

# Using Multiple Measures to Gauge and Reduce Survey Error

Steve Ansolabehere  
Harvard University

# Guiding Research Questions

- Do People have Stable and Coherent Opinions and Preferences on Issues?
  - Measure Constraint as the Correlation between two Items,  $X_1$  and  $X_2$ , where 1 and 2 are repeat measure at two times or in one survey
- How do Issue Preferences Affect Vote or Assessments of Government?
  - Regression Model of Vote on Issue Positions, Party ID, and other variables.
  - Recent Example. Issue voting and polarization studies. (A, R, S, “Purple America” JEP 2006).

# Measurement Problem

- Measurement error in surveys is known to be common stemming from
  - Vague concepts
  - Vague and confusing question wordings
  - Inattentive Respondents
- Measurement error tends to
  - Deflate Correlations
  - Deflate Regression Coefficients
  - In Multivariate Models it can cause all sorts of mischief.

# Measurement Problem

- Magnitude of Measurement Error
  - On issue and economy items in the ANES, GSS, CCES, etc., random M. E. accounts for approximately half of the variation.
  - On Party ID, M. E. is relatively small, accounting for perhaps 1/7 th of the variance.
- Simple Averaging Reduces Measurement Error Substantially.

# Model

- Assume simple measurement error model

$$w_j = X + u_j$$

$$V[w_j] = V[X] + V[u_j],$$

$$V[u_j] = V[u]$$

$$\text{Corr}[w_j, w_k] = V[X] / (V[X] + V[u])$$

- Averaging K Repeated Measures yields

$$W = \sum w_j / K$$

$$V[W] = V[X] + (V[u]/K)$$

$$\text{Corr}[W_j, W_k] = V[X] / (V[X] + (V[u]/K))$$

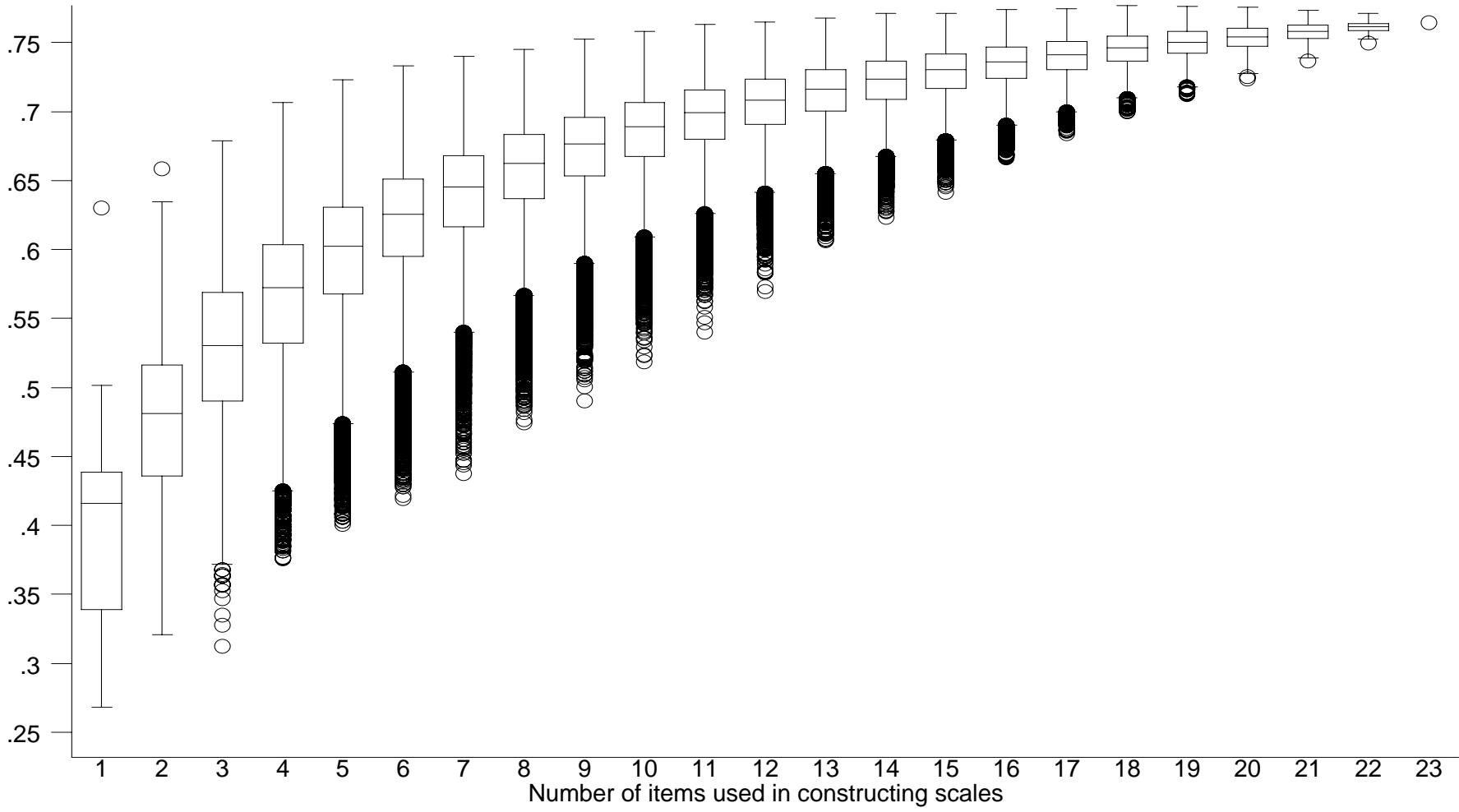
# Results

- Averages will be less influenced by M.E. than Single Items.
- The Rate of improvement depends on the number of items and the signal to noise ratio.
- The Difference in Variances of the Average of K X's and of a Single X is
$$V[w_j] - V[W] = [(K-1)/K] V[u]$$
- Can relax assumptions and find more subtle intuitions. E.g., an additional variable might not improve matters if the M.E. in the additional variable is large relative to average M.E. in other variables and K.

