps

Plume
LevelUp Studio [Download](#)

Plume is a beautiful, highly customizable Twitter client, which will change the way you feel about Twitter!

Privacy Facts

THIS APP COLLECTS YOUR

- Personal information
- Credit card / financial
- Contacts
- Diet / nutrition
- Location
- Health / medical
- Calendars
- Photos

THIS APP USES

- Advertising
- Analytics

REVIEWS

Average 4.2

5 stars 23,814
4 stars 10,209
3 stars 3,929
2 stars 1,567
1 star 2,427

★★★★☆ Queen - June 27, 2012
Thanks you for fixing the timeline issues. It's great again now all we need are emoticons :-)

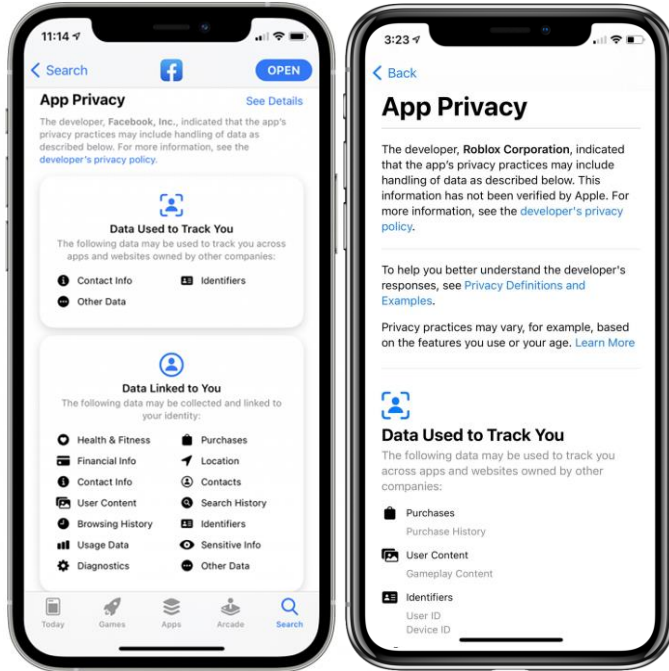
★★★★★ Luke - April 23, 2012
Great! The best Twitter client for Android.

Patrick Gage Kelley, Joanna Bresee, Lorrie Faith Cranor, and Robert W Reeder. A “nutrition label” for privacy. In Proceedings of the 5th Symposium on Usable Privacy and Security, pages 1–12, 2009.

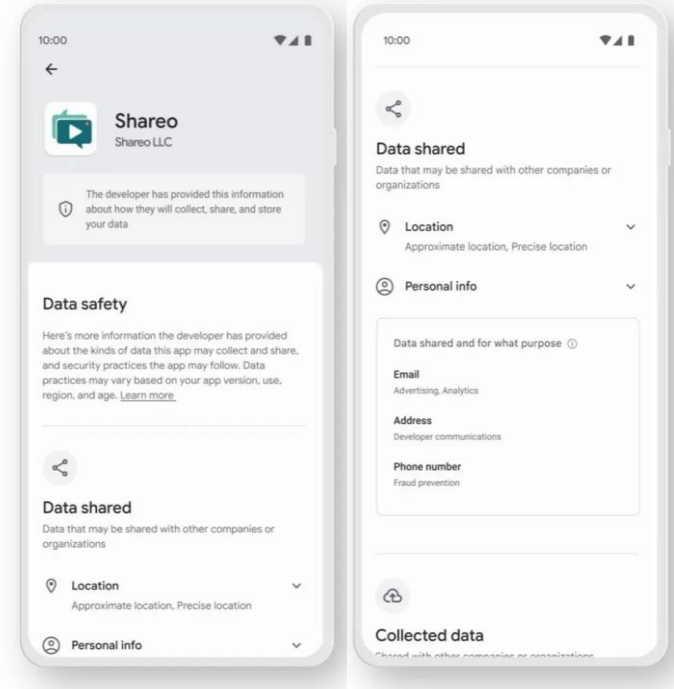
Patrick Gage Kelley, Lucian Cescas, Joanna Bresee, and Lorrie Faith Cranor. Standardizing privacy notices: An online study of the nutrition label approach. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, CHI '10, page 1573–1582, New York, NY, USA, 2010. Association for Computing Machinery.

