# Systematic App Reviews (SMAR) User Guide

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# I. SMAR Background

An SMAR (systematic app review) can be generally classified as a search and subsequent analysis of applications that meet certain criteria across a set of mobile app stores. Search criteria can include keywords, download count, and other information available in the corresponding app's store page. The search results from the SMAR include large-scale app metadata – such as user reviews and app permissions – as well as app contents such as functionality or accessibility.

The general steps of an SMAR can be classified as follows:
*First*, the researcher plans the topic, scope, and timeline of their app review. *Second*, they select a corpus of mobile apps. *Third*, they extract data for analysis, e.g., user reviews or app files. *Fourth*, they analyze their data, using either qualitative, quantitative, or automated analysis. *Fifth*, they report their method and findings.

**Table 1: Steps of a Systematic Mobile App Review**

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<tr><td>Description</td><td>Plan topic and scope</td><td>Select a corpus of mobile apps</td><td>Extract data e.g., user reviews or app files</td><td>Analyze data: many methods to choose from</td><td>Report methods and findings</td></tr>
<tr><td>Example Activities</td><td rowspan="2">- Define research questions<br>- Set timeline</td><td>- Set inclusion / exclusion criteria<br>- Search app store(s)</td><td>- Scrape user reviews<br>- Install app files</td><td rowspan="2">- Qualitative, quantitative, or automated analysis</td><td rowspan="2">- Create flow diagram<br>- Release dataset<br>- Report results</td></tr>
<tr><td colspan="2">Scrape app metadata, e.g., permissions</td></tr>
<tr><td>Challenges for researchers</td><td>- Lack of step-by-step guidelines<br>- Lack info on study design tradeoffs</td><td colspan="2">- Requires technical expertise<br>- Existing tools poorly documented & maintained</td><td>- Requires domain expertise<br>- Limited awareness of automated analysis</td><td>- No reporting standards<br>- Results lack transparency</td></tr>
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**Why would I want to conduct an SMAR?**

Conducting an SMAR is a valuable way for researchers to quickly yet effectively collect targeted mobile application data at scale. This is the starting point for many research studies aiming to analyze a subset of the existing catalog of millions of mobile applications across different platforms.

The SMAR method has been used in many fields. In the field of HCI (Human-Computer Interaction), researchers have studied how children perceive parental control apps [1,5,8], user reviews of mental health apps [6], dark patterns in Japanese apps [7], and missing label accessibility failures in Android apps [4]. In health, researchers have examined apps for child development [3], support functions in pain management apps [2], and menstrual tracking apps [9]. All of these studies started with a systematic search of app store(s).

Existing SMAR tools are either paid products targeted towards commercial developers, or free tools that require technical expertise to get up and running. Our free SMAR tool aims to provide a flexible feature set and intuitive interface to enable researchers of all backgrounds to quickly yet effectively conduct SMAR's.

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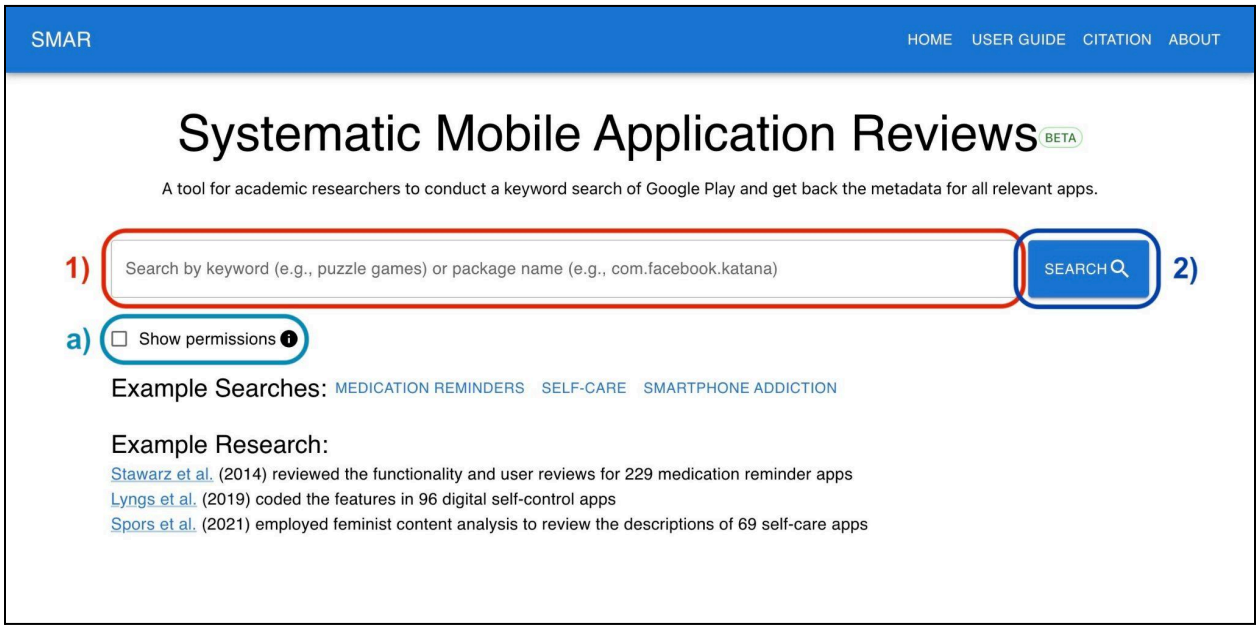
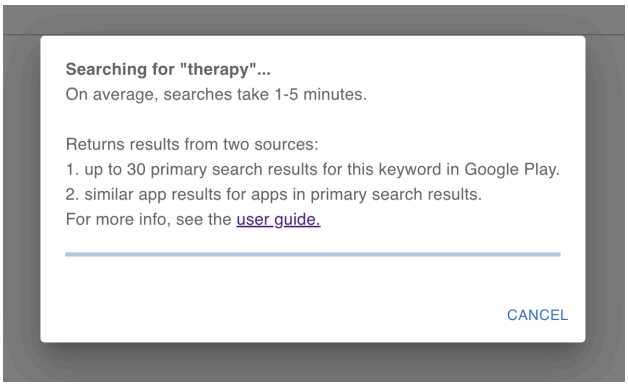
## II. How to use the SMAR Tool

