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ABSTRACT

To enhance understanding of classroom climate effects on language achievement at the elementary level, this exploratory study examined cross-level interaction effects between student characteristics and student achievement. A classroom climate scale, developed for this study, was administered to 942 students in 22 schools across Tennessee. Achievement and demographic data on each student also were obtained. A hierarchical model for total reading and total language achievement was developed. Significant relationships were found among climate measures and student achievement when analyses were conducted exclusively at an individual level and when conducted through hierarchical linear modeling. Results highlight the importance of including variance in classroom climate scale scores as variables in a hierarchical model of climate effects. Findings also revealed that classrooms are most effective in producing higher overall language arts and reading achievement when students are heterogeneous in prior achievement and report high mean levels of satisfaction, low levels of alienation, and high levels of consistency. (MM)

Relationships between Classroom Climate, Student Characteristics, and Language Achievement in the Elementary Classroom: An Exploratory Investigation

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Introduction

What is classroom climate? Classroom "climate" is typically conceptualized as a set of systemic entities whose presence and dimensionality may be inferred from students' and teachers' perceptions of psychosocial attributes of the classroom social system. Murray's (1938) need-press model, which describes behavior as a function of internal psychological needs and environmental "press," serves as the primary theoretical undergirding for classroom climate research. Climate (the social-psychological "press") is thought to influence individual behavior, esprit de corps, the meaningfulness of group and individual activities, interpersonal interactions, and the interpretation of events that transpire within the grouping context (Withall, 1949). Tagiuri (1968) defines organizational climate as a persisting quality of the internal environment that consists of several distinctive dimensions, including ecology (physical and material aspects), milieu (presence of persons and groups), social system (patterned relationships of persons and groups), and culture (belief systems, values, cognitive structures, and meaning). The representation of organizational climate as a systemic entity encompassing various dimensions was also espoused by Moos (1974), who proposed three dimensions of psychosocial climates: relationships, personal development, and system maintenance and change. Although the definition of climate is not uniformly agreed upon by climate researchers, climate researchers generally agree that it is a group phenomenon involving consensus in perception (Saldern, 1986).

Early work in classroom environment research used low-inference observational measures and interaction analysis systems to explain and predict variation in student outcomes, whereas classroom environment research since the mid-1960's has focused more on relationships between student outcomes and high-inference measures of classroom climate (Chavez, 1984). Several measures of student perceptions of classroom social environment have been constructed and used in research, including the Classroom Environment Index (CEI; Stern et al, 1975), the Classroom

Environment Scale (CES; Moos & Trickett, 1974), the Learning Environment Inventory (LEI; Fraser, Andersen, & Walberg, 1982), and the My Class Inventory (MCI; Fraser, Andersen, & Walberg, 1982). Each of these scales purportedly measures several distinctive dimensions of classroom climate. Chavez (1984) and Haertel, Walberg, & Haertel (1982) reviewed studies in which classroom environment scale scores on these and other similar instruments predicted significant amounts of variance in measures of student achievement, even after student background variables and prior achievement were taken into account.

Why study classroom climate? The study of classroom psychosocial environments has burgeoned in recent decades because climate measures have been shown to be sensitive with respect to educational outcomes and changes in curricula. Research on classroom environments in secondary classrooms has consistently demonstrated significant relationships between high-inference measures of students' perceptions of the psychosocial environment of the classroom and student affective and cognitive outcomes, but relatively few studies of climate using high-inference measures have been conducted at the elementary level. Walberg's (1972) study of classroom environment in American senior high school physics classes demonstrated the predictive validity of students' perceptions of class climate, as have several other studies conducted in different countries (Fraser, 1979; Hofstein, Gluzman, Ben-Zvi, & Samuel, 1979; Lawrenz, 1976; Walberg, Singh, & Rasher, 1977). Fraser and Fisher's (1983) study of 1,083 junior high students in 116 classrooms found support for the predictive validity of measures of classroom psychosocial climate, particularly for the dimensions of *Order* and *Organization*. Haertel, Walberg, & Haertel (1981) conducted a meta-analysis of 12 studies incorporating 17,805 students in 823 classrooms in four countries in order to determine the predictability of end-of-course cognitive, affective, and behavioral learning by such high-inference measures as the LEI, MCI, and CES. They found that several LEI subscales, including *Cohesiveness*, *Friction*, *Apathy*, *Task Difficulty*, and *Favoritism*, were significantly related to regression-adjusted gains, regardless of country or subject matter; that

