



Multi-level Modeling of Observational Ratings Using the Classroom Assessment Scoring System – Child Version (CLASS-C)

Jason Downer, Amy Luckner, Leslie Booren, Olivia Kathryn Aranda Lima, & Bonnie Yoder
University of Virginia, Center for Advanced Study of Teaching and Learning



BACKGROUND

- "Readiness" to function competently in early schooling is perhaps best understood in terms of the nature and quality of children's interactions in classrooms with adults, peers, and learning activities.
- The Classroom Assessment Scoring System – Child (CLASS-C) was recently developed to be an observational measure of these classroom interactions.
- Two advances in the field of measurement have increased the level of scrutiny on measures of children's classroom behavior, like the CLASS-C:
 - Recent evidence indicates that as much as 75% of the variance in ratings of children's behavior is attributable to the informant (Konold & Pianta, 2007).
 - Likewise, nested data, in which a teacher rates multiple children or an observer codes a classroom multiple times throughout a day, have been analyzed in multi-level models to reveal that only a certain percentage of the variance in scores is attributable to a stable child (or classroom) characteristics (Mashburn et al., 2006; Raudenbush et al., 2008).
- As part of this next wave of approaches to understanding variance in observations of children's behavior, the current study decomposes variance in the CLASS-C to understand the extent to which scores reflect something about the classroom, stable characteristics of the child, day-to-day variation, and adaptation to situational context.

RESEARCH QUESTIONS

- RQ1:** Is there a significant amount of variance in CLASS-C observation ratings at the classroom, child, day, and cycle levels?
- RQ2:** To what extent do classroom, child, and cycle level predictors account for the variance in these observation ratings?

PARTICIPANTS

- N = 44 preschool classrooms**
- 39 lead teachers (4 with multiple classrooms)
 - 95% Caucasian teachers
 - 23% of teachers with a BA degree
 - Average class size = 15.36 children
- N = 164 children**
- 55% girls
 - Mean age = 4.10 years
 - 49% of parents reporting income of \$85,001 or more

PROCEDURES

- Four children were randomly selected in each classroom (stratified by gender).
- Classroom observations were conducted across 2 mornings (a week apart) in the fall and spring.
- On each visit, 4 children were observed in alternating 15-minute cycles (10 minutes observing, 5 minutes coding).
- During each 15-minute cycle, observers collected CLASS-C and setting data.
- 20% of observations were independently coded by 2 observers, for reliability purposes (Mean agreement = 88.5% within 1).

MEASURES

Classroom Assessment Scoring System – Child (CLASS-C)

- Observational assessment of children's competence during everyday interactions with teachers, peers, and tasks in a preschool classroom, consisting of 9 dimensions that are each scored on a 1 to 7 scale.
- Teacher Interactions**
 - *Positive Engagement with Teacher:* Reflects the degree to which the child is emotionally connected to teachers, seeking and apparently enjoying interactions with them. The use of the teacher as a "secure base" is important.
 - *Teacher Conflict:* Reflects the degree to which the child's interactions with the teacher are characterized by tension, resistance, non-compliance negativity, aggression, and attention-seeking behaviors.
 - *Teacher Communication:* Encompasses child's communication with all teachers and adults, including the use of speech as a social and functional tool (e.g., requesting), to initiate and maintain conversation, and to make needs known.
- Peer Interactions**
 - *Peer Sociability:* Peer sociability refers to the child's experience of positive emotions and behaviors with peers, as seen in the propensity to seek peer interactions, social awareness and responsiveness within such interactions, and the manner in which peers respond to the child.
 - *Peer Conflict:* Peer conflict is characterized by the child's negative affect around peers, aggression and/or confrontation, and the levels of disrespect and/or attention-seeking.
 - *Peer Assertiveness:* Assertiveness is characterized by successful initiation of peer interactions, leadership in peer interactions, and self-confidence with peers; all expressed through positive strategies.
 - *Peer Communication:* Peer communication encompasses the child's communication with peers, including the use of speech as a functional and social tool (e.g., requesting) and to initiate and maintain conversation.
- Task Orientation**
 - *Task Engagement:* Engagement measures the degree to which the child is actively involved in classroom tasks and activities, including consistency of focus on any given activity and the level of enthusiasm or intensity displayed.
 - *Self-Reliance:* Self-reliance measures the degree to which the child takes learning into his own hands. This includes seeking opportunities rather than passively waiting for teacher direction.

Setting Information

- During each observation cycle, observers noted one primary activity setting, and whether or not a teacher was present.
- *Whole Group:* Child is part of an organized whole class or large group activity, with 6 or more children.
- *Free Choice/Centers:* Child is able to select what and where he would like to play or learn; the key here is that child has chosen his activity.
- *Routine/Meals:* Child is part of routine classroom procedures (e.g., major transitions, meals).
- *Recess:* Child is outside of the classroom and/or building either for free play recess or some organized outdoor and/or gross motor activity (e.g., a game of tag).
- *Small group/Individual time:* Child is part of an organized small group activity of 5 children or fewer, or is assigned to work individually with or without teachers, on worksheets, independent projects, computer work, etc.
- *Teacher presence:* Teacher is present for the majority of the observation period. This can be when the teacher is working with the child or near the child.

