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Facilitating academic performance in college: understanding the role of clear and organized instruction

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Abstract Extensive research on college impact has identified a range of practices that enhance students' academic outcomes. One practice—clear and organized instruction—has received increasing attention in recent research. While a number of studies have shown that clear and organized instruction is related to a range of postsecondary outcomes, researchers have not considered the mechanisms that link this educational practice to student outcomes. In this study, we draw on the constructivist theory of learning to identify potential mechanisms that may explain the relationship between clear and organized instruction and academic performance. Results from the Wabash National Study of Liberal Arts Education, including an analytical sample of 7116 students attending 38 four-year institutions in the USA, indicate that three mechanisms examined—faculty interest in teaching and student development, academic motivation, and academic engagement—explain almost two-thirds of the relationship between clear and organized instruction and first-year GPA. When students experience greater exposure to clear and organized instruction, they perceive their faculty as being more invested in their learning and development, and they report being more academically motivated and engaged in their studies. Moreover, students

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who enter college less academically prepared benefit more from exposure to clear and organized instruction.

Keywords Good practices in undergraduate education · Clear and organized instruction · Academic performance · Academic motivation · Academic engagement

Extensive research on how college affects students has identified a range of "good practices" that facilitate desirable outcomes in higher education (see reviews in Pascarella and Terenzini 1991, 2005). Chickering and Gamson's (1987, 1991) summary of good educational practices has been particularly useful as an orienting frame for improving the quality of teaching and learning in higher education. In addition to the seven principles identified by Chickering and Gamson, recent research has highlighted another practice worthy of attention: clear and organized instruction.

Clear and organized instruction is a composite indicator that reflects students' perceptions of the extent to which the instructor organizes and presents the material in a clear and coherent fashion, as well as the extent to which the instructor provides explanations and constructs assignments in a way that helps students learn (see Table 1). In an early study using data on college students in the 1990s, Pascarella et al. (1996) reported that clear and organized instruction is associated with learning gains in various domains such as mathematics and critical thinking. Since then, studies have shown that clear and organized instruction is related to a range of outcomes from grades and persistence to learning and well-being (see reviews in Blaich and Wise 2014; Pascarella and Blaich 2013).

Research on clear and organized instruction to date has been embedded in the college impact frameworks (e.g., Astin 1993; Pascarella 1985). This research tradition tends to focus on demonstrating effects more than on exploring mechanisms. A typical approach relies on regression models that estimate the effect of a particular practice, net of a range of confounding variables. Consequently, studies of clear and organized instruction to date have estimated the effect of this practice on student outcomes, but have not considered possible explanations that may connect clear and organized instruction with the outcomes examined (for a recent exception, see Wang et al. 2015). Moreover, this research tradition often relies on survey responses in which students are asked to evaluate a range of their college experiences over the course of a year. Those experiences are then entered into a regression model predicting general outcomes of college (e.g., motivation, grades, or persistence). The analysis is thus conducted at the level of the student experience not the specific classroom, which is perhaps one of the reasons researchers have focused on estimating effects as opposed to exploring mechanisms.

Our approach is embedded in the college impact tradition. We thus rely on a survey of students' college experiences and estimate a regression model to consider whether clear and organized instruction is related to academic performance (grade point average (GPA)), net of a range of confounding factors. While our starting point is the same as that of the previous literature on clear and organized instruction, we aim to extend the existing line of inquiry by considering potential mechanisms that may link clear and organized instruction to academic performance. In this endeavor, we draw on the constructivist theory of learning.

We rely on data from the Wabash National Study of Liberal Arts Education (WNS), including an analytical sample of 7116 students attending 38 four-year institutions in the

