Running Head: LINKING TEACHER EFFECTIVENESS AND COLLEGE READINESS

Linking Teacher Effectiveness with Instruction of Academic Behaviors Associated with College Readiness

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Presented at the annual conference of the American Educational Research Association

Division L: Educational Policy and Politics

Section 6: Teacher Policy and Politics

Vancouver, British Columbia, Canada

April 2012

Abstract

College readiness and teacher effectiveness are two emerging areas within policy research, yet few studies have linked these concepts. In this study, we examined the psychometric properties of a measure of academic behaviors associated with college readiness intended for high school teachers. Follow-up hierarchical regression analyses were conducted to determine the effect of typical teacher effectiveness measures on subscale scores. Teacher level of education, as measured by the highest degree earned, made the most meaningful contribution to teacher subscale scores, indicating more "qualified" teachers are more likely to integrate academic behaviors associated with college readiness into instruction. The implications for use as a teacher evaluation tool within high school settings are discussed.

Linking Teacher Effectiveness with Instruction of Academic Behaviors Associated with College Readiness

The Common Core State Standards movement (CCSS; National Governors Association [NGA] & Council of Chief State School Officers [CCSSO], 2010) and a subsequent initiative led by the Race to the Top Assessment Program (United States Department of Education, 2010) has brought college and career readiness to the forefront of high school instructional programs. In addition to subject-specific standards in English/Language Arts and mathematics, the CCSS emphasize cross-disciplinary standards to be integrated throughout high school courses in order to better prepare students for the rigors of college coursework. Concurrently, the Race to the Top Fund emphasizes teacher effectiveness as a major reform area (United States Department of Education, 2009). Given this recent policy activity, there is an increasing need for policy studies that connect teacher effectiveness with instruction associated with college and career readiness.

Prior evidence shows that commonly used college readiness indicators- grade point average and college admissions exam scores- are not well aligned with the necessary knowledge and skills pertinent for postsecondary success (Achieve, Inc., 2006; Brown & Conley, 2007; Brown & Niemi, 2007; Conley, 2003). According to Conley (2010), the development of college readiness skills is facilitated by student awareness and planning around key areas such as cognitive strategies, content knowledge, contextual skills and awareness, and academic behaviors. Figure 1 represents this comprehensive model of college readiness.

<insert Figure 1>

The four dimensions are meant to span across disciplines and measure the knowledge and skills pertinent to college readiness that are not typically measured by current indicators. Particularly, the academic behaviors dimension is similar to the cross-disciplinary standards within the Common Core because they tend to be independent of a particular content area. Examples include the ability to self-monitor, manage time, take notes, set goals, persevere in the face of obstacles, collaborate, self-evaluate, and self-advocate across subjects (Bransford, Brown, & Cocking, 2000; Conley, 2007).

The Race to the Top reform plan states, "improving teacher effectiveness based on performance" among the criteria for the Great Leaders and Teachers area (United States Department of Education, 2009). Although there has been some debate as to how teacher effectiveness should be defined and measured (Darling-Hammond, 2000, Goldhaber, 2002; McCaffrey et al., 2003), it is clear that higher teacher qualifications, as measured by highest degree earned and certification program characteristics, have positive effects on student achievement (Darling-Hammond, 2011; Heck, 2007). More recently, statistical value-added models measure teacher effectiveness from a residual estimate of student test scores, which have been adjusted for by adding covariates such as socioeconomic status or prior achievement to the model (Harris, 2010; McCaffrey et al., 2003; Sanders & Horn, 1998). These measures rely heavily on teacher characteristics, preparation, and job qualifications. However, current measures of teacher effectiveness are not necessarily related to the college readiness dimensions outlined by Conley (2010).

As such, it is important to understand the prevalence of academic behaviors within current high school curriculum and instruction and the relationship to indicators of teacher quality. In light of recent emphasis on the CCSS, the flaws of the current college readiness

indicators, and the need for better defined "best practices" around college readiness (Tierney, Bailey, Constantine, Finkelstein, & Hurd, 2009), new measures are needed that will inform teachers of how they might integrate academic behaviors across content areas. Such measures may help define the emerging area of teacher effectiveness in policy research.

