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Research Notes

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Psychosocial Classroom Environment and Academic Efficacy in Canadian High School Mathematics Classes

During the past three decades, independent research has been conducted in the fields of classroom psychosocial environment and academic self-efficacy. Both classroom environment and academic efficacy have been associated with cognitive and affective student outcomes (Bandura, 1997; Fraser, 1998a). However, as noted by Lorsbach and Jinks (1999), no research has investigated the possible link between psychosocial learning environments and student academic self-efficacy. This research note reports the results of a preliminary Canadian study of students' perceptions of classroom environment and academic efficacy that serves as a pilot for a wider cross-national investigation of the same issue.

Whereas classroom environment research focuses on the atmosphere, tone, or ambience of classrooms, usually from the students' perspective, academic efficacy research draws attention to the importance of fostering self-belief and self-regulatory capabilities in students (Pajares & Kranzler, 1995; Zimmerman, 1995). Although not explicitly recognized by efficacy theorists, some of these efficacy sources can be attributed hypothetically to the psychosocial learning environment that students experience in their schools and classrooms. It is plausible that learning environment contributes to academic efficacy. The present study makes two distinctive contributions to the field of learning environments. It was the first study to investigate the relationship between classroom environment and academic efficacy with a sample of Canadian high school mathematics students. In addition, by using scales from two well-established classroom environment instruments, it was possible to establish unique and joint contributions of each instrument in explaining academic efficacy.

Research Design and Context

The sample consisted of 951 (490 male, 461 female) students drawn from grade 8 and grade 10 classes in four Canadian high schools. Researchers in Australia and Asia have recently developed a classroom environment instrument called the *What Is Happening in This Classroom* questionnaire (WIHIC, Aldridge & Fraser, 2000; Fraser, 1998b). Although the WIHIC is comprehensive, it is not

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designed to assess constructivist classroom environments where students make sense of the world in relation to the knowledge that they have constructed. Another instrument, the Constructivist Learning Environment Survey (CLES, Fraser, 1998b; Taylor, Fraser, & Fisher, 1997) was developed to assist researchers to assess the constructivist dimensions of classrooms.

In the present study, seven scales from the WIHIC and three scales from the CLES were used. Scale selection was based on the descriptions of the scales provided by the developers. Table 1 shows these 10 six-item scales and their descriptions. Perceived academic efficacy refers to students' judgments of their ability to master the academic tasks that they are given in their classrooms. A 7-item scale using items developed by Midgley et al. (1997) in the United States was used to assess perceived academic competence in mathematics classwork.

Associations between environment dimensions and academic efficacy were investigated using simple and multiple correlation analyses. To examine the amount of variance in Academic Efficacy explained by the WIHIC and CLES scales used in the present study, a commonality analysis was conducted (Cooley & Lohnes, 1976; Goh & Fraser, 1998). Estimates of the internal consistency of the 10 classroom environment scales and the Academic Efficacy scale were calculated using Cronbach's Coefficient alpha. All scales had good internal consistency with coefficients ranging from .75 (Personal Relevance) to .90 (Shared Control) (M=.84, SD=.04).

Results

Separate simple and multiple correlation analyses were conducted on the data. All 10 simple correlations between the classroom environment scales and Academic Efficacy were statistically significant (p<.001). These correlations ranged from .10 for Shared Control with Academic Efficacy to .46 for Task Orientation with Academic Efficacy (M=.25, SD=.12). It is noteworthy that all these simple correlations were positive. Multiple correlation analyses were conducted. It was found that the 10 classroom environment scales accounted for 31.4% of variance in Academic Efficacy. Standardized regression coefficients for these analyses suggested that Task Orientation had the most potent effect on Academic Efficacy (β= 0.35). Consideration of the standard deviations for Task Orientation and Academic Efficacy scales (4.19 and 11.26 respectively) and the standardized regression coefficient indicated that a unit increase in Task Orientation would increase Academic Efficacy by 0.94 units, assuming no influence of Task Orientation on other predictor variables.

Results of the commonality analysis indicated that the three CLES scales accounted for a small amount of unique variance (2%) compared with the variance explained by the seven WIHIC scales (27%). The commonality, that portion of the variance that was shared by both instruments, was 3%. This analysis suggests that the three CLES scales did not contribute greatly to explaining variance in Academic Efficacy.

Concluding Remarks

Two important conclusions can be drawn from these findings. First, the study breaks new ground in that it shows that a number of important classroom environment dimensions are associated significantly with academic efficacy. For example, improved levels of Involvement, Investigation, and Task Orient-

Table 1
Descriptive Information for 10 Classroom Environment Scales

Scale Name	*Scale Description*	*Sample Item*
Student Cohesiveness	The extent to which students know, help, and are supportive of one another.	I know other students in this class.
Teacher Support	The extent to which the teacher helps, befriends, trusts, and is interested in students.	The teacher takes a personal interest in me.
Involvement	The extent to which students have attentive interest, participate in discussions, do additional work, and enjoy the class.	I explain my ideas to other students.
Investigation	The extent to which skills and processes of inquiry and their use in problem solving and investigation are emphasised.	I carry out investigations to test my ideas.
Task Orientation	The extent to which it is important to complete activities planned and to stay on the subject matter.	I pay attention in this class.
Cooperation	The extent to which students cooperate rather than compete with one another on learning tasks.	I work with other students in this class.
Equity	The extent to which students are treated equally by the teacher.	I am treated the same as other students in this class.
Personal Relevance	The extent to which school mathematics connects with students' out-of-school experiences.	I learn how mathematics can be part of my out-of school life.
Shared Control	The extent to which students are invited to share with the teacher control of the learning environment.	I help the teacher to decide which activities are best for me.
Student Negotiation	The extent to which opportunities exist for students to explain and justify to other students their newly developing ideas.	I talk to other students about how to solve problems.

ation were associated with higher levels of Academic Efficacy. Second, it is clear from the specific results of this study that scales of the WIHIC—a contemporary instrument designed for conventional classrooms—were better predictors of Academic Efficacy than the three CLES scales. That is, if academic efficacy is a desirable outcome, conventional classrooms rather than constructivist environments are a better option for teachers and students. Despite the conceptual distinctiveness of the classroom environment and academic self-efficacy fields, the practical relationship between these two fields is close. Cross-national research exploring this issue with a larger, more diverse sample is currently underway.

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