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Monitoring Academic and Social Skills in Elementary School: A Psychometric Evaluation of the Classroom Performance Survey

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Abstract

Numerous well-validated academic progress monitoring tools are used in schools, but there are fewer behavioral progress monitoring measures available. Some brief behavior rating scales have been shown to be effective in monitoring students' progress, but most focus only on students' social skills and do not address critical academic-related behaviors. We conducted a quasi-replication of a study by Brady, Evans, Berlin, Bunford, and Kern examining the *Classroom Performance Survey* (CPS) by using a multi-step analytic strategy, including confirmatory factor analysis and reliability analysis. Over a period of 3 years, 160 elementary schoolteachers in 19 schools across three states completed a modified CPS on 356 elementary students identified as at-risk for emotional and behavioral disorders. The modified CPS was found to be comprised of two factors (Academic Competence and Interpersonal Competence) and showed evidence of reliability and validity. These results suggest that the CPS shows promise as a brief behavior rating scale for progress monitoring in elementary schools.

Keywords

brief behavior rating, elementary school, progress monitoring, academic skills, social skills

The importance of student classroom behavior on academic achievement is well established (see, for example, Hoge & Luce, 1979; McKinney, Mason, Perkerson, & Clifford, 1975; Wentzel, 1993). The term "academic enablers" has been used to describe these behaviors, namely, interpersonal skills, study skills, motivation, and engagement (DiPerna & Elliott, 2000). These enablers are hypothesized to mediate the effects of academic instruction on student growth and achievement (DiPerna, 2006; Jenkins & Demaray, 2015). Farrington et al. (2012) similarly described several noncognitive factors that play a vital role in students' school success, including both academic and social skills (see also Caldarella & Merrell, 1997). Academic skills are outward behaviors generally indicative of being proficient in school such as completing work and studying. Social skills are behaviors that result in positive interpersonal interactions.

These skills are crucial to overall school success and academic achievement, particularly for students with cognitive, academic, or behavioral problems (Gresham, Sugai, & Horner, 2001; Kerr & Nelson, 2006; Malecki & Elliot, 2002; Walker, Ramsey, & Gresham, 2004). For example, social skills are associated with peer acceptance, positive relationships, teacher acceptance, and academic success (Walker et al., 2004). Similarly, students' study skills are associated with improved academic performance (DiPerna, 2006). Some students struggle with essential skills such as completing class assignments, organizing their work, and participating appropriately in classroom activities which affects their school success (Farrington et al., 2012; Minskoff & Allsopp, 2003). However, such students, if identified, can be taught skills by their teachers to improve their school success (Anderson, Munk, Young, Conley, & Caldarella, 2008).

Early Identification, Intervention, and Progress Monitoring

Students with behavior problems often experience peer rejection, low academic performance, and mental health

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concerns that can last into adulthood (Dunlap et al., 2006; Merrell & Gueldner, 2010). Experts recommend coordinated, schoolwide, multi-tiered, early identification and intervention systems such as Response to Intervention (RTI) and Positive Behavior Interventions and Supports (PBIS) to prevent such outcomes (O'Shaughnessy, Lane, Gresham, & Beebe-Frankenberger, 2003; Sugai & Horner, 2006, 2009). As part of these systems, continual progress monitoring and adaptation of interventions based on data is essential (O'Shaughnessy et al., 2003; Wehby & Kern, 2014).

Progress monitoring is a way to continually monitor students' learning to inform instructional decisions about skill development (Fuchs & Fuchs, 2011; Hosp, Hosp, & Howell, 2007). Progress monitoring can be used to check a student's rate of improvement to help educators make decisions about whether the instruction/intervention is working or whether it needs to be modified to better meet student needs. Classen and Cheatham (2015) noted that it is important to regularly and consistently collect progress monitoring data in natural settings, such as school classrooms, to help make informed instructional decisions.

Progress monitoring should be utilized across all tiers as part of RTI and PBIS to identify and provide support for all students, but is particularly important for use with students with secondary or tertiary needs who are academically or behaviorally at-risk (Wehby & Kern, 2014). Students with behavioral problems are more likely to be successful academically and socially if their needs are identified and monitored (Lembke & Stichter, 2006). Educators can use progress monitoring data to guide academic instruction and behavior supports. Data can be used to inform modification of an intervention at a secondary level and measure the effects of those modifications. Monitoring individual students' progress helps teachers create realistic goals and often motivates students to improve (O'Shaughnessy et al., 2003).

