

Comparing Hypothetical and Realistic Privacy Valuations

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Why measure privacy preferences?

- Privacy preferences = willingness/comfort sharing personal info
- Who benefits from understanding privacy preferences?
 - System designers
 - What data are users okay sharing?
 - How much value should users receive for sharing?
 - Policy makers
 - How much “loss” do consumers incur through data breaches?
 - What kind of data sharing (if any) should be disincentivized?

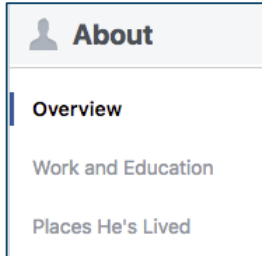
Measuring privacy preferences is challenging

- Contextual factors influence users' privacy preferences and behaviors
 - E.g., willingness to share PII depends on how it will be used
- Valuations of goods (estimations of worth) influenced by framing effects and cognitive biases
 - Hypothetical bias = overestimate value in hypothetical scenario
- Stated privacy attitudes often do not align with actual behavior (privacy paradox)

This talk: Can we predict privacy valuations?

- Privacy valuation = willingness to sell and selling price for personal info
- How do privacy valuations depend on combinations of factors?

Attribute type



Receiving party



Scenario realism



- Does hypothetical bias explain the privacy paradox?

Methodology

- Online study with 434 Prolific participants
- Participants asked to assign selling prices to personal attributes
 - Could also choose to not sell
 - Selling scenario was information marketplace operated by CMU
 - Attributes in market are sold to buyers via an auction
 - Buyers have limited budgets and purchase lowest-priced offers first

Prices assigned to 7 attributes and 6 parties

For how much do you agree to sell your [attribute] to each one of the following parties?

Choice

Sell

Do not sell

\$ amount

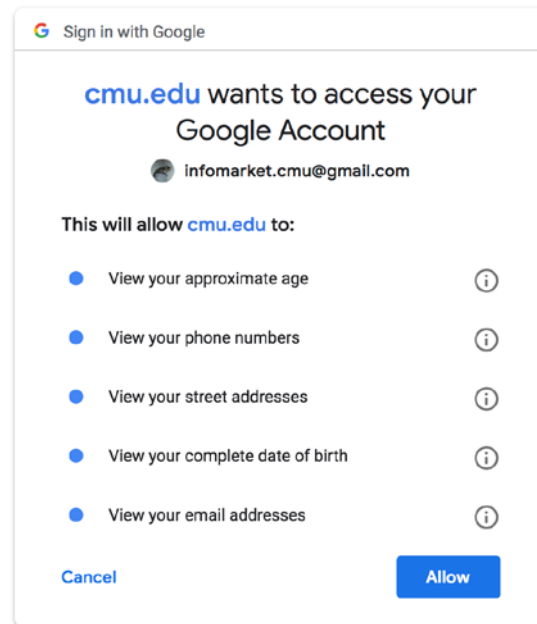
- Age
- Email address
- Gender
- Relationship status
- Home address
- Occupation
- Phone number
- Ad networks
- Federal agencies
- Insurance companies
- Market research companies
- Political parties
- Research pools

We varied the realism of the scenario

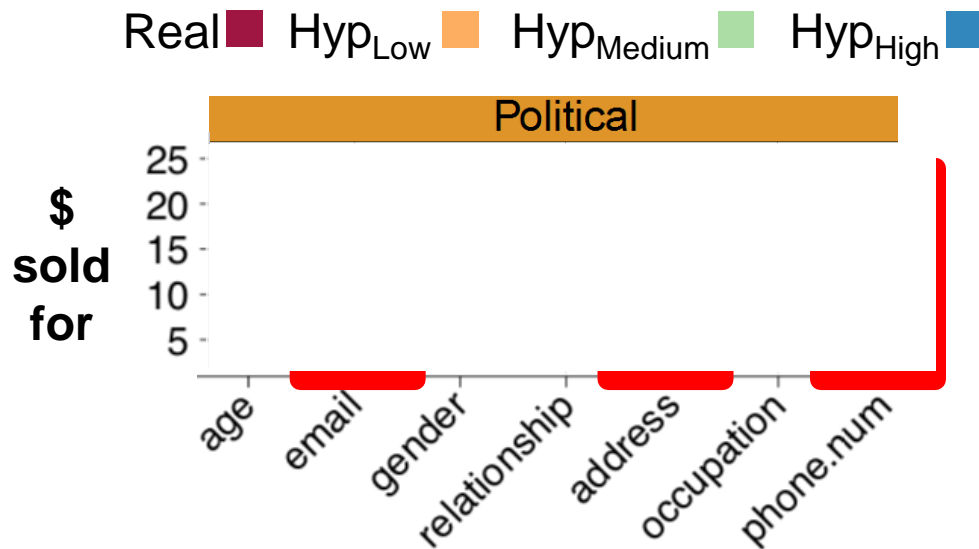
More realistic

- **Realistic (Real)**
Google SSO to share attributes (functional market)
- **Less realistic (Hyp_{Low})**
Evaluate near-operational market
- **Even less realistic (Hyp_{Medium})**
Evaluate market concept
- **Least realistic (Hyp_{High})**
Participate in research on buying/selling preferences

Less realistic



Contact info sold for more \$



Selling price depends on who is buying

\$\$

Research pools

Federal agencies

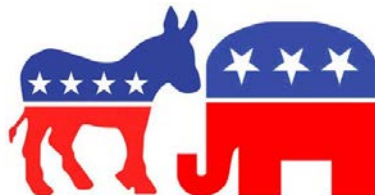


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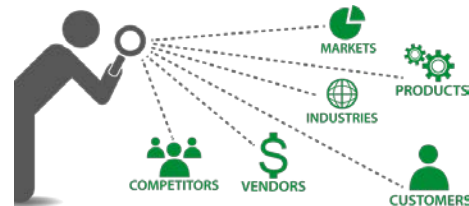
Ad networks



Political parties



Market research companies



Insurance companies



Privacy paradox doesn't always hold

- *Hypothetical* values not generally different than *Realistic* values
 - Exceptions:
 - Phone number (~\$9 vs. ~\$14)
 - Home address (~\$8 vs. ~\$11)
- Calibration factor = Hypothetical / Real
 - Largest calibration factor in our study was 1.61
 - List and Gallet (2001): 4.44 for public goods, 8.41 for private goods
- No significant differences in likelihood of selling by scenario realism

Can we predict valuations?

- From scenario realism, attribute type, and receiving party

Dollar values? 

- Not yet, individual users have very different baselines
- But, given baseline, accurate \$ prediction possible

Attribute rankings? 

- Yes, Same average rankings regardless of scenario realism
- Eliciting subset rankings further improves predictions

Takeaways

- Certain privacy preferences are possible to predict
- In contrast to other types of goods, privacy valuations not generally affected by hypothetical bias
- Attribute rankings stable regardless of scenario realism and receiving party
- Selling prices can be accurately predicted based on attribute type and receiving party, given baseline price for individual person

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