



# A Latent Profile Analysis of Direct Behavior Ratings

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## Abstract

A latent profile analysis was carried out using participants from the screening phase (n=1,955) of a large scale validation study of Direct Behavior Ratings (DBR) in order to generate subtypes of students based on their classroom behavior as measured using DBR. Predictors and subsequent outcomes associated with behavioral functioning were analyzed to assess their association with specific DBR profiles. Results will provide information regarding the evidence base for convergent and discriminant validity of the DBR measure.

## Introduction

A screening study was carried out as part of a large scale validation trial of Direct Behavior Ratings, a 3 item rating scale for classroom behavior. A latent profile analysis (LPA) was conducted to determine if distinct levels of risk could be elucidated by analyzing a latent variable comprised of ratings on 3 DBR constructs: Academically Engaged, Respectful, and Disruptive.

*Hypothesis 1:* Consistent with a tiered model, 3 classes will emerge and correspond with high, medium, and low levels of behavioral risk.

*Hypothesis 2:* Classes will be significantly differentiated by cross-sectional predictors and subsequent outcomes.

## Participants

The sample included 1,955 elementary and middle school students in Connecticut, Missouri, and New York. Male students comprised 58% of the sample, and 82% were White, 12% African-American, 2% Asian, 1% Native American or Pacific Islander, and 3% identified as other. Students identifying as being of Hispanic ethnicity made up 7% of the study sample. Within each participating classroom, 10 students were randomly selected to participate in the screening study over the course of 1 week with 10 potential ratings. 13 % of students receive special education services and 34% of students receive supplemental supports such as small group or 1 on 1 instruction, behavior management services, and academic enrichment.

## Statistical Analyses

Data analyses were carried out using Mplus version 7.2. Scores for DBR scales were derived from taking the mean score of all observations for each construct. Students with fewer than 6 ratings were not included in the analyses. The optimal class solution (Figure 1) was determined by fit indices (Table 1) and theoretical consistency (Hill, 1965). Categorical latent variable regression was used to measure the relation between fall class membership and cross-sectional predictors (Table 2). Equality of means tests were used to evaluate the association between spring outcomes and fall class membership (Table 3).

Table 1

Fit Indices For Class Solutions 1-5				
LC	BIC	aBIC	VLMR	Entropy
1	20157.731	20138.668	--	--
2	17095.198	17063.428	0.0002	0.961
3	15837.286	15792.808	0.0015	0.923
4	<b>15281.135</b>	<b>15223.949</b>	<b>0.0003</b>	<b>0.936</b>
5	15007.060	14937.165	0.2183	0.943

BIC = Bayesian information criterion; aBIC = adjusted Bayesian information criterion; VLMR = Vuong-Lo-Mendell-Rubin Adjusted Likelihood Ratio Test. Smaller values indicate better fit of the model. Entropy values close to 1.0 indicate higher classification precision.

Table 2

Fall Predictors of Fall Class Membership					
	Class 1 Severe	Class 2 Medium	Class 3 Low	Class 4 Normative	Sig Class Comparisons
BESS Mean (SD)	71.32 (9.75)	64.38 (9.53)	58.15 (8.30)	45.80 (7.83)	C1 v C2**, C3*, C4* C2 v C3*, C4* C3 v C4*
SSiS Math Mean (SD)	2.24 (1.07)	2.72 (1.05)	3.16 (1.04)	3.84 (0.99)	C1 v C3**, C4* C2 v C3*, C4* C3 v C4*
SSiS Reading Mean (SD)	2.17 (1.03)	2.61 (1.10)	3.04 (1.07)	3.88 (1.03)	C1 v C3*, C4* C2 v C3*, C4* C3 v C4*
SSiS Motivation Mean (SD)	1.61 (0.93)	2.55 (0.99)	3.01 (0.96)	4.21 (0.82)	C1 v C2**, C3*, C4* C2 v C3*, C4* C3 v C4*
SSiS Prosocial Mean (SD)	2.04 (1.01)	2.70 (0.94)	3.14 (0.89)	4.14 (0.80)	C1 v C2**, C3*, C4* C2 v C3*, C4* C3 v C4*
Retained Probability	0.240	0.098	0.094	0.032	C1 v C3***, C4* C2 v C4* C3 v C4*
EDB Diagnostic Label Probability	0.036	0.000	0.028	0.003	C1 v C2*, C4*** C2 v C3* C3 v C4*
Behavioral Supplemental Supports Probability	0.228	0.207	0.074	0.015	C1 v C3**, C4* C2 v C3*, C4* C3 v C4*