Table 1 Definitions of key independent variables

Clear and organized instruction ($\alpha = 0.905$)
Presentation of material is well organized
Faculty are well prepared for class
Class time is used effectively
Course goals and requirements are clearly explained
Faculty have a good command of what they are teaching
Faculty give clear explanations
Faculty make good use of examples and illustrations to explain difficult points
Faculty effectively review and summarize the material
Faculty interpret abstract ideas and theories clearly
Faculty give assignments that help in learning the course material
*Statements were rated on a five-point scale, ranging from never to very often
Faculty interest in teaching and student development ($\alpha = 0.873$)
Most faculty with whom I have had contact are…
… genuinely interested in students
… interested in helping students grow in more than just academic areas
… outstanding teachers
… genuinely interested in teaching
… willing to spend time outside of class to discuss issues of interest and importance to students
*Statements were rated on a five-point scale, ranging from strongly disagree to strongly agree
Academic motivation ($\alpha = 0.745$)
I am willing to work hard in a course to learn the material even if it won't lead to a higher grade
When I do well on a test, it is usually because I am well-prepared, not because the test is easy
I frequently do more reading in a class than is required simply because it interests me
I frequently talk to faculty outside of class about ideas presented during class
Getting the best grades I can is very important to me
I enjoy the challenge of learning complicated new material
My academic experiences are the most important part of college
My academic experiences are the most enjoyable part of college
*Statements were rated on a five-point scale ranging from strongly disagree to strongly agree
Academic engagement
Study time
About how many hours in a typical week do you spend preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)?
Class preparation and participation
In your experience at your institution during the current school year, about how often have you:
asked questions in class or contributed to class discussions (*class participation*)
come to class without completing readings or assignments (*not prepared for class*)
*Statements were rated on a four-point scale ranging from never to very often

USA. The results indicate that the three mechanisms explored—faculty interest in teaching and student development, students' academic motivation, and students' academic engagement—explain almost two-thirds of the relationship between clear and organized instruction and first-year GPA. In addition, there is at least some indication that students

who enter college less academically prepared benefit more from clear and organized instruction. These findings provide valuable insights into the potential benefits of combining different scholarly traditions—namely research on college impact and theories of learning—to better understand how good educational practices facilitate academic success in higher education.

Theoretical framework and the literature review

Extensive literature on how college affects students has shown that a variety of students' experiences, both inside and outside of the classroom, facilitate positive outcomes, from learning to academic performance and persistence (for reviews see Pascarella and Terenzini 1991, 2005). This literature has focused scholarly attention on understanding the interaction between students and their college environments and the ways in which those interactions affect student outcomes. More specifically, Pascarella (1985) developed a conceptual model that placed interactions with agents of socialization (such as faculty) at the center of understanding the effects of college on students. Pascarella postulated that interactions with faculty have a direct effect on student learning and development, as well as an indirect effect through influencing students' effort.

The centrality of faculty for student learning and development has received ample support in the literature (see reviews in Astin 1993; Pascarella and Terenzini 1991, 2005). Faculty engagement with students has positive effects on student outcomes such as academic motivation (Komarraju et al. 2010; Trolian et al In Press), academic engagement (Kuh and Hu 2001; Zhao and Kuh 2004), academic performance (Anaya and Cole 2001; Kim and Sax 2009), and aspirations to attend graduate school (Sax et al. 2005). In addition to general engagement between faculty and students, research shows that faculty teaching practices influence students' cognitive development (Pascarella et al. 2013; 2005; Wang et al. 2015), aspirations to attend graduate school (Cruce et al. 2006; Hanson et al. 2016), orientation to lifelong learning (Mayhew et al. 2008), and attitudes toward literacy (Seifert et al. 2010).

In addition, a number of recent studies have paid specific attention to clear and organized instruction. These studies indicate that clear and organized instruction is related to gains in reading comprehension (Bray et al. 2004); gains in critical thinking, interest in challenging intellectual activities, and academic motivation (Loes and Pascarella 2015); and the probability of persistence to the second year of college (Pascarella et al. 2008, 2011). While showing the relationship between clear and organized instruction and different college outcomes, these studies do not consider potential mechanisms that may link this educational practice to student outcomes (for a recent exception, see Wang et al. 2015). To examine how clear and organized instruction may facilitate students' academic performance, we draw on the constructivist theory of learning. This theory allow us to consider (a) why clear and organized instruction may have a positive relationship to academic performance and (b) what may be some of the mechanisms that explain the benefits of this educational practice.

Understanding the importance of clear and organized instruction

The constructivist theory of learning offers a number of insights that can illuminate how clear and organized instruction may facilitate academic performance. The fundamental

principle of the constructivist approach is that "new knowledge must be constructed from existing knowledge" (Bransford et al. 2000; p. 10; see also Neumann 2014). Students do not enter the classroom as empty vessels waiting to be filled; they enter the classroom with years of prior experience and thus specific ways of understanding the world. To facilitate student learning, instructors must effectively engage with students' existing knowledge (Bransford et al. 2000; Shulman 2004a, b; Neumann 2014; Biggs and Tang 2007). When students report that faculty are clear and organized that may in part indicate that faculty have successfully engaged with their prior knowledge and helped them to see the relevance of the material. Being clear about the content of the course and helping students organize information would be particularly crucial for first-year students, who tend to be in a dualistic phase of development where they seek clear information and "right" answers (Perry 1970).

