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Collective Climate: Agreement as a Basis for Defining Aggregate Climates in Organizations[1]

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Agreement of psychological climate perceptions is proposed as a basis for a composition theory of aggregate climate. Climates based on agreement, termed "collective climates," are shown to meet several requirements for construct validity including internal consistency, discrimination, and predictable relationship to relevant criteria. Personal and setting characteristics related to membership in collective climates are determined.

Researchers have come to partial agreement concerning the meaning of organizational climate. At the individual level, climate has been defined as a summary perception of the organization's work environment that is descriptive rather than evaluative in nature (Gavin & Howe, 1975; James & Jones, 1974; Joyce & Slocum, 1979, 1982; Payne, Fineman, & Wall, 1978; Schneider, 1975; Woodman & King, 1978). There is less agreement concerning whether these individual perceptions may be aggregated to represent the climate of a group or larger unit of analysis. Studies of aggregate climates have examined climates based on membership in formal organizational units (Drexler, 1977; Gavin, 1975; Gavin & Kelley, 1978; Howe, 1977; Jones & James, 1979; Newman, 1975), hierarchical position (Schneider & Snyder, 1975), and demographics (Schneider, 1975). No basis for aggregation has been consistently supported (James, 1982; Schneider & Reichers, 1983). Further research is necessary because of the presumed relationships between aggregate climates and organizational, subunit, and individual performance (Field & Abelson, 1982; Jones & James, 1979).

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The purpose of this study was to research the validity of aggregate climates based on agreement of individuals' psychological climate scores. James has convincingly argued that although the relevant unit of analysis for a theory of climate is the individual, "aggregate climate perceptions may provide a powerful explanatory and predictive tool" (1982, p. 221). The usefulness of an aggregate climate concept is that it allows the description of organizational settings in psychological terms, yielding "an understanding of how individuals in general impute meaning to environments, and especially, how individuals will respond to environments" (1982, p. 220). Obtaining these benefits requires that agreement among individuals' climate perceptions be demonstrated *prior* to aggregation to a macro level of analysis (James, 1982; Roberts, Hulin, & Rousseau, 1978). Climates based on perceptional agreement will be termed *collective* climates here to make clear that they refer to aggregate climates that do not necessarily overlap formal organizational units, divisions, or work groups.

Review of Aggregate Climate Research

A considerable amount of research has addressed the validity of various types of aggregate climates. A number of methodological criteria have been employed including: (1) discrimination, or demonstrable differences between mean perceptions between climates (Drexler, 1977; Howe, 1977; Newman, 1975); (2) predictable relationships to organizational or individual criteria (Pritchard & Karasick, 1973); and (3) internal consistency, or agreement in perceptions within aggregate climates (Howe, 1977). It is important to note that this third criterion has not been used as a *basis* for pooling psychological climate scores to form a measure of aggregate cimate. Aggregate climates have been formed on other bases, such as work group membership, and only then were examined to see if these climates were internally consistent. As long as climates are based upon such a priori groupings, the question of the reliability of the climates must be addressed prior to any speculation concerning relationships between climate and various criteria. Jones and James note that methodological limitations suggest that judgments concerning the validity of a particular aggregate climate concept "should rest on more than one" of the criteria (1979, p. 208). Logically, all three must be satisfied to provide consistent indication of construct validity. Representative studies of aggregate climates therefore may be conveniently grouped into those using one, two, or all three of the above criteria.

When only one criterion has been used, it often has been discrimination. Drexler (1977) utilized a composite climate measured from the *Survey of Organizations* (Taylor & Bowens, 1972) to study discrimination in climate perceptions among 21 organizations and 1,256 groups. Drexler found significant differences among the 21 organizational climates, as well as among subunit climates based on membership in functional specialties. Drexler's study supported the validity of *organization* climate with respect to criteria for discrimination. It is possible, however, that Drexler's results are overstated as a result of aggregation bias (James, 1982).

Most studies of aggregate climates have used two criteria in assessing validity, but these criteria have varied. A range of such studies is represented by work done by Pritchard and Karasick (1973) and Howe (1977). Pritchard and Karasick utilized criteria of discrimination and relationship to performance in a study of a national franchising chain. They aggregated individuals' climate scores by sales region, and then correlated these scores with measures of the region's economic performance. Aggregate climate scores also were contrasted for two organizations determined to have different climates by an independent team of psychologists. Results supported the use of aggregate climates based on *sales region*.