Brief, Feasible Behavior Progress Monitoring Measures

Progress monitoring instruments, such as curriculum-based measurement (CBM) can be effective in improving student outcomes across grade levels (Fuchs & Fuchs, 2011). Progress monitoring measures for academics have become common practice, while progress monitoring measures for social skills are being developed and tested. As noted by Chafouleas et al. (2013) "a complement to academic CBM for relevant behavioral indices has not yet been established" (p. 369), though researchers are investigating a variety of new measurement options.

Current behavioral progress monitoring measures include office discipline referrals (ODRs), systematic direct observations (SDOs), direct behavior ratings (DBRs), as well as behavior rating scales, and each has strengths and weaknesses (Cook, Volpe, & Delport, 2014). For example, ODRs require little time but are often limited in the types of behavior they can measure, being used primarily for externalizing behaviors (Miller et al., 2015), and are subject to teacher variability. SDOs can provide a detailed, naturalistic sample of a student's behavior, but require a great deal of time and resources to conduct. DBRs are more time- and resource-efficient than SDOs and allow greater flexibility, as they consist of brief ratings of relevant behaviors following observation during a specified time period. DBRs have some limitations including the tendency to focus on a few narrowly defined behaviors (Cook et al., 2014).

Behavior rating scales can help educators quantify behavior and compare it to that of other students. Some scales contain the advantage of multiple raters being able to provide different perspectives. Gresham et al. (2010) noted that rating scales have been used to monitor individuals' progress as part of RTI for more than two decades. Some of the disadvantages of behavior rating scales are that they are based on teacher or parent perceptions and can take excessive time to complete. Lewis, Scott, Wehby, and Wills (2014) noted that specific research is needed regarding the sensitivity and utility of using teacher rating scales in schools for documenting student behavioral changes. Researchers are working to develop new and/or adapt existing behavioral rating scales that are psychometrically sound, yet brief enough to be feasible for measuring student progress within systems of multi-tiered interventions and supports such as RTI and PBIS (Chafouleas, Volpe, Gresham, & Cook, 2010).

Brief behavior rating scales (BBRSs) show promise as an efficient method to use when monitoring behavioral interventions, though they still rely on perceptions of a rater (Cook et al., 2014). Because they are brief, BBRSs may be more feasible for teachers to use regularly. BBRSs could also be used to track progress across a wide variety of interventions. In a study by Gresham et al. (2010), they found that a 12-item BBRS derived from the *Social Skills Improvement System* (SSIS; Gresham & Elliott, 2008) was change-sensitive and optimal for use as a general outcome measure in assessing student social skills because of the limited time needed to complete as well as evidence of reliability and validity. Although the results of the Gresham et al. study were promising, these authors did not access critical academic skills (e.g., completing and turning in schoolwork, recording assignments) found to be linked to student success in school (Farrington et al., 2012; Minskoff & Allsopp, 2003). There is a need for additional progress monitoring tools with evidence of reliability and validity to track both academic and social skills (Cook et al., 2014); this is important given the connection between social skills and academic outcomes (Wehby & Kern, 2014). A measure that shows potential as a BBRS for both academic and social skills is the *Classroom Performance Survey* (CPS; Robin, 1998).

CPS

The CPS originated due to a need within secondary schools for a brief behavior rating scale that was reliable and effective in identifying school functioning levels for students with attention deficit hyperactivity disorder (ADHD; Children and Adults With Attention Deficit Disorder, 1996; Robin, 1998). The original version consisted of 20 Likert-type questions on a 5-point scale (from 1 = *always* to 5 = *never*) that pertained to a student's academic and social strengths and weaknesses. Since its creation, the CPS has been used to investigate school impairment in adolescent students' with ADHD (Kent et al., 2011) and in treatment outcome studies (e.g., Evans, Schultz, DeMars, & Davis, 2011; Meyer & Kelley, 2007). Kent et al. (2011) used items from the CPS to assess work completion and academic potential of adolescents with ADHD. They found that these students completed less work and did not work up to their potential compared with their peers without ADHD. Evans et al. (2011) studied a school-based psychosocial treatment program for middle school students with ADHD. They used a total raw score from the CPS as an outcome measure and found the measure to be sensitive to treatment effects.

Brady, Evans, Berlin, Bunford, and Kern (2012) conducted the only psychometric analysis of the CPS to date in which the measure was used across 23 high schools, 875 students, and 146 teachers. In this study, they approached the CPS with three aims: (a) to explore the factor structure using both exploratory and confirmatory factor analyses, (b) to calculate the reliability of the factors and provide school professionals with normative data on each item and scale by gender, and (c) to examine two additional non-Likert-type scale items on the CPS in terms of their construct validity and clinical utility. Brady et al. concluded that the CPS was comprised of two factors, Academic Competence and Interpersonal Competence, both of which were highly reliable, and that scores should be interpreted similarly across genders. These authors also noted that the CPS could serve as a general screener for school impairment, as a guide to school-based interventions, and as a progress monitoring tool for at-risk students. The disadvantages of the CPS are that (a) only one study has been conducted examining psychometric properties, (b) minimal normative data have been published, (c) there is limited evidence regarding sensitivity to change, and (d) there have been no studies examining use in elementary school settings.