Averaging Helps A LOT

# Economic Issues, Panel

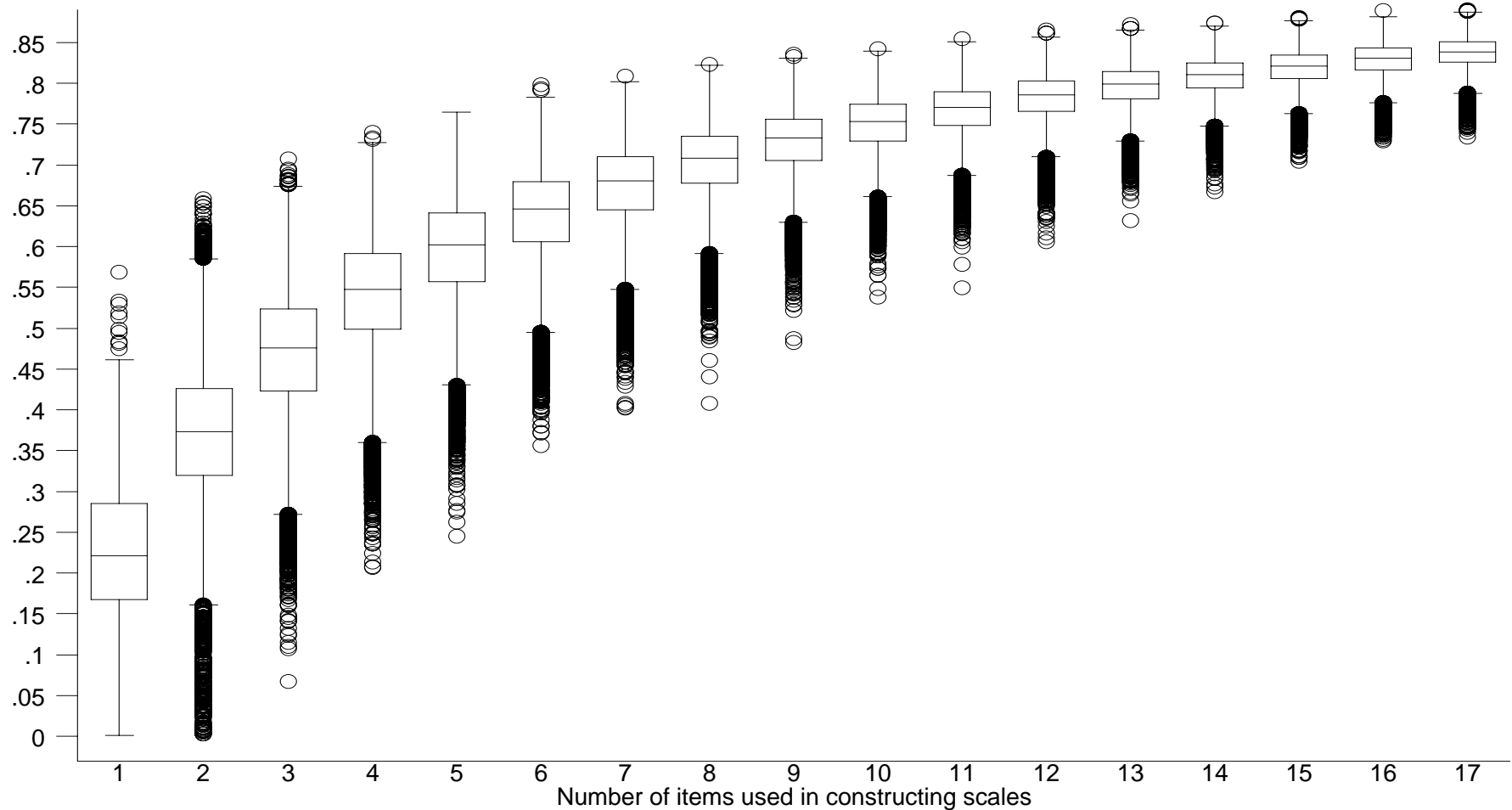
Correlation between 1990 and 1992 Economic Issue Scales  
Box-and-whiskers plot





# Economic Issues, Cross-Section

Correlation between Various 1996 Economic Issue Scales  
Box-and-whiskers plot



# Substantive Implications

- There is much more stability and constraint than is commonly thought.
- Issue Attitudes and Preferences have much stronger relations to vote choice than past literature tends to find.
- Low Education People Show As Much Constraint with Averages as High Education People Show in Single Items

# Effects of Party and Issues on Presidential Voting, 92, 96 NES

## SPECIFICATION

	Individual Item		Scaled	
	1992	1996	1992	1996
Party ID	1.18 (.12)	.99 (.08)	.99 (.09)	.86 (.08)
Ideology Scale	.58 (.12)	.54 (.10)	.40 (.10)	.53 (.09)
<u>Economic issues</u>				
Scales			.33 (.08)	.52 (.09)
Individual Items:				
average  coefficient	.09	.07		
fraction signif. (.05)	.09	.15		
<u>Moral issues</u>				
Scales			.43 (.09)	.29 (.07)
Individual Items:				
average  coefficient	.14	.12		
fraction signif. (.05)	.22	.29		
N	653	995	653	995
Pseudo-R2	.695	.672	.622	.629

# Methodological Implications

- We need systematic measures of error components in survey items to be able to make sensible design judgments.
- Measurement Error will Affect All other Survey Quality Measures as it introduces Bias and Inefficiency and thereby affects MSE and Reliability.
- Improving Question Wording Will Help
- Even with BEST question wordings (NES) we see massive improvements due to Averaging:

ASK MORE QUESTIONS  
ON EACH ISSUE