Howe (1977) researched work group climates by examining the independent contributions of subject and group effects to explained variance in climate perceptions. Using a randomized block analysis of variance design, he directly assessed the construct validity of group climate in terms of both internal consistency and discrimination. He examined 16 dimensions of climate. Significant subject effects were found for most dimensions, indicating little consensus concerning climate perceptions within groups. Significant group effects were found for only 5 of the 16 dimensions. The proportion of variance explained by groups never exceeded 13 percent. These results do not support use of the formal *work group* as a basis for aggregating individual climate scores. Unfortunately, Howe might have confounded within-group agreement stability over time to obtain an error term for significance tests.

Jones and James (1979) report one of the few studies using all three of the above criteria. They computed mean climate scores within divisions performing a variety of tasks aboard 20 U.S. Navy ships operating in the North Atlantic and Pacific. A total of 233 divisions were studied. Their results indicated that aggregate climates based on *divisions* met all three criteria for aggregation previously discussed; those based on ship and/department (propulsion, boiler, electrical, etc.) did not. Patterns of climate dimensions among divisions were systematically and predictably related to satisfaction and performance.

Some general remarks may be made about these representative studies. First, some researchers have relied on only one of the three criteria described above. Others have utilized some combination of two of the three. In either case, the resulting evidence concerning the validity of an aggregate climate concept must be inconclusive. If each criterion is important, then logically all three must obtain to provide consistent evidence of validity.

Second, most researchers have relied on some form of discrimination test. This generally has produced positive results. Fewer studies have shown validity with respect to two or more criteria in combination. Only Jones and James (1979) have shown validity with respect to all three. These disappointing and inconclusive results may be attributed to the hypothesis testing approach being used to research aggregate climates. Hypothesis testing approaches postulate homogeneity of psychological climate perceptions for various social aggregates, and then test for differences in mean climate perceptions among these groups. The success of this method depends on the researcher's ability to hypothesize a priori units of the organization within which agreement of climate perceptions are likely. The researcher then still must empirically demonstrate this agreement to provide evidence justifying aggregation (James, 1982). Furthermore, such an approach jeopardizes the possibilities of finding predictable relationships to external criteria. If the hypothesized climates are not internally consistent when such scores are "averaged within a work group and then correlated across work groups, a high correlation cannot be established because the averages have little or no reliability" (Schneider, 1975, p. 468).

Aggregate climates also could be researched as a problem in numerical taxonomic methods. Unlike hypothesis testing approaches, numerical taxonomic methods first would search for similarities in climate perceptions, and then examine discrimination and relationship criteria. Climates would be based on agreement in perceptions. This would maximize the probability that climates meet criteria of discrimination. As similarity within climates is maximized, similarity among them is minimized. By using agreement rather than some other hypothesized basis for aggregation, one obtains climates that automatically meet criteria of consistency and discrimination. The efficiency and statistical advantages of this procedure are well documented in the literature on numerical taxonomy (Anderberg, 1973). If these climates can be shown to affect important organizational criteria, and their origin can be discovered in individual and organizational factors, preliminary evidence of the usefulness of aggregate climates based on agreement will have been provided.

Aggregate climates based on agreement of psychological climate perceptions are labeled collective climates, a term intended to indicate that these climates do not place any restrictions on the concept beyond the three criteria for aggregation previously discussed. The rule for collecting is agreement on psychological climate perceptions. No other restrictions are required. Because any valid aggregate climate must meet the minimum criteria of internal consistency, discrimination, and relationship to relevant work outcomes, collective climate is the least constrained concept of aggregate climate possible. It does not assume a particular basis for aggregation, such as work groups, regions, or divisions.