Purpose

There is a need for further examination of the psychometric properties of the CPS, as well as the use of the measure with elementary school students. The purpose of the present study was to perform a quasi-replication of Brady et al. (2012) by investigating the psychometric properties of an adapted CPS for use at the elementary level (CPS-E) to further research and development efforts. Specific research questions were as follows:

Research Question 1: What is the factor structure and model fit (reliability) of the CPS-E when used at the elementary school level?
Research Question 2: Do the CPS-E scores predict academic outcomes?
Research Question 3: What is the evidence of convergent and divergent validity of the CPS-E scores with established behavioral and observational measures?

Method

Settings and Participants

Data were collected from 19 schools (see Table 1) participating in a multi-site efficacy study of the Class-Wide Function-Related Intervention Teams (CW-FIT; Wills et al., 2010) funded by the Institute of Education Sciences. Most schools were considered Title I and were located in urban settings across Missouri, Tennessee, and Utah. Participants included 160 elementary teachers (95% female, 5% male; 83% Caucasian, 11% African American, 3% Hispanic) across all grades (2% pre-kindergarten, 16% kindergarten, 20% first, 14% second, 18% third, 12% fourth, 7% fifth, 2% sixth, and 8% special education). Participants included general education teachers (n = 149) and special education teachers (n = 11), with an average of 9 years teaching experience (range = 0–44 years). Most teachers held bachelor's (45%) or master's (41%) degrees. Specialties teachers were not included in the dataset. The student participants (n = 356 students; 27% female, 73% male; 43% Caucasian, 39% African American, 15% Hispanic) were identified by their teachers as at risk for emotional or behavioral disorders (EBD) as described in the "Measures" and "Procedures" sections. Students were distributed across grade levels as follows: 1% pre-kindergarten, 18% kindergarten, 18% first, 16% second, 20% third, 13% fourth, 11% fifth, and 4% sixth.

Measures

Systematic Screening for Behavior Disorders (SSBD): Stage 1. The SSBD (Walker & Severson, 1992) is a nationally normed, multi-stage process for identifying elementary students at risk for behavior disorders. In Stage 1, classroom teachers nominate and rank order their students who exhibit externalizing or internalizing behaviors. Walker and Severson (1992) reported the SSBD Stage 1 interrater agreement (Spearman's rho) as .94 on the externalizing dimension and .82 on the internalizing dimension. Test–retest reliability for Stage 1 was reported as .79 for rankings of externalizing behavior and .72 for rankings of internalizing behavior.

Table 1. Descriptive Data for Teachers (*n* = 160), Students (*n* = 356), and Schools (*n* = 19).

Name of site	Elementary school	Number of teachers	Number of students	Percent of total sample	Free/reduced lunch (%)	School size
Site 1	School 1	9	18	5.1	71.9	220
	School 2	4	12	3.4	48.2	243
	School 3	8	17	4.8	95.8	319
	School 4	10	20	5.6	59.2	578
	School 5	5	10	2.8	81.2	290
	School 6	9	17	4.8	72.7	289
	School 7	15	36	10.1	65.0	515
Site 2	School 8	10	33	9.3	69.2	425
	School 9	10	21	5.9	81.0	490
	School 10	5	11	3.1	35.9	476
	School 11	10	15	4.2	55.3	409
	School 12	8	18	5.1	34.0	630
	School 13	13	29	8.2	82.7	504
Site 3	School 14	8	18	5.1	52.0	519
	School 15	7	18	5.1	94.2	677
	School 16	9	23	6.5	98.1	475
	School 17	5	7	2.0	40.9	472
	School 18	8	16	4.5	91.5	317
	School 19	7	17	4.8	99.0	384

CPS–Elementary (CPS-E). As the original CPS was designed for use with adolescents, we modified it to be more appropriate for use in elementary school classrooms. Four items were removed from the original 20 CPS items, as they were more applicable to secondary students: "Brings necessary materials to class," "completes long-term assignments," "arrives to class on time," and "takes notes in class." One item was changed from a *yes*/*no* question ("Is this student working up to potential?") and added to the Likert-type scale: "Works up to potential." An item, "Compared to other students in the class, how does this student perform?" was also added and rated on a 5-point scale from *above average* to *below average*. The resulting CPS-E contained 19 items total (see the appendix): 17 items on a 5-point Likert-type scale to assess academic and social skills, one item comparing student performance to peers in class, and one open-ended question regarding additional comments that could affect student achievement and performance. For the current psychometric examination, only the 17 Likert-type items were included in the analyses. Item 18 was not included because it was a relative comparison between students rather than an absolute rating of an academic or social skill and was not included in the Brady et al. (2012) analysis. Higher scores suggest more impairment while lower scores suggest higher levels of functioning.

