Graduate Research Opportunities in
Educational Measurement and Cognitive Development

Drs. Mark Gierl and W. Todd Rogers in the Department of Educational Psychology and Drs. Jeff Bisanz and Gay Bisanz in the Department of Psychology are looking for students who are interested in studying educational measurement and cognitive development at the Masters and/or PhD level at the University of Alberta. Drs. Gierl and Rogers are psychometricians specializing in educational measurement and evaluation. Drs. Bisanz and Bisanz are developmental psychologists specializing in mathematical cognition and scientific reasoning in children. We would like to jointly supervise a student who is interested in educational measurement and cognitive development as part of our ongoing research program, which is described below.

Students interested in the unique opportunity to acquire expertise in both educational measurement and cognitive development are encouraged to consider applying for admission to the graduate program in either the

Department of Educational Psychology (http://www.education.ualberta.ca/educ/psych/psych.html)

or

Department of Psychology (www.psych.ualberta.ca/programs/grad.html)

If you are interested or have questions, please contact either Mark Gierl (mark.gierl@ualberta.ca) or Jeff Bisanz (jeff.bisanz@ualberta.ca).

Current Research Program

A constant concern in large-scale testing is the possibility that particular items may function differently for specific groups of students. For example, a subset of items on a test of mathematics might yield higher scores for males than for females, even though students in these two groups score quite similarly on most other items. Items that function differentially for groups could reflect a bias that is unrelated to the academic domain being tested (e.g., the nonmathematical content of the items might be more familiar to males than females) and thus be a source of error in testing. Alternatively, these items might reflect different styles of reasoning or problem solving that have important implications for instruction and for understanding individual differences in cognitive development. Unfortunately, identifying and understanding the reasons for differential item functioning (DIF) has proved to be problematic.

Recent advances in measurement techniques (e.g., item response theory) will be used to identify items that function differentially for specific groups of students on provincial achievement tests in elementary, junior high, and high school. Next, methods of cognitive psychology (e.g., protocol analyses) will be used in studies with individuals to determine the solution processes that distinguish between students in these groups. Initially our focus will be on sex differences in mathematics and science achievement, but the scope of the research will broaden as our methods are developed. This two-component procedure, which represents a merger of methods from educational measurement and from psychology, should be extremely useful for identifying whether items that function differentially reflect unwanted biases in content or informative differences in knowledge or problem solving.

This study is being conducted collaboratively between the Centre for Research in Applied Measurement and Evaluation (CRAME) and the Centre for Research in Child Development (CRCD). The research team includes Drs. Jeff Bisanz and Gay Bisanz (CRCD, Department of Psychology, University of Alberta), Drs. Mark Gierl and Todd Rogers (CRAME, Department of Educational Psychology, University of Alberta), and Dr. Terry Ackerman (Department of Educational Psychology, University of North Carolina at Greensboro).