



CENTER FOR ADVANCING RESEARCH & COMMUNICATION

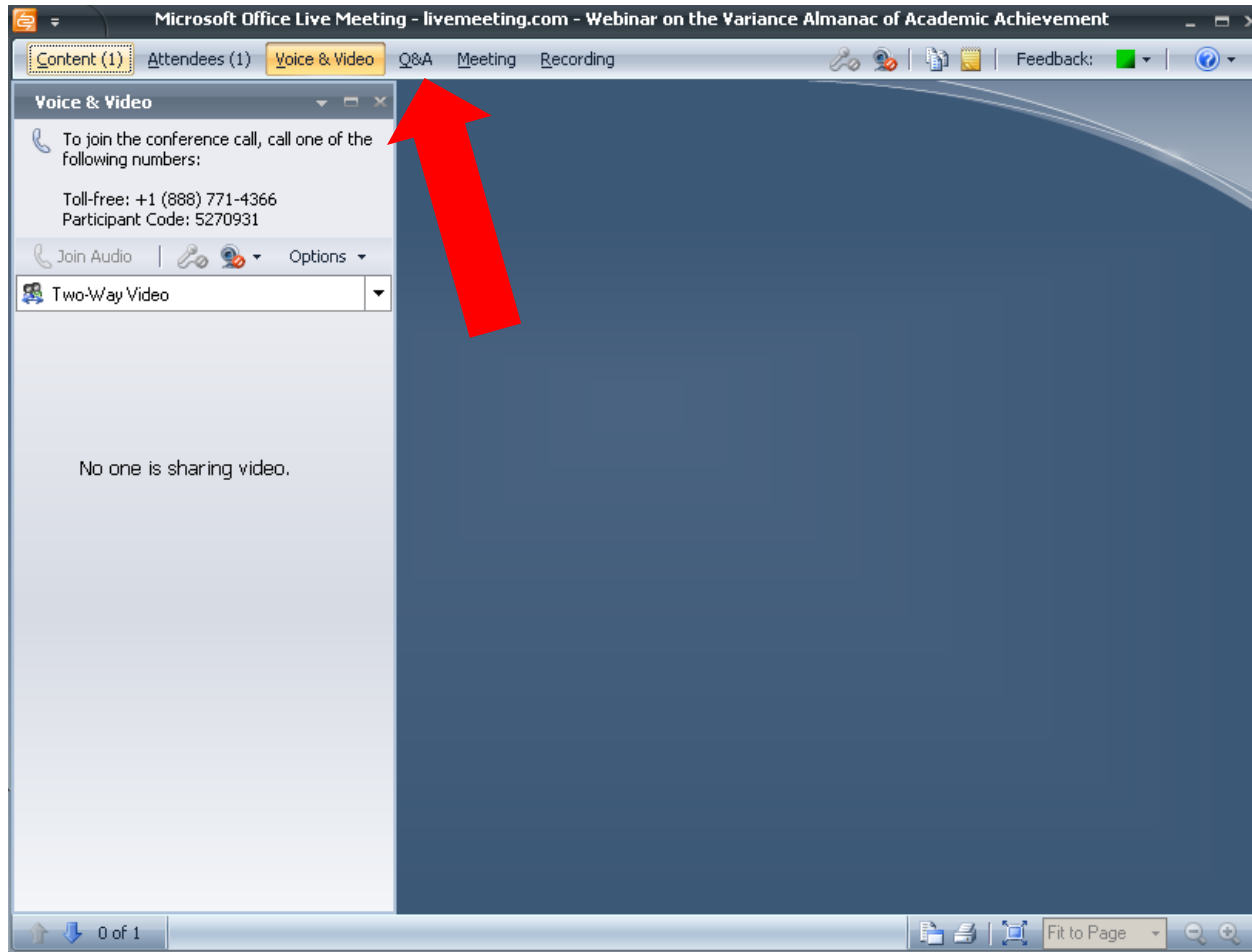
Introduction to the Online Variance Almanac

This research was supported by the National Science Foundation under Award Nos. 0129365 and 0815295. Additional support was provided to Hedges by the Institute of Education Sciences under Award No. R305D110032. Any opinions, findings, and conclusions or recommendations expressed here are those of the author(s) and do not necessarily reflect the views of the National Science Foundation or Institute of Education Sciences.