SSIS. The SSIS (Gresham & Elliott, 2008) is a standardized, norm-referenced measure consisting of three scales: Social Skills, Problem Behaviors, and Academic Competence. There are 83 items rated using 4- or 5-point Likert-type scale. Sample items include the following: "Participates appropriately in class," "makes friends easily," "acts without thinking," and "acts sad or depressed." The SSIS scales have internal consistencies (alphas) of .94 to .97. Validity evidence is found in the test manual (Gresham & Elliott, 2008).

School Social Behavior Scales–Second Edition (SSBS-2). The SSBS-2 (Merrell, 2002) is a standardized, norm-referenced instrument measuring Social Competence and Antisocial Behavior, with 32 items on each scale. Sample items are "cooperates with other students," "follows school and class rules," "is disrespectful, sassy," and "disrupts ongoing activities." Items are rated on a 5-point Likert-type scale from 1 (*never*) to 5 (*frequently*). The scales have internal consistencies of .96 to .98. Evidence of validity is found in the test manual (Merrell, 2002).

Direct observation of student behavior. Direct observations were conducted using the Multi-Option Observation System for Experimental Studies (MOOSES; Tapp, Wehby, & Ellis, 1995). MOOSES is a computer software observation program that allows researchers to record frequency and duration events for later analysis. During a 15-min observation period of a student considered at-risk, the observer recorded frequency of disruptive behaviors and duration of engagement. Disruptive behavior was defined as deliberate verbal, physical or motor displays of inappropriate behavior that interfered with a student's participation and/or the productive classroom activity of peers. Engagement was defined as a student appropriately working on the assigned/approved activity. MOOSES

has been successfully used in other research studies involving observations of student and teacher behavior (see, for example, Kamps et al., 2011; Reinke, Herman, & Stormont, 2013; Smith, Lewis, & Stormont, 2011).

Kaufman Test of Educational Achievement–Second Edition, Brief Form (KTEA-II Brief). The KTEA-II Brief (Kaufman & Kaufman, 2005) is a standardized, norm-referenced measure that assesses Reading, Mathematics, and Writing achievement. The academic tasks measured are representative of what students are asked to do in the classroom. The KTEA-II Brief has weighted mean internal consistencies (alphas) of .94 for reading, .90 for math, and .86 for writing. Data were only collected on the Reading and Mathematics domains.

Procedures

Teacher and student recruitment. All participating teachers and students were part of the grant-funded research project, with the exception of the pre-kindergarten participants who were part of a side study. Researchers worked with districts to identify schools to participate. Schools were then approached and the principal and administration decided that their staff could benefit from participation. A recruitment meeting was then conducted where teachers elected to participate if they desired. Those who chose to participate completed the appropriate informed consent procedures as approved by both the university institutional review boards and school districts.

Teachers completed Stage 1 of the SSBD to nominate students who exhibited externalizing and/or internalizing behaviors. Informed consent was obtained for these students to participate in the study. To qualify for participation, students had to be considered at-risk based on teacher report on the Problem Behaviors Scale of the SSIS, scoring in the "Above Average" range or higher, or based on meeting criteria using MOOSES. During an observation, students whose engagement levels were below 75%, or whose disruptive behaviors were above 10, for a minimum of two out of five observations during a 15-min session were considered at-risk, as similar characteristics have been found in other studies of behaviorally at-risk students (see, for example, Kamps, Conklin, & Wills, 2015; Trevino-Maack, Kamps, & Wills, 2015; Wills, Iwaszuk, Kamps, & Shumate, 2014).

Data collection schedule. As part of the study, participating teachers completed three CPS-E forms over the course of 3 weeks during a baseline phase on students identified as at-risk and for whom parental consent had been obtained. Teachers also completed one SSIS and one SSBS-2 on participating students. Researchers administered the KTEA-II Brief to individual students at a time convenient for teachers. The CW-FIT intervention then commenced in randomly selected classrooms, after which teachers completed a monthly CPS-E on all identified at-risk students in their class (typically two to three students per classroom). Direct observations using MOOSES occurred 3 to 5 times during the baseline phase and approximately 10 times thereafter across the course of the study. At the conclusion of the study (in approximately March or April of each year), teachers again completed the SSIS and SSBS-2 on participating students. Research personnel administered a final KTEA-II Brief to individual students. The same process occurred all 3 years at all locations, with the exception of the administration of the KTEA-II Brief which was not administered the first year.