correlations between LEI subscales and learning outcomes were higher at higher levels of data aggregation; and that the strength of the relationships was greater at higher grade levels. Haertel et al. (1981) speculate that the relative weakness of relationships between measures of classroom climate and achievement at lower grade levels is a function of a developmental increase in the ability to accurately rate climate dimensions.

Classroom climate research in elementary settings. Comparatively few studies of classroom climate using high-inference measures have been conducted at the elementary level (Fraser & O'Brien, 1985). Of the 734 correlations examined in the meta-analysis by Haertel et al. only 10 were derived from elementary grade level samples, and none of the correlations examined relationships between language achievement and classroom climate. Chavez reported that, even though a measure of classroom climate for use with elementary students had been around since 1969 (i.e., the My Class Inventory), "only a few studies have used the MCI," (Chavez, 1984).

While few studies have been done of climate effects in elementary classrooms, there is some indication in the research literature that there may be significant and substantial relationships between classroom climate and achievement in the elementary classroom. A recent study of these relationships in elementary classrooms was conducted by Fraser and O'Brien (1985), who found that several of the MCI subscales were significantly correlated with two measures of language achievement (word knowledge and comprehension). The Fraser and O'Brien study looked at simple correlations between mean climate measures and achievement, however, so it is not clear what relationship climate has to elementary students' language achievement gains, nor is it clear what student characteristics may mediate these potential relationships. Rakow, Butler, & Bing (1992) conducted a multilevel analysis of classroom climate effects upon mathematics achievement in fourth grade classrooms, and found that climate effects upon base achievement and cross-level interactions were evident for three

factor-based subscales of the Tennessee Classroom Climate Inventory.

Many previous studies have established classroom environment research as an active and potentially fruitful area of research, although there is a clear need to study climate at the elementary level, especially with regard to language achievement. In addition to addressing the need to extend the study of climate in the elementary classroom, this study seeks to address a common methodological problem from which most climate studies have suffered: "the unit of analysis problem". The unit of analysis problem in organizational climate research arises from two sources:

1. measures of climate are derived from individual scores, whereas systemic constructs are the theoretical entities of interest

2. traditional least-squares analyses are inappropriate for modeling hierarchical data

Recent developments in modeling hierarchical data (Raudenbush & Bryk, 1988) provide a potential solution to the statistical issues involved in organizational effects research, but the derivation of measures of systemic constructs from individual scale scores presents a dilemma for climate researchers: To what does one attribute within-class variation in individual scores and how should one handle this variation in statistical modeling of climate effects?

If climate measures are theoretically related to systemic entities and are not to be taken as "individual" measures, one may interpret individual variation on climate scale scores within a class as arising from two possible sources: the systemic entity being measured or imperfections in individual perceptions of the systemic entity. In order to be consistent with the notion that climate measures reflect characteristics of systemic entities, individual variation in students' climate scale scores was treated as a characteristic of the systemic entity for the purpose of this study. Thus, whereas the class mean score on climate scales represented the overall strength of expression of a given climate entity, the class

variance on the scale represented the degree to which consensus existed regarding the strength of expression of that entity.

Purpose of the study. The primary objective of this study was to enhance understanding of classroom climate effects at the elementary level regarding language achievement by examining cross-level interaction effects between classroom climate variables within-class relationships between student characteristics and student achievement. In order to accomplish this objective, the study was conducted in two phases:

1. development of classroom climate scales to be used with elementary students

2. utilization of these scales to examine relationships between classroom climate, student characteristics, and language achievement in elementary classrooms.