Opening Remarks

Question and Answer



What is the Variance Almanac?

- The variance almanac is a compendium of information useful for designing educational evaluation studies
- The information is about design parameters that researchers must know to create evaluation designs that have adequate statistical power and precision to detect effects
- These design parameters include
 - Between/within school variance decomposition (measured by the intraclass correlation or *ICC*)
 - Effectiveness of covariates at explaining variation (measured by the R^2 values at student and school level)

Why Do We Need a Variance Almanac?

- In designs that use **simple random samples**, precision and statistical power depend on
 - Level of statistical significance required
 - Total sample size
 - Effectiveness of covariates in explaining outcome variation
- A bigger sample size is always better
- Unfortunately, simple random samples are rare in education
- Many of our samples use two stage cluster samples:
We sample clusters (schools or classrooms) first, then sample students within clusters

Why Do We Need a Variance Almanac?

- In designs that use two-stage cluster sampling, statistical power and precision depend on:
 - Level of statistical significance required
 - The sample size **at each level** (e.g., schools/students)
 - Effectiveness of covariates in explaining outcome variation **at each level** (e.g., schools/students)
 - The school/student variance decomposition
- A bigger total sample size is **not** always better

Why Do We Need a Variance Almanac?

- In designs that use two-stage cluster sampling, statistical power and precision depend on:
 - Level of statistical significance required
 - The sample size *at each level* (e.g., schools/students)
 - Effectiveness of covariates in explaining outcome variation *at each level* (e.g., schools/students)
 - The school/student variance decomposition
- A bigger total sample size is *not* always better

These design parameters are hard to know

Why Do We Need a Variance Almanac?

- The variance almanac is designed to provide a database of empirical information about:
 - The school/student variance decomposition (in the form of intraclass correlations)
 - The effectiveness of covariates at explaining outcome variation at school and student levels
- The information comes from national surveys with representative (probability) samples

Objectives for this Webinar

1. Provide an introduction to using the online variance almanac resource
2. Provide an introduction to power analysis macros in STATA that we have developed
3. Demonstrate the use of these power analysis macros with information from the variance almanac to compute statistical power for studies that assign groups (schools) to treatments

The Online Variance Almanac (*Web VA*)

- Compendium of thousands of intraclass correlations and R^2 values based on national probability samples
- Kindergarten through 12th grade in U.S. schools
- Reading and mathematics achievement

The Samples

- The Early Childhood Longitudinal Program (ECLS)
(<http://nces.ed.gov/ecls/>)
- The Longitudinal Study of American Youth (LSAY)
(<http://lsay.msu.edu/>)
- The National Education Longitudinal Study (NELS)
(<http://nces.ed.gov/surveys/nels88/>)
- Prospects: The Congressionally Mandated Study of Educational Growth and Opportunity.
(<http://www2.ed.gov/pubs/Prospects/index.html>)

Analysis

- Our analyses considered many aspects of possible research designs
 - Achievement domain
 - Geographic subgroups
 - School subsamples
 - Different covariates

Achievement Domain

- Mathematics achievement
- Reading achievement

Geographic Subgroups

Region

- All regions
- Midwest
- Northeast
- South
- West

Urbanicity

- All urbanities
- Rural
- Suburban
- Urban

School Subsample

- All schools
- Low achieving schools
- Low SES schools

Different Covariates

- Group centered student level variables
- Group mean school level variables
- 4 models
 - None (unconditional model)
 - Pretest covariates model
 - Demographic covariates model
 - Pretest and Demographic covariates model

