

# Awareness, Intention, (In)Action: Individuals' Reactions to Data Breaches

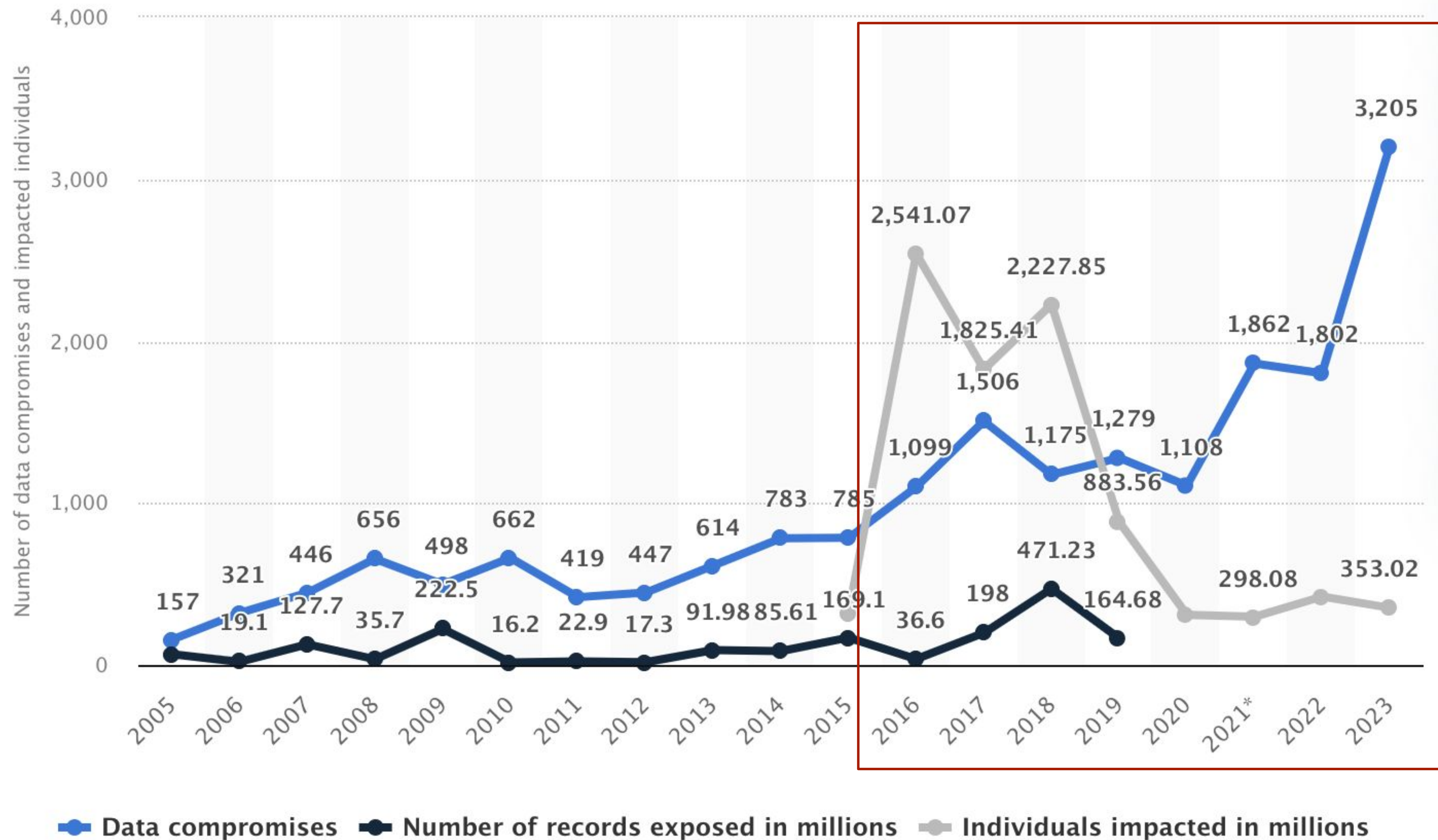
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Original  
Paper  
@USENIX  
Security

# Annual Number of Data Breaches Rises

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Data source:  
Identity Theft  
Resource  
Center

Image source:  
Statista

Prior work asked about **breaches in general** or intended reactions in **hypothetical scenarios**.

We examined individuals' reactions to **real-world breaches** that have **exposed their personal data**.