Phase 1: Elementary Classroom Climate Scale Development

The elementary form of the Tennessee Classroom Climate Inventory (TCCI; Butler & Alberg, 1989) was administered to 441 fourth-graders in 17 rural Tennessee schools in 1990. Approximately 10% of the subjects were members of a minority ethnic group and 56% of the subjects were female. The TCCI contains 44 items that reflect 11 dimensions of classroom climate as measured on the various climate instruments (i.e., MCI, ICEQ, CES) and was developed on the basis of an extensive review of the classroom climate literature (Butler & Alberg, 1989). Student responses were subjected to a principal components factor analysis; visual inspection of the eigenvalues associated with extracted factors suggested that a four-factor solution accounting for 33.3% of item variance was appropriate. An oblique rotation of the four-factor solution yielded three interpretable factors: *Satisfaction*, *Alienation*, and *Consistency*. Factor analysis was utilized as a means of grouping items, but items were retained on each scale only if they were

semantically consistent with the majority of items that loaded on a given factor.

Consistency represents the degree to which students perceive that social interactions and teacher feedback in the classroom are organized and consistent with students' expectations. This dimension seems to be related to Moos' (1974) System Maintenance and Change dimension of social climate. System Maintenance and Change is defined by Moos as

> the extent to which the environment is clear in its expectations, is orderly, maintains control over individuals, and is responsive to change. This category includes such things as clear sets of rules, students knowing . . . consequences, teacher consistency in dealing with infractions, [and] emphasis on behaving in an orderly . . . manner (Moos, 1974).

The wording of the items on the Consistency factor clearly indicate a relationship with Moos' System Maintenance and Change, for example:

"Rules in this class are the same for all students at all times."
"Tests and quizzes are based upon materials discussed in class."
"Activities in this class are well-organized."
"Students know the purpose of the classwork."
"Books and materials students need are available."
"Grades for student work are fair."

Satisfaction assesses students' affective evaluation of their involvement with the classroom social organization. Typical items loading on this factor were:

"Students' are proud of the work done in this class."
"Students look forward to coming to this class."
"Students enjoy the class."
"Students like to have visitors in this class."
"Everyone has a chance to do well in this class."
"Work from this class is put up for others to see."
"Students learn a lot in this class."

Alienation represents the degree to which students perceive that the classroom social environment is threatening, differentiating, and antagonistic. Typical items loading on this factor were:

"Students are treated differently because of their family, friends, race, or sex."
"Certain students are the favorites in this class."
"When parents are contacted about students in this class, it is about a problem."
"The way some students behave keeps others from learning."
"Things are said to students in front of other people that make them feel bad."
"Students in this class often feel like giving up."
"Some students feel left out or ignored."

Class climate scales as predictors of language achievement scores. In order to assess the predictive validity of the scales developed through the factor analysis, students' 1990 Tennessee Comprehensive Assessment Program (TCAP) Total Language normal curve equivalent scores were regressed in stepwise fashion on student minority status, sex, and individual score on each climate scale. Minority Status, Consistency, Alienation, and Satisfaction were retained in the final regression equation, which accounted for approximately 19% of the variance in Total Language scores (see Table 1). Minority Status and Alienation were negatively related to language achievement, whereas Satisfaction and Consistency were positively related to language achievement. The standardized regression coefficient associated with each climate score was larger than that associated with student's minority status or sex (see Table 1). The results of this preliminary analysis suggested that the climate scales derived through factor analysis might be useful predictors of fourth-graders' language achievement scores. The results are merely suggestive, however, given the exploratory nature of the analysis. It should also be noted that this preliminary analysis was atheoretical in the sense that it was conducted at the individual level, when the theoretical relationships of interest were hierarchical.