Data source and grade

Grade	ECLS	LSAY Cohort 1*	LSAY Cohort 2*	NELS	Prospects Cohort 1	Prospects Cohort 2	Prospects Cohort 3
K	X						
1	X						
2						X	
3	X				X	X	
4					X		
5					X		
6					X		
7		X					X
8		X		X			X
9		X					X
10		X	X	X			
11			X				
12			X	X			

* Math only

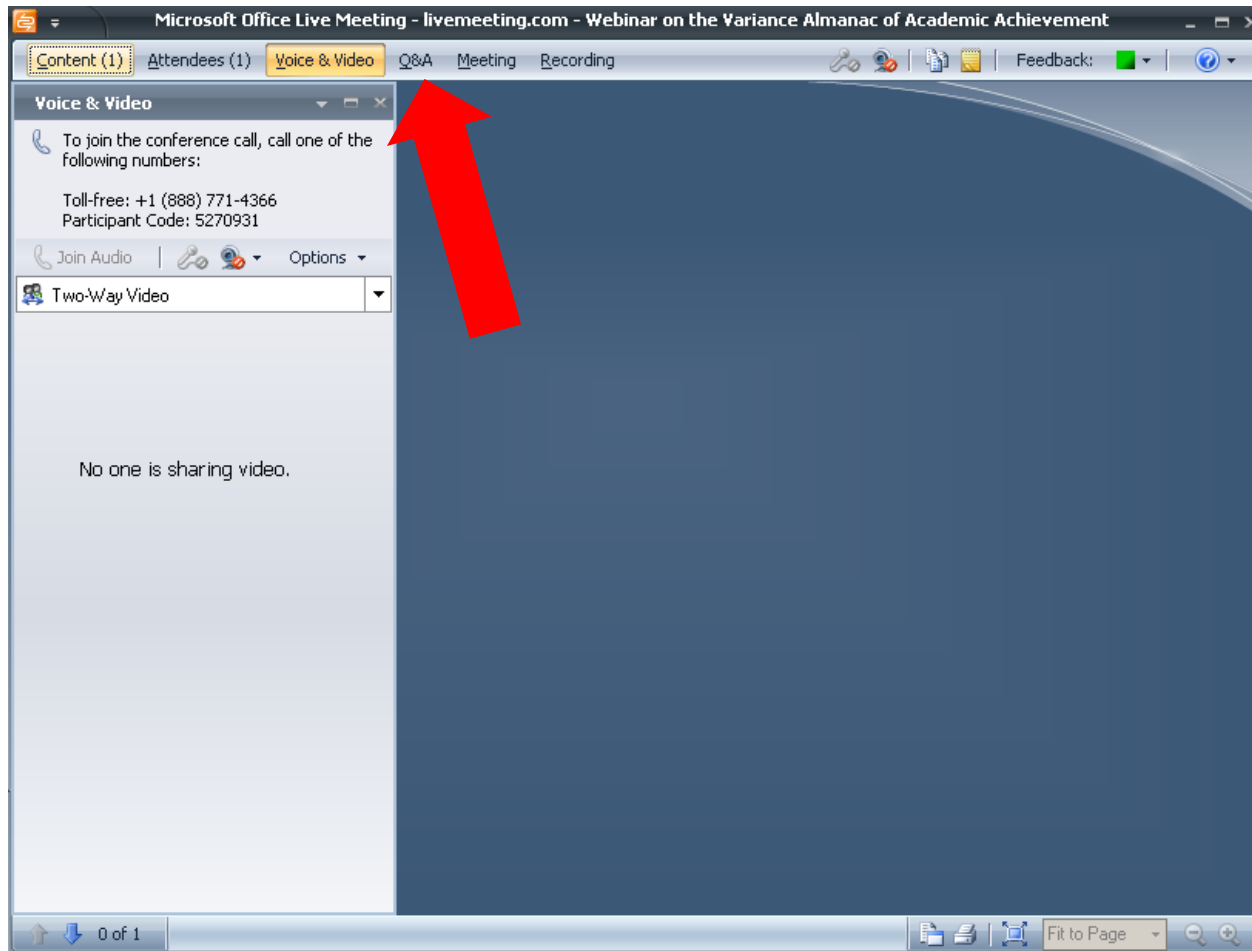
Using the Web VA

- Go to:

