

Privacy Perceptions About Health and Non-Health Mobile Apps

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Research Question

- How do(es) the **perceived health-relatedness** and/or **medical-relatedness** of an app's **purpose** and/or its **data practices** affect:
 - People's views on **what legal and app store provisions apply**, or **should apply**, to that app or those data practices; and
 - Whether they think apps are **likely to act** within those restrictions?

Study Design: Phase 1

- Survey with ~300 people in the U.S.
- Between-subjects design; random condition assignment between 6 sample apps
- Participants supply likely data practices based on app description
- Multiple-choice Likert scale questions

Simple Blood Donation

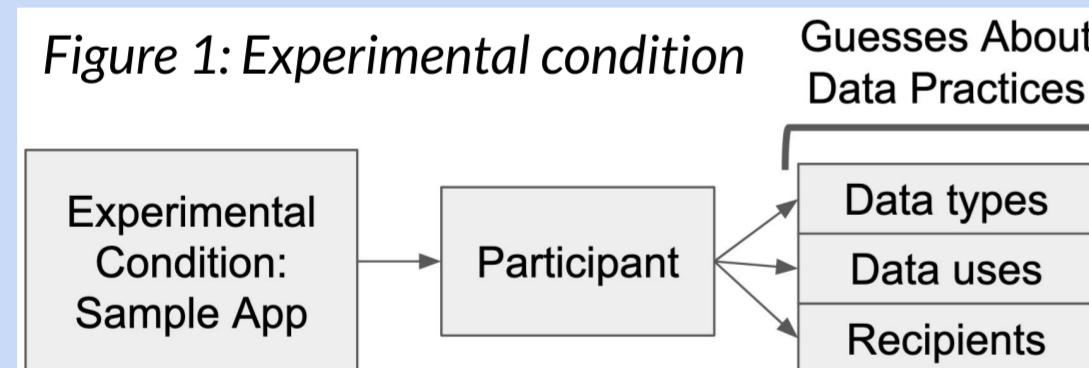
The easy-to-use "Simple Blood Donation" makes blood donation registrations and appointments hassle-free and completely digital. Furthermore, Simple Blood Donation allows you to track and manage your blood donations wherever you go. Now, you can save the lives of many people in just a couple swipes and taps! Giving blood to those in need has never been easier. Welcome to the digital era of blood donation!

Data Type Guesses: Blood donation history, Blood type, History of donation locations, Location, DOB, Email

Data Use Guesses: Selling advertisement data, Track blood donation, Keeps (blood) inventory, Informing user

Recipient Guesses: American Red Cross, Hospitals, Advertisement companies, Government

Figure 2: Example app prompt and participant-supplied data practices



- Sample App Topics:**
- Ideal Flashlight, Simple Blood Donation, Kink Finder Extra, Telehealth Pocket, STI Helper+, Step Count Manager

Analysis: Phase 1 Hypothesis Testing

Example hypothesis: If an app's purpose is health-related, users are more likely to think it's legal for the app to collect the data they expect it to collect.

Variables	
<p>Perceptions About Laws and Mobile App Store Rules:</p> <ul style="list-style-type: none"> Do they exist? Should they exist? > ...in general? > ...for predicted data practices? 	<p>Characteristics of Apps and Predicted Data Practices:</p> <ul style="list-style-type: none"> Related to health? Related to medical care? Sensitive? <p>Is data practice relevant to app purpose?</p>

- Encoded Likert responses into **binary values**
- Performed **binary logistic regression** to test 1418 relationships, using R^2 value for **strength of correlation**

Findings: Phase 1

Frequency Distribution: Views on App Store Rules

- Views on **should** have **more statistical variance** than views on **do**
- Driven by correlation of should with other variables?**
- Some participants think store rules are **more permissive** than they **should be**
- Views on **laws** are pretty **similar to store rules**

	Definitely no	Likely no	I don't know	Likely yes	Definitely yes
Do store rules allow collection of data type ?	0%	5%	15%	42%	37%
Do store rules allow sharing with recipient ?	1%	6%	27%	39%	27%
Do store rules allow this data use ?	1%	4%	17%	42%	36%
Should store rules allow collection of data type ?	8%	12%	18%	42%	21%
Should store rules allow sharing with recipient ?	17%	18%	21%	26%	18%
Should store rules allow this data use ?	12%	14%	16%	35%	23%
	Strongly disagree	Mostly disagree	Neither agree nor disagree	Mostly agree	Strongly agree

Figure 3: Answer frequencies for questions about regulation of data practices

Correlations Between Views on Legality/Allowability and App Purpose/Data Practice Characteristics

- Participants' views about **what laws or store rules say** about data practices they predicted were correlated with the **data practices' characteristics**
- Views about **what laws or store rules should say** were even **more strongly correlated**
- Views about **what laws or store rules say or should say** about data practices *may have been* directly correlated with **app characteristics**

Views on Legality of Sending to Recipient vs. Characteristics of App & Recipient (R^2)

	App purpose health-related?	App purpose medical?	App purpose sensitive?	Recipient health-related?	Recipient medical?	Recipient relevant to purpose?
Do laws allow this sharing?	0.50	0.49	0.48	0.75	0.75	0.75
Do store rules allow this sharing?	0.44	0.44	0.41	0.67	0.67	0.67
Should laws allow this sharing?	0.53	0.52	0.49	0.91	0.89	0.92
Should store rules allow this sharing?	0.52	0.52	0.47	0.91	0.90	0.92

Figure 4: Correlations of views on legality of data practices with characteristics of app and data practices. Cells show coefficient of determination (R^2). All relationships have a positive slope.

