Estimating and Adjusting for Cross-Cultural Differences in Acquiescent and Extreme Response Styles

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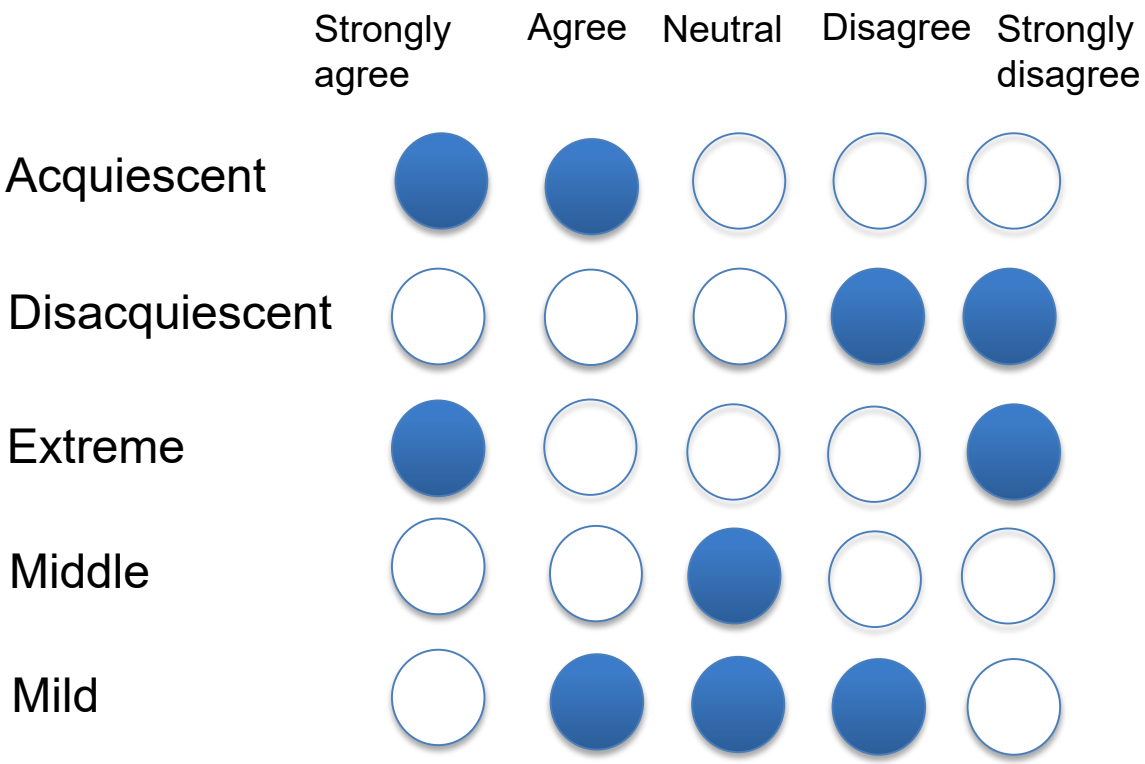
Outline

- Background
  - Response styles
- Statistical models
  - Regression analysis
  - Confirmatory factor analysis (CFA)
  - Latent Class Analysis (LCA)
- Conclusions

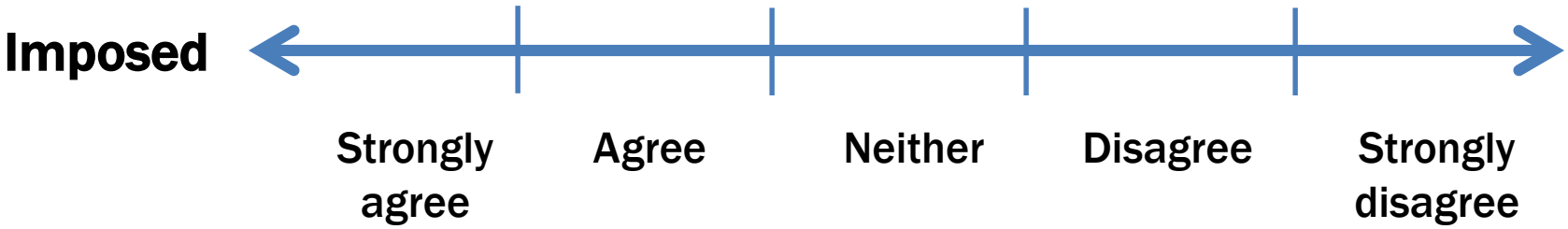
Background

- Response style describes the phenomenon that, rather than responding to the specific survey question, the respondent gives an answer that is based on some content irrelevant criteria (Paulhus 1991)

Background


Strongly agree
Agree
Neutral
Disagree
Strongly disagree
Acquiescent
Disacquiescent
Extreme
Middle
Mild

