# Permissions Displays for Android Apps

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Abstract

This research contributes to effective risk communication for mobile devices. We administered a survey to participants asking them to do a rating task on 16 statements regarding Android 5.0, Android 6.0, and a general comparison between the two. Users indicated that they want more control over which permissions gain access to their phone, but they seldom use that control when given the opportunity. Users were more knowledgeable about the features of Android 6.0, and Android 6.0 was more intuitive by comparison. Open-ended user comments revealed that people frequently do not read permissions, or they use alternative methods to decide whether to accept the risk of downloading an app.
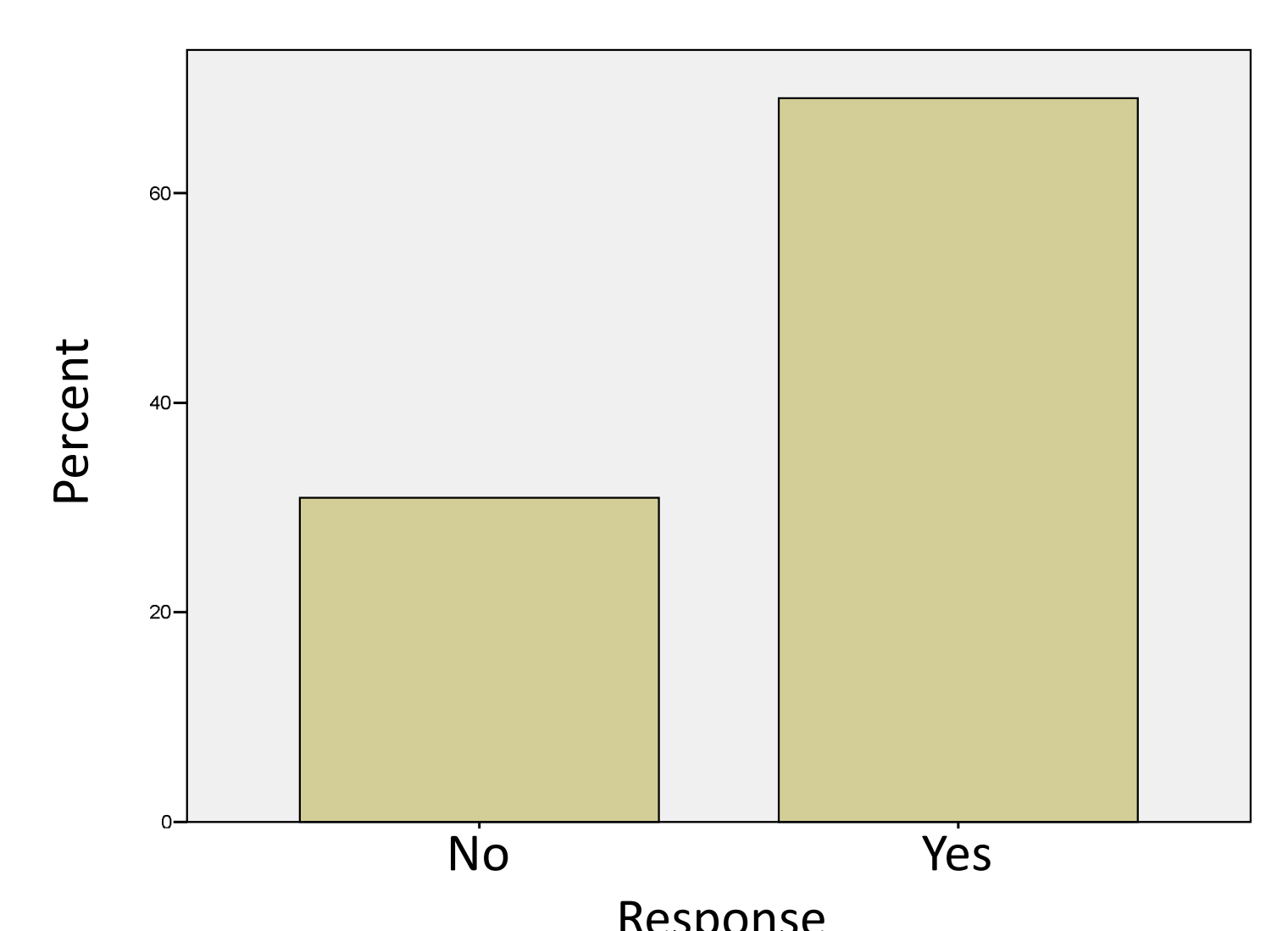
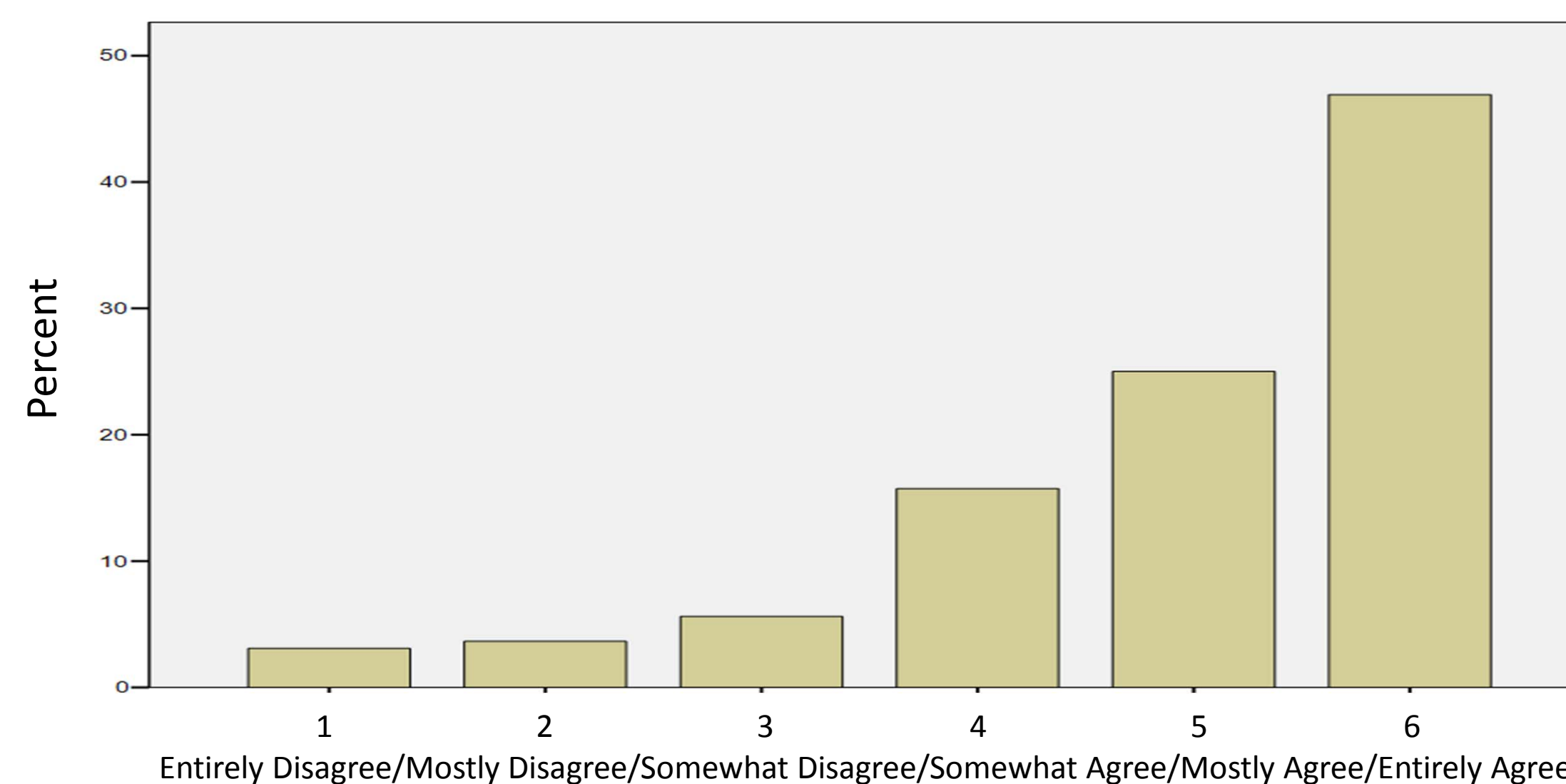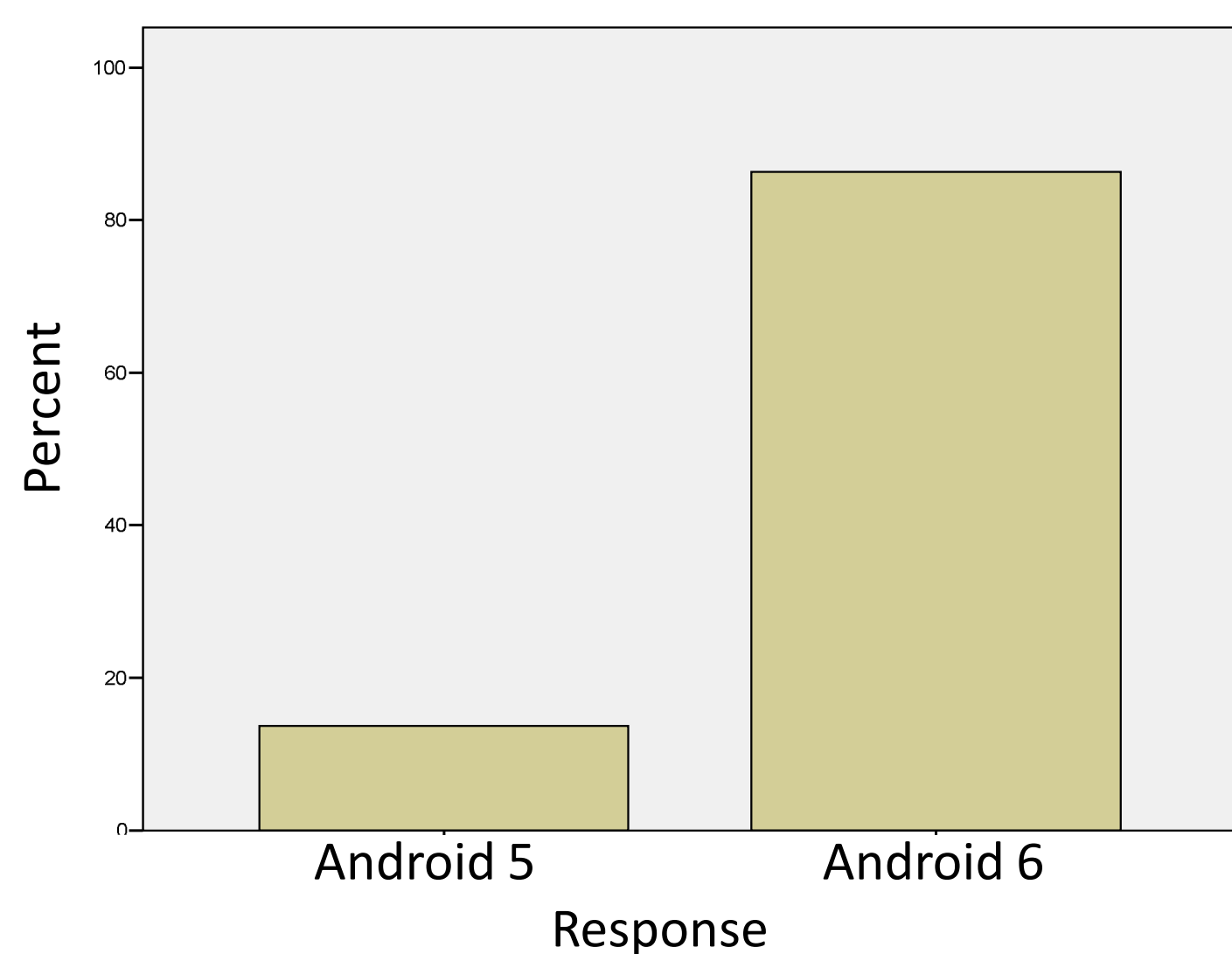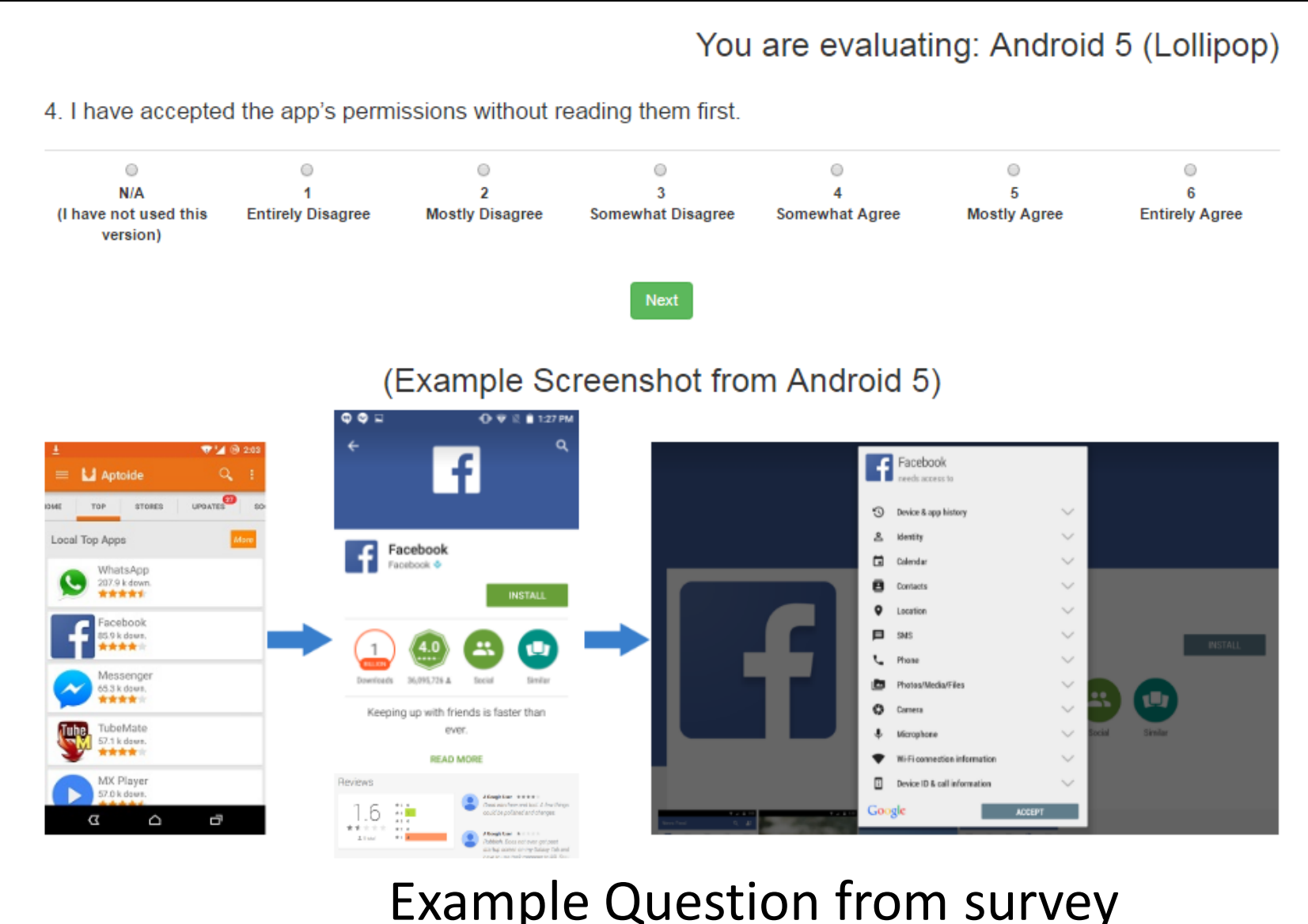Android 5.0   Android 6.0
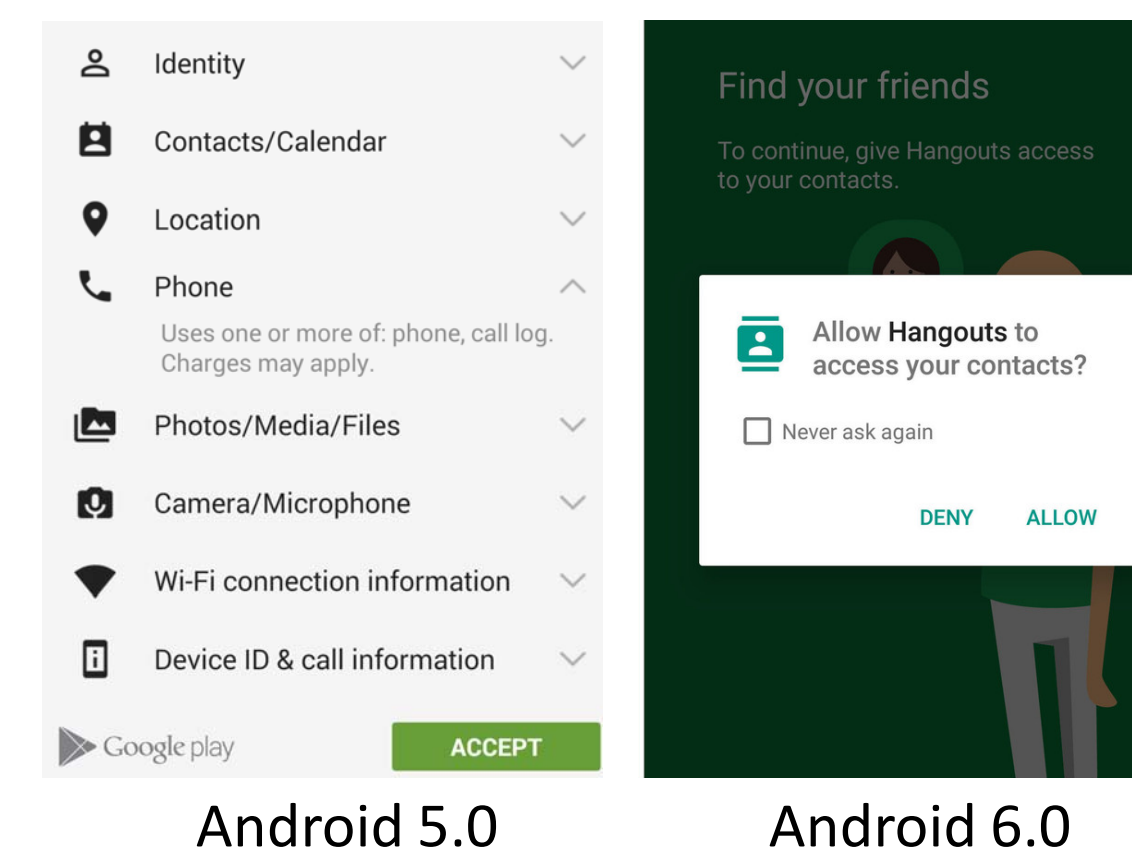
Background