The purpose of this study was to connect teacher effectiveness and college readiness by surveying current high school teachers on their integration of academic behaviors into instruction. Our study objectives were to: (a) examine preliminary reliability and validity evidence of a measure of teacher perceptions of academic behaviors associated with college readiness, and (b) examine the effects of teacher background characteristics on subscale scores.

Methods

Sample

Participants were high school teachers (N = 348) across eleven high schools in Illinois, Indiana, Michigan, Oregon, and Wyoming. Most teachers (72%) taught a core academic course- English/Language Arts (25%), Math (18%), Natural Sciences (16%), and Social Sciences (13%), with the remaining teachers reporting they taught "other" (28%), of which included Career/Technical (31%), Arts (28%), Foreign Languages (25%), Physical Education (8%), and Health (6%). Teachers taught all grades: 9th (32%), 10th (29%), 11th (26%), and 12th (13%) grades. On average, teachers reported they had been teaching for 15 years (SD = 10) and at their current school for 8.5 years (SD = 7.3). Many reported they earned a Master's Degree or higher (60%), followed by Bachelor's Degree (33%), and Associate's Degree or less (7%).

Measure

The CollegeCareerReady School Diagnostic (CCRSD) measures the four college readiness dimensions. Versions are available for students, teachers, administrators, and counselors. In this study, we focused on the Academic Behaviors dimension of the Teacher Version, which contains 58 items with response options ranging from 1 (*not at all like me*) to 5 (*very much like me*) and a *don't know/not applicable* option. Teachers are asked: "Please indicate how much each statement describes activities you do and expectations you have for students in your class" and they rate the items accordingly. The intent is for teachers to self-rate their practices using exemplary college readiness behaviors as a reference point. If teachers do not believe certain items describe their behaviors or indicate they do not know, they are less aware of successful college readiness practices and behaviors. The Academic Behaviors dimension has two hypothesized constructs: Learning Strategies and Self-Monitoring. Within the constructs are aspects. For Learning Strategies, the aspects are: Collaborative Learning Strategies, General Study Strategies, Note-Taking Strategies, Strategic Reading Strategies, Test-taking Strategies, and Time Management. For Self-Monitoring, the aspects are: Goal-setting, Persistence, and Self-awareness.

The items were written based on a previous study of over 4,000 students in 38 high schools that demonstrated exemplary practices in terms of college readiness of aspiring first generation and underrepresented students (Conley, 2010; Conley, McGaughy, Kirtner, van der Valk, & Martinez-Wenzl, 2010). These practices were coded, categorized, and operationalized into the four overarching dimensions shown in Figure 1. Prior reliability and validity evidence has been established for the student version (Lombardi, Conley, Seburn, & Downs, in press; Lombardi, Seburn, & Conley, 2011).

Data Analysis

To examine the psychometric properties of the CCRSD Academic Behaviors, we conducted a confirmatory factor analysis (CFA) of the hypothesized factor structure and examined internal consistencies by subscale. Then, we conducted multiple regression models to examine the effects of teacher background characteristics, subject and grade level taught on the subscale scores. Two types of software were used for analyses, PASW 18.0 (SPSS Inc., 2010) and Mplus 6.1 (Muthen & Muthen, 2010).

Results

Descriptive Statistics and Reliability

Table 1 shows descriptive statistics and reliability for the full measure, subscales, and aspects within subscales.

<insert Table 1>

On the Learning Strategies subscale, the aspect scores ranged from 3.31 to 3.73. On the Self-Monitoring subscale, the aspect scores ranged from 3.28 to 3.74. Reliability was evaluated with Cronbach's α. All coefficient values met the acceptable criterion of .70, and nearly all (83%) met the preferable criterion of .80 (Nunnally, 1975).