Ecologically  
valid responses



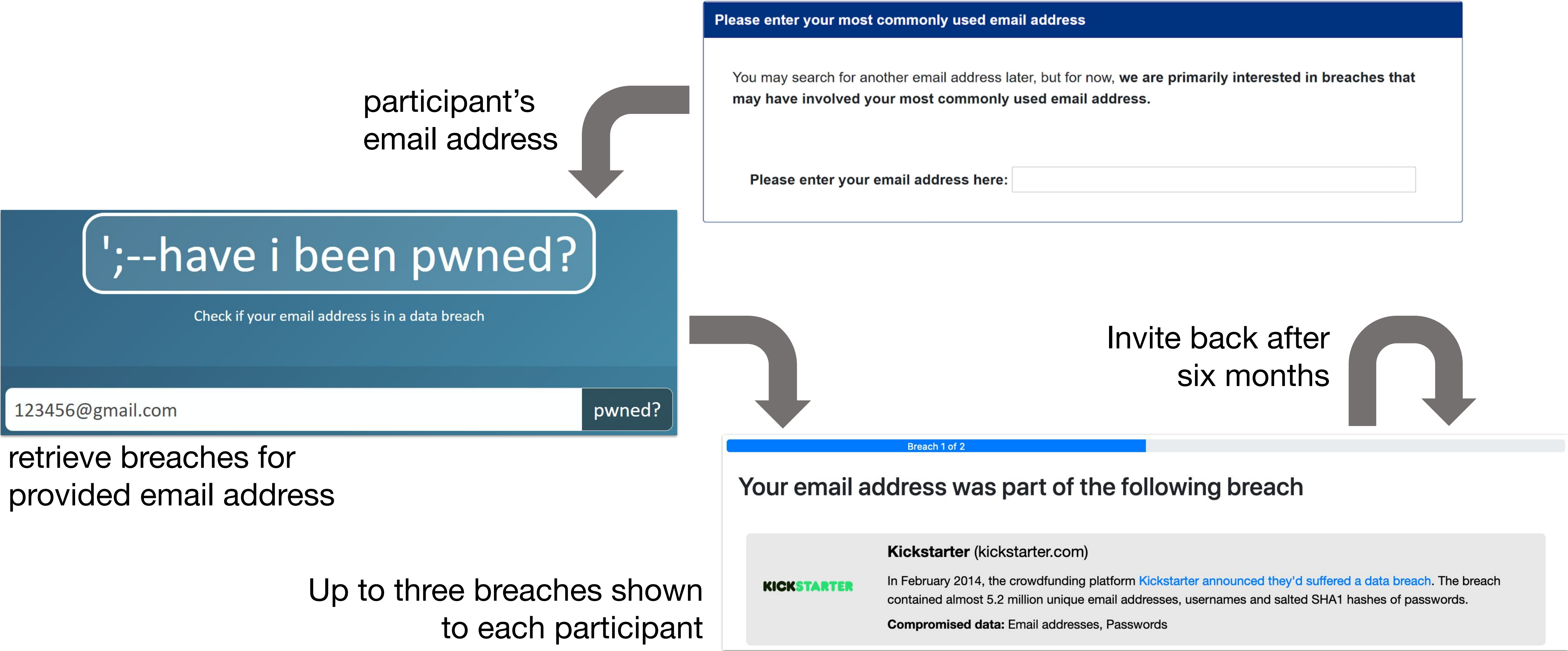
Mitigate potential  
recall bias

Followed up with participants after six months:  
**which actions** they took after we made them **aware of the breach**.



# We built our own survey platform that queries the API of **Have I Been Pwned**.

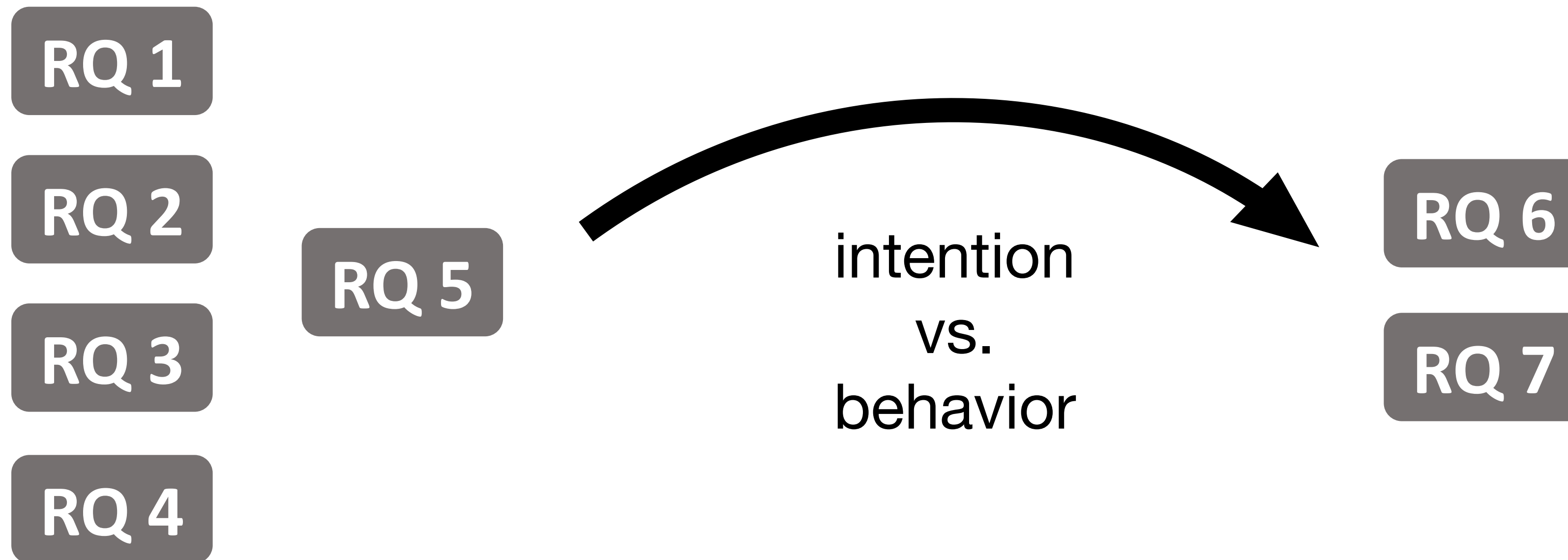
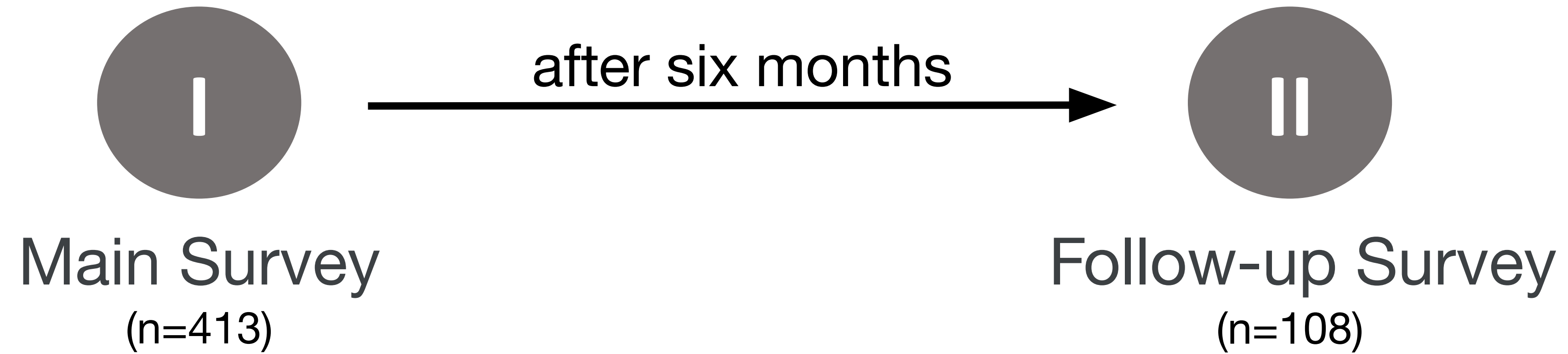
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# Research Questions

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- RQ 1** **Factors** influencing the **likelihood of exposure** to data breaches?
- RQ 2** Perceptions of **causes** and **impacts** when affected by data breaches?
- RQ 3** Participants' **awareness** of data breaches?
- RQ 4** Participants' **emotional reactions** to data breaches?
- RQ 5** Participants' **behavioral intention** after data breaches?
- RQ 6** Participants' **behavioral responses** to data breaches?
- RQ 7** **Factors** influencing participants' **behavioral responses**?