Defining aggregate climate on the basis of agreement has a number of theoretical as well as methodological advantages. Collective climates identify individuals for whom the situation has common stimulus value (Pearlman, 1980). This is not necessarily accomplished by a priori groupings based on formal organizational groups. These groupings neglect the possibility that individuals within the same group perceive the work situation differently because of differences in the nature of their specific jobs, differences in leader-subordinate dyadic interactions, and other factors, such as position in the group (deviant, isolate, etc.). This is important because one would expect individuals who perceive their work environment similarly to behave similarly. Stern, Stein, and Bloom propose that agreement in climate perceptions is important "insofar as attempts to identify individuals who will exhibit similar qualities of performance is simplified by considering subjects for whom the press [situation] has similar stimulus value" (1956, p. 37).

The theoretical importance of agreement for studying aggregate climate has been supported by every major review of the climate literature. James and Jones concluded that there "appear to be other types of situational influences which might be appropriately considered organizational climate and which go beyond known situational characteristics. One example. . . is the role of consensus of perceptions of the environment" (1974, p. 1109). Hellriegel and Slocum suggested that a parsimonious way of assessing aggregate climate would be to "determine the degree of congruence between climate perceptions" (1974, p. 276). Payne, Fineman, and Wall argue that "many studies of organizational climate lack validity since they do not show an adequate consensus by which measures could be said to validly describe organizations" (1976, p. 49). Finally, Schneider writes that the "problem of inter-rater agreement on climate perceptions must be addressed" (1975, p. 468).

This research studies aggregate climates defined by agreement in psychological climate perceptions. The concept of collective climates and the statistical techniques utilized to identify them maximize the probability that criteria of internal consistency and discrimination will be met. The specific criteria studied in this research are job performance and satisfaction. These criteria were chosen because of their general importance as work outcomes. Because of the exploratory nature of the collective climates concept, specific relationships among collective climates, job performance, and facets of job satisfaction are not hypothesized. These relationships are the subject of additional analyses. The general propositions are:

P1: Membership in climates formed on the basis of similarities in perceptions (collective climates) will be significantly related to measures of individuals' job performances.

P2: Membership in collective climates will be significantly related to individuals' job satisfactions.

Underlying these propositions is the idea that collective climate may reflect common patterns of assigning psychological meaning to an environment. Collective climates may reflect similarities in cognitive disposition, structuring redefinition or selective attention, as well as similar situational stimuli. Relationships with job satisfaction and performance would be expected as a result of consistency among cognition (perception), affect, and behavior.

Method

Sample

Data for this study were collected within three plants operated by a heavy duty truck manufacturer. The plants were located in close physical proximity to one another in the northeastern United States. The respondents were 220 first-line foremen. Participation in the study was voluntary, and the sample represented 81 percent of the foremen employed at the three plants. The overall response rate was in excess of 90 percent; however, approximately 9 percent of the returned questionnaires were eliminated on the basis of partial or unusable responses, yielding the final sample of 178.

The respondents had been with the company for an average of 11 years and had occupied the position of foreman for an average of 4.3 years. Over 50 percent of the sample had completed at least two years of college, and all of the subjects were male.

The distribution of foremen among functions within the three plants was as follows. Plant 1 employed 32 foremen. Of these, 27 supervised the assembly of truck axles; the remaining 5 foremen supervised maintenance operations. Plant 2 employed 32 foremen: 18 were in sheet metal fabrication; 5 in the wheel and axle machine shop; 4 in fire engine body fabrication; and 5 in production control. The remaining 116 foremen were from the third plant. This is the largest plant at the facility and is responsible for the actual assembly of complete trucks. The foremen were distributed as follows: heavy chassis production line, 12; light chassis production, 18; frame assembly, 18; can construction, 13; final assembly, 16; and production control, 49.

Measurement of the Variables

The majority of the data for this study were collected using questionnaires. The measures were administered by the researchers on company premises during working hours, in groups ranging in size from 15 to 40 members. The questionnaires required approximately 30 minutes to complete. Each foreman was asked to sign the questionnaire for research identification purposes.

Performance. Each foreman's job performance was rated by his supervisor on 15 performance dimensions (e.g., knowledge of job, quality mindedness, communicates effectively, recognizes work priorities). The measure was developed by the host organization and normally was used for basic personnel functions—promotions, merit adjustment, job changes. This rating was conducted expressly for use by the researchers and was not to be used for normal company purposes. The measures therefore should avoid sources of possible rater bias (halo, leniency) affecting measures of performance when these are used for personnel decisions (Guion, 1965).