Confirmatory Factor Analysis

Responses were subject to a CFA using maximum likelihood estimation. Each measured aspect was associated with one of the two constructs, or latent variables (Learning Strategies and Self-Monitoring) via a single path. Model fit was evaluated using the minimum fit function χ^2, the χ^2/df ratio, and four goodness-of-fit indices: the root mean square error of approximation (RMSEA), the standardized root mean square residual

(SRMR), the comparative fit index (CFI), and the Tucker Lewis index (TLI). We determined a value of less than 5 for the χ^2/df ratio (MacCallum, Brown, & Sugawara, 1996) and RMSEA < .08, SRMR < .08, and CFI/TLI > .90 (Browne & Cudeck, 1993; Hu & Bentler, 1995) indicates good model fit.

The obtained χ^2 value for the model was χ^2 (26) = 95.05, $p < 0.001$, indicating a statistically significant difference between the two-factor model and the data. However, χ^2 values are potentially inflated by large sample sizes, and χ^2/df ratio was 3.65, indicating acceptable model fit. The obtained values for the goodness-of-fit indices were as follows: RMSEA = .08, SRMR = .03, CFI = .96, and TLI = .95, all of which indicate good model fit. Figure 2 shows the two-factor solution with standardized parameter estimates that ranged from .56 to .84, all of which are positively and statistically significantly different from zero.

<insert Figure 2>

Regression Models

To understand the effect of teacher characteristics on academic behaviors, we conducted a series of hierarchical regression models. We entered background characteristics (number of years teaching, years at current school, and highest degree earned) on step 1 and subject taught on step 2. Our decision to separate subject from background characteristics was based on previous definitions of teacher quality (Darling-Hammond, 2000; Heck, 2007) and the assumption that academic behaviors are integrated into instruction differently depending on the subject taught. As such, four dummy coded variables were created based on the core academic subjects required for college admission,

where teachers were coded as teaching English (1) or not(1), Math (1) or not (0), Science (1) or not (0), and Social Studies (1) or not (0). In all, we conducted nine regression models. Results are shown in Table 2.

<insert Table 2>

Overall, step 1 and 2 predictors explained a greater amount of variance in Learning Strategies aspects than in Self-Monitoring. Notably, 10% of variance in Note-Taking scores, $R^2 = .10$, $F(7, 340) = 6.103$, $p < .001$ were explained by the combination of the seven predictors. The standardized beta weights showed highest degree earned ($\beta = .14$, $p < .001$), English ($\beta = .16$, $p < .05$), Math ($\beta = .16$, $p < .05$), Science ($\beta = .24$, $p < .001$), and Social Studies teachers ($\beta = .22$, $p < .001$) added unique variance to the model, indicating that note-taking skills are integrated into instruction depending on the subject taught, and the teachers with higher degrees are more likely to teach these skills. Similar findings resulted for Test-Taking, where 8% of the variance was explained by the seven predictors, $R^2 = .08$, $F(7, 340) = 5.534$, $p < .001$, as well as Strategic Reading where 9% of the variance was explained by the model, $R^2 = .09$, $F(7, 340) = 5.483$, $p < .001$. In both of these models, highest degree earned contributed unique variance at step 1, and three of four subject variables contributed unique variance at step 2. In fact, highest degree earned contributed significant unique variance in five of nine models (General Study Skills, Note-Taking, Test-Taking, Strategic Reading, Goal-setting), and Math contributed significant unique variance in four of nine models. In the models for Strategic Reading and Goal-setting, math teachers showed negative beta weights, indicating that math teachers are less likely to integrate

these learning strategies into their instruction. Overall, the combination of seven predictors significantly explained variance in the most of the Learning Strategies aspect scores, but these same predictors did not significantly explain variance in two of the three Self-Monitoring areas (Persistence and Self Awareness). This finding suggests teachers may be better trained to integrate interpersonal rather than intrapersonal strategies into instruction.

Discussion

Our findings demonstrate the promise of the Academic Behaviors dimension within the CollegeCareerReady School Diagnostic, teacher version. Specifically, this instrument had adequate psychometric properties and might be considered a viable tool in evaluating teacher knowledge and integration of college readiness practices within the classroom. Given the recent emphasis on college readiness skills as pronounced by the Common Core (NGA & CCSSO, 2010), school administrators may wish to gain insight on the teaching practices within their schools as compared to validated college readiness behaviors.