\*\*\*p<.05 \*\*p<.01 \*p<.001

Figure 1: Latent Profiles

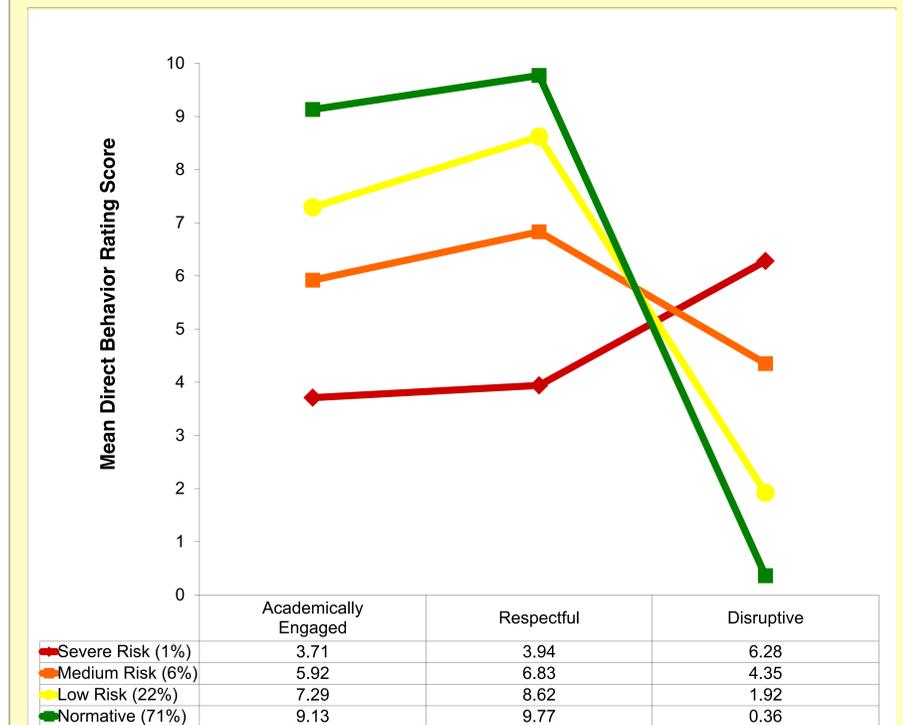


Table 3

Spring Outcomes Predicted By Fall Class Membership					
	Class 1 Severe	Class 2 Medium	Class 3 Low	Class 4 Normative	Sig Class Comparisons
Total # of ODRs Mean (SD)	6.85 (2.01)	6.37 (1.52)	1.51 (0.20)	0.48 (0.06)	C1 v C2***, C3**, C4* C2 v C3**, C4* C3 v C4*
Total # of Absences Mean (SD)	9.92 (1.50)	7.03 (0.75)	7.27 (0.40)	6.09 (0.19)	C1 v C4*** C3 v C4**

\*\*\*p<.05 \*\*p<.01 \*p<.001

## Discussion

Findings indicate that DBR is highly precise in detecting behavioral risk across multiple levels, and the differences between various levels of risk are meaningful in terms of symptom severity, service use, retention, and subsequent rate of attendance, and office disciplinary referrals. Study results also suggest that given the consistent performance of DBR item scores in relation to each other, DBR may be capable of precisely detecting risk with fewer than three items.