An emphasis on prior knowledge highlights the importance of considering what students bring to the classroom. The constructivist tradition has focused in particular on the cultural dimension of students' prior experiences. Neumann (2014) notes that "The ideas, assumptions, and beliefs that students bring into class as starting points for their learning of academic ideas are rooted in students' family and community lives, past schooling, and other personal experiences, all culturally shaped (p. 251)." In addition to their cultural backgrounds, students enter higher education with a certain amount of academic knowledge. Students who enter college with lower levels of academic preparation may be particularly sensitive to instructional quality. Without a strong academic foundation to build upon, a lack of clarity and organization may pose particular challenges for those students as they aim to comprehend the course material. They may thus benefit from structure and clarity to a greater extent than their more academically prepared peers, who may be able to succeed even in a less organized or coherent classroom.

The constructivist theory of learning also illuminates several mechanisms through which clear and organized instruction may exert its effects. The first is academic engagement. In the constructivist framework, teacher's role is to facilitate, while the student is responsible for learning. This makes students' active engagement in the learning process central. Students who are actively engaged may be expected to exhibit a range of behaviors such as invest more time in their studies, participate in class discussion, and come to class prepared.

Prior research shows that academic engagement, which has been broadly defined as time devoted to academically purposeful activities, including time spent preparing for class and time engaged in classroom learning, is related to academic outcomes (Kuh et al. 2007; Kuh et al. 2005). Using data from the National Survey of Student Engagement (NSSE), Kuh et al. (2008), for example, reported that time spent on academically purposeful activities had a positive relationship with first-year GPA and persistence to the second year of college. Similarly, research shows that active engagement in the classroom is related to better academic performance (Carini et al. 2006; Svanum and Bigatti 2009), as is the amount of time students spend studying (Arum and Roksa 2011; Astin 1993).

The constructivist theory also notes the importance of motivation for learning. Students are most motivated when they can be successful. Classes that are targeted at the right level of challenge (what Vygotsky (1978) called the "zone of proximal development") help students successfully complete tasks, which increases their confidence and motivation. Motivation can thus be influenced by what instructors do in the classroom (Ambrose et al. 2010; Bain 2004). Lectures that are disorganized, where course goals or assignments are not clear, where instructors do not explain complex ideas or summarize the material, may make it difficult for students to be successful and thus to be academically motivated.

Higher education research provides ample evidence showing that academic motivation is a strong predictor of academic performance (e.g., Allen et al. 2008; Lotkowski et al. 2004; Robbins et al. 2004). If students struggle in the course due to a lack of clarity and organization, that is likely to impact their motivation and, subsequently, their academic performance.

By emphasizing the contextual dimension of learning, the constructivist approach also implies that learning is not just a cognitive process but also an affective one. In discussing the classroom environment, Ambrose et al. (2010) noted that "faculty-student interaction impacts learning and performance through motivational and socioemotional mediating mechanisms (p. 178)." The importance of the classroom environment is highlighted by Bain's examples of what the best teachers do: "the best teachers we studied displayed not power but an investment in the students (p. 139)." Indeed, quantitative studies show that various measures of student–faculty relationships that include faculty interest in teaching and student development are related to a range of outcomes, from development of reading and critical thinking skills (Cruce et al. 2006) to inclinations toward lifelong learning and literacy (Seifert et al. 2010).

We build on these insights to identify potential mechanisms that link clear and organized instruction to academic performance. In this endeavor, we integrate insights from the constructivist theory of learning into the models of college impact, which serve as our organizing frame for analysis. We do not have close observations of interactions and experiences at the classroom level. Instead, our observations are at the more general level, considering how college affects students more broadly. Our overall frame is thus one advanced by Pascarella (1985), and a similar one subsequently developed by Astin (1993), emphasizing the importance of college experiences for students' academic outcomes.