# Main Study Results

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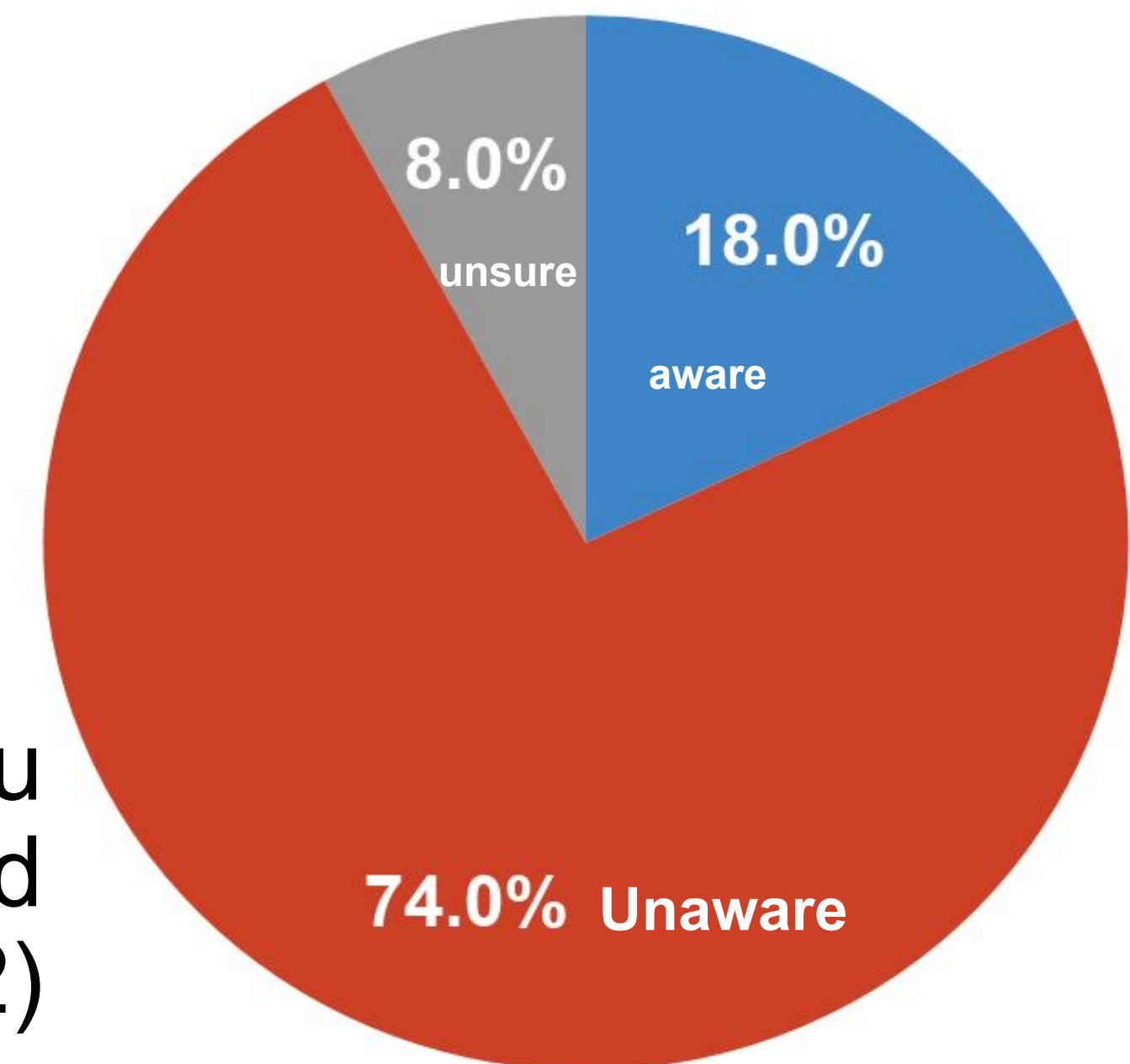
73%

participants had  
one or more data  
breaches.

5.4

as the average  
number of breaches  
per participant.

Participants were **unaware**  
of most breaches  
displayed to them.