Background


Imposed
Strongly agree
Agree
Neither
Disagree
Strongly disagree

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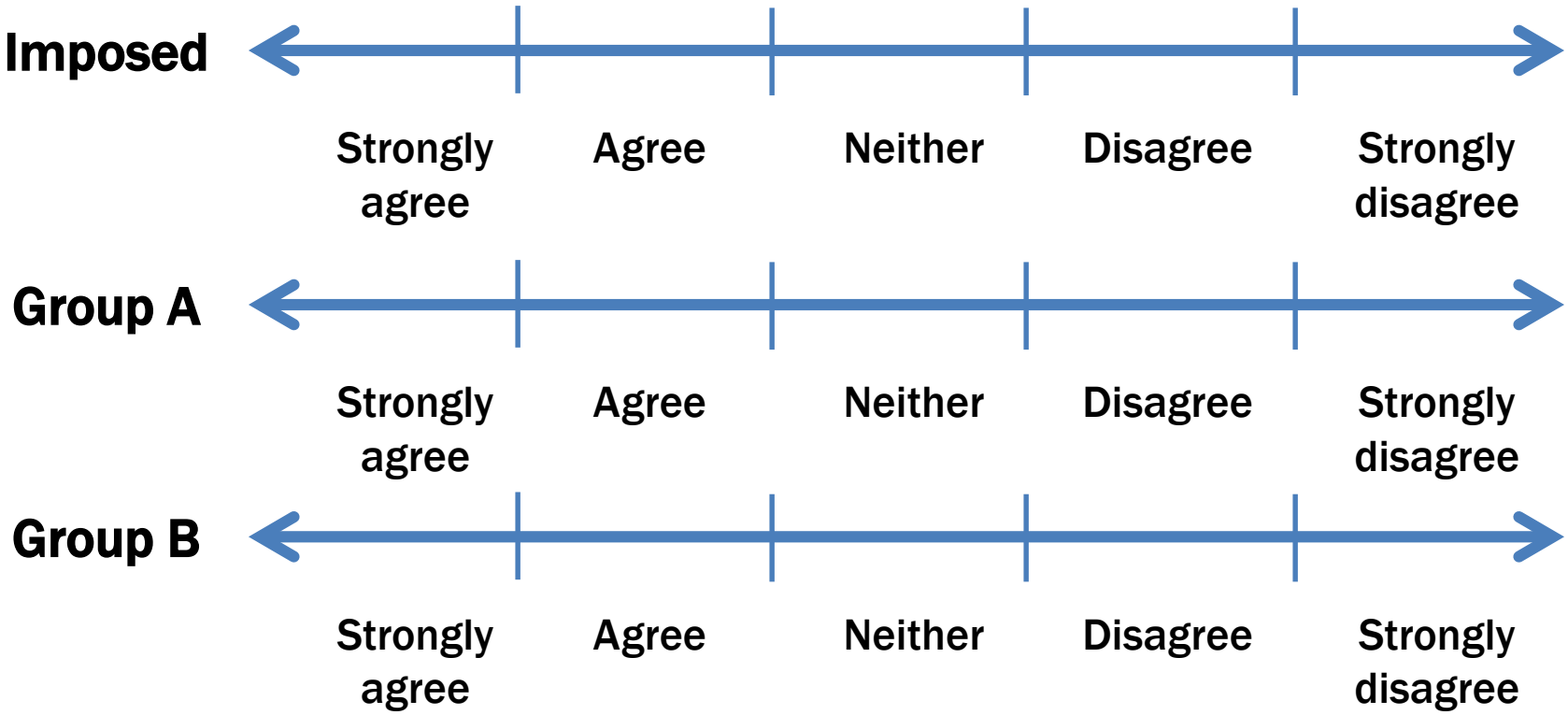
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Strongly disagree
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Agree
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Disagree
Strongly disagree
Group B
Strongly agree
Agree
Neither
Disagree
Strongly disagree

