Who's Listening? Analyzing Privacy Preferences in Multi-User Smart Personal Assistants Settings

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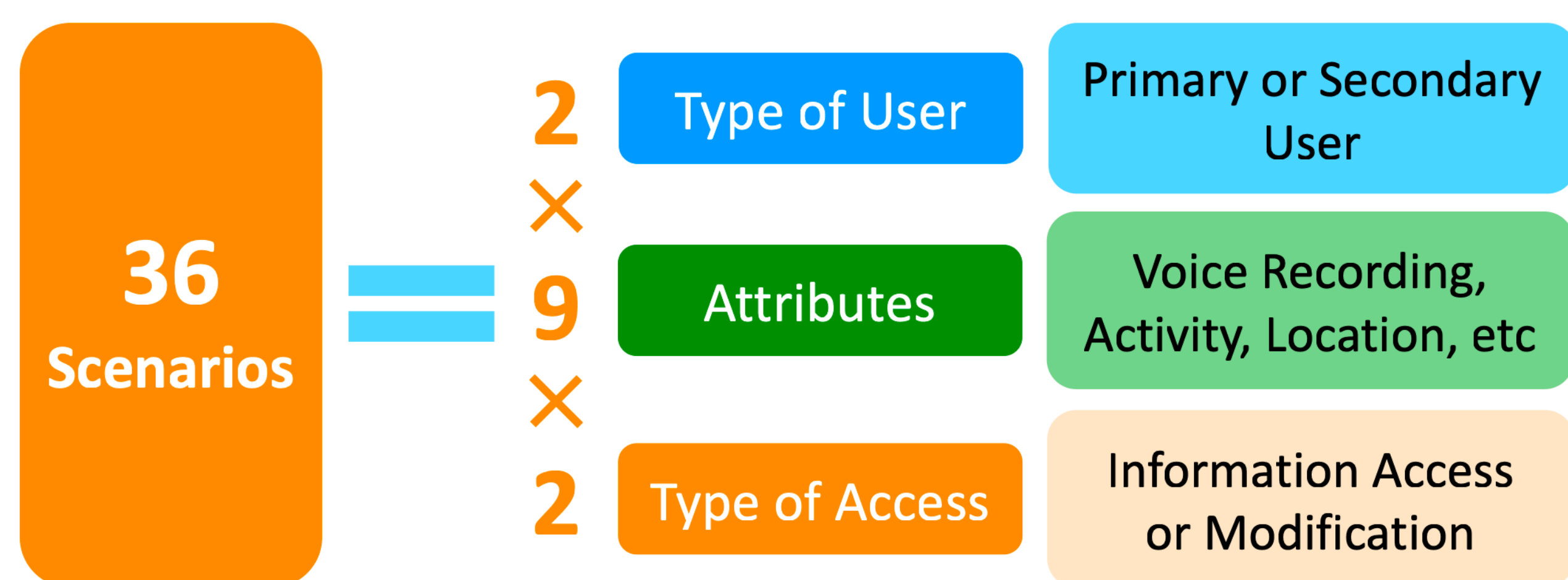[1]Carnegie Mellon University, [2]IST University of Lisbon and INESC-ID

How do smart personal assistants' (SPAs) privacy settings align with user preferences?

SPA adoption is increasing, but **SPAs lack fine-grained privacy controls** which puts both the device owner and incidental users at risk. Our work differs from prior work by including:

➤ secondary users' preferences and priorities
➤ access control for viewing **and changing** settings

