

Effective Risk Communication for Android Apps

Christopher Gates^{1,3} Jing Chen^{*,2,3} Ninghui Li^{1,3} Robert W. Proctor^{2,3}

1. Department of Computer Science; 2. Department of Psychological Sciences;
3. CERIAS; * Presenter

Overview

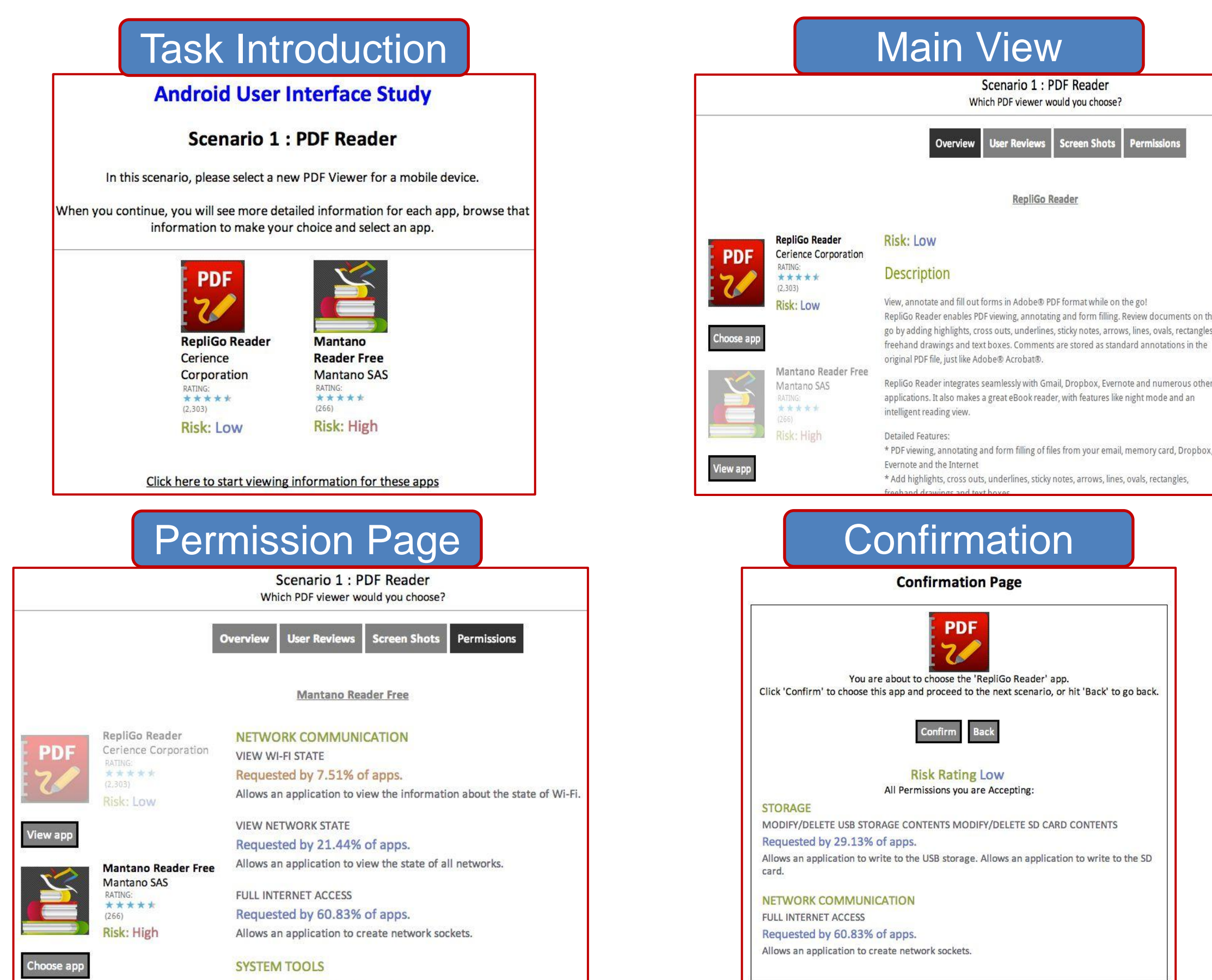
Due to the popularity and openness of the Android platform, it has been an attractive target for malicious and intrusive apps. Android relies on users to understand the permissions that an app is requesting and to base the installation decision off of the list of permissions. This reliance on users has been shown to be ineffective because most users do not understand or consider the permission information.

We propose a solution to assign a summary risk score to each app. We then investigate the impact of presenting risk information, as well as the most effective way in which to present this information. Our results in three studies show that the introduction of risk-score information has significant positive effects in the selection process and can lead to more curiosity about security-related information.

Study 1: Adding a Risk Metric

How useful is summary risk information for the app selection process?

- An MTurk study that presents the risk of an app in a simulated app selection scenario.
- Participants select one app out of two.
- Standard Interface vs. Risk Interface.