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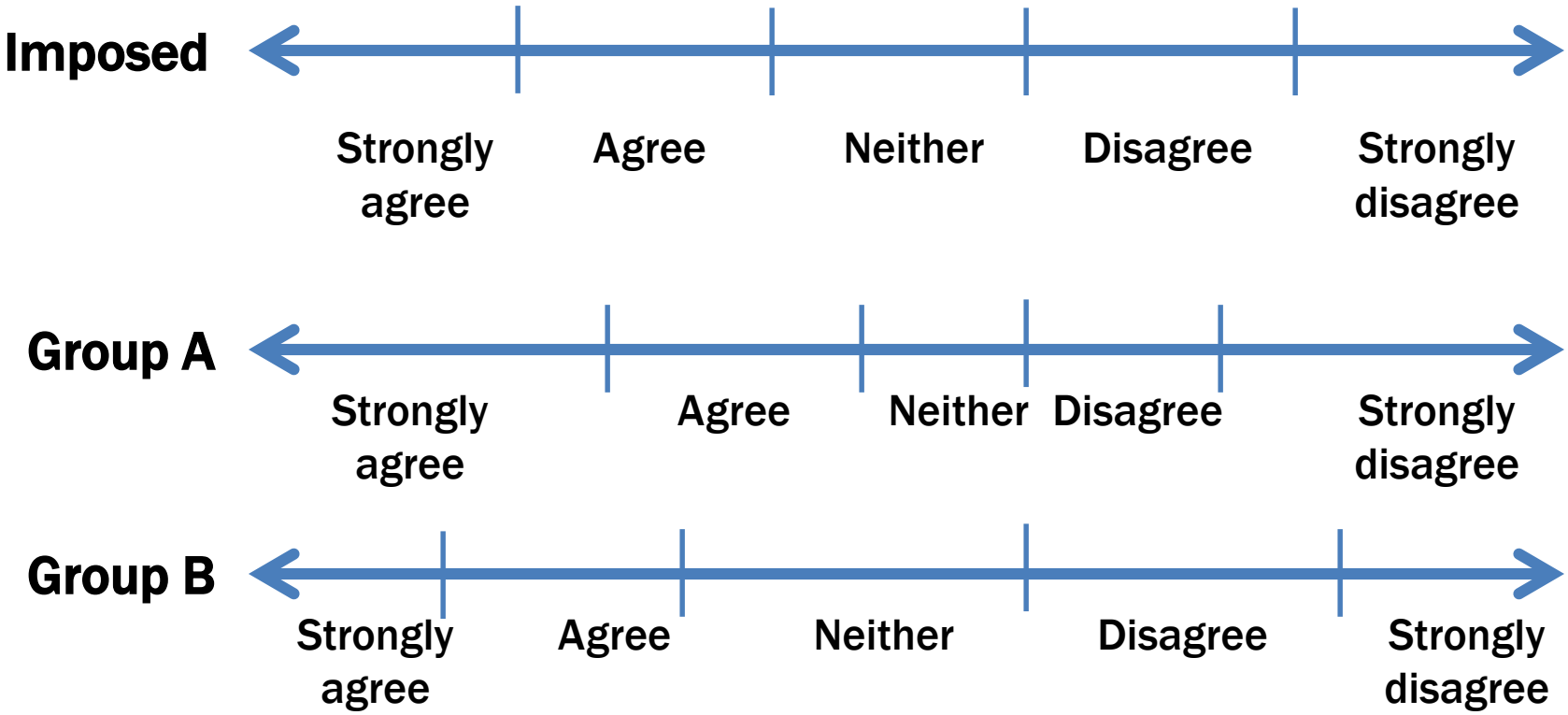
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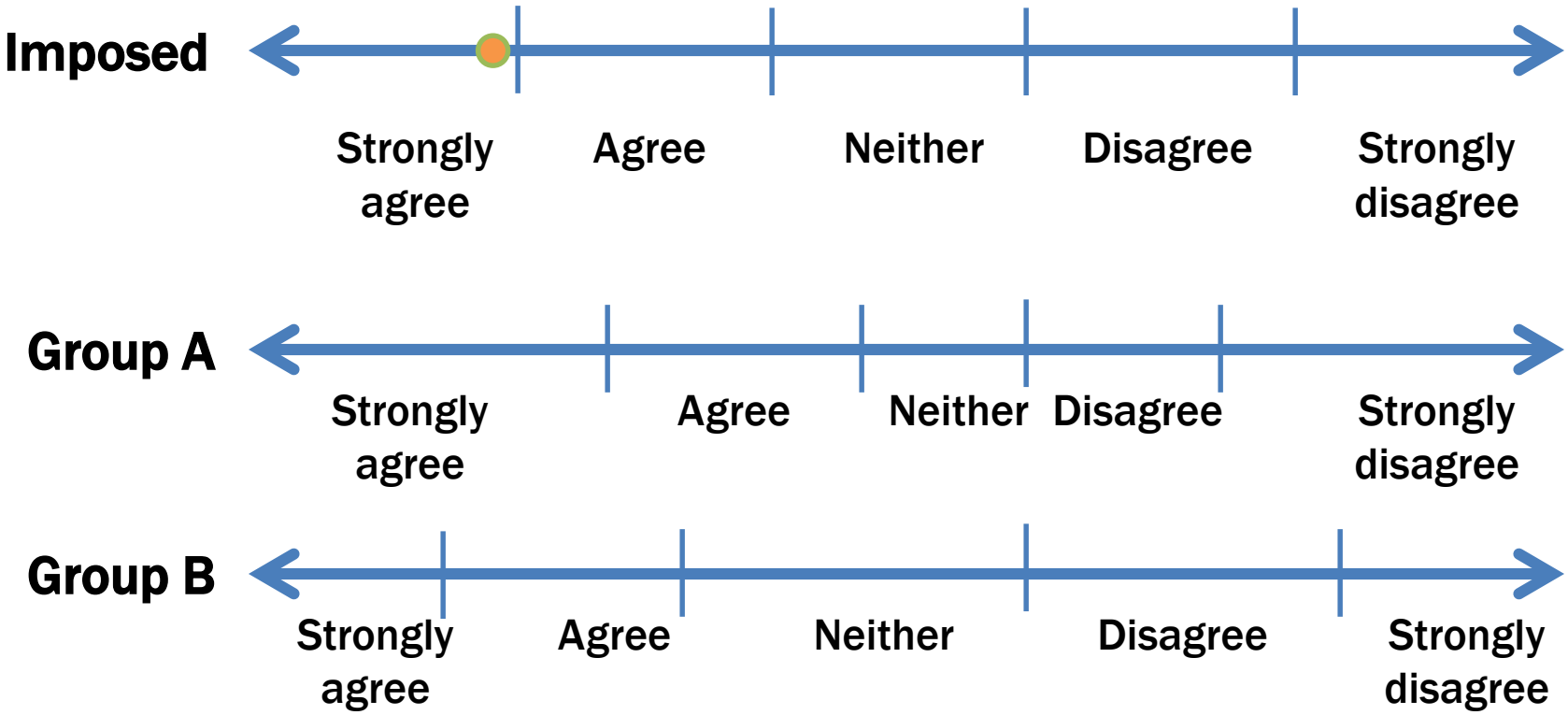
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