Data and methods

We rely on data from the Wabash National Study of Liberal Arts Education (WNS), a longitudinal, multi-institutional study of college experiences and outcomes. Across the three waves, including students who started college in the fall of 2006, 2007, and 2008, 38 different four-year institutions are represented in the sample. WNS institutions were selected to represent the diverse characteristics of American higher education including institutional type, size, selectivity, and location. However, because the study was primarily concerned with the impact of liberal arts experiences, liberal arts colleges were purposefully overrepresented. Overall, the institutions are more selective than would be expected from a national sample (average entering freshman ACT for the sample = 25; national average for all test takers = 21).[1] The results can thus be generalized to the sample examined, but not necessarily to the population as a whole.

First-year, full-time students were invited to participate in the longitudinal study of undergraduate experiences. The student sample was selected in one of the two ways. First, for larger institutions, it was selected randomly from the incoming first-year class at each institution. The only exception to this was at the largest participating institution in the study, where the sample was selected randomly from the incoming class in the College of

[1] National data obtained from ACT: http://forms.act.org/newsroom/act-national-and-state-scores/. It is important to note that some of the students who took the test (and especially those who did not do well) may not enter four-year institutions.

Arts and Sciences. Second, for a number of the smallest institutions in the study, the sample included the entire incoming first-year class.

In the fall of their first year of college, students completed a survey including demographic characteristics, family background, high school experiences, and college plans. The students were surveyed again in the spring of their first year, which is the focus of our analysis. In the follow-up survey, students were asked a range of questions about their academic experiences and engagement. Transcript data were also collected from each institution, providing an accurate semester-by-semester grade point average (GPA). Having administrative data on GPA is a key strength of the study, as it means that we do not have to rely on students' self-reports.

We focus on the first year of college, as this time represents the beginning of a trajectory that has consequences for subsequent outcomes. In particular, GPA in the first year is highly predictive of subsequent GPA, persistence and graduation (e.g., Adelman 2006; Bowen et al. 2009; Kuh et al. 2008; see also reviews in Pascarella and Terenzini 1991, 2005). The sample examined in this study includes 7116 students who participated in the survey at the end of their first year of college and had available data on GPA. The overall response rate for the spring survey was 49 %, although some of the students did not respond because they were no longer enrolled at the institution. The overall response rate among those enrolled in both the fall and spring semesters was 55 %, with substantial variation across institutions.

Outcomes and predictors

The outcome examined in this study is students' academic performance, which is measured as students' grade point average (GPA) at the end of the first year of college.[2] In the analyses, the measure is standardized with a mean of 0 and standard deviation of 1 to facilitate consideration of effect size. Our key predictor is exposure to clear and organized instruction, a 10-item scale that has vetted reliability and validity (Pascarella et al. 2011, 1996). Alpha for the sample used in this study is 0.905 (see Table 1).

Following, we consider several mechanisms that may link clear and organized instruction with student performance. The first is faculty interest in teaching and student development, a composite of five items listed in Table 1 ($\alpha = 0.873$), developed by Pascarella and Terenzini (1980, 1983). This scale can be regarded as reflecting faculty's overall educational philosophy, with higher numbers representing faculty who are more student-centered in their approach.

In addition, we consider students' academic motivation and engagement. Academic motivation is an eight-item scale that aims to assess students' motivation toward academic pursuits (see Table 1, $\alpha = 0.745$). This scale was originally developed by Pascarella and Terenzini for the federally funded National Study of Student Learning conducted between 1992 and 1995 (Author, personal communication, February 17, 2016). The scale has been vetted and pilot tested before inclusion in WNS (Gillig 2016). Finally, academic engagement is represented by several indicators—the amount of time students spend preparing for class, whether they ask questions in class and whether they have come to

[2] Although mean and median for GPA are close (mean = 3.2 and median = 3.3), the measure is not normally distributed. Given the long left tail, there is no easy transformation and several plausible transformations (e.g., reflecting GPA and then either taking a square root or natural log) still failed normality tests. Instead of transforming the variable, we estimate robust standard errors, which are recommended when the dependent variable is skewed.

class unprepared (see Table 1). All key predictors except hours spent studying (which has an intuitive metric) are standardized with a mean of 0 and standard deviation of 1.

In addition to these key variables of interest, all analyses control for students' background characteristics: gender (dummy variable for male students), race/ethnicity (dummy variables for African-American, Hispanic, and Asian students, with White serving as a reference), and parental education (dummy variables: At least one parent has a BA; at least one parent has a master's/doctoral/professional degree; students whose parents have not completed college serve as a reference). We also control for students' academic preparation, including their college admission test scores (ACT or SAT scores converted to the ACT scale, and standardized in the analysis) and high school GPA. The original high school GPA measure included several categories, but most students reported very high grades, with virtually all reporting earning A's and B's. We thus created a dummy variable for students who reported earning A's in high school (with all other students serving as a reference).

