

**THE NEBRASKA CENTER FOR  
RESEARCH  
ON CHILDREN, YOUTH, FAMILIES  
AND SCHOOLS**

**Is Pleased to Present the 2009 - 2010  
Research Methodology Series**

The Research Methodology Series is an ongoing effort by the Nebraska Center for Research on Children, Youth, Families and Schools (CYFS) to provide information to social science researchers about important and cutting-edge research methodology and statistical approaches. Series presenters include personnel from the CYFS Statistics and Research Methodology Unit, along with invited guests.



**The CYFS Statistics and Research Methodology Unit**

The CYFS Statistics and Research Methodology Unit provides support to CYFS Faculty Affiliates in the conceptualization of research designs and methodology and the selection and execution of data analyses. Unit personnel are experienced statisticians who specialize in experimental, quasi-experimental, and correlational design methodology; measurement; and cross-sectional, longitudinal, and correlational data analytic approaches (e.g., regression, analysis of variance, structural equation modeling, growth modeling, hierarchical linear modeling). For more information about CYFS or the CYFS Statistics and Research Methodology Unit, contact the CYFS Center Director, Dr. Susan Sheridan, at [ssheridan2@unl.edu](mailto:ssheridan2@unl.edu).

**Jim Bovaird** received his PhD in Quantitative Psychology from the University of Kansas in 2002. He is currently an Assistant Professor of Quantitative, Qualitative and Psychometric Methods in Educational Psychology at UNL and Director of the CYFS Statistics & Research Methodology Unit. His research interests involve determining the proper use of latent variable methods - including structural equation modeling, item response theory, and multilevel modeling - and applying these methods to advance substantive research in the social and behavioral sciences.

**Greg Welch** received his PhD in Research Methodology in Education from the University of Pittsburgh in 2007. He is now a Research Assistant Professor for the CYFS SRM Unit. His research interests include structural equation modeling, latent curve analysis, and educational policy.

**Kevin Kupzyk** received his master's degree in Quantitative Psychology from the University of Kansas in 2005. He is now a methodological consultant for the CYFS SRM Unit and a doctoral student in Quantitative, Qualitative, and Psychometric Methods in Educational Psychology at UNL. His research interests include power analysis and optimal design of experiments, educational measurement, multilevel modeling, and latent variable growth models.

**Kyongboon Kwon** received her PhD in School Psychology from the University of Georgia in 2008. She is now a postdoctoral fellow in CYFS working with Dr. Susan Sheridan on randomized clinical trial interventions designed to promote family-school partnerships. Her research interests include peer group socialization in school settings and family-school relationships.



## **Fall 2009**

### **Methods for Modeling Context**

**Friday, November 20, 12:00 PM - 1:00 PM**

**242 Mabel Lee Hall**

**Jim Bovaird, PhD, Assistant Professor, Department of Educational Psychology and Director, CYFS Statistics & Research Methodology Unit**

A developing child's environment, or context, is known to affect individual behavior. Developmentalists have long recognized the need to look at the "ecosystem" in which humans learn and develop. Using Bronfenbrenner's (1979, 1986) ecological model as a template, this presentation will outline current methodological possibilities that allow us to consider the influence of multiple interacting systems in a child's environment, including immediate social settings (microsystems); the connections between multiple distinct social settings (mesosystems); neighborhood and community influences (exosystems); the overarching cultural, political, and economic influences (macrosystems); and the developmental impact of time (chronosystem). Particular attention will be given to matching ecologically-pertinent research questions with available appropriate methodologies and identifying when the state-of-the-science may be inadequate.

### **Introduction to Multilevel Modeling**

**Friday, December 11, 12:00 PM - 1:00 PM**

**242 Mabel Lee Hall**

**Kevin Kupzyk, MA, CYFS Statistics and Measurement Consultant**

In the behavioral and social sciences, access to data is often dictated through naturally-occurring organizational structures, or clusters, such as social groups, classrooms, neighborhoods, schools, or communities. This is especially the case in educational research settings. Such complex sampling leads to dependence in the data that violates the assumption of independence of residuals in linear regression. As clustered

structures have become apparent and prevalent across many research settings, it has become increasingly important that researchers utilize analytic methods to deal with such structures appropriately. This presentation will cover the fundamentals of multilevel models, outline how they differ from single-level linear regression, and provide examples for performing and interpreting the analyses using SAS and SPSS.

## **Spring 2010 (Time, Date, & Location TBD)**

### **Assessing Inter-rater Reliability: An Overview**

**Greg Welch, PhD, Research Assistant Professor, CYFS**

Research in the social and behavioral sciences is replete with instruments requiring ratings of subjects on some phenomenon of interest by one or more raters or interviewers. When multiple raters are involved, a certain level of consensus among ratings is needed, with various methods available to determine such consensus. This presentation will provide an overview of many of common methods to determine inter-rater consensus, including percent agreement, Cohen's Kappa, and the Intraclass Correlation Coefficient. Examples will be provided to demonstrate the utility of these methods in an applied setting.

### **Propensity Score Matching: Advantages and Limitations**

**Kevin Kupzyk, MA, CYFS Statistics and Measurement Consultant**

Matching procedures are frequently employed by researchers using quasi-experimental research designs to make some limited causal statements. Traditional matching methods attempt to equate participants across comparative, non-experimental conditions based on one or a small number of variables. Propensity score matching has the potential to match samples on as many variables as are available. This presentation will provide the rationale for matching, discuss some traditional methods, and describe propensity score matching both conceptually and by example. The primary goal is to provide researchers with an understanding of what propensity score

matching is, how it is performed, and when it should and should not be utilized.

### **Non-Parametric Analyses in Small-N and Single Case Research**

**Greg Welch, PhD, Research Assistant Professor, CYFS**

Intervention research using inherently small samples is sometimes necessary and desirable to answer certain research questions or address issues with underrepresented samples. In such cases, traditional statistical analytic approaches via commonly utilized parametric techniques (e.g., regression, ANOVA) are not appropriate. Non-parametric approaches are suitable for research utilizing small samples due to their lack of reliance on known information about the variables of interest. This presentation will discuss commonly utilized non-parametric approaches; including the Mann-Whitney U, Wilcoxin Matched-Pairs, and the Kruskal-Wallis-H tests; in the context of small-N and single case research. An overview of small-N and single case research designs, including the strengths and weaknesses of each, will also be provided.

### **On the Conceptual, Methodological, and Statistical Distinctions between Mediation and Moderation**

**Kyongboon Kwon, PhD, Postdoctoral Fellow, CYFS**

Questions regarding the context(s) under which an intervention works are as important as determining the direct efficacy of the intervention itself. Mediators identify possible mechanisms through which an intervention might achieve its effects, while a moderator specifies for whom and under what conditions an intervention works. Correctly identifying mediators and moderators is a critical step toward uncovering potential causal mechanisms explaining intervention efficacy or futility. However, the distinction between a variable acting as a mediator or moderator, or both, is sometimes less clear. In this presentation, several popular definitions of mediators and moderators will be discussed. Appropriate methodologies for evaluating mediation and moderation effects will be presented.