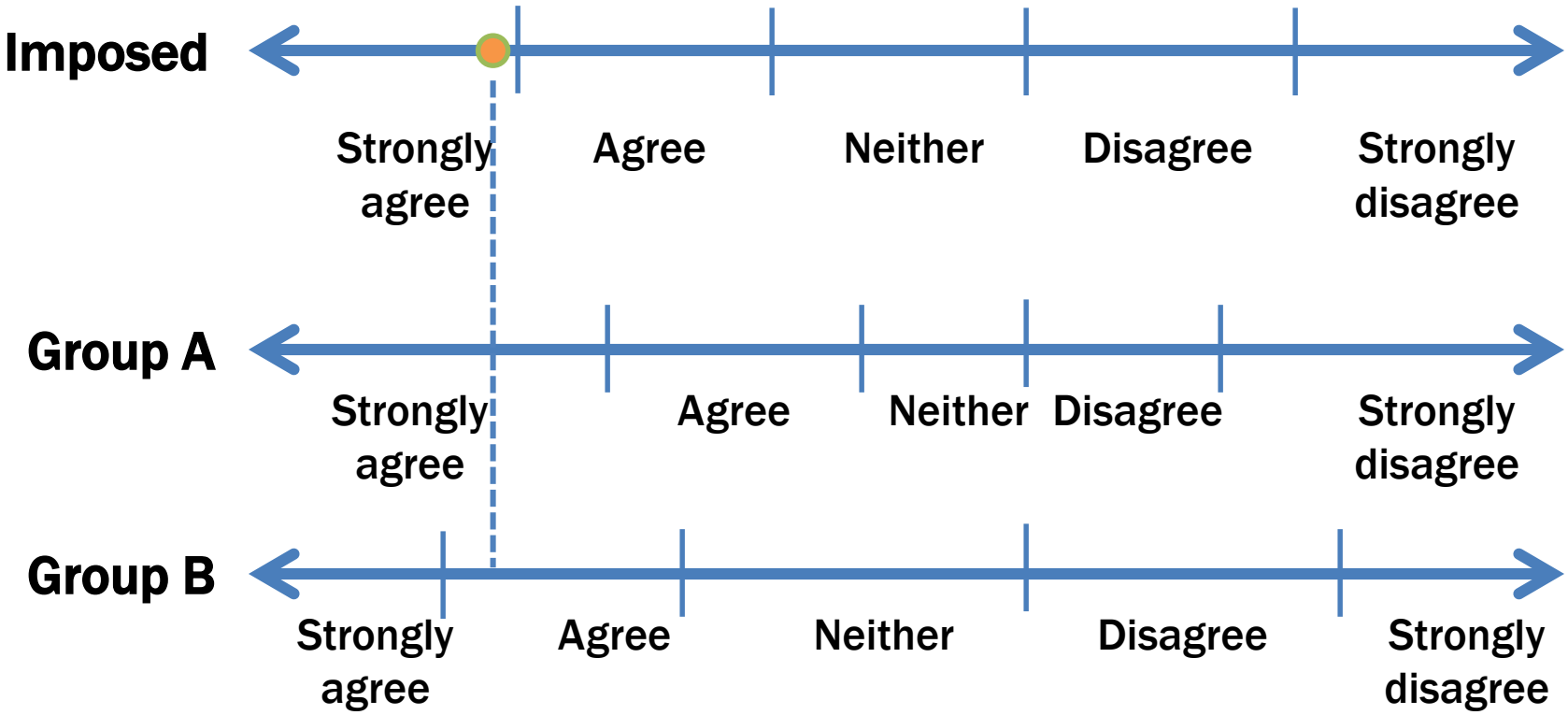
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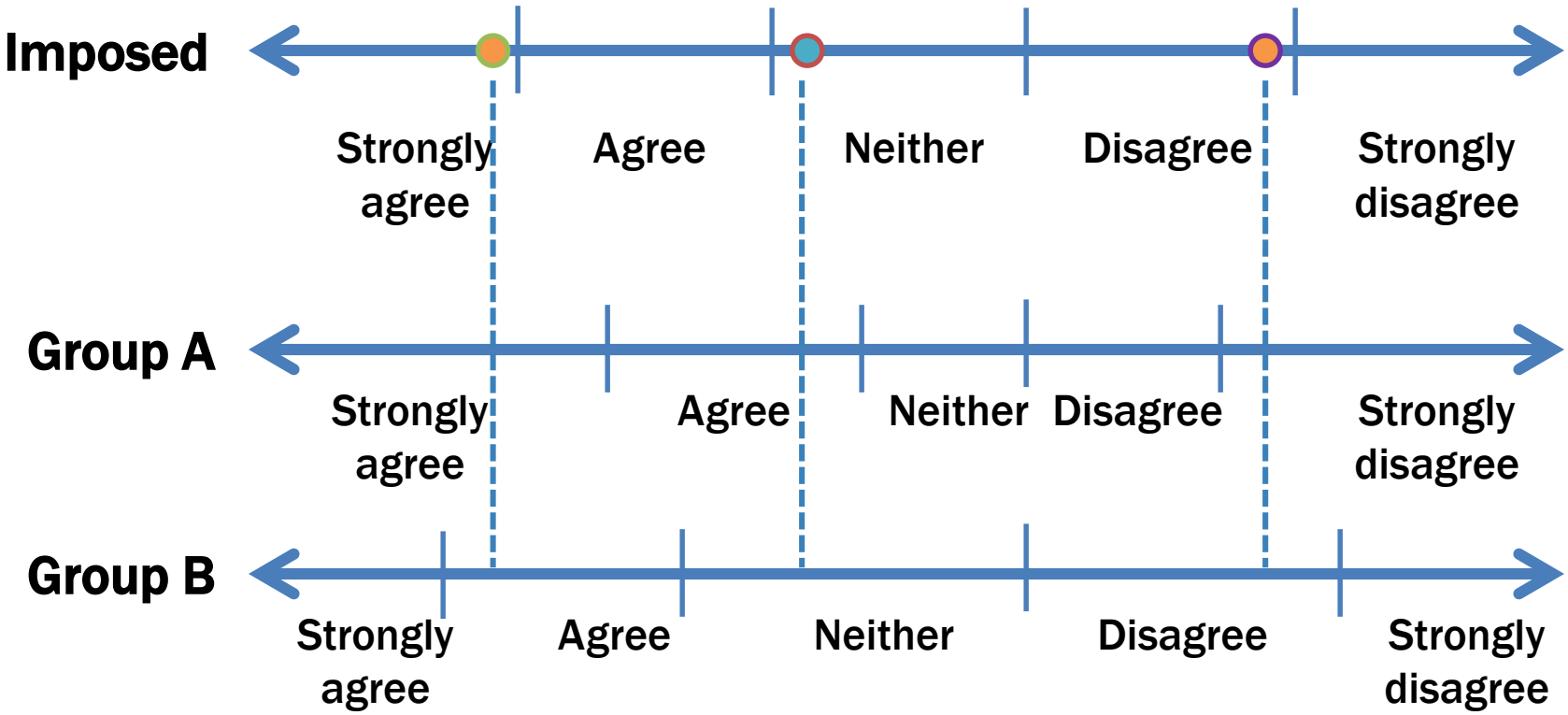
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Statistical Modeling