Patrick Gage Kelley, Lorrie Faith Cranor, and Norman Sadeh. Privacy as part of the app decision-making process. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, CHI '13, page 3393–3402, New York, NY, USA, 2013. Association for Computing Machinery.

App Privacy Labels on the App Store December 2020



Google Play's Data Safety Sections April 2022



PrivacyQA Dataset

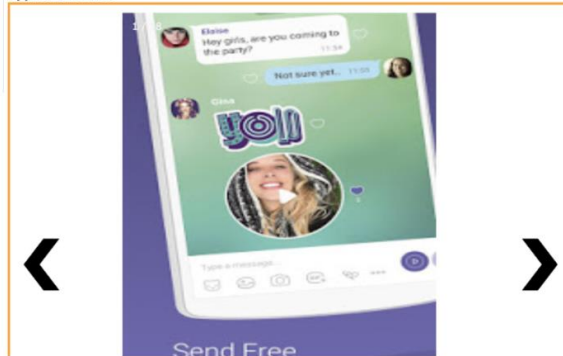
- Crowdsourced Question Elicitation through MTurk
- Questions about 35 mobile apps representing a diverse mix of app categories and popularity levels
- A total of 1,750 questions collected

App Description

App Name : **Viber Messenger**

Viber Free Messenger and Phone Calls: Connecting millions worldwide! Write a text message, call, chat and share with anyone, anywhere!Viber is your go-to free messenger, allowing you to message or call anyone in the world through your Internet connection*. Send a text message to friends and family with Viber Messenger. Call your loved ones using Viber's live video chat or voice call, all part of Viber's free and high-quality phone calls. Express yourself with cool stickers and emoji icons, share photos, and send your favorite videos. The free messenger also lets you make international phone calls for free

App Screenshots



Can Privacy Labels Answer Users' Privacy Questions?