We also control for two aspects of students' college experience that may be related to student performance: The amount of time they spend in extracurricular activities and their intended college major (dummy variables for humanities, social sciences, natural sciences, professional fields, and other majors, with business serving as a reference). In addition, we control for two dimensions of institutional context: selectivity (average ACT scores for incoming freshman class) and institutional type. In terms of the latter, we include a dummy variable for liberal arts institutions since recent research indicates that students attending these types of institutions report higher exposure to clear and organized instruction than students attending regional or research universities (Loes and Pascarella 2015; Pascarella et al. 2013). Finally, since the sample included three cohorts of students, we control for cohort (dummy variables for the 2007 and 2008 cohorts, with the 2006 cohort serving as a reference), and since some of the schools participated in the study multiple times, we include a dummy variable reflecting multi-year participation. Descriptive statistics for all variables are presented in Table 2.

Missing data for all independent variables were handled using a multiple imputation procedure. We follow the "multiple imputation, then deletion (MID)" method (von Hippel 2007). In this approach, the dependent variable is used in the imputation equation but the analyses are estimated on the non-missing values of the dependent variable. We used PROC MI in SAS to create five distinct datasets with imputed values for independent variables. The amount of missing data ranged from 1 % for high school grades to 6 % for academic motivation. Each of these datasets is analyzed separately, and parameter estimates are combined using PROC MIANALYZE. In addition, to adjust for clustering of students within institutions, we use PROC SURVEYREG with a cluster command.[3]

Results

To propose certain variables as mediators, those variables must not only be related to the outcome of interest (in this case first-year GPA), but also be related to the key predictor, which is clear and organized instruction (Baron and Kenny 1986). We thus begin by

[3] An alterative model specification would be to use HLM. Only 11 % of the variance in the intercept-only model is observed across institutions, and the results do not substantively differ when using HLM as opposed to the cluster command specification. In addition, HLM is not recommended when the ratio of independent variables to the number of level-2 units is low.

Table 2 Descriptive statistics: means and standard deviations for continuous measures ($N = 7116$)

	Mean	S.D.
Outcome		
Grade point average (GPA)	0.00	1.00
Key predictors		
Clear and organized instruction	0.00	1.00
Faculty interest in teaching and student development	0.00	1.00
Academic motivation	0.00	1.00
Study time (h)	15.29	8.27
Class participation	0.00	1.00
Not prepared for class	0.00	1.00
Controls		
Male	0.39	
Race/ethnicity		
African-American	0.10	
Hispanic	0.05	
Asian	0.05	
White	0.80	
Parental education		
Less than BA	0.32	
Bachelor's degree	0.32	
Graduate/professional degree	0.36	
ACT score	0.00	1.00
Overall earned A's in high school	0.59	
Extracurricular activities (h)	6.82	7.74
Intended major		
Humanities	0.15	
Social science	0.16	
Natural science	0.16	
Professional field	0.19	
Business	0.12	
Other major	0.21	
Multiple cohort	0.20	
Cohort 2006	0.38	
Cohort 2007	0.18	
Cohort 2008	0.44	
Liberal arts college	0.47	
Institutional selectivity	24.71	3.30

presenting correlation analyses examining the relationship between clear and organized instruction and each of the proposed mediators. Table 3 reveals statistically significant associations between students' perceptions of clear and organized instruction and our proposed mediators. Students who experienced higher exposure to clear and organized instruction also perceived their faculty to be more invested in their learning and

Table 3 Correlations between the key independent variables

	2	3	4	5	6
1. Clear and organized instruction	0.647***	0.355***	0.165***	0.222***	−0.139***
2. Faculty interest in teaching and student development		0.336***	0.132***	0.203***	−0.102***
3. Academic motivation			0.251***	0.297***	−0.265***
4. Study time				0.171***	−0.195***
5. Class participation					−0.052***
6. Not prepared for class					1.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

development. Moreover, these students were more academically motivated, spent more time studying, and were more engaged in their classes (i.e., they asked questions more frequently and attended class unprepared less often). Regression analyses (available on request from the authors) including control variables from Table 2 show the same patterns.