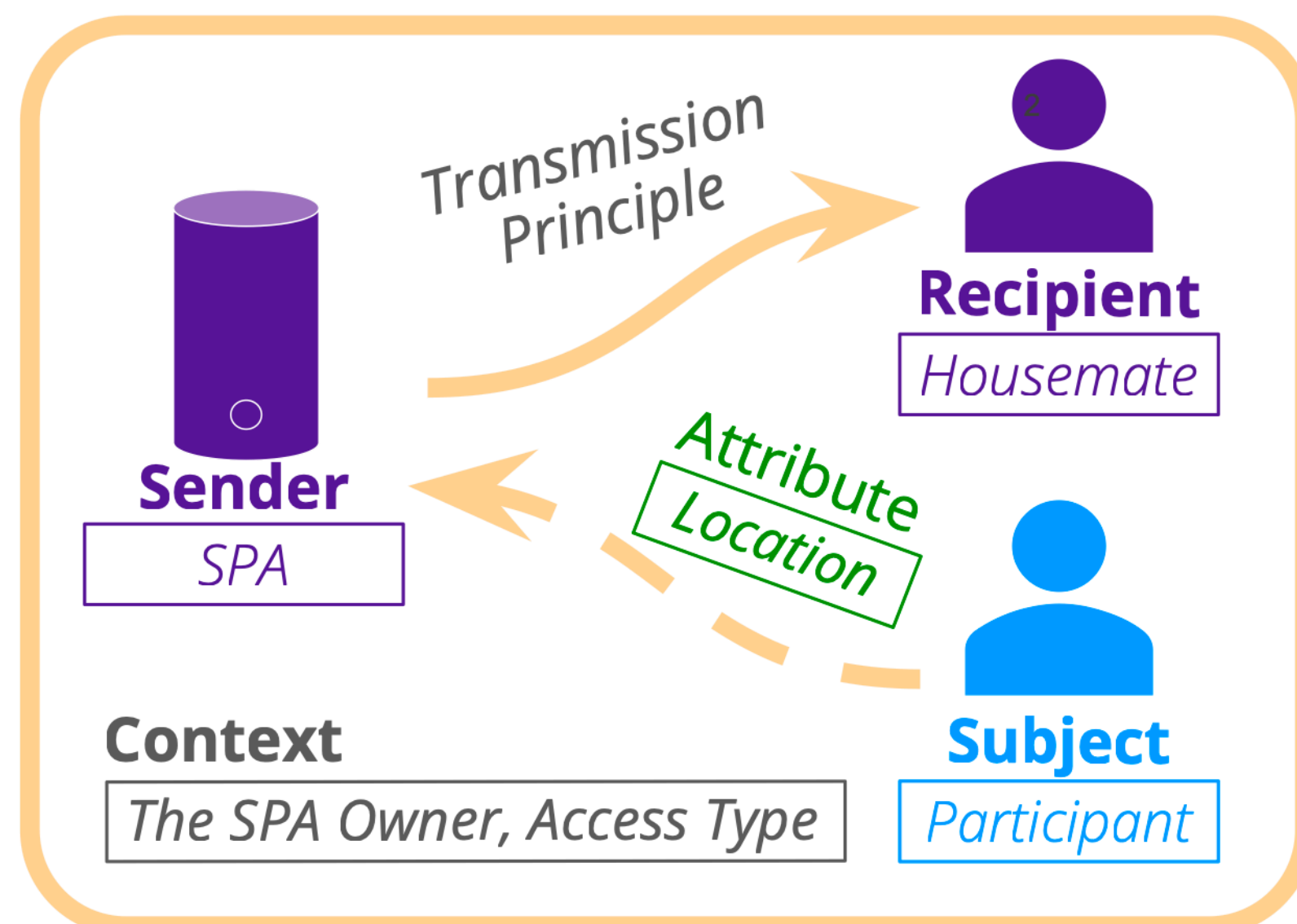## We surveyed 90 people about their access control preferences for 36 scenarios

36 Scenarios = **2** × **9** × **2**

2	Type of User	Primary or Secondary User
9	Attributes	Voice Recording, Activity, Location, etc
2	Type of Access	Information Access or Modification

An example with *Modification*, *Activity* for a *Secondary User*:

