Nested Designs

In School-Based Mental Health Services Research

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Background

Evaluating school-based mental health services for youth with emotional disturbance (ED) has been a challenge for researchers. One particular challenge is the study design of using the student as the statistical unit of analysis, which may lead to a violation of the "independence of error" assumption. This statistical effect of nesting is due to students being located in classrooms, classrooms being located in schools, and schools being located in school districts. However, the alternative to this nested design (including fewer students and more schools), can be costly and complex.

Present Study

The purpose of the current study is to empirically document the effects of nested designs in investigating psychological and educational variables with students with ED.

Sample

The data consists of 314 parents/students with ED served in special education settings in 24 public schools in 10 states. Schools varied by grade (elementary, middle, high) and location (rural/urban). Students were on average 12 years old and male (84.4%). Over half of the sample is Black (57.6%) and 34.7% White. Most (78%) received mental health services during the year under investigation.

Method

Attendance, discipline, and IQ data were collected from the school, parents completed measures of child impairment (CIS or CAFAS) & psychopathology (CBCL). Students were given a math / reading achievement test (WRAT 3).

To understand the impact of nesting students within a school, the design effect (DE) is estimated for the subjects using the formula:

$$DE = 1 + \rho (n-1)$$

where n is the average sample size within each school and ρ is the intra-class correlation (ICC).

We have classified ICC values as small when <.05, medium from .05 to .25, and large when >.25.

Results

	Variable	ICC	Interpretation
Individual	CBCL Total T-Score	.01	Small
	CBCL Internal T-Score	.03	Small
	CBCL External T-Score	.03	Small
	CIS Total Score	.00	Non-existent
	CAFAS Total Score	.21	Medium
School	IQ Score	.20	Medium
	WRAT 3 Math Score	.15	Medium
	WRAT 3 Reading Score	.09	Medium
	% in Special Ed Setting	.44	Large

Discussion

Variables focusing on psychopathology are less affected by nesting but school-related variables such as academic functioning are more affected. Design effects vary by grade level, suggesting that grade should be considered when designing such evaluations.

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