Our findings showed the higher the degree earned, the more likely the teacher will integrate certain academic behaviors into instruction, particularly for interpersonal, strategy-emphasized skills such as note-taking, test-taking, study skills, and reading strategies. In some models, these learning strategies were integrated according to subject area, as shown by the significant unique variance of the subject area variables. Interestingly, the math variable was the only predictor that explained significant negative unique variance in two subscales (Strategic Reading and Goal-setting). Also, our findings show teachers may need additional training or understanding of how to integrate self-monitoring skills into their classrooms, a finding that is not surprising, although somewhat

troubling. The internal nature of metacognition is essentially invisible- we cannot see thinking skills. However, college faculty expect students to utilize such skills upon entering college (Conley, 2003). Thus, it is especially important to better understand how to integrate self-monitoring skills into instruction within high school settings.

Limitations

While these study findings demonstrate the promise of the CCRSD as a reliable and valid measure of teacher integration of academic behaviors into their instruction, there are several limitations to consider in interpreting the findings. First, we selected limited measures of teacher quality (years teaching, years teaching at current school, and highest degree earned). More recent studies have shown other indicators of teacher quality and effectiveness, particularly teacher residual effects as estimated by value-added models (Harris, 2010; McCaffrey, et al., 2003; Sanders & Horn, 1998). These variables were outside the scope of the current study, but should be considered in any future studies that examine the relationship between teacher effectiveness and the emphasis in college and career readiness instruction.

Implications for Practice

The CCRSD may be a valuable tool to inform teachers of instructional gaps and areas to integrate self-monitoring and learning strategies into their classrooms. As academic behaviors are cross-disciplinary in nature, this tool may be used across subject areas. Administrators may wish to use the CCRSD to evaluate and better understand the teaching practices of their teachers. Responses may be used as a starting point for teacher evaluation and improvement conversations between administrators and teachers.

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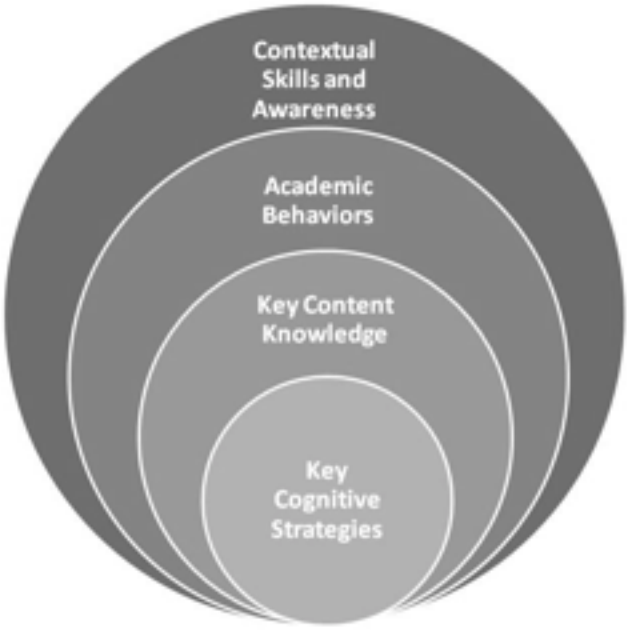

Figure 1. Conley's (2010) comprehensive model of college and career readiness

Table 1

Descriptive Statistics and Reliability by Scale, Subscale, and Aspect

Subscale	Item *N*	α	$\bar{X}$	*SD*
Academic Behaviors	58	0.97	3.51	0.72
Learning Strategies	39	0.96	3.51	0.75
Collaborative Learning	7	0.89	3.73	0.86
General Study Skills	6	0.83	3.60	0.76
Note Taking	11	0.92	3.51	0.94
Test Taking	7	0.84	3.36	0.92
Strategic Reading	6	0.88	3.43	0.97
Time Management	2	0.77	3.31	1.27
Self-Monitoring	19	0.92	3.51	0.75
Goal Setting	8	0.89	3.28	0.93
Persistence	6	0.78	3.74	0.72
Self Awareness	5	0.80	3.61	0.84

Note. Scale ranges from 1 (Not at all like me) to 5 (Very much like me).