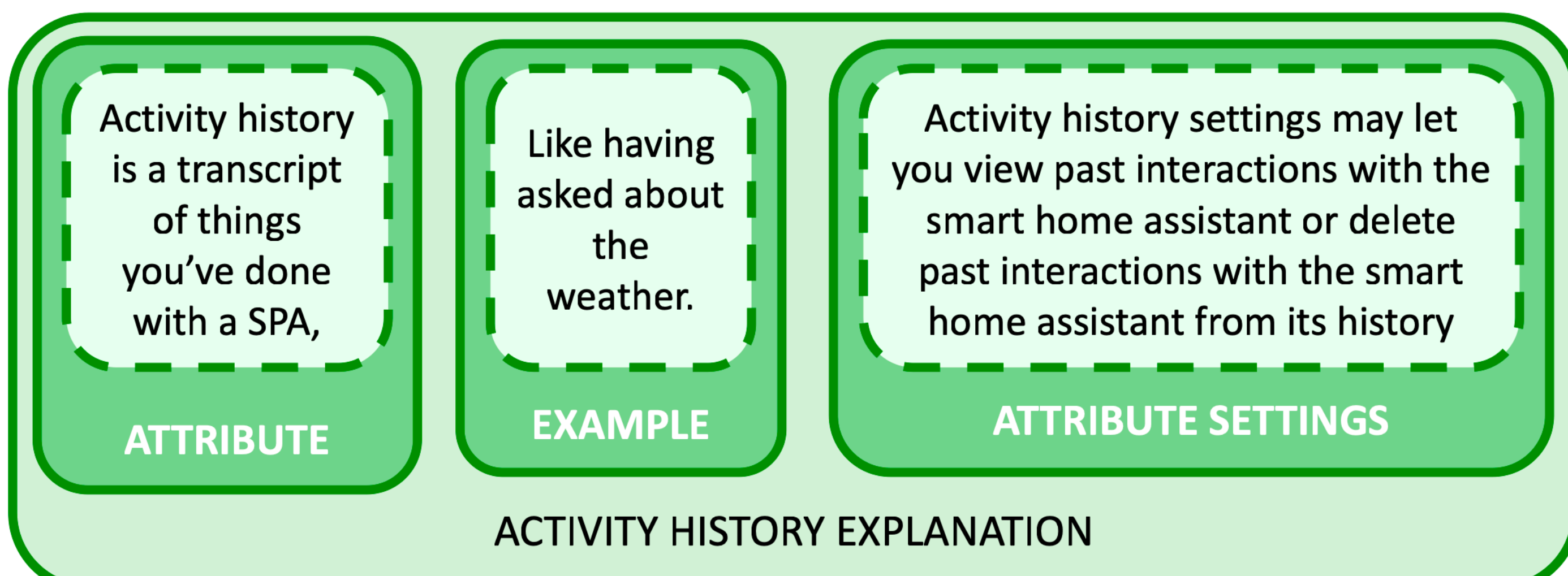*"How important is it for you to be able to change the activity history settings (e.g. who has access to the history) on a smart voice assistant, assuming that the smart voice assistant is owned by: [Secondary User Recipients]"*

Each scenario had up to 10 recipients:
➤ Partner
➤ Children
➤ Housemate
➤ Neighbor
➤ Close friend
➤ Close family
➤ Landlord

We designed explanations for each **attribute**:

ATTRIBUTE	EXAMPLE	ATTRIBUTE SETTINGS
Activity history is a transcript of things you've done with a SPA,	Like having asked about the weather.	Activity history settings may let you view past interactions with the smart home assistant or delete past interactions with the smart home assistant from its history

ACTIVITY HISTORY EXPLANATION

We analyzed the privacy settings of two SPAs,

and used heuristic evaluation to assess whether the nine **attributes** had the settings we asked about in our survey

➤ The expert evaluation revealed limitations in the settings granularity, particularly for the activity history attribute

Google Home

Apple HomePod

➤ Acceptability seems to be linked with relationship proximity

Close family members, partners, and close friends typically have higher acceptability percentages

Participants' answers for the *Modification*, *Activity* and *Secondary User* scenario