Table 1
Climate Scale Scores as Predictors of Language Achievement: Final Regression Statistics

Variable	B	S.E. B	Beta	t	t-prob.
Min. Status	-10.97	2.95	-.17	-3.71	.0002
Consistency	4.91	.88	.25	5.58	.0000
Alienation	-5.52	.99	-.25	5.59	.0000
Satisfaction	4.24	.97	.19	4.39	.0000
(Intercept)	58.36	1.04		56.05	.0000

n = 441. R-squared (adj) = .19.

Phase 2: Exploratory development of a hierarchical linear model

Methodology

Sample. The sample used to develop a hierarchical model of climate effects upon elementary students' language and reading achievement consisted of 942 students in 46 classrooms in 22 schools geographically dispersed across the state of Tennessee. Of the 942 students in the sample, approximately 48% were female, 24% were non-Caucasian (97% of these were African-American), and 23% were Chapter 1 eligible.

Instrumentation. The Tennessee Classroom Climate Inventory (Butler & Alberg, 1989) was administered to each student. Achievement and demographic data on each student were obtained from the Tennessee State Department of Education. Data selected for analysis included students' demographic information (sex, minority status, and Chapter 1 status) and their 1990 and 1991 normal curve equivalent scores for Total Reading (Vocabulary and Comprehension subtests) and Total Language (Mechanics and Expression subtests) on the Tennessee Comprehensive Assessment Program (TCAP) achievement test battery.

Data sets. Hierarchical linear modeling requires two data sets: one "individual"-level data set, and a "group"-level data set. The individual-level data set included dummy-coded variables to indicate student gender (0=male, 1=female), minority status (0=Caucasian, 1=minority), and Chapter 1 status (0=non-eligible, 1=eligible), as well as 1990 and 1991 TCAP Total Reading and Total Language normal curve equivalent scores. The data set for classes ("groups") included classroom means and variances for the Consistency, Satisfaction, and Alienation classroom climate scales, and means and standard deviations for 1990 TCAP Total Reading and Total Language N.C.E.'s.

Preliminary analysis. The results of preliminary analyses were used to specify an initial model to utilize in developing an exploratory empirical model of relationships between climate variables and language achievement. These preliminary analyses included computation of mean univariate regression coefficients and parameter reliability estimates across classes for pretest and demographic variables, as well as correlation matrices among group variables, univariate regression coefficients, and group variables with univariate regression coefficients.

Hierarchical model development. A separate hierarchical model was developed for Total Reading and Total Language achievement in the following manner:

1. After examining the results of the preliminary analyses, within-class (individual-level) variables were initially chosen if:

   a. their inclusion did not result in a substantial reduction in group n due to lack of variance (e.g., classes composed of 0% or 100% minority or Chapter 1 eligible students).

   b. they had potentially significant relationships with the outcome variable.

2. Within-class regression coefficients were modeled as randomly varying between classes if:

a. preliminary analysis suggested that sufficient parameter reliability and variability existed.

b. exploratory analyses suggested a significant relationship between parameter variability and a class-level variable.

The final model was developed through iterative model respecification: models were respecified until either no significant parameter variance remained or no group-level variables were significantly predictive of variance in the Empirical Bayes (EB) residuals obtained.

Results

Results: Total Language Model

Preliminary analyses. Preliminary analyses of the data using 1991 Total Language scores as the outcome variable suggested that mean posttest and the pretest-posttest slope had sufficient parameter reliability (i.e., rel. > .05) to be modeled as random parameters in a hierarchical linear model (see Table 2). Minority status and Chapter 1 status were not incorporated intc the model because their inclusion would have resulted in a substantial drop in the number of groups that could be included in the model (see Table 2). Sex was included in the model because subsequent analyses suggested that sufficient parameter reliability was present, and because the slope associated with sex was significantly correlated (r=-.26) with variance in Consistency scores at the class level (see Table 3). In the initial model, means were modeled as a function of variance in Alienation, sex slope as a function of variance in Consistency, and pretest Language score slope as a function of mean Alienation score.