DATA ANALYSIS APPROACH

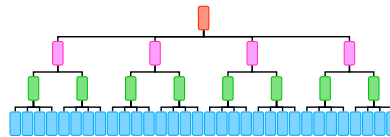
- 4-level Hierarchical Linear Models (HLM, Raudenbush & Bryk, 2002) with the following levels:

CLASSROOM

STABLE CHARACTERISTICS OF CHILD

DAY-TO-DAY VARIATION

SITUATIONAL ADAPTATION (CYCLE)



- RQ1: Unconditional model
- RQ2: Conditional model, with predictors at the classroom, child, and cycle levels.

RESULTS: Unconditional Model

Variance	Teacher Interactions			Peer Interactions			Task Orientation		
	Positive Engagement	Conflict	Commun.	Sociability	Conflict	Assertive	Commun.	Engagement	Self-Reliance
Classroom	.118**	.003	.140*	.089*	.015*	.110*	.248**	.035	.090*
Child	.131***	.012**	.320***	.327***	.033***	.428***	.516***	.070*	.093*
Day	.198***	.033***	.112**	.160***	.056***	.302***	.099*	.227***	.494***
Cycle	1.598***	.186***	1.702***	1.484***	.374***	1.765***	2.46***	1.413***	1.497***
% of Variance									
Classroom	6%	1%	6%	4%	3%	4%	7%	2%	4%
Child	6%	5%	14%	16%	7%	16%	16%	4%	4%
Day	10%	14%	5%	8%	12%	12%	3%	13%	23%
Cycle	78%	80%	75%	72%	78%	68%	74%	81%	69%

RESULTS: Conditional Model

Level-1	Teacher Interactions			Peer Interactions			Task Orientation		
	Positive Engagement B (SE)	Conflict B (SE)	Commun. B (SE)	Sociability B (SE)	Conflict B (SE)	Assert. B (SE)	Commun. B (SE)	Engagement B (SE)	Self-Reliance B (SE)
Activity Setting									
Free Choice	.20 (.10)*	-.08 (.04)*	.81 (.10)***	.39 (.09)***	.15 (.05)**	.67 (.10)***	.93 (.11)***	.27 (.10)**	.85 (.10)***
Recess	-.23 (.11)**	-.02 (.04)	.27 (.12)*	.84 (.11)***	.25 (.06)***	.55 (.12)***	.65 (.13)***	.35 (.11)**	.20 (.11)*
Routine/Meals	-.03 (.09)	.01 (.04)	.56 (.10)***	.37 (.09)***	.13 (.05)**	.29 (.10)**	.72 (.11)***	.03 (.09)	.20 (.09)*
Small group/Ind.	.18 (.11)	-.05 (.04)	.74 (.12)***	.21 (.11)*	.06 (.05)	.37 (.12)**	.50 (.13)***	.29 (.11)**	.56 (.12)***
Teacher presence	1.06 (.08)***	.00 (.03)	.85 (.08)***	-.59 (.08)***	-.10 (.04)*	-.77 (.08)***	-.10 (.09)***	-.16 (.08)*	-.43 (.08)***
Child									
Boy	-.25 (.09)**	.08 (.03)**	-.15 (.12)	.07 (.11)	.09 (.05)*	.06 (.13)	.04 (.14)	-.15 (.08)+	.00 (.10)
Maternal Ed.	-.03 (.02)	-.03 (.01)**	-.04 (.03)	-.03 (.03)	-.03 (.01)**	-.07 (.03)*	-.05 (.04)	-.02 (.02)	-.03 (.02)
Teacher									
Years Exp.	-.01 (.01)	-.01 (.00)+	-.02 (.01)	-.01 (.01)	-.01 (.01)+	-.01 (.02)	-.03 (.02)	.02 (.01)+	.01 (.01)
ECE Major	.15 (.15)	-.04 (.05)	.00 (.17)	-.10 (.19)	.03 (.07)	-.08 (.22)	-.25 (.26)	.07 (.12)	.21 (.15)
Classroom									
# of Children	-.01 (.01)	.00 (.00)	-.02 (.01)	-.00 (.01)	.00 (.00)	-.01 (.01)	-.02 (.02)	-.00 (.01)	-.01 (.01)
% Caucasian	.17 (.23)	.01 (.07)	.29 (.27)	-.10 (.30)	-.05 (.11)	.07 (.34)	.30 (.40)	.01 (.19)	.06 (.24)

DISCUSSION

- Despite changes in context throughout the morning, there was a significant element of stability to children's classroom behaviors, some of which was explained by gender and maternal education.
- Clearly though, children are regularly adapting their behavior to different classroom situations within a given morning, underscoring the point that school readiness must be considered in context.
- This situational adaptation is in part explained by the availability of the teacher and activity settings.
 - Compared to whole group, free choice time is a setting in which children are far more likely to have high quality teacher, peer, and task interactions.
 - When teachers are directly available to children, peer and task interactions are occurring less often and are of lower quality.
- Pairing CLASS-C observations and activity setting data has the potential to inform tailored classroom interventions that can support children's adaptation to different situations.

This study is part of the Interagency Consortium for School Readiness Outcome Measures (ICSROM) and co-funded by the U.S. Departments of Health and Human Services and Education.