## Exploring TIMSS With R

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The IEA and Boston College publicize the amazing TIMSS dataset every 4 years. The study shows how students from different countries perform on the same math and science questions. The dataset comes with guides that explain how to explore the data using SPSS and SAS. While the dataset is typically explored using those languages, I will show that TIMSS can be explored as well, if not better, using R.

National Question Success Rate

## ΓIMSS 2011: Comparison of Country Correct Response Per Math Questic GIVEN VISUALIZATIONS Once data is imported into R it can then go through the 'Exploration Loop'. That is, the data is manipulated, then visualized, and then interacted with. The goal of manipulation is to format the data in a way that is ideal for testing a particular hypothesis. The goal of visualization is to TIMSS 2011: 15 Most/Least Variable Math Questions gain insight on how different datapoints relate to eachother. The goal of interaction is to dig even deeper into the Cognitive Domain relationships found and to come up with APPLYING new hypotheses. EXPLORATION LOOP GIVEN DATA 2015 TIMSS: International Comparison of Math Questions Question Success in United States Question Success per Country tidyr::nest Create a list of dataframes containing all the nested variables ♦ Data and Chance dplyr::mutate Add new variables while preserving existing ones ★ Geometry Return rows with matching conditions ♣ Number Keep only the queried variables dplyr::select Applying Join two dataframes by matching variables dplyr::left\_join Knowing stringr::str\_detect Detect substring and return boolean Reasoning stringr::str\_extract Extract and return substring Description stringr::str\_replace Replace substring with declared string Convert SPSS data into R dataframe haven::read\_spss base::sapply Create a vector as a result of a row-wise function Convert SAS data into R dataframe haven::read\_sas Convert Excel data into R dataframe readxl::read\_excel