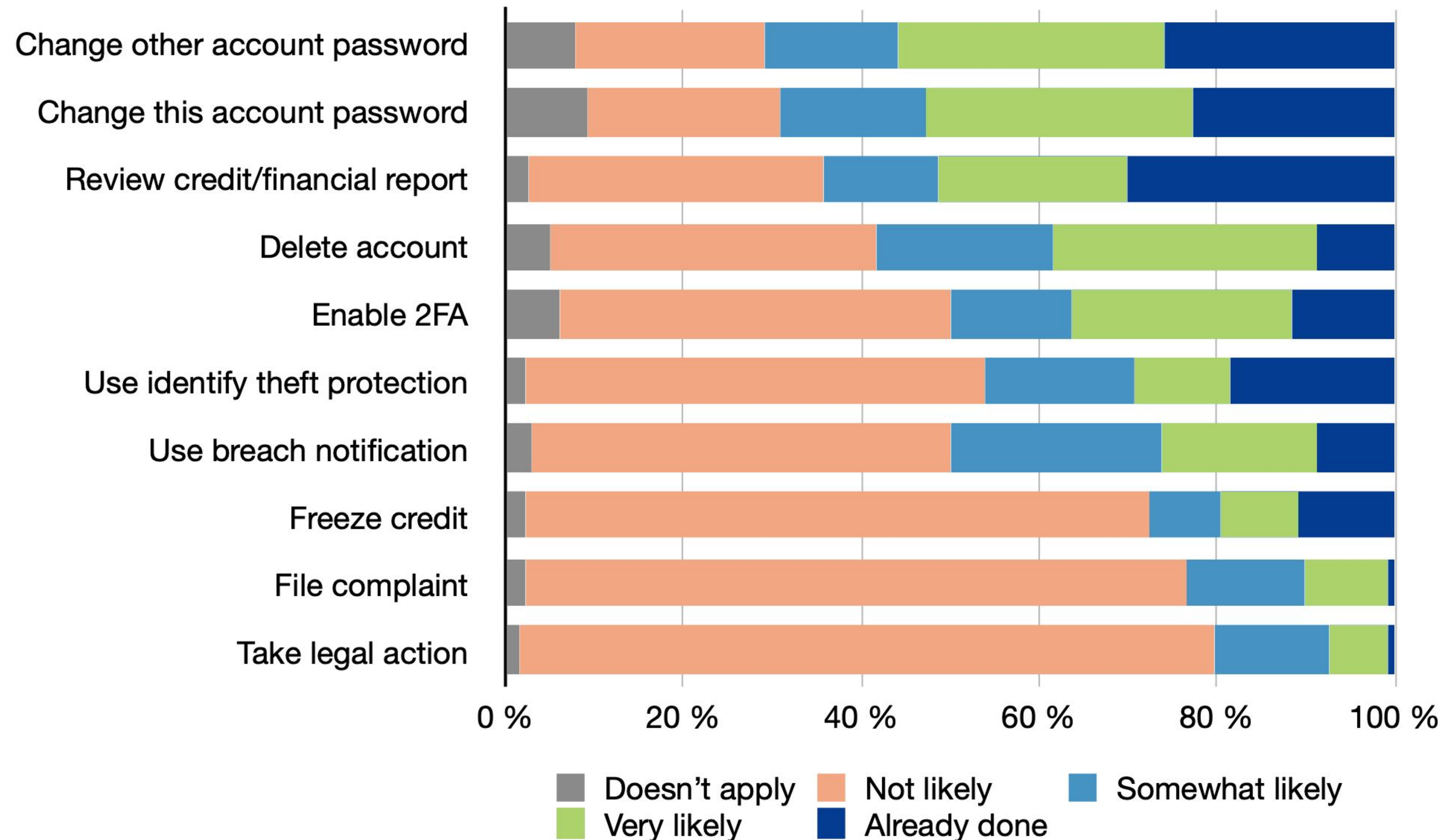


“Prior to this study, were you  
aware that you are affected  
by this breach?” (n=792)



# Behavioral Intention in Main Study

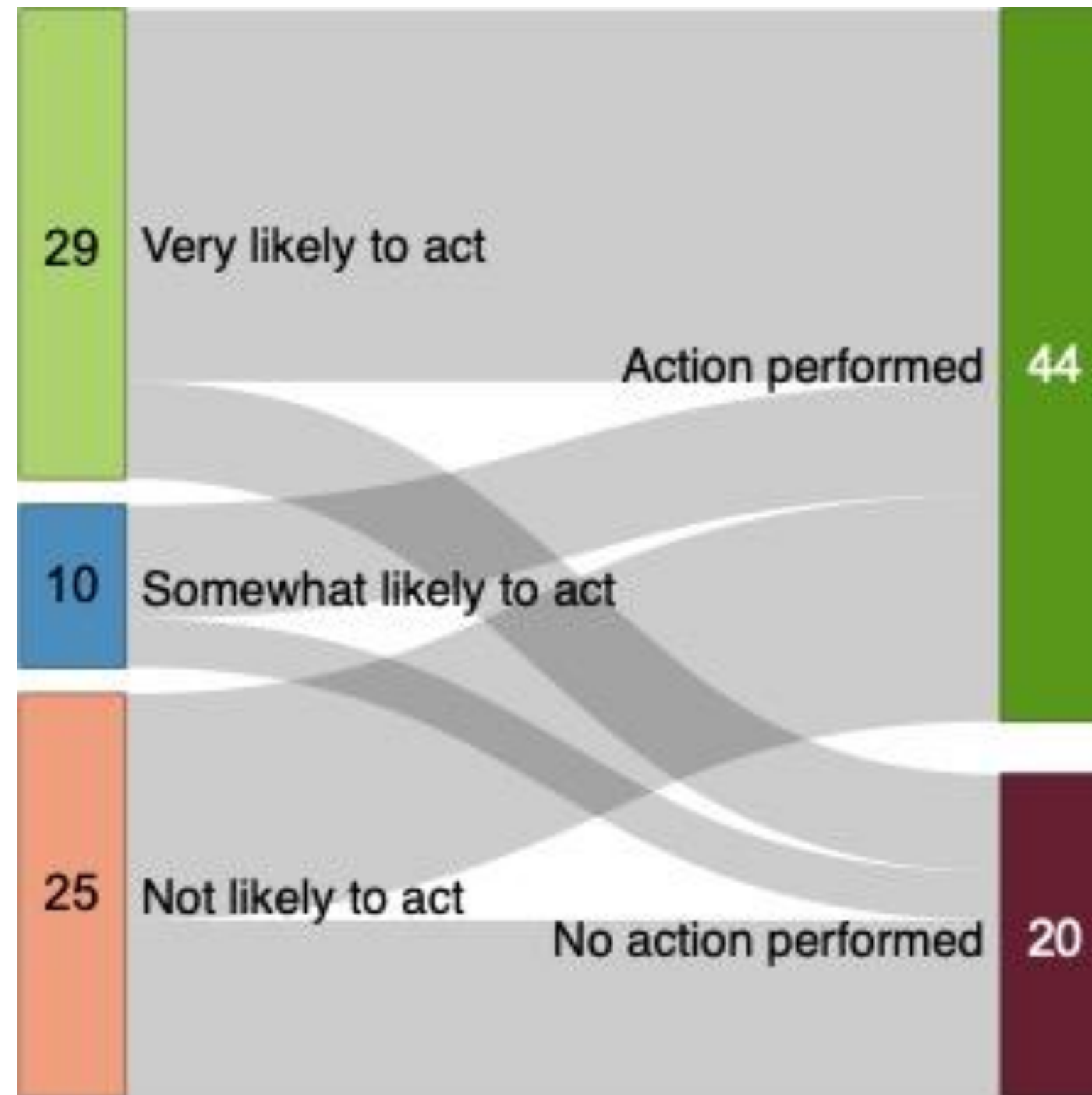
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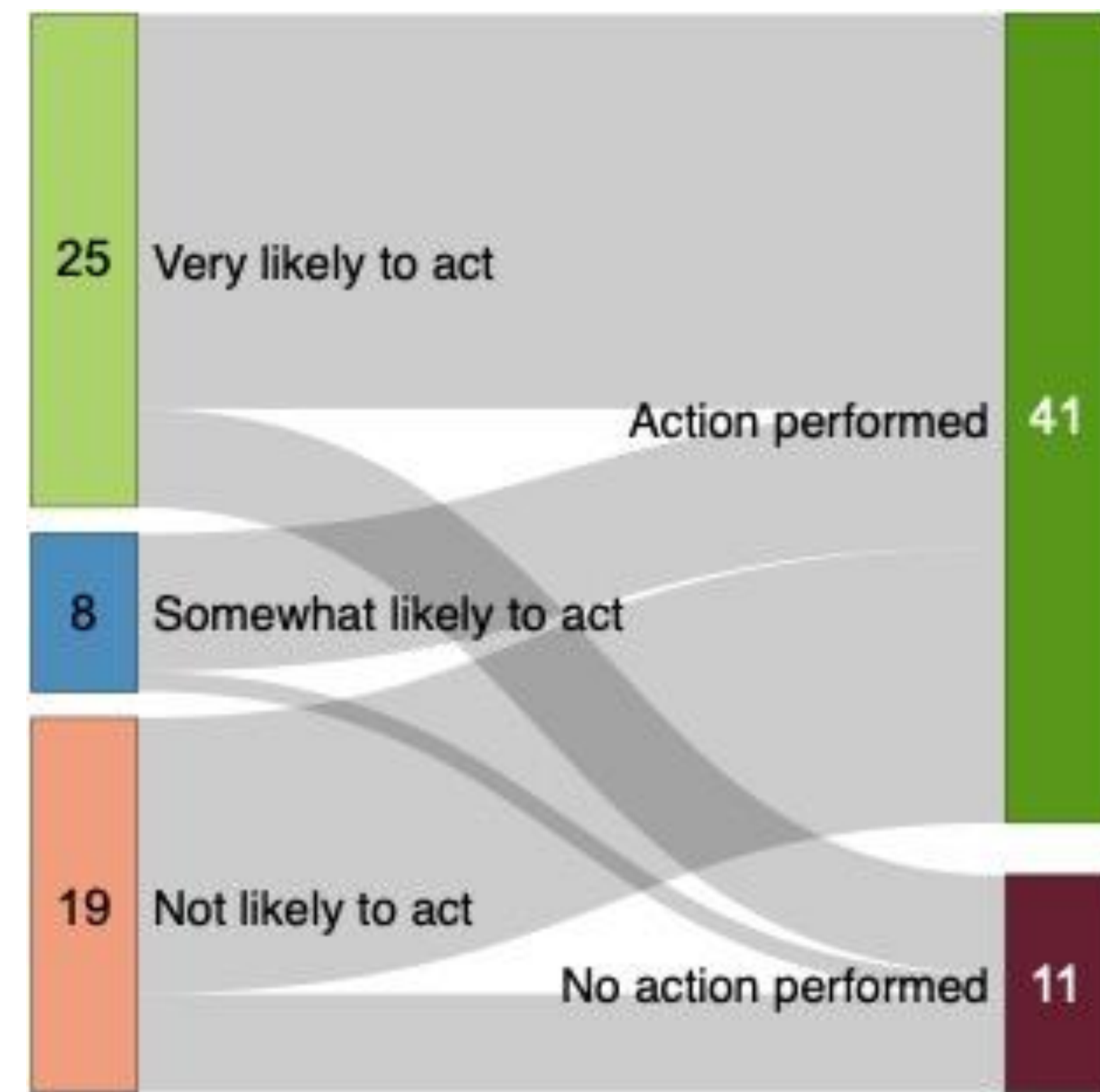