- Thematic analysis of questions
- Match questions to labels



Top Six Question Themes

Theme

Data collected

App security

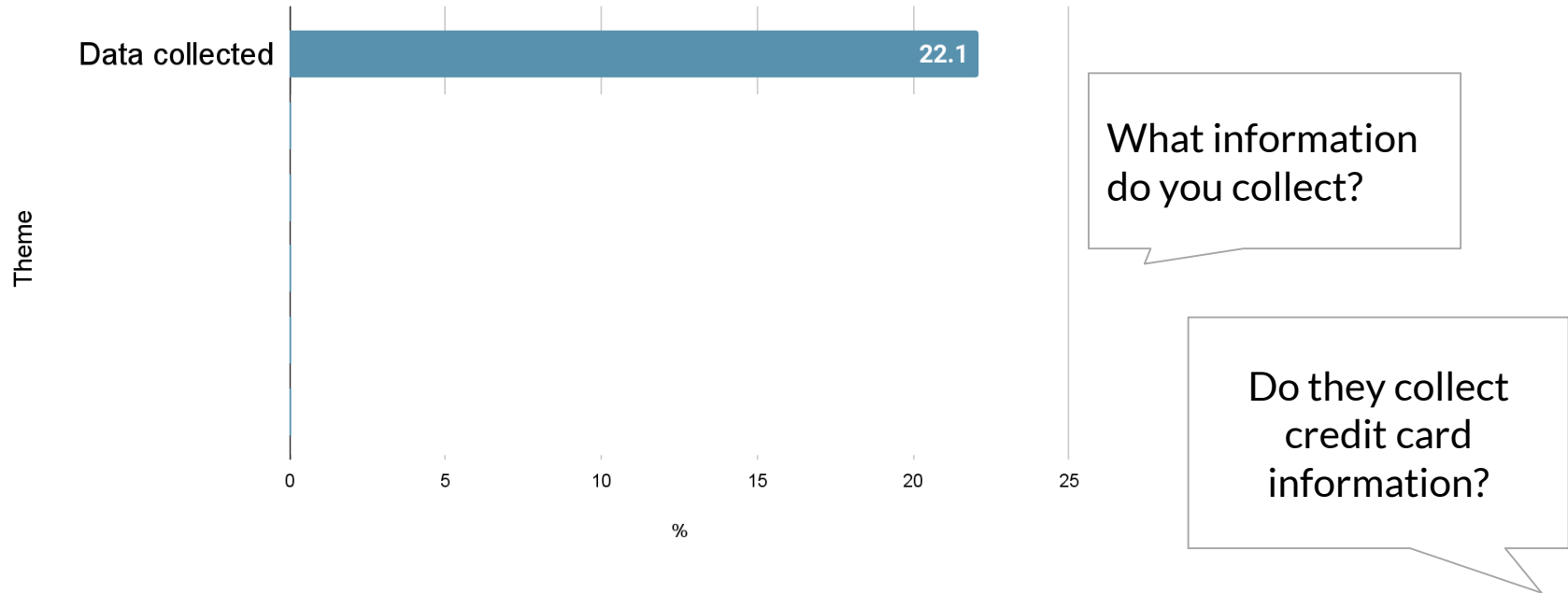
Sharing

Selling

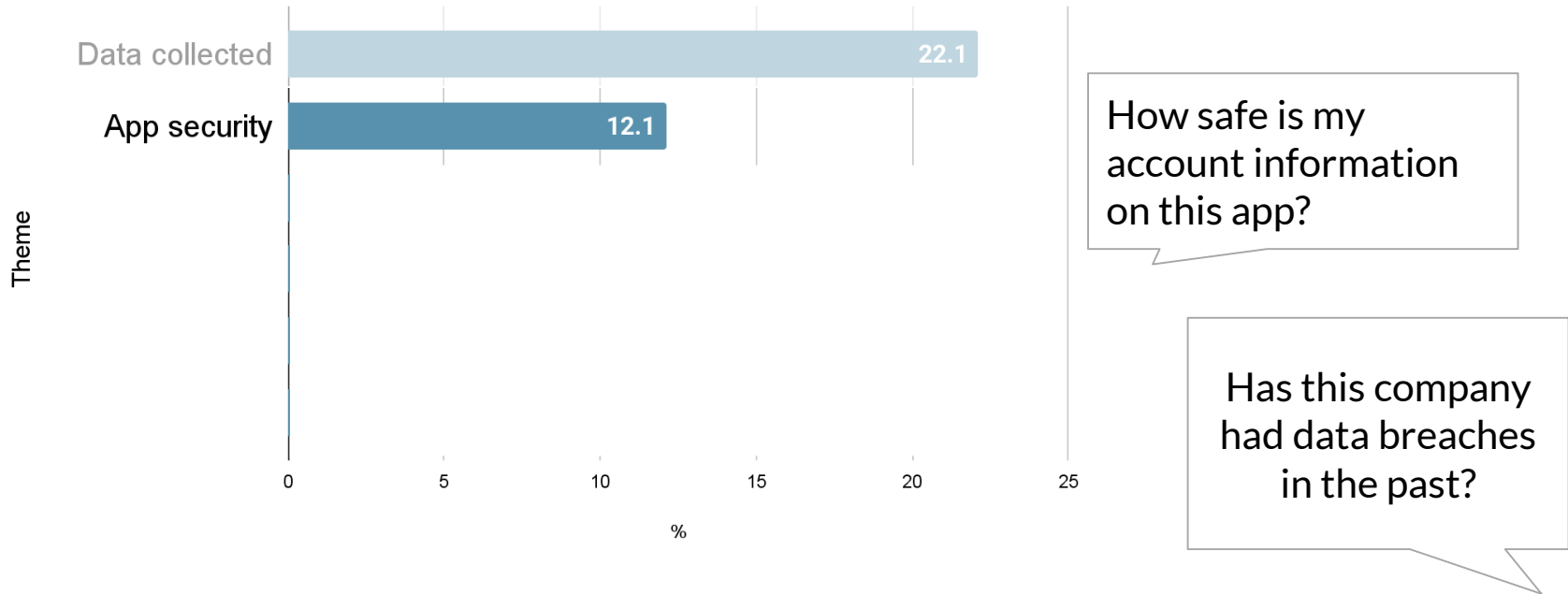
Permissions

App-specific

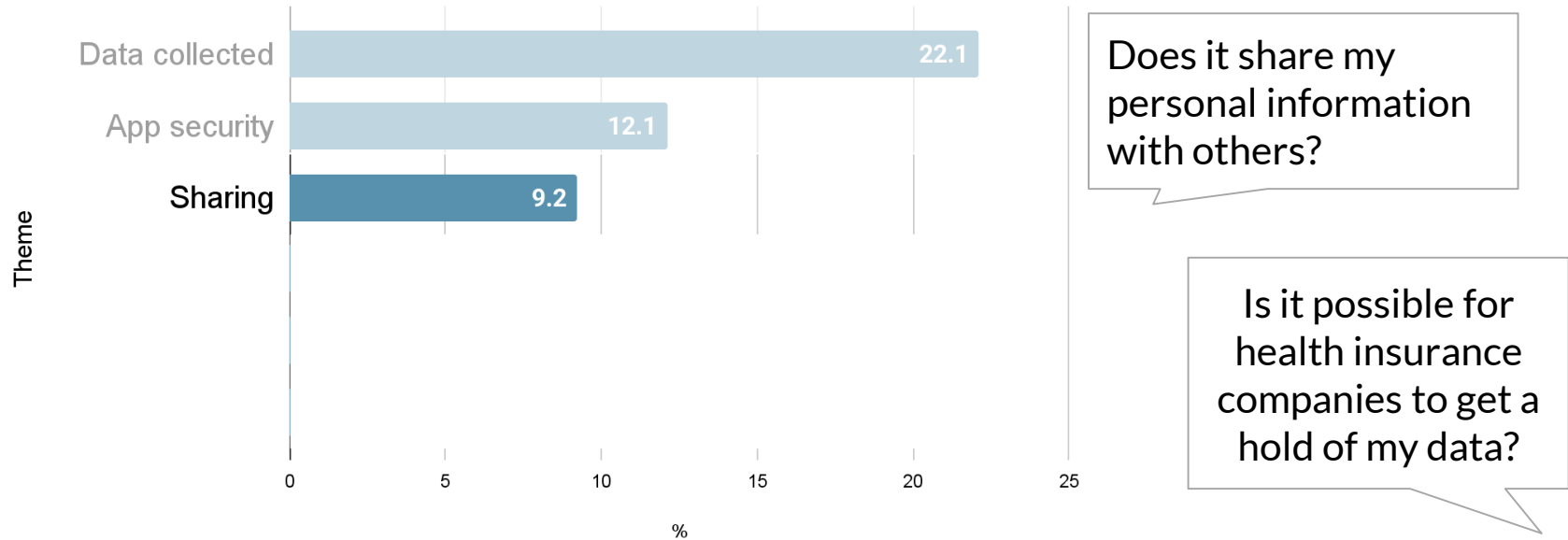
