SOCIETY FOR PREVENTION RESEARCH
22ND ANNUAL MEETING
WASHINGTON, DC

Pre-Conference Workshop IV
Date: Tuesday, May 27, 2014
Time: 8:30 am – 4:30 pm

Time-varying Effect Models in Prevention Research

Co-Organizers and Co-Presenters: *Stephanie T. Lanza, PhD,* The Methodology Center, Pennsylvania State University**,** *Sara A. Vasilenko, PhD*, The Methodology Center, Pennsylvania State University, and *Runze Li, PhD,* Pennsylvania State University,

Description

A new analytic method, the time-varying effect model (TVEM), can enable prevention researchers to examine dynamic (i.e. time-varying) processes. This method can help to answer questions such as: How do program effects change over time? How do risk factors differentially predict behavior at different ages? What ages may be particularly important times for intervention?

The goal of this hands-on workshop is to attendees gain the background and skills to be able to identify and address new research questions using TVEM. We have three primary objectives:

Objective 1. Participants will identify, explain, and describe attributes of TVEMs, including

(a) a new set of research questions that can be addressed using TVEM, and

(b) data structures that lend themselves to traditional longitudinal methods, compared to data structures that permit an examination of time-varying effects.

Objective 2. Participants will gain theoretical knowledge of and experience in use of SAS software to

(a) estimate a basic TVEM in order to examine the mean level, proportion, or count on an outcome variable as a function of continuous time,

(b) examine the time-varying effects of both time-invariant (e.g., gender) and time-varying (e.g., urge to smoke) predictors on an outcome,

(c) incorporate grouping variables (e.g., treatment condition) as moderators of time-varying effects, and

(d) interpret all TVEM output, which includes tables of fixed effects and figures showing nonparametric coefficient functions for the mean trend and time-varying effects of covariates.

Objective 3. Participants will understand the different metrics of time that can be used to address innovative research questions, and will gain familiarity with applications of TVEM to cross-sectional and panel data.

Audience

The audience is researchers who have an interest in using time-varying effects in their research. Basic familiarity with SAS and logistic regression analysis is helpful, but not a prerequisite. Maximum number of attendes: 30.

Materials to be provided to attendees

Participants will receive handouts of all power point slides, sample SAS output to facilitate model interpretation, and a recommended reading list. In addition, students will receive SAS macros and a sample dataset on a flash drive provided by the instructors. Participants should bring their own laptops with SAS installed if they wish to participate in the hands-on portion of the workshop.

Outline

Morning:

- Dr. Lanza will present a conceptual overview of intensive longitudinal data (ILD) and the time-varying effect model (TVEM). Focus will be given to research questions that can be addressed with this statistical technique.
- Drs. Li and Lanza will present the mathematical model underlying TVEM; throughout the workshop, Dr. Li will field any technical questions that arise.
- Dr. Lanza will present a detailed example of TVEM based on EMA data from a smoking cessation study. This will include presenting research questions and the parameters being estimated, specifying the model in SAS using the macro developed by the Instructors, and interpreting results.

Lunch: Questions and open discussion.

Afternoon:

- Dr. Vasilenko will present several applications of TVEM using cross-sectional and panel data, and discuss how the technique can be used to study behavioral phenomena across historical and developmental time.
- Participants will conduct hands-on computer exercises where they will fit TVEM models; instructors will answer questions.

Presenters

- The workshop will be led by three instructors with complementary backgrounds: Stephanie Lanza and Sara Vasilenko (human development and methodology) and Runze Li (statistics). All three have been instrumental in expanding applications of TVEM to the social and behavioral sciences. Dr. Li is the original developer of TVEM and the corresponding SAS Macro, and Drs. Lanza and Vasilenko are experts on the application of TVEM to address questions about dynamic processes, and have written TVEM papers on topics including smoking cessation treatments, adolescent substance use, and adolescent and young adult sexual behavior.

Presenter bios:

Stephanie T. Lanza, Ph.D. is Scientific Director of The Methodology Center and Research Associate Professor of Health and Human Development at Penn State. She has a background in research methods, human development, and substance use and comorbid behaviors, with first-authored publications appearing in methodological journals such as *Structural Equation*

Modeling and *Psychological Methods* and applied journals including *Development and Psychopathology* and *Prevention Science*. She is co-author of *Latent Class and Latent Transition Analysis: With Applications in the Social, Behavioral, and Health Sciences* (published by Wiley, 2010) and leads the ongoing development of PROC LCA, a SAS add-on procedure for fitting latent class models. Her research interests include advances in finite mixture modeling and time-varying effect models for ILD. She is passionate about disseminating these methods to behavioral and social science researchers, as indicated by the many NIH-funded dissemination conferences she has organized, trainings and workshops she has given, and tutorial articles she has published in top journals. Most recently, she edited (with Drs. Megan Piper and Saul Shiffman) a special issue for *Nicotine and Tobacco Research* (in press) on methods for studies that rely on ecological momentary assessments.

Sara A. Vasilenko, Ph.D. is a Research Associate at the Methodology Center at Penn State. Her background is in human development and research methodology, specifically using longitudinal methods to examine adolescent and young adult sexual risk and substance use behaviors. She encourages the use of innovative methods through publications in applied journals. She has forthcoming papers in *Journal of Adolescent Health* and *Nicotine and Tobacco Research* that apply time-varying effect models to different types of data (e.g. longitudinal panel data, ecological momentary assessment data). In addition, she was recently awarded an R03 from NICHD to apply these models to understand how predictors of condom use differ over time in a relationship with a sexual partner.

Runze Li, Ph.D., is a Distinguished Professor of Statistics at Penn State and a Principal Investigator at The Methodology Center. Dr. Li's recent projects apply nonparametric and semiparametric statistical modeling techniques to the analysis of intensive longitudinal data and high dimensional data, including ecological momentary assessments. He is the lead developer of the Center's SAS software for conducting time-varying effect modeling and has published prolifically in both statistical and social science journals including *Journal of the American Statistical Association*, *Psychological Methods*, and *Prevention Science*. He is the current co-editor of *Annals of Statistics* and an American Statistical Association fellow. Dr. Li frequently presents on his work globally**.**