Analytic Strategy

To assess the reliability and validity of the CPS-E, a multistep analysis was performed (similar to Brady et al., 2012) in Mplus 7.4 and SPSS 23. In Step 1, we randomly selected 33% of the data (129 students) and performed an exploratory factor analysis (EFA) in Mplus (using TYPE=EFA and an exploratory structural equation modeling [ESEM] approach) and then a confirmatory factor analysis (CFA) with the remaining data (227 students) in Mplus. We wished to have greater power to detect lack of fit, thus we unevenly split the sample to allow for a larger sample size in the CFA. Due to the Likert-type scale nature of the items, they were declared categorical and the ESTIMATOR=WLSMV and Parameterization=theta was used in Mplus. Also, because of the nested nature of the data (multiple measures per student), we used CLUSTER=studentID and the TYPE=COMPLEX in the ANALYSIS section of Mplus. CFA with categorical items has several assumptions, which were checked and are reported in the "Results" section: linearity between the items, no extreme collinearity, independence of observations, no multivariate outliers, missing data handled appropriately, and correct model is specified. A good model fit was established by the fit indices produced by Mplus, and Cronbach's alpha was calculated in SPSS. Step 2 investigated predictive validity using all the students at the first time point (351 students) of the CPS-E by having the derived factor scores (intercepts and slopes) predict academic outcomes with a multilevel model (clustering on student) after controlling for covariates (i.e., grade, ethnicity, academic measures pretest). Step three investigated convergent and divergent validity of the CPS-E by correlating the derived factor scores with established measures (SSIS, SSBS-2, MOOSES) completed on the same students (all 351), using only data from the first baseline time point to avoid potential treatment effects confounding the results using all the students.

Results

The "Results" section mirrors the three research questions and analytic strategy. Table 2 contains descriptive statistics

Table 2. Correlations of Variables and Descriptive Statistics in Model.

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Black	1.00										
2. Hispanic	−.34**	1.00									
3. Grade	−.06	.06	1.00								
4. Treatment status	.03	.03	−.01	1.00							
5. KTEA-II reading (pretest)	−.24**	.05	.79**	−.05	1.00						
6. KTEA-II math (pretest)	−.13*	.11	.85**	−.07	.84**	1.00					
7. Days absent	−.07	.08	.05	−.03	−.04	.00	1.00				
8. KTEA-II reading (posttest)	−.27**	.06	.74**	−.05	.96**	.82**	−.08	1.00			
9. KTEA-II math (posttest)	−.23**	.07	.82**	−.00	.86**	.92**	−.07	.85**	1.00		
10. Academic competence (CPS-E)	.05	.09	.06	.05	−.19**	−.20**	.09	−.18**	−.16*	1.00	
11. Interpersonal competence (CPS-E)	.11*	−.05	−.09	.06	−.05	−.05	−.04	−.02	−.07	.34**	1.00
Descriptive statistics	1	2	3	4	5	6	7	8	9	10	11
M	0.40	0.15	2.42	0.53	22.77	22.11	8.17	26.83	25.30	0.00	0.00
SD	0.49	0.35	1.76	0.50	13.82	11.59	6.75	13.99	10.83	0.72	0.45
Minimum	0.00	0.00	0.00	0.00	0.00	1.00	0.00	2.00	5.00	−1.72	−1.27
Maximum	1.00	1.00	6.00	1.00	57.00	56.00	42.00	65.00	58.00	1.92	1.50
n	351	351	343	351	241	241	227	242	244	351	351

Note. Mplus rescales the CPS-E latent variables to have a mean of 0 by default. KTEA-II = *Kaufman Test of Educational Achievement–Second Edition, Brief Form*; CPS-E = *Classroom Performance Survey–Elementary*.
*$p < .05$. **$p < .01$.

and correlations of the demographics and test results of the sample. It should be pointed out that Mplus rescales the factor scores with a mean of 0 by default which explains why the CPS-E factors have means of 0.

The first research question examined the factor structure and model fit (reliability) of the CPS-E measures when used at the elementary school level. An EFA was run with a Geomix rotation in Mplus. There were three factors with eigenvalues greater than one but the scree plot favored two factors and two factors explained approximately 58% of the variance. Two factors were thus chosen and labeled Academic Competence and Interpersonal Competence (as done by Brady et al., 2012). *Barlett's test of sphericity* was significant ($p < .001$) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .89, both of which indicated the appropriateness of proceeding with the EFA. The two factors were correlated with a value of .27 ($p < .01$). As in Brady et al. (2012), several of items were eliminated as the differences between the loadings of an item across factors was less than 0.15, which would cause interpretation and other problems, as recommended by Worthington and Whittaker (2006). Three items were eliminated by these criteria (5, 6, and 15). The EFA was then rerun without these items to further explore the relations. This reduced EFA resulted in similar results. No items had communalities less than .40 or factor loadings less than .32. Thus no further items were eliminated.