Table 4 presents regression analyses of students' first-year GPA. The first model indicates that exposure to clear and organized instruction is related to GPA: One standard deviation increase in clear and organized instruction is associated with a 0.12 standard deviation increase in GPA, net of controls. Notably, this effect is comparable to the effect of having college-educated parents.

Model 2 shows that 25 % of the relationship between clear and organized instruction and academic performance is mediated by faculty interest in teaching and student development. This pattern implies that clear and organized instruction, at least in part, conveys to students that their faculty are invested in their learning and development. Academic motivation (Model 3) and academic engagement (Model 4) similarly explain a substantial portion of the relationship between clear and organized instruction and GPA. Students who experienced clear and organized instruction also reported being more academically motivated and academically engaged in their courses.

The final model includes all variables of interest. Given that the proposed mediators are correlated with each other (see Table 3) their individual impact is attenuated once they are all included in the same model. The coefficients for faculty interest in teaching and student development and academic motivation decrease substantially in the final model. This pattern suggests that students who perceive their faculty as being invested in their learning and development and are more academically motivated are also more academically engaged. In the final model, the coefficient for clear and organized instruction is still statistically significant, but it has decreased by almost two-thirds from Model 1. Much of the relationship between clear and organized instruction and GPA is thus explained by students' academic motivation and engagement, in addition to students' perceptions that faculty are invested in their learning and development.

In addition to exploring factors that may explain the relationship between clear and organized instruction and academic performance, we considered the possibility that effective instruction may differentially benefit certain groups of students. Prior studies have reported conditional effects based on students' high school preparation with respect to other outcomes (e.g., An 2015; Trolian et al. In Press). Moreover, an emphasis of the constructivist theory on students' prior experiences would imply that students who enter college less academically prepared may benefit more from exposure to clear and organized

Table 4 Regression models predicting students' academic performance (GPA)

	Model 1	Model 2	Model 3	Model 4	Model 5
Key predictors					
Clear and organized instruction	0.118**	0.088**	0.075**	0.079**	0.045**
	(0.011)	(0.013)	(0.012)	(0.011)	(0.012)
Faculty interest in teaching and student development		0.050**			0.031*
		(0.013)			(0.013)
Academic motivation			0.120**		0.058**
			(0.009)		(0.010)
Academic engagement					
Study time				0.010**	0.009**
				(0.001)	(0.002)
Class participation				0.104**	0.091**
				(0.011)	(0.011)
Not prepared for class				−0.091**	−0.080**
				(0.014)	(0.014)
Controls					
Male	−0.287**	−0.286**	−0.272**	−0.240**	−0.238**
	(0.046)	(0.046)	(0.044)	(0.044)	(0.044)
Race (ref: white)					
Black	−0.283**	−0.282**	−0.310**	−0.285**	−0.297**
	(0.063)	(0.063)	(0.062)	(0.062)	(0.061)
Hispanic	−0.074	−0.078	−0.099*	−0.064	−0.080
	(0.048)	(0.048)	(0.048)	(0.046)	(0.047)
Asian	−0.037	−0.035	−0.068	0.007	−0.012
	(0.046)	(0.047)	(0.047)	(0.047)	(0.047)
Parental education (ref: less than BA)					
Bachelor's degree	0.122**	0.122**	0.118**	0.108**	0.107**
	(0.030)	(0.030)	(0.030)	(0.029)	(0.029)
Graduate/professional degree	0.129**	0.130**	0.127**	0.110**	0.112**
	(0.026)	(0.025)	(0.025)	(0.025)	(0.024)
ACT score	0.409**	0.409**	0.418**	0.409**	0.414**
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Overall earned A's in high school	0.610**	0.608**	0.588**	0.550**	0.544**
	(0.032)	(0.031)	(0.032)	(0.034)	(0.034)
Hours spent in extracurricular	−0.003*	−0.003*	−0.004*	−0.005**	−0.005**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Major (ref: business)					
Humanities	−0.084	−0.086	−0.099	−0.094	−0.101
	(0.057)	(0.057)	(0.054)	(0.052)	(0.052)
Social science	−0.111*	−0.110*	−0.128**	−0.126**	−0.132**
	(0.049)	(0.050)	(0.047)	(0.046)	(0.046)
Natural science	−0.275**	−0.274**	−0.316**	−0.295**	−0.313**
	(0.060)	(0.060)	(0.059)	(0.059)	(0.058)