Raw scores on each dimension were standardized, based on the mean and the variance for that dimension of the population of foremen and converted to percentile scores. Because these scores were highly intercorrelated, total performance scores were obtained by summing across all 15 items as recommended by Nunnally (1978). This yielded a normally distributed performance index that theoretically could range from 0 to 1500. The mean performance score in this sample was 757, with a standard deviation of 205. The internal consistency reliability of this index was $\alpha = .96$.

Job Satisfaction. Job satisfaction was measured using scales from the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969). Schneider and Snyder (1975) noted that Smith et al. (1969) mixed descriptive and evaluative items in developing the work satisfaction scales for the JDI. Smith, Smith, and Rollo (1974) refactored the JDI work scale and reported loadings on both descriptive and evaluative factors. Because climate and satisfaction often are distinguished along precisely these dimensions (Hellriegel & Slocum, 1974; James & Jones, 1974), the possibility exists that previous climate researchers employing the JDI may inadvertently have analyzed relationships among alternative climate measures. To avoid such confounding, the work scale was factor analyzed using a principal components analysis with varimax rotation to determine if a dual factor structure existed. Two factors were obtained. These corresponded to the descriptive and evaluative dimensions found by Smith et al. (1974). Only the evaluative scale was analyzed in this research. The internal consistency reliability for this scale was $\alpha=.87$. The dual factor structure obtained for the work scale is confined to that scale only. The other scales from the JDI used in this research were satisfaction with pay, promotion, supervisors, and co-workers. The internal consistency reliabilities of these scales ranged from $\alpha=.73$ to $\alpha=.86$.

Climate. Dimensions of climate were measured using scales developed by Campbell and Pritchard (1969) and reported in research by Pritchard and Karasick (1973) and Abbey and Dickson (1983). Subjects were asked to describe, not evaluate, the climate within their respective plants. This process was intended to maximize the respondent's use of actual experiences as a basis for describing a climate. Items forming 10 a priori scales were selected on the basis of theoretical relevance and the previous experience of other researchers using this instrument. These scales were: autonomy, social relations, level of rewards, performance-reward dependency, motivation to produce, status polarization, flexibility-innovation, supportiveness, decision centralization, and structure.

A series of analyses assessed the psychometric properties of these scales. First, the scales were factor analyzed using the principal factor method (Harman, 1967). A 6-factor orthogonal solution was selected as most interpretable, and it explained 68 percent of the common variance. The items from the a priori scales that loaded on these factors subsequently were refactored to confirm the obtained structure. The reduced variable set exactly reproduced the 6-factor solution. Climate scores were calculated by summing scores of items loading on the six respective factors. The internal consistency reliability of each scale was assessed using coefficient alpha. Similar reliabilities have been reported by Abbey and Dickson (1983). The final dimensions, numbers of items comprising each scale, and associated internal consistency reliabilities are:

1. Rewards (7 items, $\alpha=.82$): the extent to which adequate rewards are available within the organization and are contingent on performance.
2. Autonomy (2 items, $\alpha=.70$): the extent to which employees are allowed to plan and schedule their work as they choose, as determined by rules and regulations and the actions of co-workers.

3. Motivation to achieve (3 items, $\alpha=.59$): the degree to which members of the organization are viewed as attempting to excel, to address difficult problems, or to advance themselves.
4. Management insensitivity (3 items, $\alpha=.56$): the extent to which foremen's superiors actively direct or intervene in the activities of their subordinates.
5. Closeness of supervision (3 items, $\alpha=.56$): the extent to which foremen's superiors actively direct or intervene in the activities of their subordinates.
6. Peer relations (3 items, $\alpha=.53$): the degree to which supervisors at equivalent organizational levels maintain warm and friendly relations.

Coefficient alpha is a lower bound estimate of internal consistency reliability that increases monotonically with the number of items comprising a scale. When the number of items is small, the mean interitem correlations provide a better indication of internal consistency. Nunnally (1978) recommends that these levels should exceed .25. All mean interitem correlations for these climate scales exceeded Nunnally's criterion.