- Regression analysis
- Confirmatory factor analysis (CFA)
- Latent class analysis (LCA)
- Multidimensional unfolding model (MUM)

Data and Measures

- 2012 American National Election Studies (ANES)
  - Face-to-face and Web
  - Sample size: face-to-face = 1929, web = 3581
  - Response rate: face-to-face = 38%, web = 2% (AAPOR RR1)
  - Re-interview rate: face-to-face = 94%, web = 93%
  - Sampling
    - Face-to-face: an address-based, stratified, multi-stage cluster sample
    - Web: GfK KnowledgePanel, address-based sampling or random-digit dialing

Data and Measures

- Likert Scales
  - 2 scales, 8 items
    - Moral traditionalism (4)
    - Position of blacks in society (4)
  - 5-point
    - Disagree strongly (1)
    - Disagree (2)
    - Neither agree nor disagree (3)
    - Agree (4)
    - Agree strongly (5)

Regression Analysis

- Dependent Variables:

- Acquiescent Response Style (ARS)

$$Y_i = 100 \times \frac{\text{"Agree strongly/ Agree" response}_i}{\text{questions answered}_i}$$

- Extreme Response Style (ERS)

$$Y_i = 100 \times \frac{\text{"Agree strongly/ Disagree strongly" response}_i}{\text{questions answered}_i}$$

  - where *i* indexes persons

Regression Analysis

- Ordinal rating items need to be as heterogeneous as possible (Baumgartner & Steenkamp, 2001, p. 200; Couch & Keniston, 1960; Greenleaf, 1992)
- Vague definition of heterogeneity
- Unknown required number of items to unconfound substantive responses from response styles

Regression Analysis

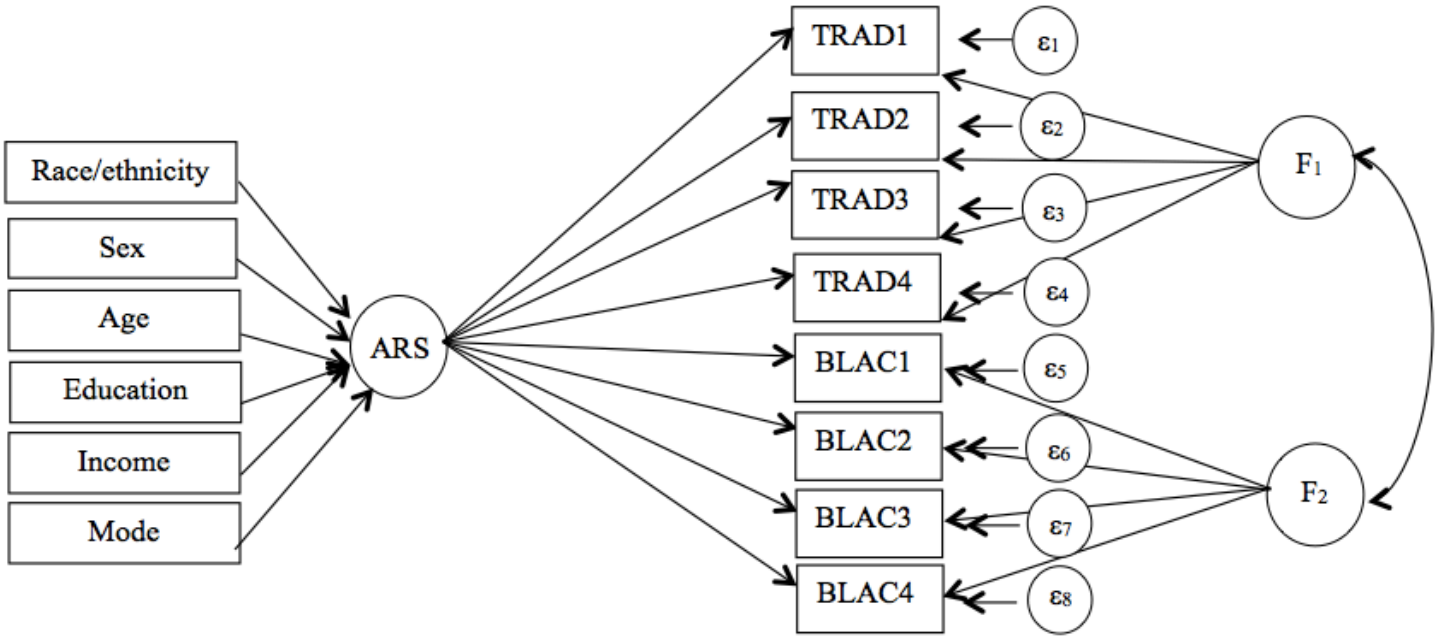
	ERS		ARS		
	β	S.E.	β	S.E.	
Non-Hispanic black	-2.59	1.58	5.67	1.34	***
Hispanic (English interview)	-1.70	2.13	1.93	1.50	
Hispanic (Spanish interview)	-5.82	3.25	3.45	3.57	
Non-Hispanic white	(Reference)			0.04	

