Chapter  8
Implementing Structural Equation Modeling on Public Data

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ABSTRACT

The researchers used structural equation modeling (SEM) to create a model predicting fourth-grade student achievement in math by exploring the relationships among: student, household, school, and teacher factors. Public data from the New York State Education Department (NYSED) 2012–13 school report card data, NYSED fiscal reporting system, Census 2010 School District Demographics System, and 2011 Civil Right Data Collection were used from 1,263 schools in New York excluding New York City. Variables were chosen using this convenient sample and supported by our conceptual rationale. The model predicted fourth-grade math achievement with 67 percent of effect size. Household factors had strong predictive, while school attendance rate had medium predictive value for student achievement.

INTRODUCTION

President Johnson signed the Civil Rights Act in July 1964. The stated goal of the act was to outlaw discrimination and promote equality among all races. One of the results of the act was that the U.S. Congress commissioned sociologist
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James Coleman to write a report on education equality in the U.S. Two years later, Coleman and his team published the Equality in Educational Opportunity report, also known as the Coleman report. Coleman found that there was little variation in the resources between Black and White schools. However, there was a significant difference in outcomes in reading and math between Black and White schools. He stated that these differences in education outcomes were a result of student, family, school, and teacher characteristics (Coleman, 1966). Many researchers (New York State Office of Education Performance Review, 1974; Madden, Lawson, and Sweet, 1976; Summers & Wolfe, 1976; Hughes, 1995) followed Coleman team trying to find the malleable factors that school administrators control and effect achievement. Due to those studies, the U.S. education system went through several reforms A Nation at Risk (1983), No Child Left Behind Act (2001), Race To The Top (2009), and Every Student Succeeds Act (2015). However, the gap between schools based on socioeconomic status still exists. According to New York state assessment results (NYSED Press Conference 8/19/2013), there is one-standard-deviation gap between students who live in poverty and students who come from higher socioeconomic class. This difference is equivalent to the gap that was observed by Coleman and his team in 1966.

BACKGROUND

One of the immediate effects of the Coleman report was that it led politicians to state that schools make no difference and therefore there is no need to increase school spending since it has little to no effect in terms of student achievement. Rivkin, Hanushek, and Kain (2005) found that specific school resources do actually have significant effects on student outcomes. Teacher experience, teacher level of education, and smaller class size were found to have small but significant positive impact on student achievement (Rivkin, Hanushek, & Kain, 2005).

Other researchers (Bachman, Coley, & Chase-Lansdale, 2009; Crosnoe & Wildsmith, 2011; Hampden-Thompson, 2009) found that family structure had a direct relationship with student achievement. They found that children in stably married families experienced improved academic, behavioral, and psychological well-being compared to children in stable cohabiting or single-parent families. However, part of it is rooted in the better socioeconomic circumstances of families headed by stably married parents (Bachman, Coley & Chase-Lansdale, 2009; Crosnoe & Wildsmith, 2011; Hampden-Thompson, 2009). Contradicting to that, Weisner and Garnier (1992) found in a 12-years longitudinal study that children to non-traditional families with strong commitment to their life style do better in school than traditional children.
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