The SMAR Tool is designed around the central search bar that allows users to quickly retrieve a filtered list of applications from the Google Play Store.

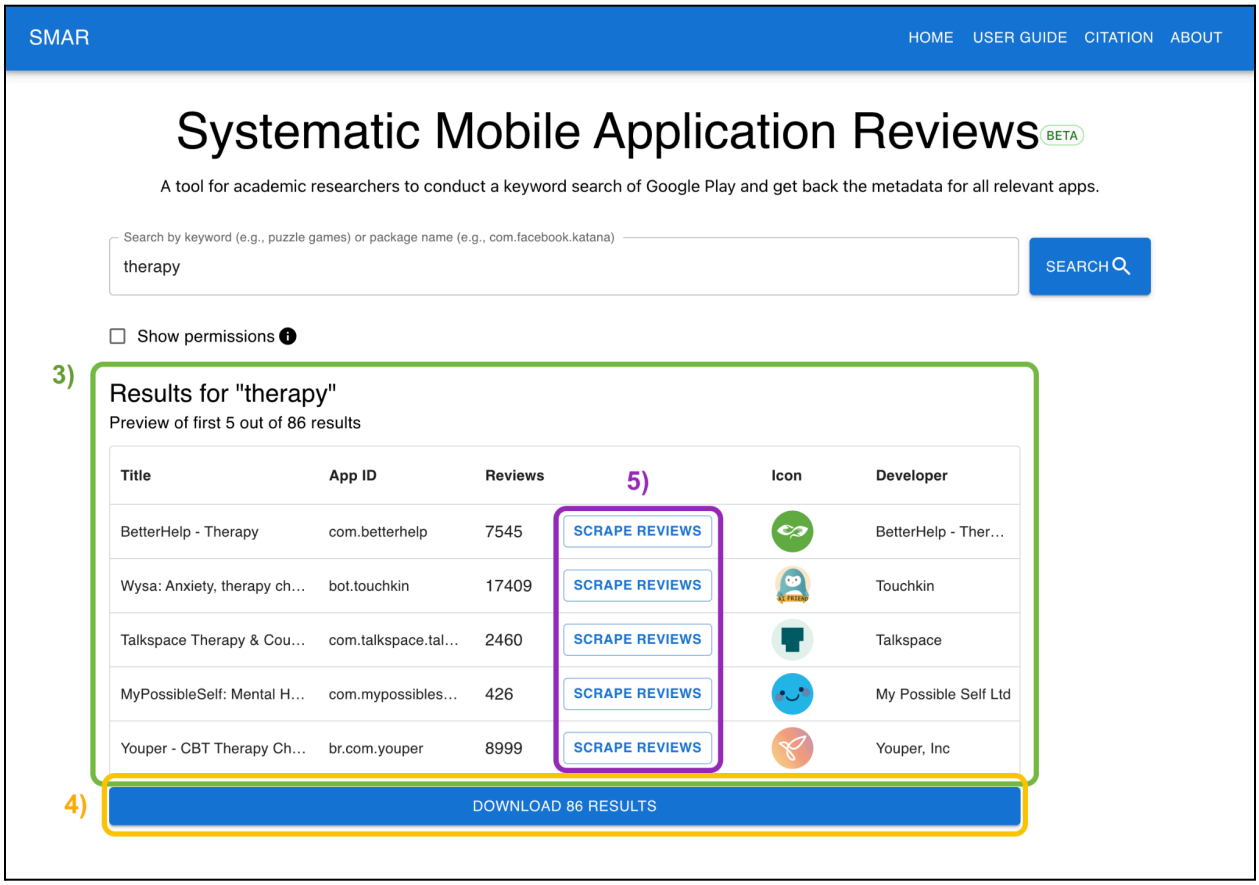
1. To get started, type in a search keyword **(1)**. Optionally, check the 'Show permissions' button to also retrieve permissions (such as microphone or camera access) used by individual apps **a)**. Click on the 'Search' button **(2)** to begin the search process.




2. Now a dialog box will appear with the following message: "Searching for **your keyword** ". This will take a couple of minutes to complete.



3. Once the search has completed, a portion of the page will update with search results. A preview of the first few results will be visible **(3)** and are horizontally scrollable, and the rest of the results can be downloaded by clicking the button at the bottom of the page **(4)**. Additionally, user reviews for each application can be scraped by clicking the corresponding row's 'scrape reviews' button **(5)**.




4. To begin another search, repeat steps 1-3.