Table 4 continued

	Model 1	Model 2	Model 3	Model 4	Model 5
Professional field	−0.112*	−0.113*	−0.120*	−0.114*	−0.119*
	(0.051)	(0.050)	(0.051)	(0.050)	(0.050)
Other major	−0.188**	−0.184**	−0.197**	−0.185**	−0.187**
	(0.036)	(0.036)	(0.035)	(0.037)	(0.036)
Multiple cohorts	0.039	0.040	0.028	0.026	0.022
	(0.085)	(0.087)	(0.082)	(0.084)	(0.083)
Cohort (ref: 2006 cohort)					
2007 cohort	−0.054	−0.056	−0.074	−0.074	−0.083
	(0.063)	(0.063)	(0.062)	(0.063)	(0.062)
2008 cohort	−0.042	−0.041	−0.062	−0.051	−0.059
	(0.064)	(0.064)	(0.063)	(0.060)	(0.060)
Institutional characteristics					
Liberal arts	0.002	−0.013	−0.003	−0.020	−0.028
	(0.074)	(0.073)	(0.071)	(0.069)	(0.068)
Selectivity	−0.058**	−0.058**	−0.057**	−0.061**	−0.060**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Intercept					
	1.309**	1.327**	1.336**	1.300**	1.325**
	(0.323)	(0.323)	(0.319)	(0.307)	(0.307)

Table reports regression coefficients and standard errors (in parentheses)

* $p < 0.05$, ** $p < 0.01$

Table 5 Regression models predicting students' academic performance (GPA), selected results for interaction terms

	Model 1	Model 2
Key predictors		
Clear and organized instruction	0.063**	0.040**
	(0.019)	(0.013)
Faculty interest in teaching and student development	0.031*	0.031*
	(0.013)	(0.013)
Academic motivation	0.058**	0.057**
	(0.010)	(0.010)
Academic engagement		
Study time	0.009**	0.009**
	(0.002)	(0.002)
Class participation	0.091**	0.092**
	(0.011)	(0.011)
Not prepared for class	−0.081**	−0.082**
	(0.014)	(0.013)

Table 5 continued

	Model 1	Model 2
Interactions with academic preparation		
Clear and organized instruction × overall earned A's in high school	−0.033	
	(0.023)	
Clear and organized instruction × ACT score		−0.024**
		(0.009)

Table reports coefficients and standard errors (in parentheses)

Models include all control variables from Table 4

* $p < 0.05$, ** $p < 0.01$

instruction. Table 5 presents selected results for interaction terms of clear and organized instruction with college admission test scores (ACT) and high school GPA.

Model 2 reports a statistically significant negative interaction between clear and organized instruction and ACT scores, indicating that the relationship between clear and organized instruction and GPA is moderated by this dimension of academic preparation. More specifically, students who enter college with lower test scores tend to benefit more from exposure to clear and organized instruction. The interaction term between clear and organized instruction and high school GPA is also negative, although not statistically significant. This could be in part because our measure of high school GPA is not adequately nuanced. A more fine-grained measure of high school GPA may follow patterns closer to those observed for test scores. Taken together, the findings indicate that at the very least all students benefit from clear and organized instruction, or in some respects, students who enter college less academically prepared may benefit more.

Conclusion

Extensive research on college impact has identified a range of practices that enhance students' academic outcomes (see reviews in Pascarella and Terenzini 1991, 2005). In addition to the seminal list of beneficial educational practices provided by Chickering and Gamson (1987, 1991), several recent studies have drawn attention to clear and organized instruction. Extant research has noted that clear and organized instruction is related to outcomes such as grades, persistence, and learning (Blaich and Wise 2014; Pascarella and Blaich 2013).

Prior studies on clear and organized instruction have been conducted within the college impact framework and thus have focused primarily on examining whether there is a relationship between this educational practice and student outcomes, net of a range of confounding factors, without necessarily examining the mechanisms that link clear and organized instruction to student outcomes. We address this gap in the literature by drawing on the constructivist theory of learning to identify several potential mechanisms that may explain the relationship between clear and organized instruction and students' academic performance.

The results, based on a large sample of students and institutions in the USA, indicate that almost two-thirds of the relationship between clear and organized instruction, and first-year GPA is explained by the mechanisms considered: faculty interest in teaching and student development, students' academic motivation, and students' academic engagement. When students experience greater exposure to clear and organized instruction, they perceive their faculty as being more invested in their learning and development, and they report being more academically motivated and engaged in their studies. Notably, students who enter college less academically prepared benefit more from exposure to clear and organized instruction.