<https://arc.uchicago.edu/reese/variance-almanac-academic-achievement>

- Next: a live demonstration

Question and Answer





What you need to know

[AERA Deadline for Paper and Session Submissions is July 22](#)

[Proposals for the Cyberlearning: Transforming Education program are due July 14](#)

[Proposals for the Transforming STEM Learning \(TSL\) program are due March 9, 2012](#)

[Society for Research on Educational Effectiveness \(SREE\) meeting September 2011](#)

[ICPSR webinar on data management](#)

[Webcast on the REESE program](#)

[Webcast on the new PRIME program](#)

[New website features Resources for STEM Education](#)

[Event at NSF in 2009 features REESE research](#)

[View Archive](#)

Variance Almanac

[Login](#) to post new content in the forum.

Forum	Topics	Posts	Last post
Forum for Variance Almanac (VA) Discussion group for users of the online Variance Almanac of Academic Achievement developed by Larry V. Hedges, ARC and Northwestern University, and Eric Hedberg, NORC at the University of Chicago. <i>NOTE: This is not a moderated discussion forum. However, ARC staff will check periodically for questions regarding the use of the VA to extract design parameters. If you have an urgent question on using the Web VA or do not have a user account, please e-mail your question or comment to arc-info@norc.org.</i>	3	3	2 weeks 1 day ago by Kevin Brown

User login

E-mail: *

Password: *

Log in

• [Request new password](#)



What you need to know

- [AERA Deadline for Paper and Session Submissions is July 22](#)
- [Proposals for the Cyberlearning: Transforming Education program are due July 14](#)
- [Proposals for the Transforming STEM Learning \(TSL\) program are due March 9, 2012](#)
- [Society for Research on Educational Effectiveness \(SREE\) meeting September 2011](#)
- [ICPSR webinar on data management](#)
- [Webcast on the REESE program](#)
- [Webcast on the new PRIME program](#)
- [New website features Resources for STEM Education](#)
- [Event at NSF in 2009 features REESE research](#)
- [View Archive](#)

References for Variance Almanac

Hedges, Larry V. & E. C. Hedberg, (2007). [Intraclass correlation values for planning group-randomized trials in education](#). *Educational Evaluation and Policy Analysis*, 29(1), 60-67.

Experiments that assign intact groups to treatment conditions are increasingly common in social research. In educational research, the groups assigned are often schools. The design of group-randomized experiments requires knowledge of the intraclass correlation structure to compute statistical power and sample sizes required to achieve adequate power. This article provides a compilation of intraclass correlation values of academic achievement and related covariate effects that could be used for planning group-randomized experiments in education. It also provides variance component information that is useful in planning experiments involving covariates. The use of these values to compute the statistical power of group-randomized experiments is illustrated.

Hedges, Larry V. & E. C. Hedberg, (2007). [Intraclass correlations for planning group randomized experiments in rural education](#). *Journal of Research in Rural Education*, 22(10).

Experiments that assign intact groups (usually schools) to treatment conditions are increasingly common in educational research. The design of group randomized experiments requires knowledge of the intraclass correlation structure to compute statistical power and to determine the sample sizes required to achieve adequate power. The intraclass correlation structure of academic achievement is shown to be somewhat different in rural schools than in all schools in the nation. This article provides a compilation of intraclass correlation values of academic achievement and related covariate effects that could be used for planning group randomized experiments in rural schools. The use of these values to compute statistical power of group randomized experiments involving rural schools is illustrated.

User login

E-mail: *

Password: *

[Request new password](#)



Finding the *Web VA*

- Go to <https://arc.uchicago.edu/reese/variance-almanac-academic-achievement>
- Google “ARC Variance Almanac”

**Center for Advancing Research and Communication in Science, Technology,
Engineering, and Mathematics (ARC)**

<https://arc.uchicago.edu>

NORC at the University of Chicago