Most Frequent Question Theme



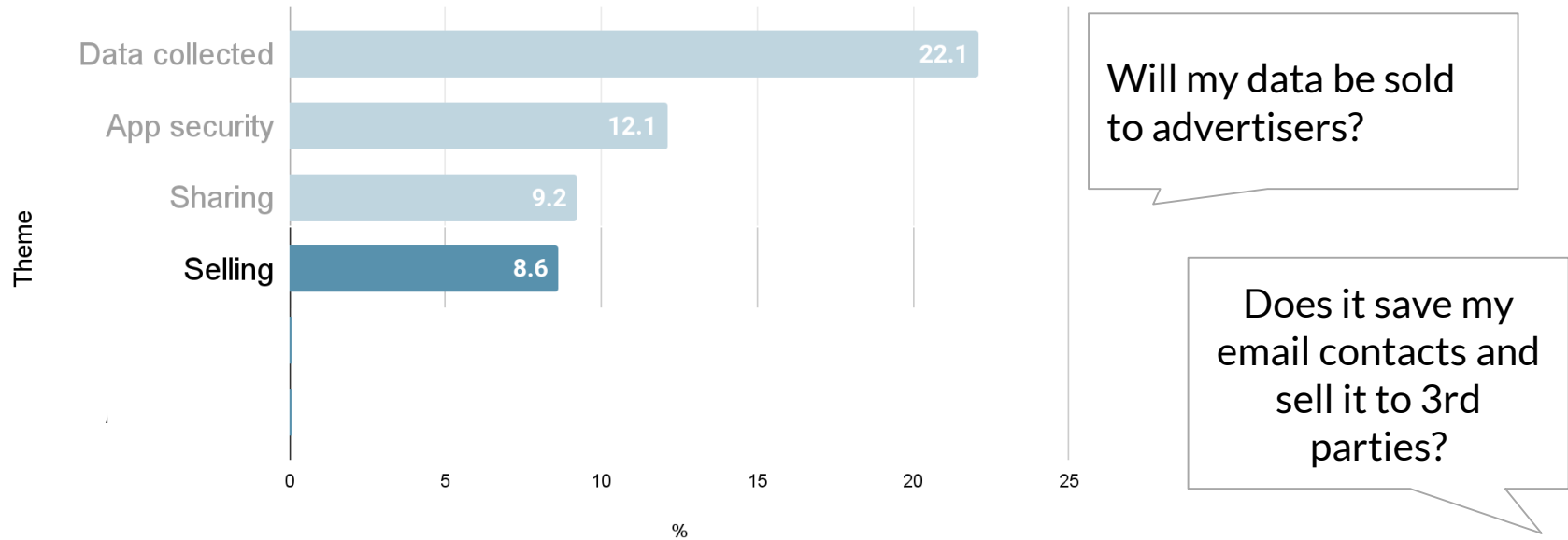
2nd Most Frequent Question Theme



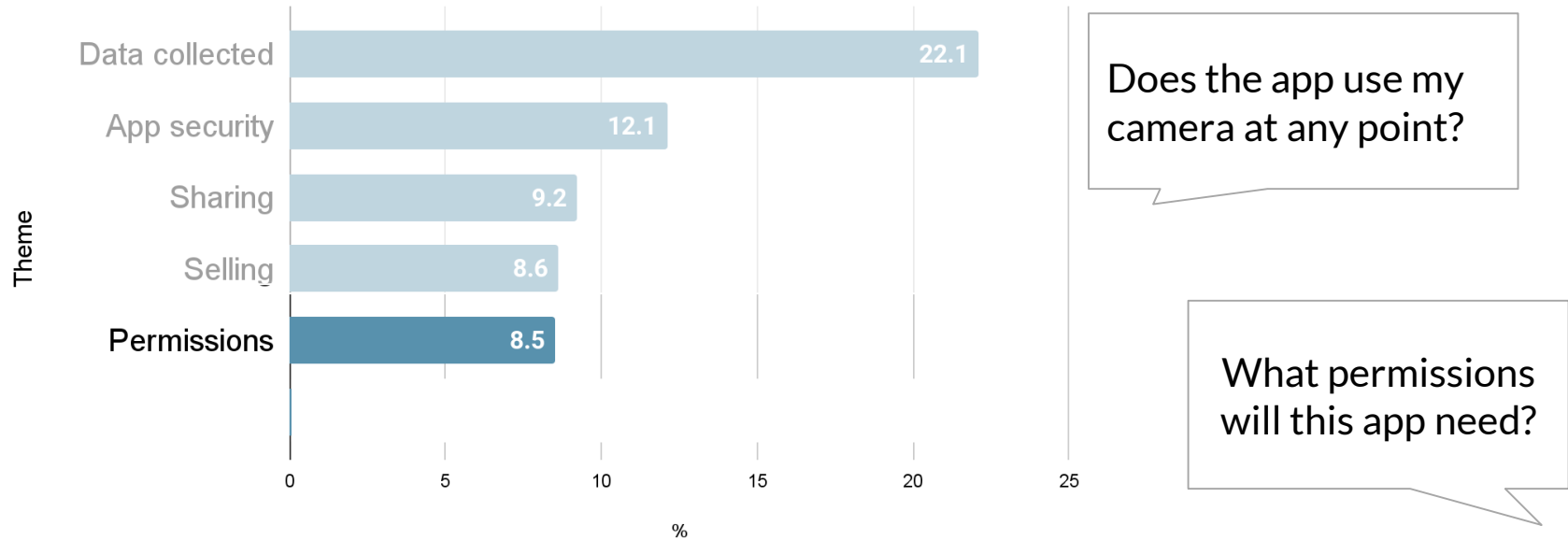
3rd Most Frequent Question Theme



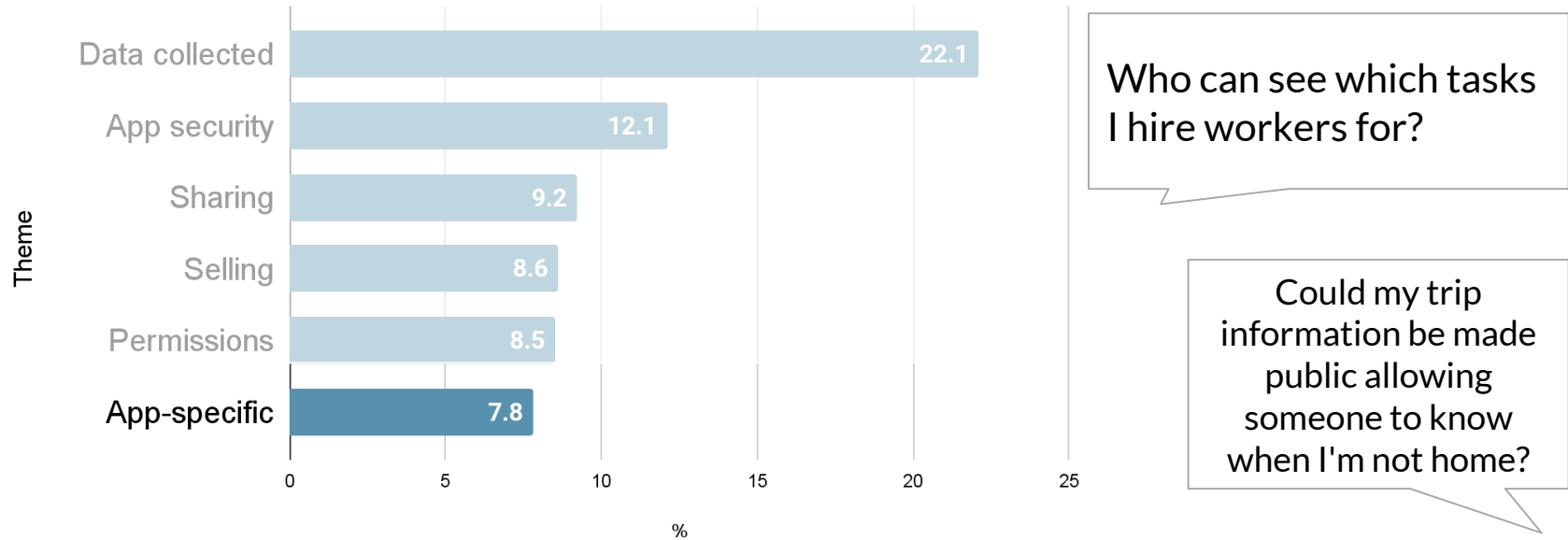
4th Most Frequent Question Theme



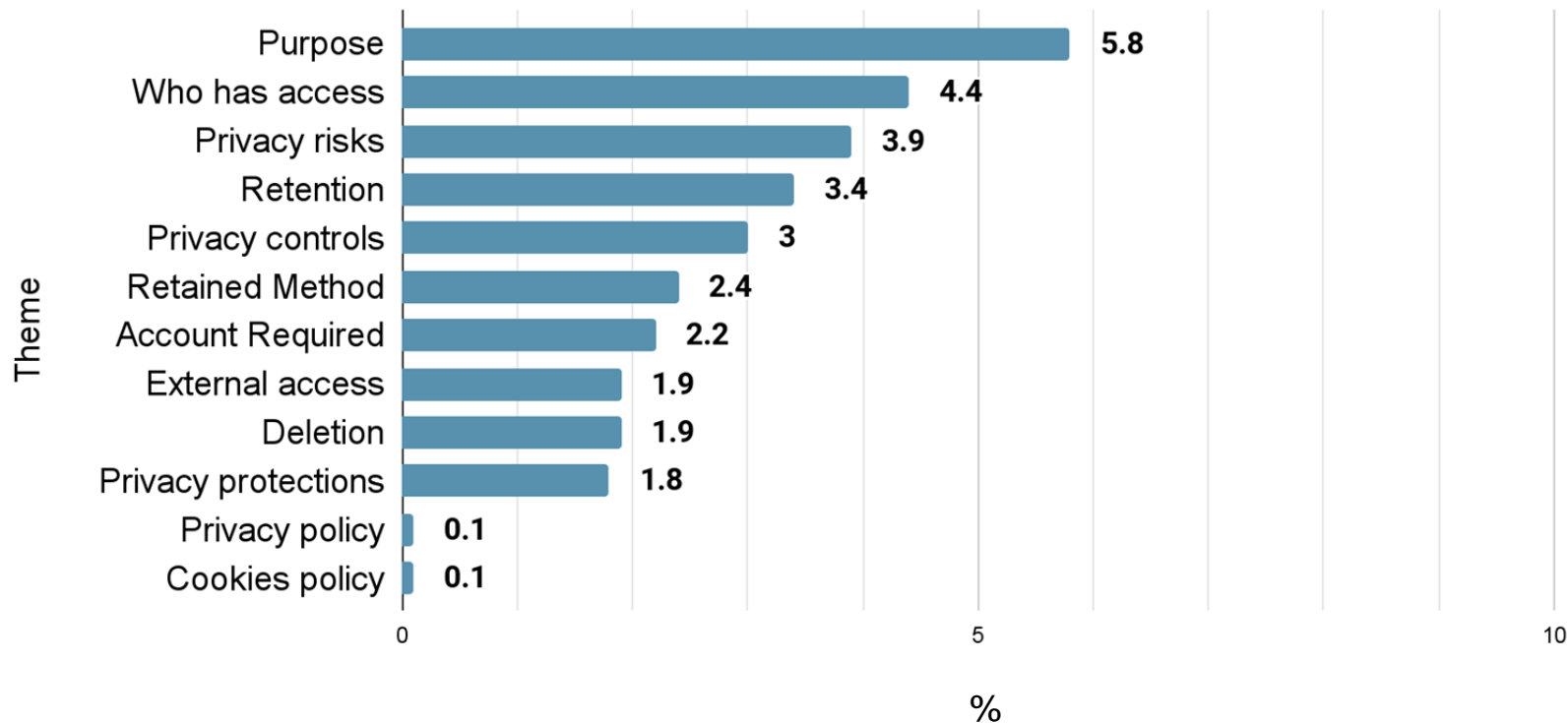
5th Most Frequent Question Theme



6th Most Frequent Question Theme



Remaining Question Themes



Theme Answered by Labels

Theme	Google Label	Apple Label
<p>Data Collected</p> <div><p>What information do you collect?</p></div> <p>22% of Questions</p>		

Questions **Not** Answered Under Theme

Theme	Google Label	Apple Label
<p>Data Collected</p> <div><p>What information do you collect?</p></div> <p>22% of Questions</p>	<p>Data Anonymous</p> <div><p>Persistent Location, App-specific Data Types (e.g., gestures)</p></div>	<p>Call Log, IP Address, Calendar, Optional Data</p>

Questions **Implicitly** Answered by Labels

Theme	Google Label	Apple Label
Data Collected <div style="border: 1px solid black; padding: 5px; width: fit-content;"><p>Are you storing any of my information?</p></div>		

Theme Answered by Labels

Theme	Google Label	Apple Label
App Security		

Are you certified to be secure?

