Modeling
Dynamic Comparative Public Opinion

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Modeling

Dynamic Comparative Public Opinion

#SPSA2020

San Juan

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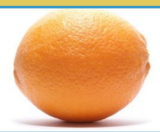
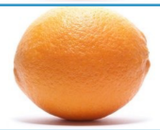
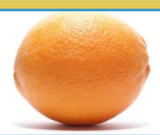
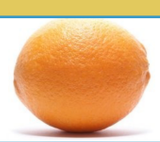
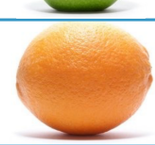
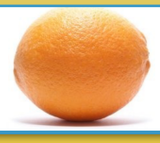
How to handle sparse, incomparable cross-national time series?

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

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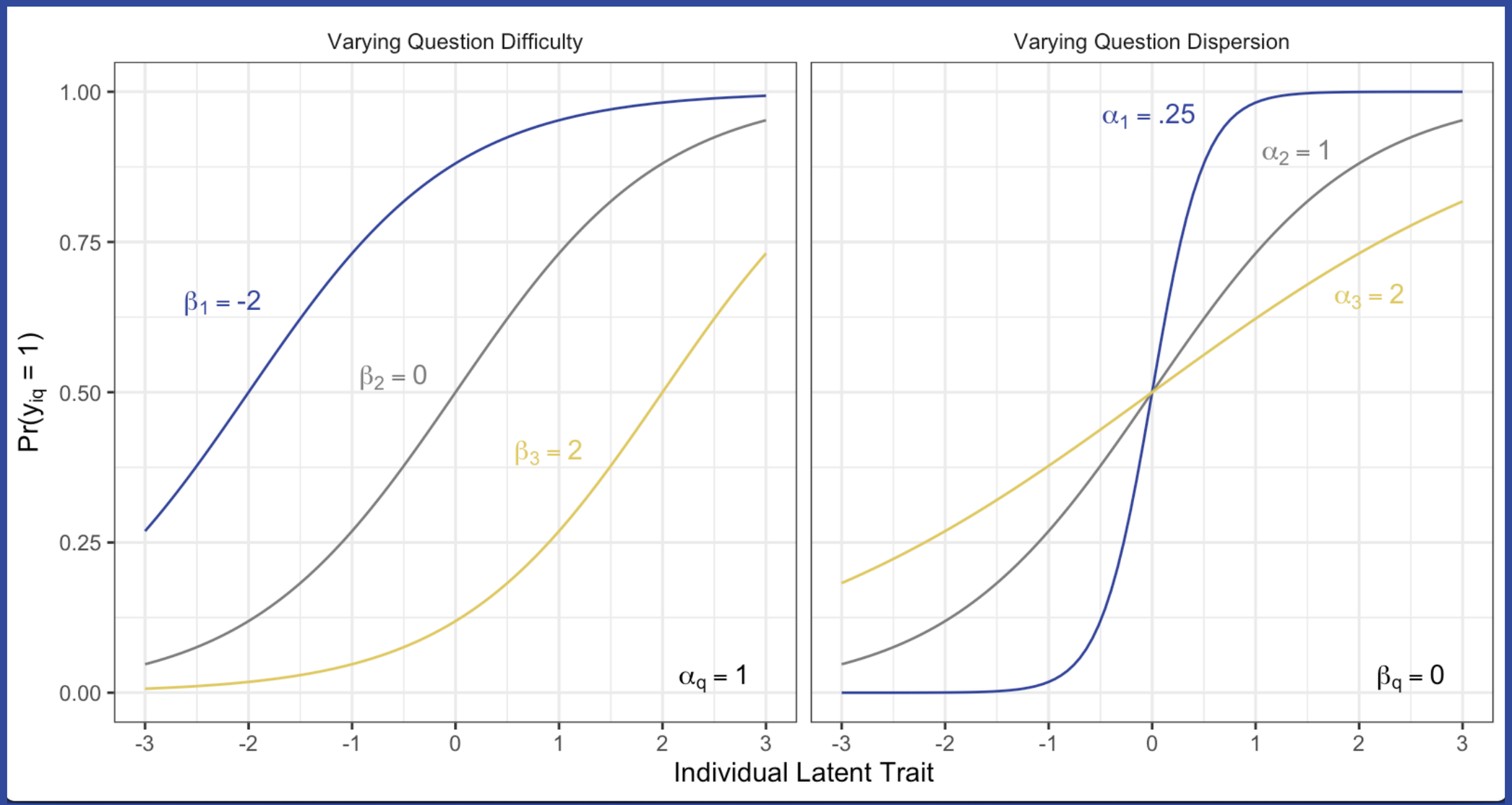
Two-Parameter **Ordered** Logistic Item Response Theory



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Country-specific item bias terms to address item response bias

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

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Random walk priors for opinion **mean** and standard deviation

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

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

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Measure of mean public opinion **bounded** between 0 and 1

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

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

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Support for Democracy (Claassen 2019)

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51 Survey Datasets

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107 Countries

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107 Countries ← with data in 3+ years

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Support for Democracy (Claassen 2019)

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107 Countries ← with data in 3+ years

998 Country-Years

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DCPO

Support for Democracy (Claassen 2019)

51 Survey Datasets

107 Countries ← with data in 3+ years

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

Sparse!

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Support for Democracy (Claassen 2019)

51 Survey Datasets

107 Countries ← with data in 3+ years

out of possible 107*24=2568 →

998 Country-Years

Sparse!

29 Survey Items

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Support for Democracy (Claassen 2019)

51 Survey Datasets

107 Countries ← with data in 3+ years

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

Sparse!

Incomparable! → **29** Survey Items

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Internal Validation Test

Model	Country Means MAE
Claassen (2019)	0.112
Caughey, O'Grady, and Warshaw (2019)	0.186
DCPO	0.186

Internal Validation Test

Model	Country Means MAE	Model MAE
Claassen (2019)	0.112	0.032
Caughey, O'Grady, and Warshaw (2019)	0.186	0.049
DCPO	0.186	**0.031**

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Internal Validation Test

Model	Country Means MAE	Model MAE	Percentage Improvement
Claassen (2019)	0.112	0.032	71.4
Caughey, O'Grady, and Warshaw (2019)	0.186	0.049	73.7
DCPO	0.186	**0.031**	**83.3**

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Model	External Validation Test		
	k-fold Mean MAE	*k*-fold Mean Percentage Improvement	*k*-fold 80% Credible Interval Coverage
Claassen (2019)	0.057	51.7	+4.9
Caughey, O'Grady, and Warshaw (2019)	0.063	66.1	-67.4
DCPO	**0.055**	**70.5**	**-4.5**

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Data Preparation

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1 Identify survey items

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2 Download surveys

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3 Generate raw dataset

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Data Preparation

1 Identify survey items
2 Download surveys
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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
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 ← **Automated!** 614 surveys in DCPOtools

4 Reformat dataset for model

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DCPO

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!**

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The **DCPO** package is available **now on CRAN**:
`https://CRAN.R-project.org/package=DCPO`

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DCPO

Dynamic
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The **DCPO** package is available **now on CRAN**:
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Get the **paper here**:

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