- Models control for gender, age, education, household income, and response mode
- For ERS,
  - Comparing to non-Hispanic white, non-Hispanic black and Hispanic (both English and Spanish interviews) do not show a significant difference
- For ARS,
  - Non-Hispanic blacks more likely to provide acquiescent answers comparing to non-Hispanic white
  - No significant differences between Hispanic (both English and Spanish) and non-Hispanic white on ARS

Confirmatory Factor Analysis (CFA)

- CFA model content variables and ARS variable as separate latent factors simultaneously in the same model

Confirmatory Factor Analysis (CFA)



Confirmatory Factor Analysis (CFA)

Model Fit Statistics of Confirmatory Factor Analysis of ARS.

		RMSEA	p<=.05	CFI	# free parameters
Model 1	content factors only	0.050	0.5040	0.897	65
Model 2	content+ARS	0.027	1.0000	0.975	80
Model 3	content+ARS, cov(content,ARS)=0	0.026	1.0000	0.976	79
Model 4	**content+ARS, cov(content,ARS)=0, ARS equal loading**	**0.031**	**1.0000**	**0.966**	**78**

- A Root Mean Square Error of Approximation (RMSEA) value smaller than 0.05 and its associated p-value close to 1 indicates good model fit.
- a CFI close to 1 indicates good model fit.
- All models have reasonable model fit.
- Model 1 has the worst model fit.
- After adding ARS to the model, model fit improved
  - Model 2: covariance between the content factors varies
  - Model 3, covariance between content factors and the ARS factor to be 0
- Model 4: factor loadings of ARS to be equal across all items (Billiet & Davidov, 2008; Billiet & McClendon, 2000)

Confirmatory Factor Analysis (CFA)

Estimated Regression Coefficients and Standard Errors of Race/Ethnicity and Control Variables on Acquiescent Response Style (ARS), 2012 American National Election Studies.

	$\hat{\beta}$	S.E.	
Non-Hispanic black	0.17	0.03	***
Hispanic (English interview)	0.13	0.03	***
Hispanic (Spanish interview)	0.25	0.07	**
Non-Hispanic white	(Reference)		

Models control for gender, age, education, household income, and survey mode

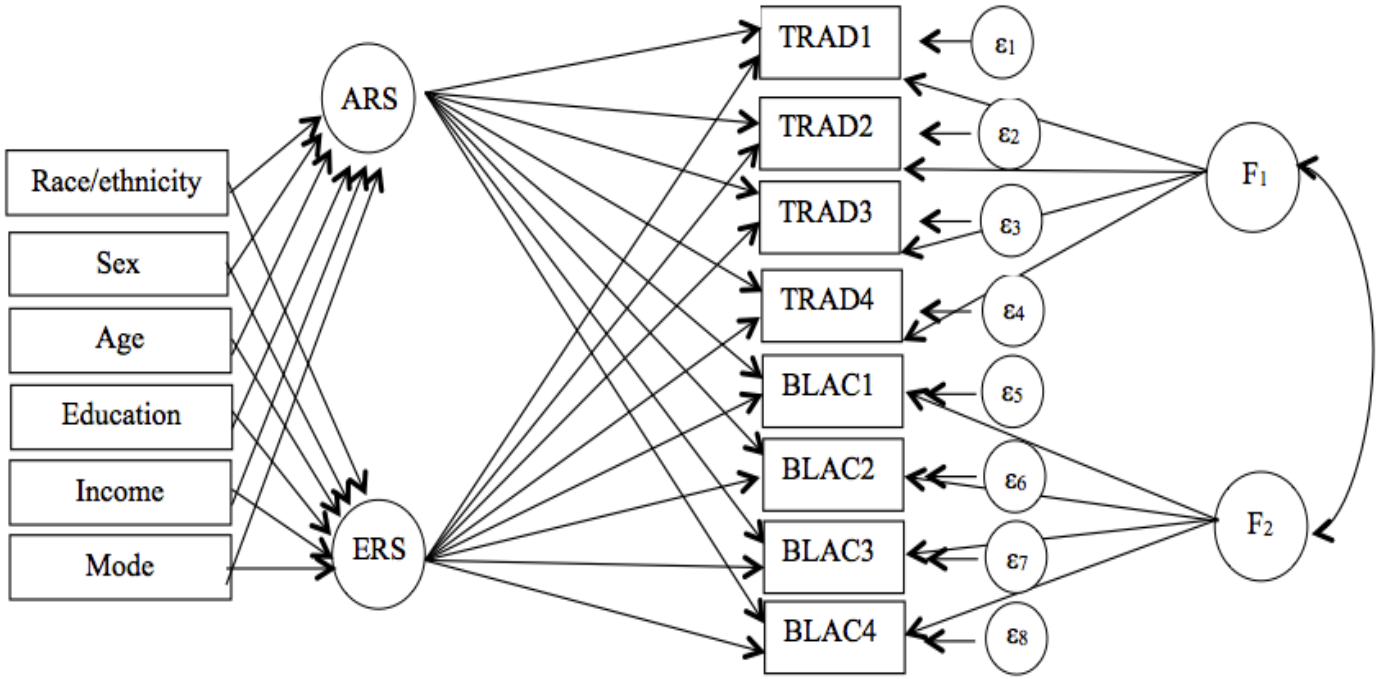
Non-Hispanic and Hispanic (both English and Spanish interviews) both show stronger ARS than non-Hispanic white