The assumptions for CFA were checked by examining histograms and scatterplots in SPSS and were found to be met insomuch that there were no strong curvilinear relations among the items. As the items were handled categorically, normality was not a large concern and the lack of independence was handled by using CLUSTER=student and TYPE=COMPLEX. Missing data were handled by the Full Information Maximum Likelihood method in Mplus. Little's *Missing Completely at Random* (MCAR) test was run in SPSS and the null hypothesis was rejected (Chi-square = 433.11, DF = 343, $p = .001$) reflecting that the data was not MCAR. Nevertheless, the means and standard deviations produced by listwise, all data, and regression imputation were all very similar to the second decimal place for all the items via the missing data analysis functionality of SPSS. Thus, the data were assumed to be Missing at Random (MAR) at worst and were handled by the Full Information Maximum Likelihood method in Mplus. The CFA was conducted on the remaining data (227 students) not run in the EFA. One modification was done to the CFA, which correlated the residual errors of the 1st (Completes class assignments) and 4th (Turns in completed work) items. The model fit indices showed reasonable model fit for two of the three fit statistics (root mean square error approximation [RMSEA] = 0.08, comparative fit index [CFI] = 0.95, Tucker–Lewis index [TLI] = 0.94) with cutoffs for RMSEA < .08 (Browne & Cudeck, 1993; Byrne, 2013; MacCallum, Browne, & Sugawara, 1996), CFI > .95 (Hu & Bentler, 1998, 1999), and TLI > .9 (Wang & Wang, 2012). The correlation between the two derived factors was significant with a value of .43 ($p < .001$). Item loadings are

Table 3. Factor Loadings for the CPS Academic Competence and Interpersonal Competence Factors (n = 351) With Items Treated as Categorical.

CPS items	Factor loadings
Academic Competence factor	
1. Completes class assignments	0.81**
2. Completes homework on time	0.61**
3. Records assignments consistently	0.87**
4. Turns in completed work	0.82**
7. Demonstrates skills in reading assigned tests and materials	0.89**
8. Demonstrates adequate spelling and writing skills in work	0.88**
9. Performs satisfactorily on tests	0.88**
10. Completes assigned work with accurate computation/detail	0.89**
11. Completes assignments legibly	0.74**
17. Works up to potential	0.75**
Interpersonal Competence factor	
12. Relates positively to teachers	0.84**
13. Demonstrates respect for property	0.84**
14. Relates positively to peers	0.69**
16. Accepts assistance when needed or offered	0.65**
Deleted items	
5. Attends to instructions in class	
6. Cooperates/participates in class	
15. Communicates own needs or asks questions	

Note. Standardized factor loadings as produced by Mplus are shown. *ESTIMATOR=WLSMV*. CPS = *Classroom Performance Survey*.
**$p < .01$.

shown in Table 3. Cronbach's alpha was .92 for Academic Competence and .79 for the Interpersonal Competence at the first time point.

The second research question examined whether the CPS-E factor scores predicted academic outcomes. Unfortunately, Mplus does not allow categorical items to be used with correlated residual variances with TYPE=RANDOM which is necessary to estimate random slopes. The CFA portion was also run with the items as continuous with extremely similar results, thus the items were treated as continuous in the following analysis with ESTIMATOR=MLR. It is important to note that the CPS-E factors (Academic Competence and Interpersonal Competence) are inversely scored such that a higher score means less of the underlying construct. First we examined whether there was change in the CPS-E constructs over time. The mean of the slope term for both Academic Competence ($B = -0.05$, $p = .000$) and the mean of Interpersonal Competence ($B = -0.05$, $p = .000$) were statistically significant and negative indicating improvement in these latent variables over time on average. In addition, the factors predicted particular academic outcomes (see Table 4). The model showed that the intercept for Academic Competence predicted KTEA-II Reading ($B = -1.36$, $p = .005$), KTEA-II Math ($B = -2.07$, $p = .000$) and Days Absent ($B = 1.63$, $p = .017$). The slope of Academic Competence also predicted an expected change in KTEA-II Reading ($B = -26.50$, $p = .001$) and a marginal increase in Days Absent ($B = 22.52$, $p = .062$). The only significant relation in regard to Interpersonal Competence predicted a *decrease* in KTEA-II Reading with the intercept ($B = 1.85$, $p = .004$).