■ Very Important ■ Somewhat Important ■ Not Important
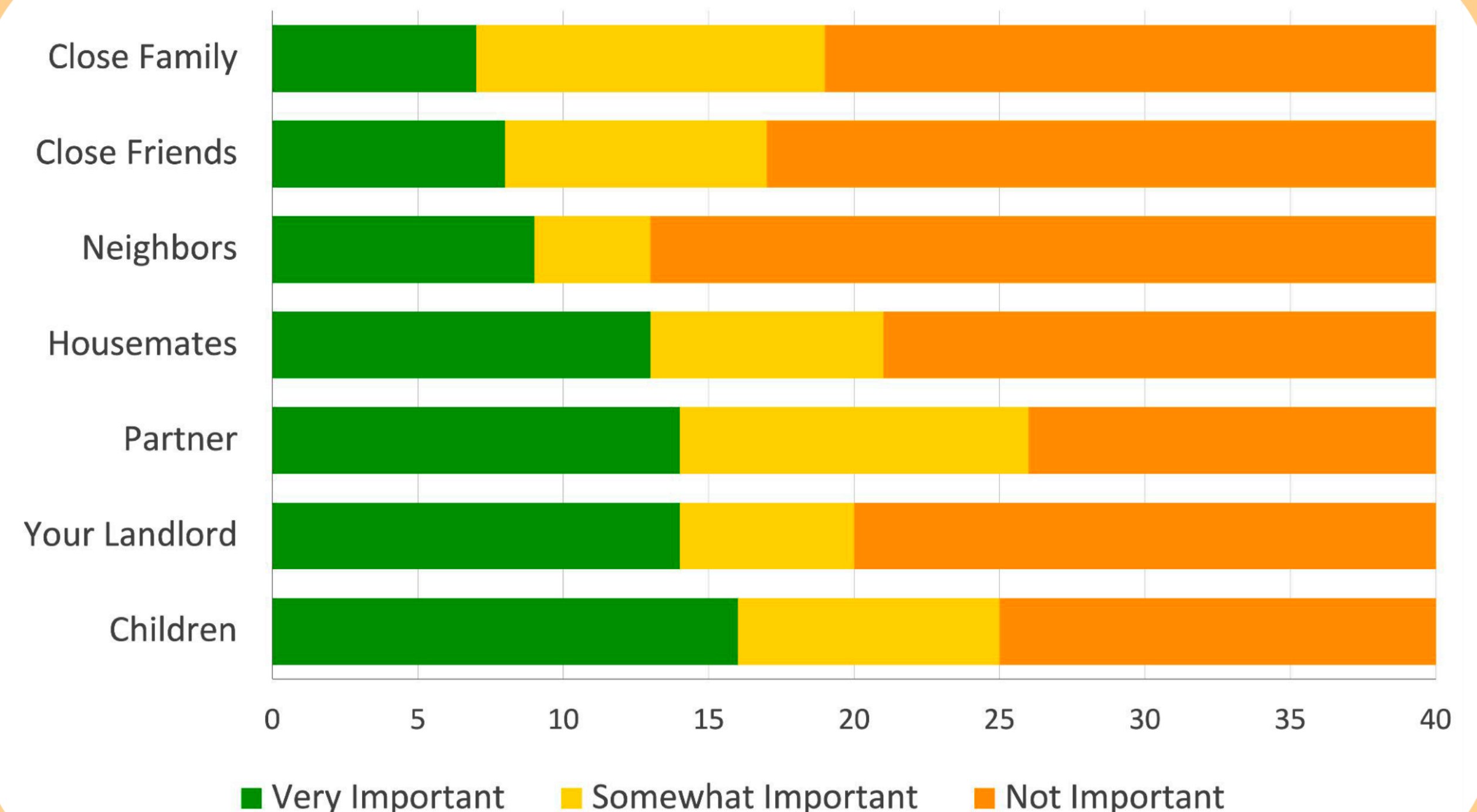
➤ Participants don't want to share control of all settings when they are the SPA owners, however,

when they are secondary users, they still wish for control (mainly when the owners are their partners, children, or housemates)

➤ Main concern about SPAs is monitoring, but not all participants were worried,

"They listen to you if you don't turn that setting off, and that is super creepy. (...)" (P72)

"I think security perversions are inevitable whether or not you own a home assistant" (P58)

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