Table 2
Univariate Regression Statistics: Total Language Scores

Variable	Mean Regr. Coeff.	Reliability	Chi-square	K
Means	52.37	.81	250.88	46
Sex	-1.51	.....	42.58	46
Minority Status	-7.30	.....	38.78	36
Chapter 1 Status	-11.02	.29	46.76	29
Language Pretest	.68	.46	77.20	46

Note: Reliability estimates represent the proportion of variance in the coefficient attributable to parameter (as opposed to sampling) variance. Blanks indicate that the reliability estimate could not be calculated.

The final model arrived at through iterative model respecification took the following form: means were modeled on Alienation variance, sex slope on Consistency variance, and pretest Language score slope on mean Consistency and mean pretest Total Language score (see Table 4). Variance in Alienation scores was positively related to mean achievement (gamma=1.26, t-prob.=.025), variance in Consistency was negatively related to slope for sex (gamma=-1.27, t-prob.=.001), mean Consistency was negatively related to Language pretest slope (gamma=-.03, t-prob.=.017), and mean Language pretest was marginally positively related to Language pretest slope (gamma=.02, t-prob.=.058) (see Table 4).

Table 3

Correlations between Class-level Variables and Univariate Regression Coefficients (Total Language Scores)

	Means	Sex	Minority	Chapt. 1	PreLang
Satis. Mean	.02	.08	.27[a]	-.29[a]	.04
Satis. Var.	-.16	-.03	-.04	.19	-.09
Consist. Mean	.01	.06	.07	.12	-.12
Consist. Var.	-.14	-.26[a]	-.11	.20	-.02
Alien. Mean	.19	.12	.14	.31[a]	-.19
Alien. Var.	.31[a]	.01	.12	-.27[a]	.02
PreLang Mean	-.06	-.14	-.21	-.05	.06
PreLang S.D.	-.13	-.10	-.34[a]	-.07	.04

K = 46.

[a]Significant at $p < .05$.

Table 4

Gamma Coefficients for Final Model: Language Achievement

	Gamma	S.E.	t-statistic	prob. t
Means (Base)	45.92	3.08	14.91	.000
Alien.Var.	1.26	.52	2.41	.025
Sex Slope (Base)	.25	1.72	.15	.392
Consist.Var.	-1.27	.35	-3.59	.001
PreLang Slope (Base)	.76	.07	10.22	.000
Consist. Mean	-.03	.01	-2.58	.017
PreLang Mean	.02	.01	1.99	.058

K=46.

Note: Significant parameter variance remained for means (Base), but not for PreLanguage Slope or Sex Slope. Reliability estimates were: .88 for means, .08 for Sex Slope, and .19 for PreLanguage Slope.

Results: Total Reading Model

The hierarchical model for Total Reading scores was developed in the same way as the model for Total Language. On the basis of the preliminary analysis, posttest means, sex slope, and pretest reading slope were modeled as random parameters (see Table 5). The group-level variables that were significantly correlated with univariate regression coefficients were used in the initial model specification: pretest Reading slope was modeled using mean Satisfaction (r=.38), Satisfaction variance (r=-.25), and Consistency variance (r=-.37) (see Table 6). The final model derived through iterative respecification used pretest Reading standard deviation to model mean posttest, pretest Reading mean to model sex slope, and Consistency mean and variance to model pretest Reading slope (see Table 7). Pretest Reading standard deviation was positively related to posttest means (gamma=.22, t-prob.=.012), and Consistency mean and variance were both negatively related to pretest Reading slope (gamma=-.026, t-prob.=.05 and gamma=-.029, t-prob.=.02, respectively) (see Table 7).

Table 5
Univariate Regression Statistics: Total Reading Scores

Variable	Mean Regr. Coeff.	Reliability	Chi-square	K
Means	55.05	.78	236.52	46
Sex	.82	.....	38.84	46
Minority Status	-8.64	.....	30.22	36
Chapter 1 Status	-11.28	.25	44.31	29
Reading Pretest	.71	.51	87.41	46

Note: Reliability estimates represent the proportion of variance in the coefficient potentially attributable to parameter variance. Blanks indicate that the reliability estimate could not be calculated.