Smart mobile devices have become very common but there are risks associated with using these devices. Android has developed different methods for communicating risk information to the user. One major facet of risk information is permissions. The average user does not understand or even read the permissions associated with an app. The goal of our team was to find out which format of permissions displays are effective and visually appealing. Android 5.0 informs the user of all permissions when downloading the app, whereas Android 6.0 informs the user of each permission upon first use. Understanding how users respond to various displays can give insight into designing a better interface.

Procedure/Methods

- 403 participants were recruited from Amazon Mechanical Turk
- 2 versions of the first study were run, one with Android 5.0 presented first, and the other with Android 6 presented first
- Each participant rated 16 statements on a 6-point Likert scale
- A pre-task questionnaire was given prior to the task to verify which versions of Android the user was familiar with. The participant's data in each Android version was only used if she or he reported having had previous experience with that version.
- We also gathered information about the user's technical knowledge, downloading habits, and type of mobile device

Results

- Participants' indicated preference for the Android 6.0 display of permissions over Android 5.0
- Participants using Android 5.0 specified that they desire more control over permissions, but users of Android 6.0 said they do not utilize that control (see charts)
- An open-ended question at the end of the study confirmed that users frequently do not read permissions and use alternative methods to decide whether to accept the risk of downloading an app
- Users desire a new way to communicate risk information outside of the traditional methods
- Users of Android 5.0 were less informed about its features compared to Android 6.0
- Users reported that they understand the concept and meaning of permissions well

You are evaluating: Android 5 (Lollipop)

4. I have accepted the app's permissions without reading them first.

N/A (I have not used this version) | 1 Entirely Disagree | 2 Mostly Disagree | 3 Somewhat Disagree | 4 Somewhat Agree | 5 Mostly Agree | 6 Entirely Agree

(Example Screenshot from Android 5)

Example Question from survey

Which version of Android do you feel communicates the permissions of an app more understandably?

Android 5.0- If my current version had a feature that allowed me to turn permissions on and off, I would use it.

Entirely Disagree/Mostly Disagree/Somewhat Disagree/Somewhat Agree/Mostly Agree/Entirely Agree

Android 6.0- I have used the option to turn permissions on or off from the settings menu.

Conclusion/Future Directions

- Participants overwhelmingly favored the Android 6.0 interface over the Android 5.0 interface for effectively communicating permissions. However, many users indicated they do not read or care about what permissions an app requests. Users of Android 5.0 stated they would control permissions more if given the option, but users of Android 6.0 do not exercise that control. Based on user comments and ratings, people felt like they understood permissions well and are concerned about privacy. In addition, many users rely on the developers or third-party applications to filter out potential security risks to their mobile device.
- A follow-up study is currently being conducted to test the survey's results in an experimental setting, specifically the likability and effectiveness of each version. Participants will complete a simulation for each version and then have their knowledge of permissions tested, along with subjective ratings of the interface.