# Performed Actions

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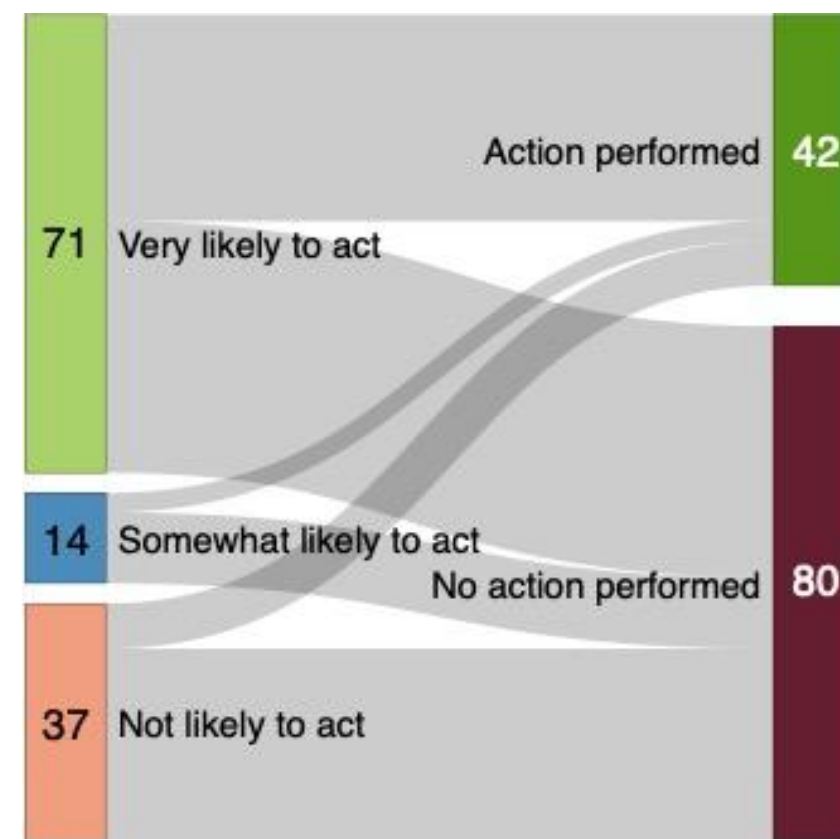
Review Credit Reports



