Using the 'Matrix of Fields' Field-Type in REDCap: How-To Guide

This guide describes what a Matrix of fields is and how to create a matrix of fields in REDCap.

Help and FAQ Section on Matrix of Fields:
https://redcap.ctsi.ufl.edu/redcap/index.php?action=help#ss52

What is a matrix of fields in REDCap?
REDCap can display a matrix group of fields in either Single Answer format (i.e. radio buttons) or Multiple Answer format (i.e. checkboxes). A matrix allows you to display a group of similar multiple choice fields in a very compact area on a page. This makes data entry forms and surveys much shorter looking. Using matrix fields is especially desirable on surveys because survey respondents are much less likely to leave a survey partially completed if the survey appears shorter, as opposed to looking very long, which can feel daunting to a respondent. Having compact sections of questions can actually improve a survey's response rate.

A matrix can have as many rows or columns as needed. Although the more choices you have, the narrower each choice column will be. Any field in a matrix can optionally have its own branching logic and can be set individually as a required field. A matrix can also optionally have a section header.

The key aspect of a matrix of fields is each choice (shown as columns above) is shared by every field (rows). In other words, each field in the matrix will have the same choices. You cannot have a field with unique choices in the matrix.

Using the screenshot above for example, you suspect that many people are eating out on the weekend, so you add the choices Saturday and Sunday. Now anyone can also mark that the Drink, do Aerobics, or go to the Gym on Saturday and Sunday. However, say the gym is closed on Sundays so you know that no one in town does weight training on Sundays. With the matrix of fields, there is no way for you to prevent participants from selecting Sunday for the Gym field. The choices in the matrix are the same for each field. Therefore, you would want to remove the Gym field from the Matrix.

Common uses of Matrix of Fields

Matrix of fields are very useful for conducting a survey of customer experience. This way you can grade customer satisfaction all on the same scale see example below.

Matrix of fields can also be modified to allow a user to only input one unique choice per row. For example, in the screenshot below, it would mean that if a user selected 5 for Speed of Service, then no other row could have a 5 selected. This is great for ranking each row in the matrix.

By making our matrix ranked and altering the matrix header text to give better instructions, we get the following. Note that each choice/column can only be selected once throughout the matrix. Users are also notified with the note in the upper left of the matrix (just below the header text).

Matrix of Fields Group Name and individual variable names

What makes the checkbox or radio button fields in a matrix of fields unique is the matrix group name. This unique variable name is associated with all of the fields within the matrix (column P in the data dictionary). Without the matrix group name, the fields would be displayed as individual checkbox or radio button fields. Each field/row within the matrix of fields has its own variable name. Just like all other field types, these variable names must be unique throughout the project.

If you attempt to save a matrix of fields without this value in the Online Designer, you will be prompted to enter a group name and individual variable names before you can save your edits. When you export the data, there is no indication that fields within a matrix are grouped – the matrix group name is not included.

Matrix of Fields Header Text and Individual Fields

The Matrix header text is very much like other "begin new section" text. It will start a new page on a survey unless you choose to display the survey as a single page in the survey settings. Also, the header will always display unless all fields between it and the next "begin new section" text are hidden (this includes fields beyond the current matrix of fields, but before the next "begin new section".

Fields in a matrix of fields can be modified much the same way as typical checkbox or radio button fields. If you use these fields to pipe information into later fields, the choice label will be displayed (rather than the stored numeric value). You can also assign default values to the matrix fields using the @DEFAULT action tag in the field annotation (NOTE: this is not recommended for ranked matrices). Any other action tags you want to use will go in the annotation field as well. These fields do not have field notes, so instructions will have to be given through the header text.

Converting a group of radio button or checkbox fields to a Matrix of Fields.
You can convert a group of existing radio buttons or checkboxes to a matrix of fields. The instructions below were provided by Vanderbilt.

Answer by redcap.answerhub.api · Jun 09, 2016 at 07:10 PM

Any existing group of radio button fields or checkbox fields in a REDCap project might possibly be converted into a matrix of fields. In order for fields to be grouped together into a matrix, the following things are required:

1. fields must all be a Radio Button field or all be a Checkbox field,
2. they must have the *exact* same multiple choice options (same option label AND same raw coded value), and
3. they must all be adjacent to each other on the same data collection instrument (or if not, they can be moved first so that they are adjacent).

A matrix can be created only if those three conditions are met. The conversion of regular checkbox/radio fields into a matrix of fields cannot be done in the Online Designer but only using the Data Dictionary. To accomplish this:

1. Download the existing data dictionary for the project from the "Upload Data Dictionary" page.
2. Add to column P (i.e. Matrix Group Name) the matrix group name for *every* field that will be in the matrix.
3. Save and upload the data dictionary on the "Data Dictionary Upload" page
4. Confirm those fields display as a matrix on your data collection instrument instead of separate fields.

NOTE on Matrix Group name: The matrix group name is a tag that is used to group all the fields together in a single matrix group. The matrix group name can consist only of lowercase letters, numbers, and underscores, and the group name must not duplicate any other matrix group name in the project. The group name is not ever displayed on the form/survey during data entry, but is used only for design and organizational purposes. The matrix group name can be any value (even an arbitrary value), but it may be helpful to name it something related to the fields in the group (e.g. "icecream" if all the matrix fields are about ice cream).