We created a Shiny application that allows users to upload their data and create an EGM in graph format. The app allows users to upload their datasets, and use point and click options to summarize data for combinations of factors, and then create an EGM using the ggplot2 package in R (Wickham, 2011). We also provide an example dataset for instructional purposes. The app contains multiple tabs, the contents of which are explained below.

In the About tab, we present an overview of EGMs and our app. In the Instructions to Use the App we provide detailed information on how to use the app. We provide instructions for each of the tabs in the app and also provide background information on calculations of the summary data to be used to create the EGM.

The Load Data tab allows users to select whether they want to use an example data or upload their own data. The example dataset is from a meta-analysis conducted to examine interventions to decrease cyberbullying (Polanin et al., 2021). The data contains effect size, variance of the effect size, and three factors: outcome measure (to be mapped to the x-axis), type of treatment assignment (to be mapped on to the y-axis), and school setting (optional, to be mapped on to color). If users want to upload their own data, they can select whether to upload an effect size level data or a summary level data. Effect size level data refers to raw meta-analytic dataset with each row containing an effect size and corresponding data on variables like outcome measure, methodology, comparison type etc. Summary level data refers to data that contains number of studies and/or average effect size aggregated for combination of factors.

Once users select to use example data or upload their own data, the app will prompt them to input variables necessary to create the plot. For the example data, users can select whether they want to use two factors, mapped to x-axis and y-axis of the EGM plot, or three factors, mapped to x-axis, y-axis and color. For effect size level data, users will be prompted to input variables that the users want to map on to x-axis, y-axis or color on the plot, and variables containing effect sizes, variances or standard errors of the effect sizes, and study identifiers. For summary level data, users will be prompted to input variables that the users want to map on to x-axis, y-axis or color on the plot, and variables containing the number of studies per combination of factors and, if they have calculated it, the average effect size per combination.

The Create Summary Data tab allows users to select parameters to run meta-regression analyses per combination of factors if the users input raw effect size level data or select example data. We refer to the intersection of the levels of each of the factors mapped onto the x-axis, y-axis or color as ***cells***. For the example and effect size level data, the app will calculate the average effect size estimate per cell as follows:

1. For cells that contain more than two studies, by default, the app will calculate the average effect sizes using the correlated effects model (Hedges, Tipton & Johnson, 2010). Users can select the value for the within-study correlation between the effect sizes to be input in the correlated effects model. The default value for the correlation is set 0.8 following the default set in the robumeta package (Fisher, Tipton & Zhipeng, 2017).
2. For cells that have less than or equal to two studies, the app will run a univariate random effects model.
3. For cells that only have one effect size estimate, the app will just use the raw effect size estimate.

Users can then click “Create Summary Data” button, which will prompt the app to run meta-regression to calculate average effect sizes per combination of factors as well as the number of studies and the number of effect sizes per combination of factors. For summary level data, users do not have to select any parameters and click the “Create Summary Data” button to view the data they uploaded.

Users can then click on the Create Evidence Gap Map tab to create the EGM plot. The Create Plot tab contains options to overlay the plot with number of studies, average effect size, or nothing (with the default being nothing). Further, users can add informative labels for the x-axis, y-axis, and/or the color mapping. Users can click the "Create Plot" button to generate the plot.

The Download tab contains options to name of the image to be downloaded, and adjust height and the width of the figure. Users can click the "Download" button to download the graph.

Finally, the R Syntax tab provides reactive syntax corresponding to the data and variables inputted by the users, as well as any other selections they made. Users can copy the syntax, paste it in R Studio, and edit the script as necessary to make any further changes.