

# **Doing Bayesian Data Analysis in Julia using Turing.jl**

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# What and why

Kruschke began his text with “This book explains how to actually do Bayesian data analysis, by real people (like you), for realistic data (like yours).” In the same way, this project is designed to help those real people do Bayesian data analysis. My contribution is converting Kruschke’s JAGS and Stan code for use in another probabilistic programming framework, `Turing.jl` which makes it easier to fit Bayesian regression models in Julia (Ge, Xu, and Ghahramani (2018)) using a number of samplers. I also prefer plotting and data wrangling with the packages from `Plots.jl` (Bezanson et al. (2017)). So we’ll be using those methods, too.

This ebook is not meant to stand alone. It’s a supplement to the second edition of Kruschke (2015) *Doing Bayesian data analysis: A tutorial with R, JAGS, and Stan*. Please give the source material some love.

# **1 What's in This Book (Read This First!)**

## **2 Introduction: Credibility, Models, and Parameters**

## **3 The Julia programming language**

## **4 What is This Stuff Called Probability?**



## 5 Bayes' Rule

## **6 Inferring a Binomial Probability via Exact Mathematical Analysis**

## 7 Markov Chain Monte Carlo

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## 9 Hierarchical Models

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## **20 Dichotomous Predicted Variable**



## **21 Nominal Predicted Variable**

## **22 Ordinal Predicted Variable**

## 23 Count Predicted Variable

## **24 Tools in the Trunk**

## References

- Bezanson, Jeff, Alan Edelman, Stefan Karpinski, and Viral B Shah. 2017. “Julia: A Fresh Approach to Numerical Computing.” *SIAM Review* 59 (1): 65–98. <https://doi.org/10.1137/141000671>.
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- Kruschke, John. 2015. *Doing Bayesian Data Analysis (Second Edition)*. Boston: Academic Press.