Views on Legality of Collecting Data Type vs. Characteristics of App & Data Type (R^2)

	App purpose health-related?	App purpose medical?	App purpose sensitive?	Data type health-related?	Data type medical?	Data type sensitive?	Data type relevant to purpose?
Do laws allow this collection?	0.73	0.70	0.72	0.80	0.84	0.81	0.83
Do store rules allow this collection?	0.69	0.67	0.69	0.77	0.81	0.78	0.78
Should laws allow this collection?	0.78	0.76	0.76	0.89	0.90	0.89	0.94
Should store rules allow this collection?	0.78	0.76	0.76	0.89	0.89	0.89	0.94

Views on Legality of Data Uses vs. Characteristics of App & Data Uses (R^2)

	App purpose health-related?	App purpose medical?	App purpose sensitive?	Data use health-related?	Data use medical?	Data use relevant to purpose?
Do laws allow this use?	0.57	0.56	0.58	0.79	0.79	0.82
Do store rules allow this use?	0.55	0.54	0.55	0.75	0.75	0.77
Should laws allow this use?	0.60	0.58	0.58	0.91	0.90	0.95
Should store rules allow this use?	0.60	0.58	0.57	0.90	0.90	0.94

Planned Study Design: Phase 2

- Add app prompts on more topics that are **ambiguously "health-ish"**
- Break structure into **two surveys**:
 - Survey 1: Rate characteristics
 - Survey 2: Predict app behavior and app store rules
- Focus on **recommendations for app platforms** (drop laws questions)
- Drop unpromising variables**

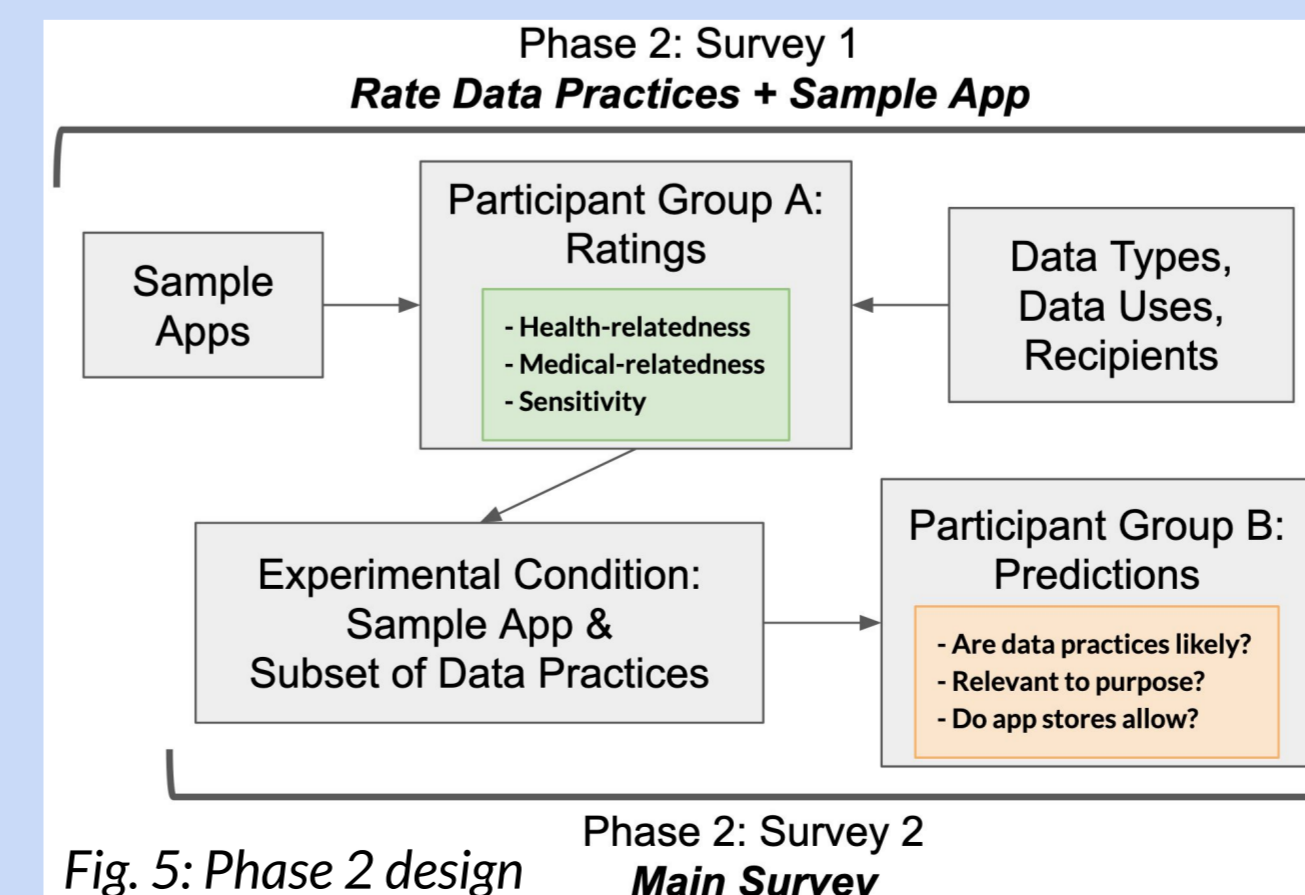


Fig. 5: Phase 2 design

Implications So Far

- The context of an app and **how it presents itself** can affect the **privacy protection perceptions** of the user
 - An app presenting itself as a **health/medical app** may gain **more privacy leeway**, whether or not it's merited
- People may think protections should be more **health-specific**
 - Higher correlation between **health/medical-relatedness of data practices** and what **protections should say** versus what **protections do say**
- May suggest focus on **transparency of data type collection**