Table 6
Correlations between Class-level Variables and Univariate Regression Coefficients (Total Reading Scores)

	Means	Sex	Minority	Chapt. 1	PreRead
Satis. Mean	-.12	.22	.14	-.25[a]	.38[a]
Satis. Var.	-.02	-.11	-.07	.11	-.25[a]
Consist. Mean	-.14	.20	-.01	.10	-.24[a]
Consist. Var.	.08	.03	.25[a]	.27[a]	-.37[a]
Alien. Mean	-.19	.18	.29[a]	.18	-.07
Alien. Var.	.02	-.01	.00	-.20	.09
PreRead Mean	-.22	-.20	.00	.05	-.14
PreRead S.D.	.04	-.12	-.23	-.12	.05

K = 46.
[a]Significant at $p < .05$.

Table 7
Gamma Coefficients for Final Model: Reading Achievement

	Gamma	S.E.	t-statistic	prob. t
Means (Base)	44.06	4.10	10.75	.000
PreRead S.D.	.22	.08	2.74	.012
Sex Slope (Base)	-2.21	1.79	-1.23	.185
PreRead Mean	.09	.06	1.52	.125
PreRead Slope (Base)	.92	.08	11.33	.000
Consist. Mean	-.03	.01	-2.07	.050
Consist. Var.	-.03	.01	-2.50	.020

K=46.
Note: Significant parameter variance remained for means and PreReading Slope, but not for Sex Slope. Parameter reliability estimates were: .86 for means, .06 for Sex Slope, and .30 for PreReading Slope.

Discussion

Implications for classroom climate research

Several significant findings from this exploratory study suggest that classroom climate measures may be useful predictors of elementary students' language achievement, as well as relationships between students' entering ability and posttest language achievement. Significant relationships were found among climate measures and student achievement when analyses were conducted exclusively at an individual level (i.e., the regression analysis) and when conducted through hierarchical linear modeling. The hierarchical approach should be the method of choice when studying climate-achievement relationships, however, given that organizational climate theory is concerned with predicting organizational (group-level) effects upon individual behavior.

The results also highlight the importance of including variance in climate scale scores as variables in a hierarchical model of climate effects for both empirical and theoretical reasons: empirically, this study has shown that variances in climate scale scores are predictive of adjusted posttest means and the relationship between pretest and posttest language achievement. Theoretically, variances should be considered to be important measures of climate dimensions because they represent the degree of consensus that exists with regard to the organizational expression of particular systemic entities.

Finally, the results of this study argue against they hypothesis advanced by Haertel et al. (1981) that elementary students' perceptions of psychosocial dimensions of the classroom environment are not predictive of achievement due to the students' developmental level. An alternative explanation is that classroom climate research conducted prior to 1981 utilized inappropriate methodology to examine climate effects, and that the scales utilized in most climate research involving elementary students have used scales that were adaptations of climate researchers' a priori operationalizations of classroom climate in secondary classrooms, rather than scales developed specifically for use with elementary students.

Educational implications

The results of this study suggest that elementary teachers should be cognizant of the influential role that students' psychosocial perceptions of the classroom social environment may play in the educational process. Of particular concern are climate dimensions that are related to differential rates of educational progress between students that vary with respect to uncontrollable demographic characteristics. Teachers should work to achieve an environment that maximizes the distribution of educational benefits to the class as a whole without exacerbating achievement differences between students based upon their sex, race, entering ability level, or socioeconomic status. Findings from this exploratory analysis suggest ways in which specific dimensions of climate interact with these characteristics of individual students and their achievement in language arts and reading. In the following discussion, correlations

between means and variances for each scale with univariate regression coefficients are discussed along with the results of the hierarchical linear modeling analysis.