Similar to regression analysis result, Non-Hispanic Blacks have a higher acquiescence in their responses

Latent Class Analysis (LCA)

- ARS and ERS evaluated simultaneously
- The hybrid model contains
  - content-related
  - response style latent class variables
- All modeled as discrete ordinal variables with equidistance between any two adjacent classes
- The Likert items are treated as
  - ordinal variables when estimating the ARS latent class variable because
    - as the level of acquiescence increases the respondent is more likely to choose a response option closer to the positive end of the scale than the negative end.
  - nominal variables when estimating the ERS latent class variable because
    - respondents with higher levels of ERS are more likely to select the endpoints than the middle options
    - The nominal specification can capture the non-monotonic (U-shape) of the ERS latent class variable

Latent Class Analysis (LCA)



Latent Class Analysis (LCA)

Model Fit Statistics, 2012 American National Election Studies.

	BIC	No. of parameters
Model 1: Content only (2-class)	104093	69
Model 2: Content+ERS (2-class)	100179	115
Model 3: Consent+ARS (2-class)	101264	91
Model 4: Content+ARS+ERS (2-class)	98079	137
Model 5: Content+ARS+ERS (3-class)	96874	141
Model 6: Content+ARS+ERS (4-class)	96129	145
Model 6a: Equality on all latent variables	106823	104
Model 6b: Equality on style latent variables	**96402**	**110**

Latent Class Analysis (LCA)

Estimated Regression Coefficients (Log Odds) and Standard Errors of Race/Ethnicity and Control Variables on Extreme Response Style (ERS) and Acquiescent Response Style (ARS), 2012 American National Election Studies.

	ERS		ARS		
	$\hat{\beta}$	S.E.	$\hat{\beta}$	S.E.	
Non-Hispanic black	-0.15	0.44	3.53	0.60	***
Hispanic (English)	0.66	0.45	3.32	0.70	***
Hispanic (Spanish)	1.09	0.70	5.47	1.25	***
Non-Hispanic white	(Reference)				

- Models control for gender, age, education, household income, and survey mode
- For ERS,
  - no significant race/ethnicity difference
- For ARS,
  - compare to white respondents, black respondents and Hispanic respondents interviewed in both English and Spanish show significantly more ARS

Multidimensional unfolding model （MUM）

- Cumulative model

- Unfolding model

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  - Disagreement increases as the underlying attitude becomes displaced from the statement in the negative direction and decreases as the underlying attitude becomes displaced from the statement in the positive direction.

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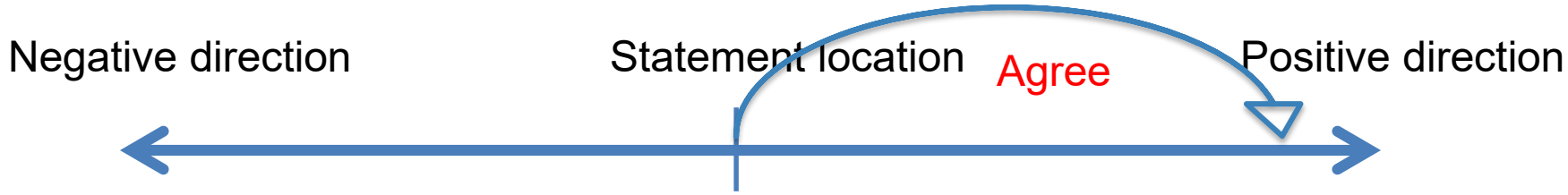

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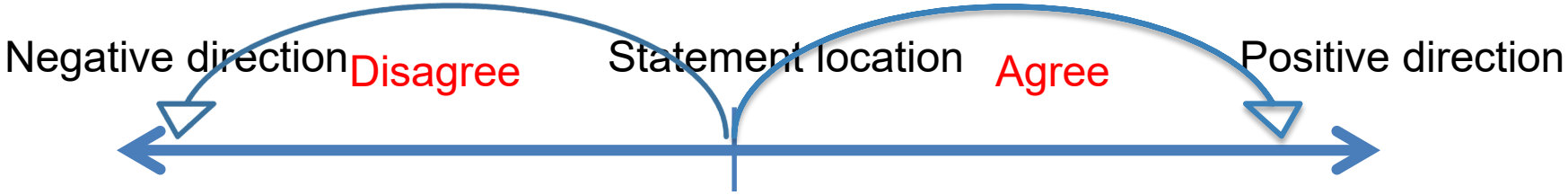