Is my app data encrypted?

12% of Questions

Questions **Not** Answered Under Theme

Theme	Google Label	Apple Label
App Security Are you certified to be secure? Is my app data encrypted? 12% of Questions	Payment, Past Breaches, 2FA	N/A

Theme Answered by Labels

Theme	Google Label	Apple Label
Sharing		

Does it share my personal information with others?

9% of Questions

Questions **Not** Answered Under Theme

Theme	Google Label	Apple Label
Sharing Does it share my personal information with others? 9% of Questions	Sharing with Advertisers Sharing with Whom	

Theme **Implicitly** Answered by Labels

Theme	Google Label	Apple Label
Selling		
<div><p>Will any of my information be sold?</p></div>		
9% of Questions		

Questions **Not** Answered Under Theme

Theme	Google Label	Apple Label
<p>Selling</p> <div><p>Will any of my information be sold?</p></div> <p>9% of Questions</p>	<p>N/A</p>	<p>Selling to Whom</p>

Theme Answered by Labels

Theme	Google Label	Apple Label
<p>Purpose</p> <div><p>Will you use my data for advertising?</p></div> <p>6% of Questions</p>		

Theme Answered by Labels

Theme	Google Label	Apple Label
<p>Deletion</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"><p>Can i delete my information permanently?</p></div> <p>2% of Questions</p>		

Questions **Not** Answered Under Theme

Theme	Google Label	Apple Label
<p>Deletion</p> <div style="border: 1px solid gray; padding: 5px; width: fit-content;"><p>Can i delete my information permanently?</p></div> <p>2% of Questions</p>	<p>Delete Specific Data</p>	<p>N/A</p>

Question Theme	# of Questions	Answered by Google	Answered by Apple	
Data collected	364	325	310	} Could be answered or partially addressed by labels
App security	199	161	0	
Sharing	151	119	122	
Selling	141	0	125	
Purpose	95	87	87	
Deletion	31	18	0	
Privacy policy	9	7	7	

Question Theme	# of Questions	Answered by Google	Answered by Apple
Data collected	364	325	310
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Selling	141	0	125	
Purpose	95	87	87	
Deletion	31	18	0	
Privacy policy	9	7	7	
Permissions	140	0	0	} Not answerable by labels
App-specific privacy	128	0	0	
Who has access	73	0	0	
Privacy risks	64	0	0	
Retention	56	0	0	
Privacy controls	49	0	0	
Retained method	40	0	0	
Account required	37	0	0	
External access	32	0	0	
Privacy protections	29	0	0	
Cookies policy	9	0	0	
Sum	1647	717 (43.6%)	651 (39.5%)	

Question Theme	# of Questions	Answered by Google	Answered by Apple	
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Sharing	151	119	122	
Selling	141	0	125	
Purpose	95	87	87	
Deletion	31	18	0	
Privacy policy	9	7	7	

Majority of User Questions Not Answered

Retention	56	0	0	} Not answerable by labels
Privacy controls	49	0	0	
Retained method	40	0	0	
Account required	37	0	0	
External access	32	0	0	
Privacy protections	29	0	0	
Cookies policy	9	0	0	
Sum	1647	717 (43.6%)	651 (39.5%)	

Missing Key Information

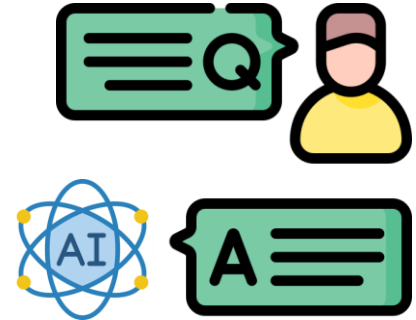
- **Data Recipients**

Missing Key Information

- Data Recipients
- **App Permissions**

Privacy Question Answering Functionality

- Decrease User Burden
- Address App-specific Questions



Do Privacy Labels Answer Users' Privacy Questions?

- Analyzed a corpus of crowd-sourced privacy questions on mobile apps
- Showed that the majority of these questions are not addressed/answered
- Advocated privacy question answering functionality

Thank you!

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