

# Modeling Dynamic Comparative Public Opinion

















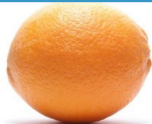
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# Modeling Dynamic Comparative Public Opinion

#SPSA2020  
San Juan

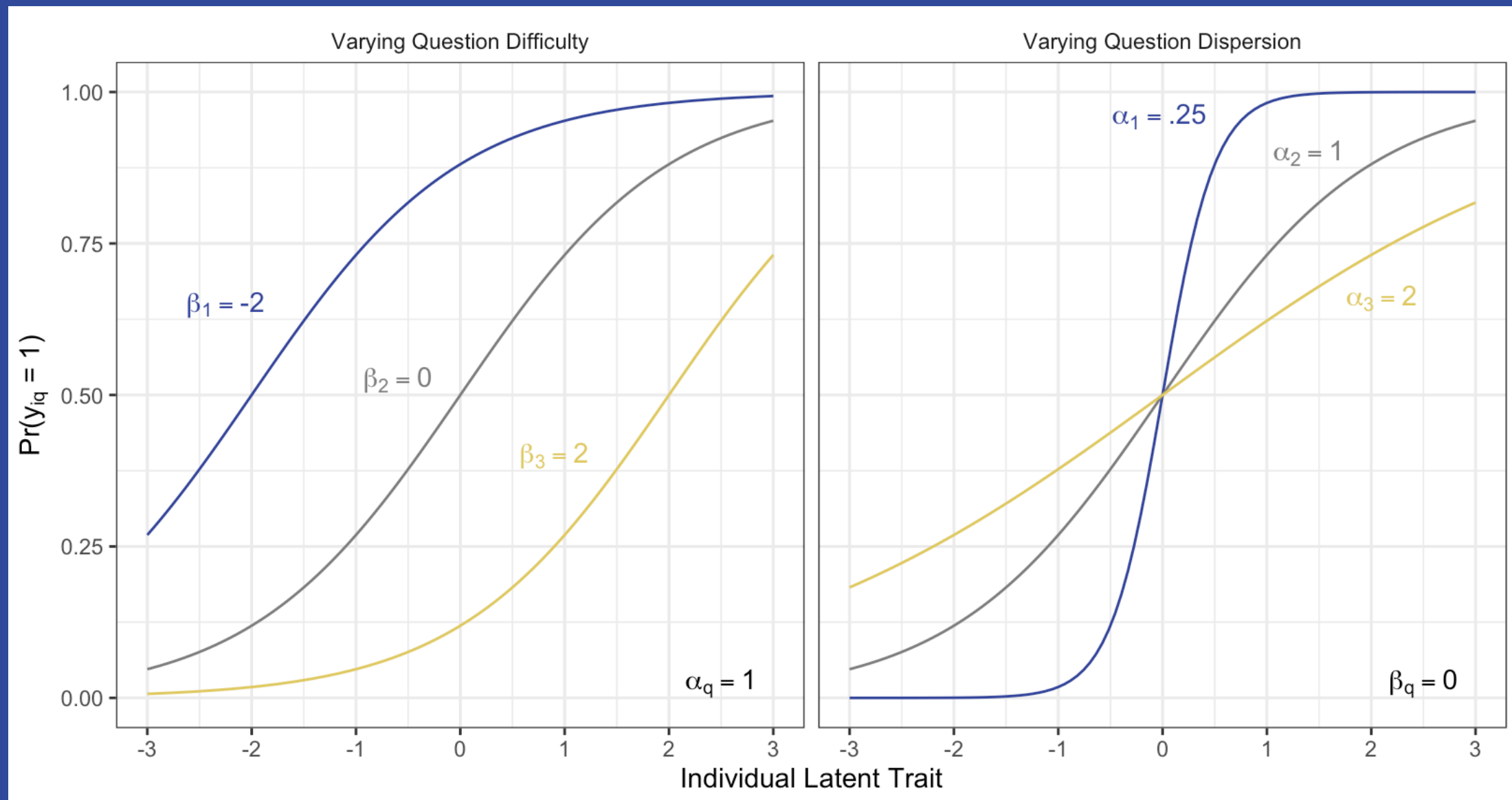
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# How to handle sparse, incomparable cross-national time series?