Alienation. Mean Alienation score was significantly positively correlated with the univariate regression coefficients for Chapter 1 status (r=.31; [Language]) and minority status (r=.29; [Reading]), indicating that the negative effects (i.e., negative regression coefficients) on achievement associated with Chapter 1 and minority status are exacerbated in classrooms that students perceive to be high in Alienation. Interestingly, variance in Alienation scores within a class was positively associated with mean posttest (r=.31; [Language]) scores, and negatively related to the coefficient associated with Chapter 1 status (r=-.27; [Language]). In the hierarchical model, variance in Alienation was the only classroom climate variable that predicted significant variance in adjusted posttest means. Most of the relationships between Alienation means and variances and within-class univariate regression coefficients were found when analyzing Language, rather than Reading scores. It appears that classrooms high in Alienation are likely to have a less favorable impact upon the learning of the formal syntactic elements of language (as represented by the Mechanics and Expression subtests of the Total Language battery), and may exacerbate differences between African-American and Caucasian students with respect to more holistic measures of language arts achievement (Total Reading). Rakow et al. (1992), in a multilevel analysis of climate effects upon mathematics achievement, also found that Alienation scores on the TCCI were "positively related to the differentiating effect of race on achievement" (Rakow et al. referred to the Alienation scale as *Class Tension*; the items on each scale are identical).

Satisfaction. Mean Satisfaction was positively correlated with the univariate regression coefficient associated with minority status (r=.27; [Language]) and pretest (r=.38; [Reading]), and was negatively associated with the coefficients for Chapter 1 status (r=-.29; [Language], r=-.25; [Reading]). Thus, classes high in Satisfaction exhibited an attenuation of the relationship between

Chapter 1 status and posttest achievement, but were associated with an increase in the pretest and minority status coefficients. Rakow et al., Butler, & Bing (1992) also found that "higher levels of student satisfaction were associated with smaller differences in achievement between students of higher SES and lower SES students." However, in a study utilizing the My Class Inventory, Chavez and Cardenas (1980) found that high levels of satisfaction were associated with higher achievement levels in language arts and reading for Chicano students: "Chicano students needed to perceive twice the amount of satisfaction to experience the same achievement level in reading . . . as non-Chicanos." Thus, the relationship between classroom satisfaction and minority student achievement remains ambiguous.

Consistency. Mean Consistency was negatively correlated with the slope for reading pretest (r=-.24), a result which suggests that classes higher in consistency were associated with more equitable gains between students at different levels of prior achievement. This finding was corroborated in the multilevel analysis, in which mean Consistency was negatively related to reading pretest slope. When less consensus existed regarding consistency, the negative effects of race and socioeconomic status upon reading achievement were higher (i.e., variance in Consistency scores was positively related to the slopes associated with race [r=.25] and Chapter 1 status [r=.27]).

Other effects. Significant cross-level interactions associated with classroom means and standard deviations on achievement pretest scores were observed. Language pretest standard deviation was negatively correlated (r=-.34) with the minority status slope, indicating that minority students fared better in classes that were heterogeneous with respect to prior achievement. For reading achievement, larger pretest standard deviations were associated with higher posttest achievement. Pretest scores were more predictive of posttest achievement in classes with relatively high mean prior achievement.

Conclusions

The results of this study illustrate the importance of classroom climate dimensions in the elementary classroom as mediators or covariates of within-class relationships between student

characteristics and language arts and reading achievement. According to these findings, classrooms that are the most effective in terms of producing higher overall mean language arts and reading achievement while reducing the differentiating effects of sex, race, socioeconomic status, and prior achievement have the following characteristics:

1. Students are heterogeneous in prior achievement.
2. Students report high mean levels of satisfaction (although the relationship between satisfaction and minority students' achievement is ambiguous).
3. Students report low levels of alienation.
4. Students report high mean levels of consistency.
5. Students are less consensual on the level of alienation, and more consensual on the level of consistency.

More research is needed in this area to determine specific characteristics of classrooms that are associated with both between-class and within-class variation in students' perceptions of these classroom climate dimensions so that teachers, teacher educators, and educational policy makers can work to create learning environments that maximize student achievement at the class level in an equitable manner.

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