The final research question examined evidence of convergent and divergent validity of the CPS-E factor scores with established behavioral and observational measures. Step 3 of the analytic strategy correlated the SSIS, SSBS-2, and MOOSES subscale scores with the two CPS-E factors. The results are shown in Table 5. There were significant inverse correlations between the Academic Competence and Interpersonal Competence and a majority of the SSIS, SSBS-2, and MOOSES subscales showing convergent validity. The table also shows evidence of divergent validity as SSIS Self-Control and MOOSES disruptive behavior code were only correlated with Interpersonal Competence and not with Academic Competence.

Discussion

In this study, we examined the psychometric properties of the CPS when used in elementary schools. Similar to the work of Brady and colleagues (2012), we conducted an EFA and a CFA of the instrument, but with elementary school data. Brady and colleagues examined convergent validity with other self-report measures, something we replicated here (SSIS and SSBS-2). We also studied the convergent validity with standardized academic measures, Days Absent, and a direct observation measure, as recommended by Brady et al.

Results suggest that the revised CPS-E used in the current study shows promise as a brief progress monitoring tool to track both academic and social skills in elementary school classrooms for students at-risk for EBD. The CPS-E was found to be comprised of two factors, Academic Competence and Interpersonal Competence, similar to the Brady et al. (2012) CPS study in secondary schools. The CPS-E appears to be a reliable measure for use in elementary schools, with scores from both factors yielding high internal consistency. There were also statistically significant changes over time in CPS-E scores, showing the potential that scores are sensitive to change and suggesting that (a) these constructs are susceptible to intervention and (b) these are malleable factors and not state traits. The scores on CPS-E Academic Competence factor also predicted

Table 4. Multilevel Model of CPS-E Factors Predicting Academic Outcomes in the Presence of Covariates.

	Outcomes					
	KTEA-II reading		KTEA-II math		Days absent	
Predictors	*B* (*SE*)		*B* (*SE*)		*B* (*SE*)	
CPS-E						
Academic competence (intercept)	−1.26**	(0.48)	−2.07**	(0.48)	1.63*	(0.69)
Academic competence (slope)	−26.50**	(7.72)	−14.40	(7.86)	22.52†	(12.09)
Interpersonal competence (intercept)	1.85**	(0.64)	0.01	(0.53)	−0.79	(1.20)
Interpersonal competence (slope)	9.13	(8.78)	10.44	(8.80)	7.14	(15.15)
Black	−0.53	(0.59)	−1.94**	(0.59)	−1.09	(0.96)
Hispanic	0.45	(0.75)	−2.16**	(0.83)	0.19	(1.44)
Grade	0.34	(0.30)	2.00**	(0.60)	0.07	(0.30)
KTEA-II reading (pretest)	0.92**	(0.04)	—		—	
KTEA-II math (pretest)	—		0.61**	(0.10)	—	

Note. CPS-E items are inversely scored which explains the negative betas. The slopes of the CPS-E latent variables were statistically significant and negative (meaning improvement). CPS-E = *Classroom Performance Survey–Elementary*; KTEA-II = *Kaufman Test of Educational Achievement–Second Edition, Brief Form*.
†$p < .10$. *$p < .05$. **$p < .01$.

Table 5. Correlations Between CPS-E Factors and SSIS, SSBS-2, and MOOSES at Time Point 1 ($n = 331$).

Variables	CPS-E academic competence	CPS-E interpersonal competence
SSIS		
Communication	−.22**	−.41**
Cooperation	−.38**	−.32**
Assertion	−.35**	−.10
Responsibility	−.30**	−.53**
Empathy	−.07	−.41**
Engagement	−.19**	−.34**
Self-control	−.01	−.48**
SSBS-2		
Peer relations	−.22**	−.28**
Self-management/ compliance	.02	−.55**
Academic behavior	−.71**	−.27**
MOOSES		
Disruptive behavior	−.08	.16**
Disengagement	.14*	.14*

Note. CPS-E items are inversely scored which explains the negative correlations. CPS-E = *Classroom Performance Survey–Elementary*; SSIS = Social Skills Improvement System; SSBS-2 = *School Social Behavior Scales–Second Edition*; MOOSES = Multi-Option Observation System for Experimental Studies.
*$p < .05$. **$p < .01$.

academic outcomes (i.e., reading, math, days absent) in the expected directions, which is important as it helps establish predictive validity. It is unclear why scores on the Interpersonal Competence factor were not a significant predictor of positive academic outcomes, though items comprising this factor focus more on students' social skills which may be more distally related to academic outcomes than items on the Academic Competence factor.

Finally, the CPS-E factors were found to correlate with well-established measures of academic and social behavior, including direct observation measures, helping to further establish validity. Thus, the CPS-E appears to measure more than simple teacher likeability of students, but rather constructs that directly relate to academic and interpersonal competence in elementary school. This is important given the need for brief, behavioral progress monitoring measures as part of PBIS (Wehby & Kern, 2014). We anticipate this research serving as a baseline for additional research and development efforts in elementary schools.