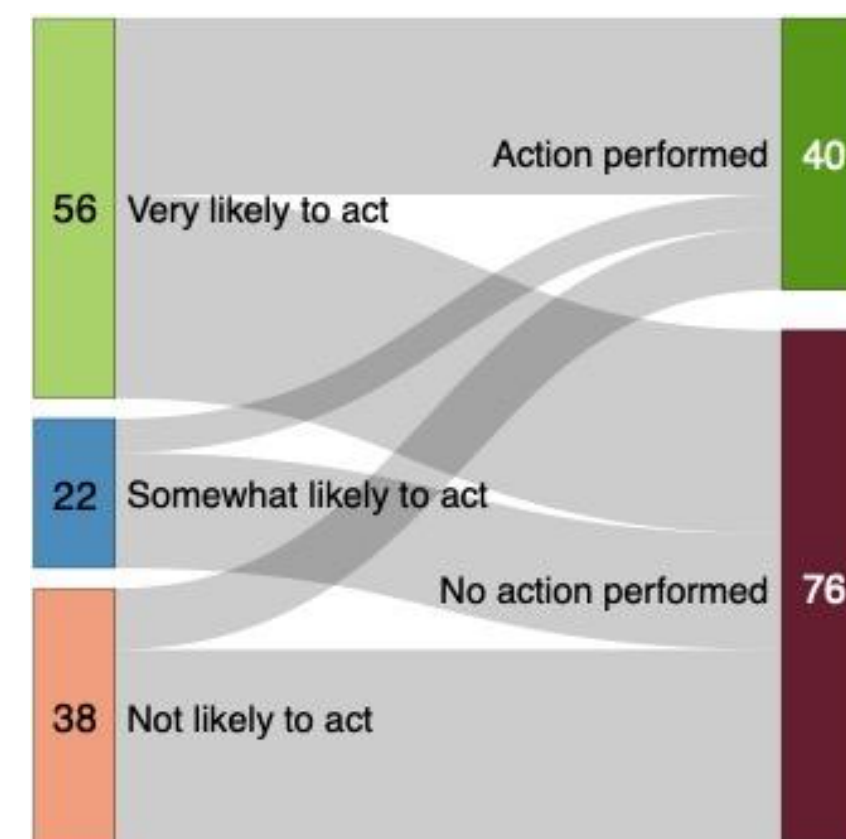
Review Financial Statements

# Performed Actions

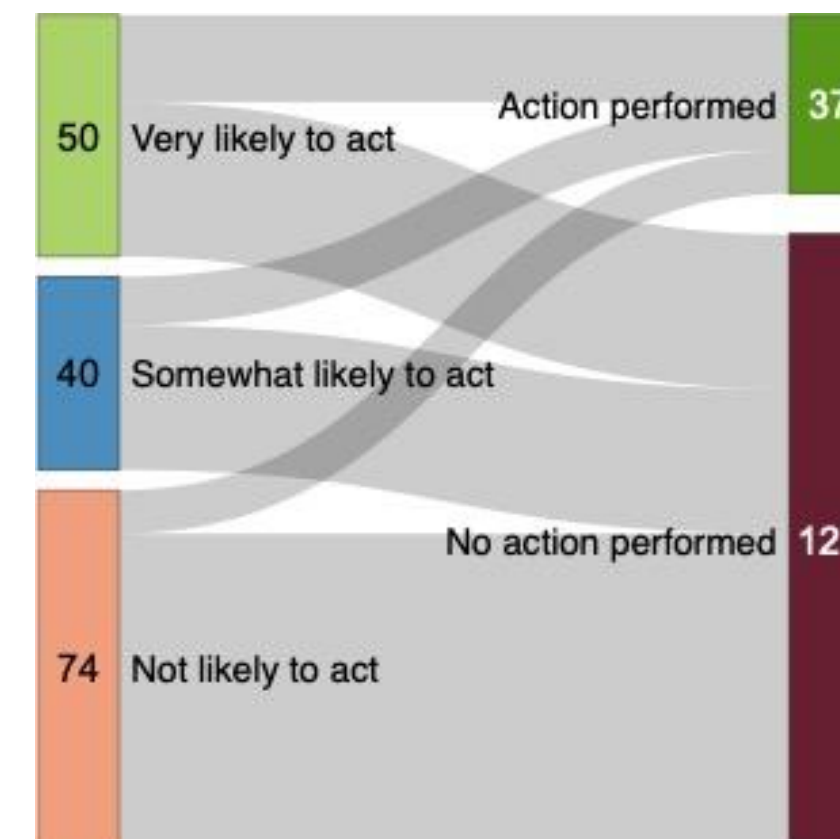
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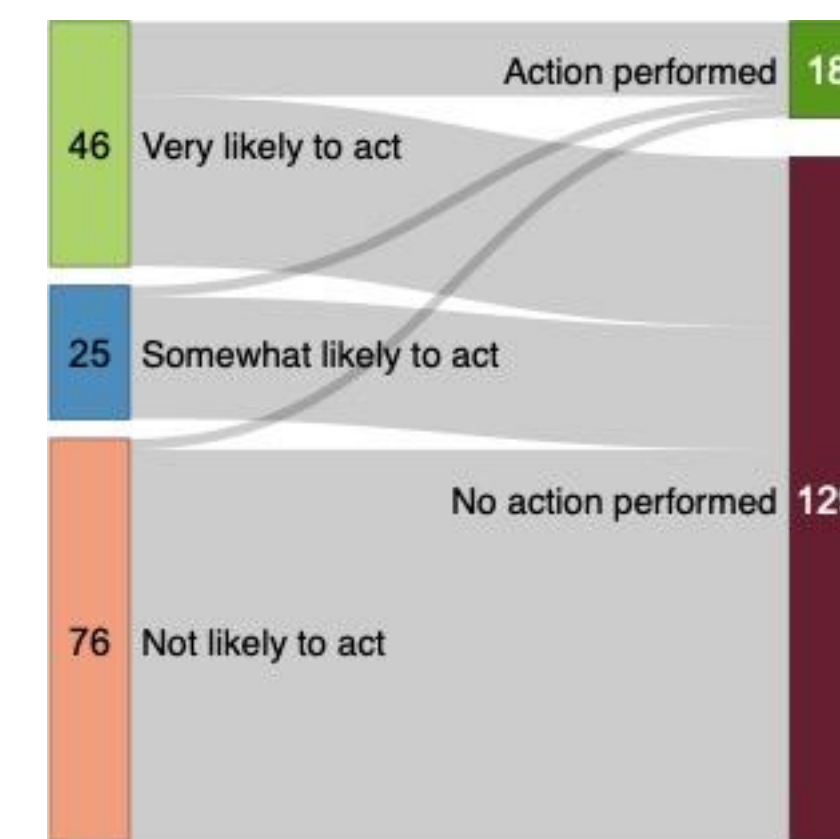
Change Password