App Selection Results:

the percent of users who chose the lower risk app

Apps	Interface	Standard Info	Risk Info	Chi-square Test
Task1_Low/High		59.1%	82%	$\chi^2 = 12.226, p < .001$
Task2_Low/Low		51.6%	52%	$\chi^2 = 0.003, p = .957$
Task3_Low/Med		60.2%	68%	$\chi^2 = 1.271, p = .260$
Task4_Low/High		56%	76.3%	$\chi^2 = 8.863, p = .003$
Task5_Med/Med		55%	49.4%	$\chi^2 = 0.592, p = .442$
Task6_Med/VHigh		50%	82%	$\chi^2 = 12.226, p < .001$
Overall		56.2%	77.2%	$\chi^2 = 38.269, p < .001$

Questionnaire Results:

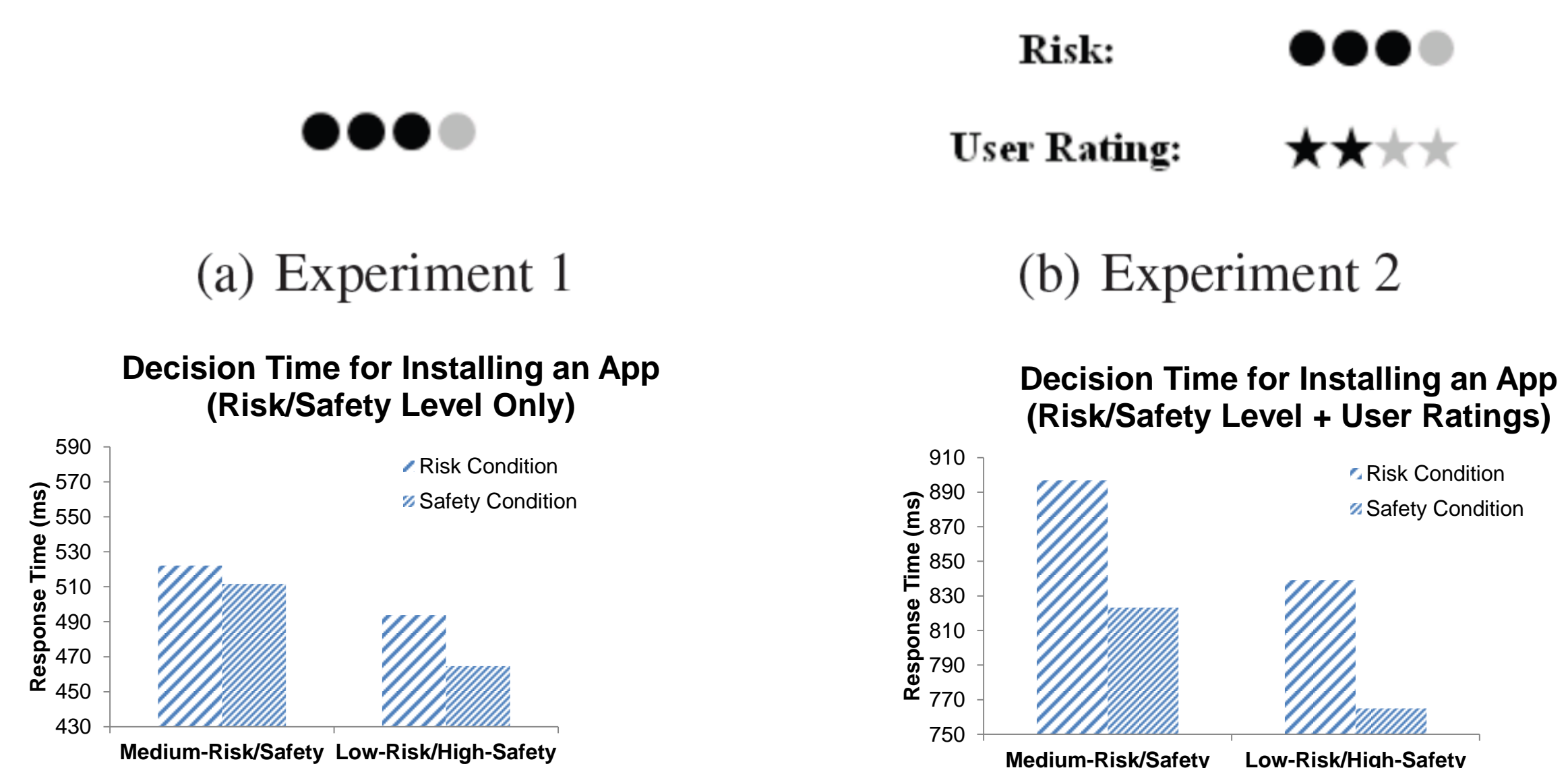
the number of users who specified a factor as

Factor	Most Important Factor		Considered Factors	
	Risk	Standard	Risk	Standard
Risk Level	78	N/A	154	N/A
User Ratings	43	70	166	180
User Reviews	32	55	122	136
Descriptions	18	32	87	118
Permissions	15	19	66	58
Screen Shots	4	14	58	78

Study 2: Adding a Risk Metric

Is it better to present a score as positive (safety) or negative (risk) information?

- An in-person lab study to evaluate the effects of framing the score with safety or risk information.
- Participants make a decision whether to install an app.
- Response time measure in a Go/No-go paradigm.



Responses in the safety condition were faster than responses in the risk condition in both experiments, indicating that that presenting the information in terms of "safety" led to faster processing than presenting it in terms of "risk".

Study 3: Framing in Context

Does framing it as safety or risk have any impact when making decisions in the context of app selection?

- An MTurk study to evaluate the framing in simulated app selection setting.
- Participants select one app out of two.
- Safety Interface vs. Risk Interface.

Results: Both the App selection and questionnaire results showed that the safety information worked a little better than the risk information, although the difference was not statistically significant.

Conclusion

These studies validate our hypothesis that when a summary risk score is presented (early) in the selection process, it will lead users to select apps with lower risk effectively. We expect that adding such a risk metric would cause positive changes in the app ecosystem.