Limitations and Directions for Future Research

Several limitations of the current study should be noted. The CPS-E was modified based on researcher knowledge of developmentally appropriate questions (four questions were dropped without statistical justification) making direct comparisons with prior research on the CPS somewhat questionable. We did not conduct other examinations of reliability, such as test–retest or interrater agreement, though this would be helpful to investigate in future studies. The assessment measures were not counterbalanced when they were given to the teachers to complete and teachers may have changed the order of completing the scales based on personal preference. The CPS-E scales are scored in such a manner that 1 indicates the *behavior always occurs* and 5 indicates the *behavior never occurs*. This may be confusing when measuring academic and

social skills rather than deficits. However, because other studies of the CPS have used this same scoring procedure (see, for example, Brady et al., 2012; Evans et al., 2011; Meyer & Kelley, 2007), we did not think it appropriate to alter this procedure.

Although the sample used in the current study was diverse, it was not a nationally representative sample. The CPS-E, and the other measures, were only completed on students identified as at-risk for EBD which limits the generalizability of the findings. Teachers also volunteered to participate in the study and were not randomly selected. It would be advantageous to study the use of the CPS-E with nationally representative, randomly selected students and teachers to establish a normative sample and determine whether the psychometric properties shown in the current study are replicated.

Although we investigated the psychometric properties of the CPS-E, we did not specifically examine how teachers could use scores to alter classroom practices as part of RTI or PBIS, though this is an area worthy of future study. As with other behavior rating scales, the CPS-E is based on teacher perceptions, which may be a limitation. Another direction for future research would be to develop a student self-report form of the CPS-E to gain insight into student perceptions on their academic and social skills, rather than relying solely on teacher report.

Implications

Results of this study suggest positive implications for using the CPS-E within PBIS and RTI frameworks in elementary schools, especially as the measure was correlated with direct observations. This is important given the need for reliable and valid BBRS to be used as part of progress monitoring in schools (Cook et al., 2014). Because the CPS-E is brief, it should be feasible for teachers to complete regularly in the classroom. The CPS-E could be used to develop individualized interventions based on items on which a student demonstrates deficits. This could be helpful for students who struggle with essential academic skills such as completing class assignments, organizing their work, and participating appropriately in classroom activities (Farrington et al., 2012; Minskoff & Allsopp, 2003). Particular academic or social skills in which students show deficits could be the focus of a number of secondary or tertiary level interventions, such as the teaching of self-management strategies (Briesch & Chafouleas, 2009) or instruction in essential academic behaviors (Anderson et al., 2008) to improve school outcomes. The CPS could be used to monitor students over time to determine whether they are improving or to adjust interventions as needed. We encourage additional study of the CPS-E to help further establish its validity and utility for use within elementary schools.

Appendix

Classroom Performance Survey–Elementary

Student Initials/ID: _____ Teacher Name: _____
Date Completed: _____ Academic Subject: _____
School: _____

Please read each item carefully and circle the number that best describes this student's behavior for *this week*, to the best of your knowledge.

	Always	Most of the time	Some of the time	Hardly ever	Never
1. Completes class assignments.	1	2	3	4	5
2. Completes homework on time.	1	2	3	4	5
3. Records assignments consistently.	1	2	3	4	5
4. Turns in completed work.	1	2	3	4	5
5. Attend to instructions in class.	1	2	3	4	5
6. Cooperates/participates in class.	1	2	3	4	5
7. Demonstrates skills in reading assigned tests and materials.	1	2	3	4	5
8. Demonstrates adequate spelling and writing skills in work.	1	2	3	4	5
9. Performs satisfactorily on tests.	1	2	3	4	5
10. Completes assigned work with accurate computation/detail.	1	2	3	4	5
11. Completes assignments legibly.	1	2	3	4	5
12. Relates positively to teachers.	1	2	3	4	5

(continued)

Appendix. (continued)

		Always	Most of the time	Some of the time	Hardly ever	Never
13.	Demonstrates respect for property.	1	2	3	4	5
14.	Relates positively to peers.	1	2	3	4	5
15.	Communicates own needs or asks questions.	1	2	3	4	5
16.	Accepts assistance when needed or offered.	1	2	3	4	5
17.	Works up to potential.	1	2	3	4	5
		Above average	Slightly above average	Average	Slightly below average	Below average
18.	Compared with other students in the class, how does this student perform?	1	2	3	4	5
19.	Additional skills, behaviors, or concerns you feel have an impact on this student's classroom performance and achievement:					

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