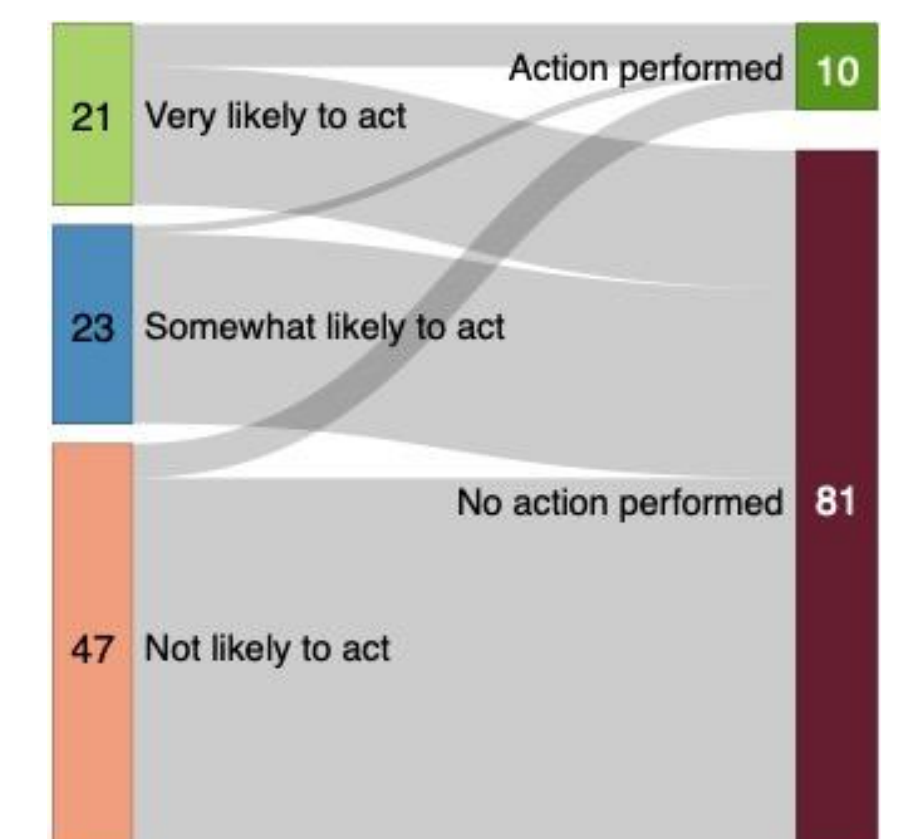
Change Other Passwords



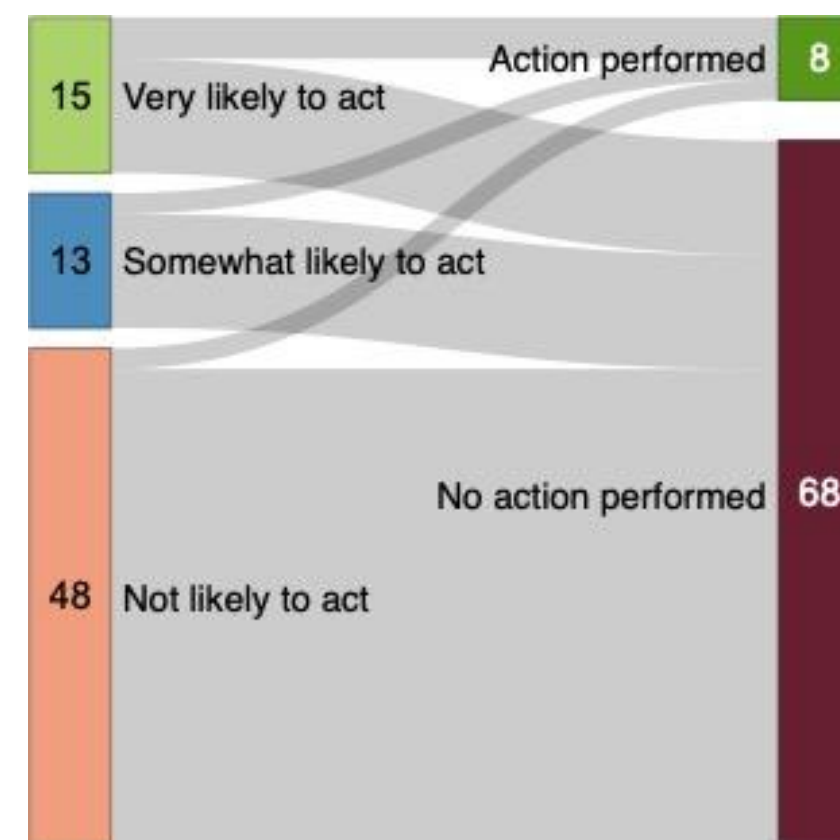
Delete Account



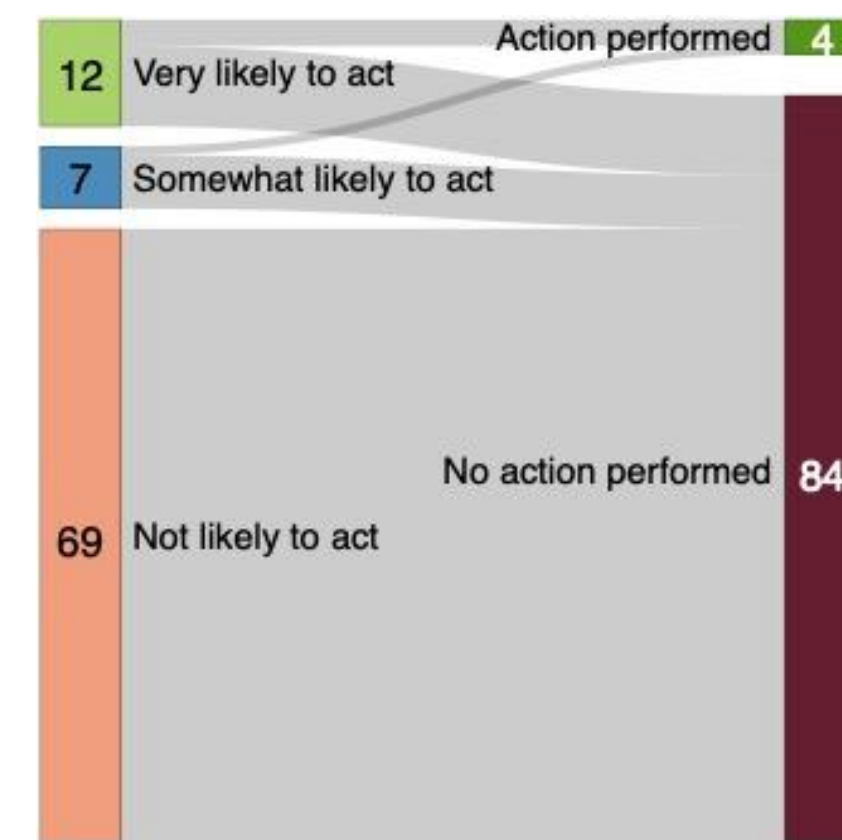
Enable 2FA



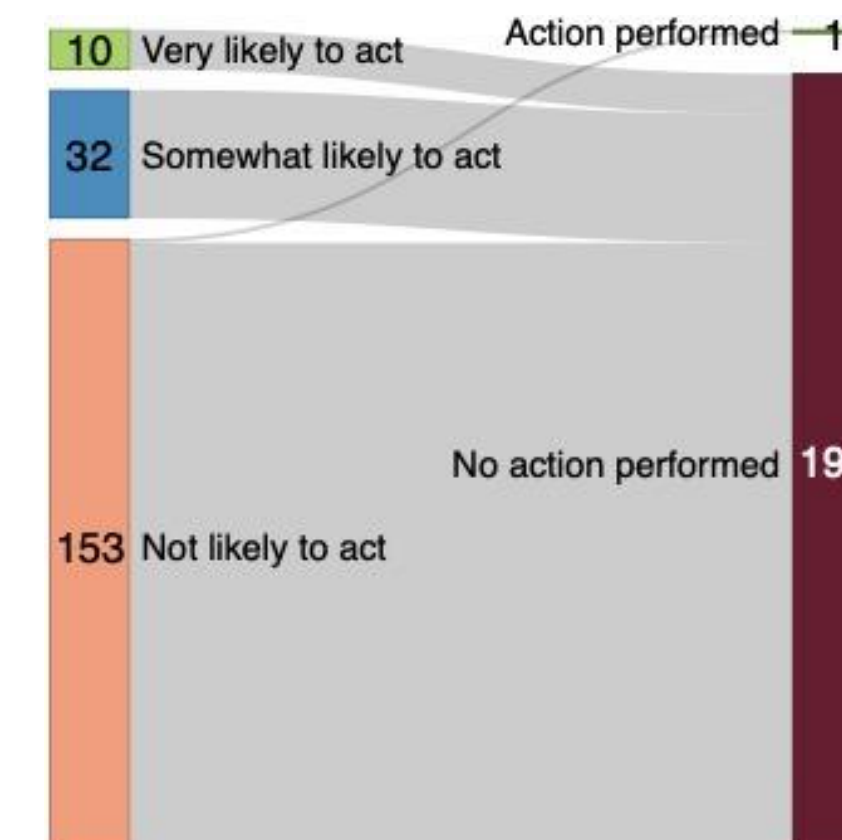
Breach Notification Service



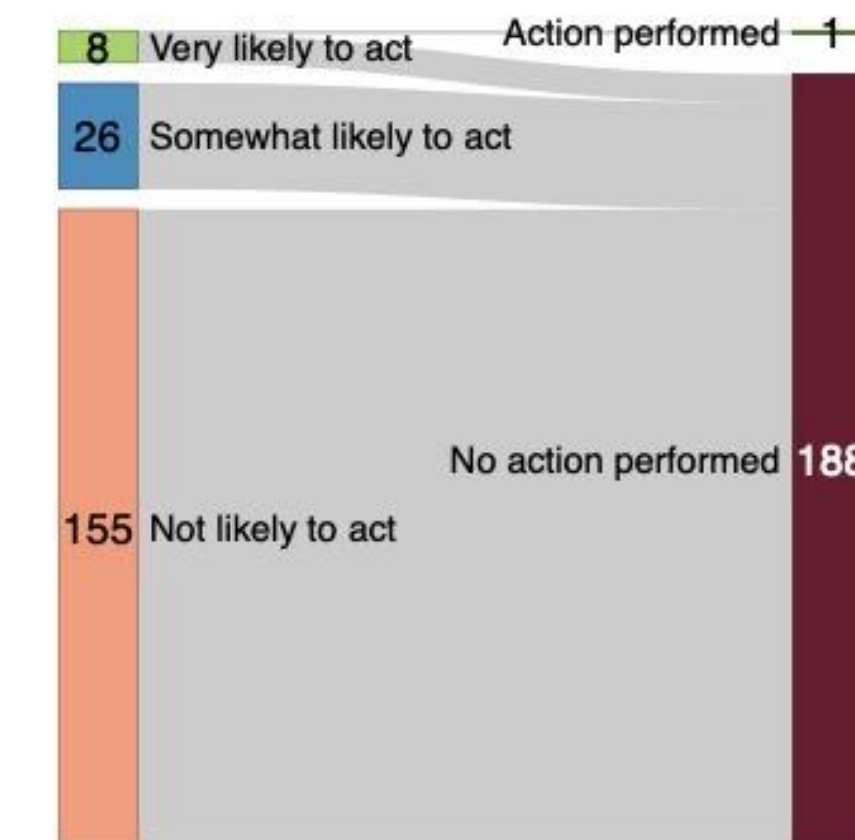
Identity Monitoring Service



Credit Freeze



File Complaint



Take Legal Action

# Intention-Behaviour Gap

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- ▶ **Reviewing credit reports and financial statements** were among the **most performed** actions
- ▶ **Legal actions and complaints to consumer protection authorities** were among the **least performed** actions
- ▶ There's a **significant intention behavior gap** in responding to breaches, influenced by specific actions



## Motivators for taking proactive actions

- ▶ Concern
- ▶ Prior Incidents
- ▶ Proactive attitudes



## Hindrances for not taking action

- ▶ Apathy
- ▶ Perceived costs
- ▶ Forgetfulness
- ▶ Resignation toward breaches
- ▶ Account Issues



# Implications

- ▶ Bridge the Intention-Behavior Gap
  - ▶ E.g., reminders or commitment nudges
  - ▶ Finding strategies is part of future work
- ▶ Consider the Effort Budget and Situations of Individuals
- ▶ Address Misconceptions
  - ▶ Individuals might be deterred by costs that do not exist
  - ▶ Individuals might blame themselves
- ▶ Develop Better Tools to Help Individuals React to Breaches
  - ▶ Make protective/proactive actions seamless, so recovery actions are unnecessary
- ▶ Set Stricter Legal Requirements for Notifying & Protecting Individuals
  - ▶ More usable protections by companies and provision of proactive tools
  - ▶ More effective ways to make affected individuals aware of breaches

# Key Takeaways

- ▶ Bridge the Intention-Behavior Gap
- ▶ Consider the Effort Budget and Situations of Individuals
- ▶ Address Misconceptions
- ▶ Develop Better Tools to Help Individuals React to Breaches
- ▶ Set Stricter Legal Requirements for Notifying & Protecting Individuals

Thank you!

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