	1991	1992	1993	1994
Australia				
Austria				
Belgium				
Canada				
Denmark				
Finland				
France				
Germany				
Hungary				



# Two-Parameter Ordered Logistic Item Response Theory





Country-specific  
item bias terms  
to address item  
response bias

A yellow curved arrow originates from the text 'item bias terms' and points towards the  $\delta_{kq}$  term in the equation below.

$$\eta_{ktqr} = \text{logit}^{-1} \left( \frac{\bar{\theta}'_{kt} - (\beta_{qr} + \delta_{kq})}{\sqrt{\alpha_q^2 + (1.7 * \sigma_{kt})^2}} \right)$$



Random walk  
priors for  
opinion mean  
and  
standard  
deviation

$$\bar{\theta}'_{kt} \sim \text{N}(\bar{\theta}'_{k,t-1}, \sigma_{\bar{\theta}'}^2)$$


$$\sigma_{kt} \sim \text{LN}(\sigma_{k,t-1}, \sigma_{\sigma}^2)$$




Measure of mean  
public opinion

**bounded**

between 0 and 1


$$\bar{\theta}_{kt} = \text{logit}^{-1}(\bar{\theta}'_{kt} - 1)$$

	McGann (2014)	Claassen (2019)	Caughey, O'Grady, and Warshaw (2019)	
Cross-National	✗	YES	YES	YES
Dynamic Priors	✗	YES	YES	YES
Ordinal	✗	✗	YES	YES
$\delta_{kq}$	✗	YES	✗	YES
Bounded Mean Opinion	YES	✗	✗	YES
Opinion Polarization	YES	✗	✗	YES





# Support for Democracy (Claassen 2019)



Support for  
Democracy  
(Claassen 2019)

# 51 Survey Datasets



Support for  
Democracy  
(Claassen 2019)

**51** Survey Datasets  
**107** Countries



# Support for Democracy (Claassen 2019)

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**107** Countries ← with data  
in 3+ years



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**998** Country-Years



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out of possible  
 $107 * 24 = 2568$  → **998** Country-Years  
**Sparse!**



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**29** Survey Items



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**51** Survey Datasets


**107** Countries ← with data  
in 3+ years

out of possible  
 $107 * 24 = 2568$  → **998** Country-Years  
**Sparse!**

**Incomparable!** → **29** Survey Items



# Internal Validation Test

Model	Country Means MAE	Model MAE	Percentage Improvement
Claassen (2019)	0.1112	0.032	71.4
Caughey, O'Grady, and Warshaw (2019)	0.186	0.049	73.7
	0.186	<b>0.031</b>	<b>83.3</b>

# External Validation Test

Model	<i>k</i> -fold Mean MAE	<i>k</i> -fold Mean Percentage Improvement	<i>k</i> -fold 80% Credible Interval Coverage
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Claassen (2019)

0.057

51.7

+4.9

Caughey, O'Grady,  
and Warshaw (2019)

0.063

66.1

-67.4



**0.055**

**70.5**

**-4.5**

# Data Preparation

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## **1** Identify survey items

# Data Preparation

- 1** Identify survey items
- 2** Download surveys

# Data Preparation

- 1** Identify survey items
- 2** Download surveys
- 3** Generate raw dataset

# Data Preparation

- 1** Identify survey items
- 2** Download surveys
- 3** Generate raw dataset
- 4** Reformat dataset for model



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# Data Preparation

- 1 Identify survey items
- 2 Download surveys ← Automated!  
(well, mostly)
- 3 Generate raw dataset
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614 surveys  
in DCPOtools
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# Data Preparation

- 1 Identify survey items
- 2 Download surveys ← Automated!  
(well, mostly)
- 3 Generate raw dataset ← Automated!  
614 surveys  
in DCPOtools
- 4 Reformat dataset for model  
← Totally  
automated!



Dynamic  
Comparative  
Public  
Opinion

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The **DCPO** package is available **soon on CRAN**:  
<https://CRAN.R-project.org/package=DCPO>

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Get the **paper here**:



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