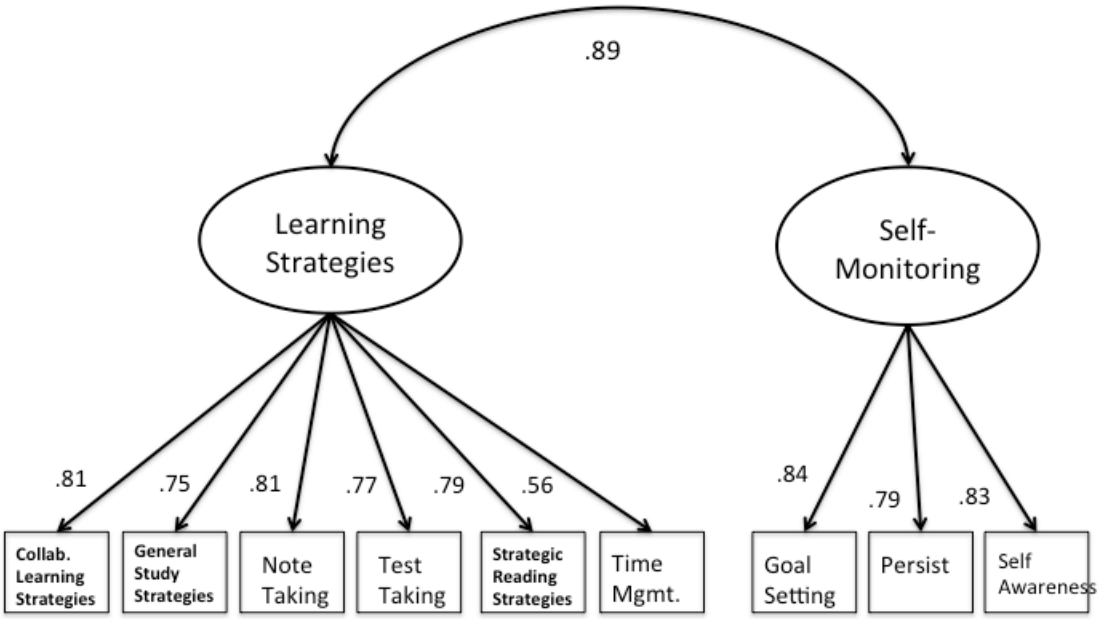

Figure 2. CFA model with standardized parameter estimates

Table 2

Hierarchical Regression Model Results and Standardized Beta Weights for Academic Behaviors Subscales

	Learning Strategies												Self-Monitoring					
	CL		GSS		NT		TT		SR		TM		GS		P		SA	
Block	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1: Background characteristics	.01		.04*		.04*		.04*		.02		.02		.01		.01		.01	
Years teaching		.03		.16*		.01		.07		.02		.08		.14*		.03		.02
Year teaching at current school		-.04		-.21*		-.03		-.04		-.05		-.06		-.10		.01		.03
Highest degree earned		.07		.13*		.14*		.14*		.12*		.13*		-.03		.03		.04
Step 2: Subject	.01		.01		.06**		.04*		.07**		.01		.05*		.01		.02	
English		.01		.05		.16*		.10		.18*		-.02		.03		.10		.01
Math		-.01		-.02		.16*		.17*		-.12*		-.07		-.20*		-.01		-.11
Science		.11		.07		.24**		.19*		.10		.01		.01		.10		-.04
Social Studies		.03		-.02		.22**		.15*		.14*		-.03		-.10		.01		-.08
Total R^2	.02		.05*		.10**		.08**		.09**		.03		.06*		.02		.03	

Note. Standardized beta weights are shown when all variables were included in the equation. CL=Collaborative Learning, GSS= General Study Skills, NT=Note-Taking, TT=Test-Taking, SR=Strategic Reading, TM=Time Management, GS=Goal-Setting, P=Persistence, SA=Self-Awareness.
*$p < .05$. **$p < .001$