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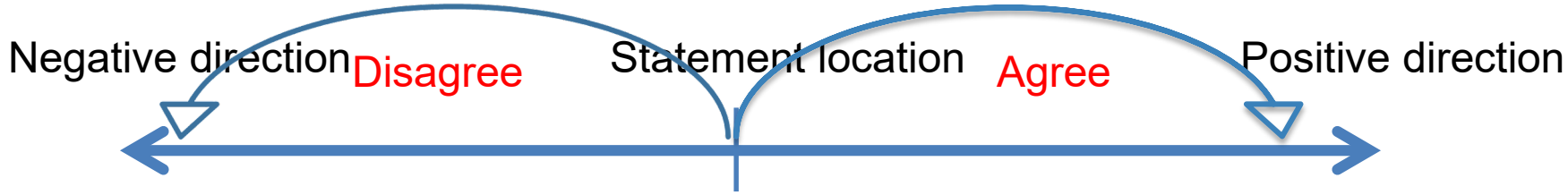

- Unfolding model
  - Disagreement increases as the individual's attitude becomes more distant in either direction from the statement's location on an attitude continuum.

Multidimensional unfolding model （MUM）

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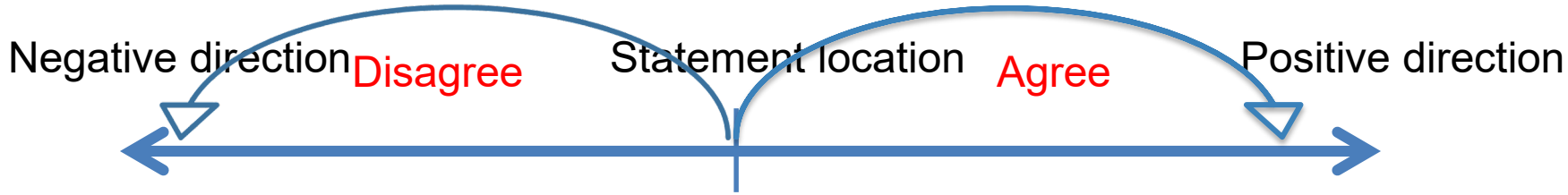

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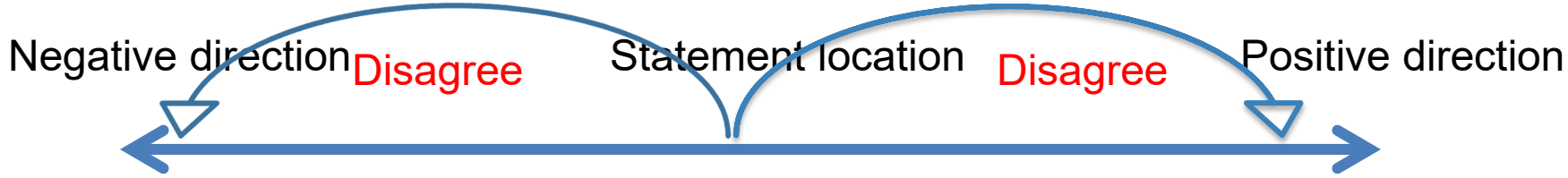

For example,

- A respondent may have a low score on the moral traditionalism continuum
  - and yet disagree that he should adjust his view of moral behavior to those changes since he/she does not necessarily believe in any kind of moral compass
- At the same time, another respondent could score high on moral traditionalism
  - and still disagree with needing to adjust to those changes

Multidimensional unfolding model （MUM）

- Unfolding model can simultaneously model three parts
  - Latent structure model for ordinal variables (Agresti, 2002, pages 277-279; Javaras and Ripley, 2007),
  - Linear model that defines group memberships (Javaras and Ripley, 2007)
  - Response threshold structure model (Javaras and Ripley, 2007; Rossi et al., 2001).

Multidimensional unfolding model （MUM）

- MUM can estimate the ARS (shifting) and ERS (scale) parameters simultaneously
- Although model parameterization include other covariates to be included, estimation code could only handle group of interest

Multidimensional unfolding model （MUM）

- The overall goodness of fit statistics suggest that modelthat imposes group specific shifting and scaling parameters fits the data better
- Other groups (Hispanics and Non-Hispanic Blacks) have higher acquiescence and extremity in their responses than non-Hispanic white group

Multidimensional unfolding model （MUM）

Response Style	Group	Shifting or Scaling Parameter (SE)
Acquiescence		
	Non-Hispanic white	0.00*
	Non-Hispanic black	0.76 (0.07)
	Hispanic (English interview)	0.71 (0.02)
	Hispanic (Spanish interview)	0.71 (0.15)
Extreme Response Style		
	Non-Hispanic white	-0.13*
	Non-Hispanic black	0.08 (0.03)
	Hispanic (English interview)	0.12 (NA)
	Hispanic (Spanish interview)	0.13 (0.06)

MUM Estimates of Parameters and Variances of Interest, for the Response-style Parameters, 2012 American National Election Studies

*Constrained for estimation

Conclusion

- Different
  - Assumptions and data requirement
    - Multi-item rating scales
      - Balanced
      - Heteregenoity
    - MUM doesn’t include
      - controls
      - weighting
    - MUM and LCA model ARS and ERS simultaneously
  - Interpretations
    - MUM allows to estimate adjusted means
  - Statistical packages different
    - SAS
    - R
    - Mplus
    - Latent Gold
- Different conclusion wrt ERS requires further investigation

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