

# The Quantitative Methods and Evaluation (QME) Area

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# Introduction

The Quantitative Methods and Evaluation (QME) Area at Vanderbilt is a dynamic, multifaceted area that supports a wide variety of teaching and research functions.

In what follows, I'll briefly describe the structure of our course offerings, our teaching philosophy, and several major areas of research that our members engage in.

# Standard First Year Sequence

Most students will take the following *required* basic sequence:

- Psychology 310 (Statistical Inference) in Fall 2010
- Psychology 304B (Experimental Design / ANOVA) in Spring 2011

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- The “finished product” is what counts
- Some students will/should exempt or delay Psychology 310
- Decision should be made in collaboration with Professor Steiger and your advisor/supervisor
- Exemption requests should be supported by documentation of previous courses, and should be made prior to the start of the semester

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## Advanced Courses

QME currently offers a wide variety of courses on a rotating basis, including:

- **Multivariate Analysis**
- Structural Equation Modeling
- Psychological Measurement
- Item Response Theory I
- Item Response Theory II
- Advanced Latent Variable Models
- Correlation and Regression
- Multilevel Regression Models
- Introductory Longitudinal Methods
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## General Orientation

Which courses you take will depend, of course, on your particular needs and interests.

Our orientation is generally “open book and results-oriented.” In keeping with that point of view, we are now building many of our courses around the freeware statistical system R. For example, in Psychology 310 we have open-book, open-note exams and allow students to use R to perform computations.

We even encourage students to develop their own software libraries and we allow students to use their libraries on exams.

# Research in Quantitative Methods and Evaluation

- There are several distinct subareas within quantitative
- Even well-defined subdivisions have considerable “cross-talk”
- Research is active and ongoing

# Naturally Occurring Change

Emphasis is on longitudinal designs and statistical approaches to modeling developmental phenomena.

## Example (Recent Research Topics)

- Application of hierarchical linear and nonlinear models to assess change in psychiatric and educational settings
- Identifying individual differences in patterns of change over time
- Precursors and predictors of antisocial behavior
- Studying the development of mathematical talent over time

## Instigated Change

Our focus on the analysis of instigated change (e.g., the effects of policies, programs, interventions) highlights the development and use of state-of-the-art experimental and quasi-experimental field methods.

### Example (Recent Research Topics)

- Experimental and quasi-experimental evaluations of changes in systems of mental health care children and adolescent
- Multi-site experimental evaluation of interventions to assist homeless substance abusers
- Policy-driven meta-analysis of welfare-to-work experiments, examining the relative effects of alternative models, context, and implementation levels

# Research in Quantitative Methods

Our focus here is on the development of innovative new methods for analyzing change, as well as basic research on the effectiveness of methods that are already available. This research combines Monte Carlo simulation, meta-analysis, and new developments in statistical theory. Our goal is to foster a continuous improvement in social science methods.

## Example (Recent Research Topics)

- Evaluation of specific structural equation models for analyzing change
- Confidence interval methods for evaluating the fit of structural equation models
- Confidence intervals as a replacement for traditional hypothesis tests in ANOVA
- Methods for testing complex hypotheses on correlations

# Summary

The QME area serves multiple functions in the department

- We offer services courses and advanced courses
- We consult and collaborate with our faculty
- We do research in a variety of areas

# Welcome!

Welcome to Vanderbilt!!

We look forward to getting to know you and working with you in the future!