These findings have important implications for the theoretical frameworks employed to understand how college affects students. While college impact frameworks encompass activities of both faculty and students (e.g., Astin 1993; Pascarella 1985), the inter-relationship of student and faculty behaviors, actions, and perceptions is rarely examined in depth. Most studies to date have focused on estimating net effects of a particular variable of interest (e.g., see extensive reviews in Pascarella and Terenzini 1991, 2005) without studying how different variables are related or how they combine together to influence student outcomes. In other words, empirical research in this tradition has often omitted an examination of the mechanisms that connect specific educational practices to student outcomes.

A lack of attention to mechanisms stems at least in part from the disconnect between the research on college impact and theories of learning. Studies of college impact are rarely integrated with studies of teaching and learning in higher education, even though many impacts of college refer to educational practices in the classroom (see a compelling discussion of this disconnect in Neumann 2014). Notable methodological and conceptual differences have created a schism between the two traditions.

Our results illustrate the value of combining insights from the two scholarly traditions. Theories of learning elucidate the mechanisms that link specific classroom practices to student performance. Integrating those mechanisms into studies of college impact can facilitate an examination of specific processes that relate students' experiences and outcomes. Faculty actions may lead to certain perceptions and behaviors among students, which in turn could enhance their academic outcomes. Understanding those mechanisms would provide a much more compelling account of the college impact on students.

Although our primary contribution is to the research on college impact, presented findings also offer valuable insights for the literature on teaching and learning. Since Barr and Tagg (1995) argued for a shift toward student-centered instruction, a burgeoning literature has examined how specific classroom practices affect student learning. This literature has considered a range of topics—from the use of innovative pedagogy to the nature of assignments and quality of feedback (Blaich et al. In Press; Wieman 2015; Smith et al. 2013). Most of the attention in this literature seems to be focused on structuring the learning environment, with less discussion being dedicated to the affective aspect of teaching and learning.

The results of this study indicate that students may look at the way that faculty structure the classroom environment to "read" the intentions of their faculty, and that the intentions they read subsequently influence their academic performance. Faculty who are improving their classes in a way that clearly signals their care and commitment to students may have greater impact than faculty who make changes in a way that may be technically proficient but does not signal their good intentions to students. Faculty who are not prepared for class, distribute poorly written and unclear syllabi or assignments, or who do not take the time to review course material can hinder student success both because they are exhibiting poor

teaching skills *and* because they are signaling that they do not care about their students. As Kirp (2014) noted, "The process of teaching and learning is an intimate act…," and our visible commitment to student learning, as reflected both in our affect and in how we teach our classes, counts.

Limitations and future directions

Although the WNS includes a large sample of students across a variety of four-year institutions in the USA, it is not a nationally representative sample. In particular, WNS oversamples liberal arts institutions, and the institutions in the sample tend to be more selective than the national average. The results thus cannot be generalized to higher education as a whole. Given that we find a negative interaction between clear and organized instruction and academic preparation, the results presented herein may underestimate the role of clear and organized instruction in enhancing student performance. Future studies with larger samples and a broader array of institutions are needed to evaluate the generalizability of the presented results.

The findings may also underestimate the importance of clear and organized instruction due to our measurement approach. This study is embedded in the research on college impact and thus conceptualizes clear and organized instruction as a good practice in undergraduate education and measures key constructs at the level of the student experience not the classroom. Clear and organized instruction in this study is thus a general representation of the courses students took, and their GPA is the overall GPA at the end of the first year. Since courses vary in the extent to which they employ clear and organized instruction, this measurement approach likely attenuates the effects of clear and organized instruction. If data were collected at a course level, we anticipate that the relationship would be substantially stronger. Future research, replicating these findings at the classroom level, would be particularly valuable in understanding the effects of clear and organized instruction and the mechanisms linking this educational practice to students' academic performance.

Our findings indicate that future research on good practices in higher education would be strengthened by considering insights from the literature on teaching and learning. Instead of only considering whether there is an effect of a specific practice, researchers would benefit from unearthing the mechanisms that relate those practices to student outcomes. The present study makes one step in that direction. Additional research in this vein can help to break down the silos between different scholarly traditions as well as provide more compelling explanations of how college affects students.

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