Formation of Collective Climates

Collective climates were identified using a series of analyses that clustered individuals on the basis of profile similarity on the six climate dimensions. Clustering was performed within plants because subjects had been asked to describe the climate at that level of analysis. The procedures utilized correspond to those recommended by Wishart (1970).

Both hierarchical and nonhierarchical clustering techniques were utilized. Hierarchical techniques begin clustering at the individual level and successively aggregate individuals into groups, these groups into larger groups, and so on until one final group (the entire data set) is clustered. The researcher must decide at what point to terminate clustering, or which level in the hierarchy "best" represents the collective climates. When individuals are allocated to clusters using hierarchical methods, the results at succeeding levels of clustering generally are dependent. Consequently, allocation decisions made early in the clustering affect subsequent clusters, and nonoptimum clusters are generated (Wishart, 1970). Nonhierarchical methods may be used to refine these initial clusters to obtain a better solution.

Initial clusters were determined using Ward's (1963) method. Ward's procedure provides an index of the "cost" of further reducing the number of clusters in terms of the increases in pooled within-group sum of squares. When further clustering produces a discontinuity in the plot of sum of squares versus the number of climates, dissimilar groups were being combined and hierarchical clustering was terminated (see Ward and Hooke, 1963, and Schneider, 1974, for similar examples of this procedure).

After a set of initial clusters had been selected in this fashion, Wishart's (1970) nonhierarchical RELOC (a sub-routine of the CLUSTAN computer package) procedure was used to optimize the results. Each individual was removed from his initial cluster, and euclidean distances to all cluster means were computed. If reallocation to an alternative cluster improved the solution (by reducing the pooled within-group variance), the subject was assigned to this cluster, and the new cluster means were computed. This procedure was repeated until cluster assignments were stable and subsequent iterations of the procedure failed to produce a decrease in pooled within-cluster variance.

Plant 1 was found to contain three collective climates; Plant 2, two climates, and Plant 3, eight climates. These findings support previous research by Schneider and Snyder (1975), Newman (1975), Johnston (1976), Drexler (1977), and Jones and James (1977) that multiple climates can be found within single formal organizations.

Three manipulation checks were performed to assess the adequacy of the clustering procedures. First, the average discrepancy within each collective climate (between individuals, within clusters) was compared with the discrepancy between that climate and the most similar other collective climate from that plant. The minimum ratio of between- to within-cluster discrepancy (using a measure based on d^2) provides a lower bound measure of internal consistency reliability. These statistics were 7.3 in Plant 1, 14.0 in Plant 2, and 7.2 in Plant 3, indicating reliable clusters.

The second check utilized multivariate and univariate analyses of variance to determine if differences existed among the final clusters' climate profiles. These results are shown in Table 1. With the exception of the closeness of supervision climate dimension in Plant 2, there were strong differences among the collective climates along the six climate dimensions utilized in this research.

Table 1
Climate Perceptions as a Function of Membership in Clusters

Climate Dimension	Plant 1 F	Plant 1 p	Plant 2 F	Plant 2 p	Plant 3 F	Plant 3 p
Multivariate	df=12,48		df=6,25		df=42,486	
	11.14	.001	16.37	.001	17.13	.001
Univariate	df=2,29		df=1,30		df=7,108	
Rewards	6.31	.01	35.15	.001	24.38	.001
Autonomy	7.34	.01	6.17	.02	11.62	.001
Motivation to achieve	5.98	.01	62.82	.001	13.17	.001
Management insensitivity	5.21	.01	12.41	.001	19.68	.001
Peer relations	15.18	.001	10.63	.01	25.60	.001
Closeness of supervision	16.82	.001	.69	.41	10.47	.001

As a final check on the reliability and stability of the clustering methods, measures of the intraclass correlation coefficients (Snedecor & Cochran, 1967) for each climate dimension within each of the three plants were computed. These measures provide point estimates of interrater reliability and can be interpreted as indicators of agreement (James, 1982). A high intraclass correlation coefficient indicates small within-group variance. Reviews of the climate literature by James, Hater, Gent, and Bruni (1978), James and Sells (1981), Jones and James (1979), and Hater (1977) indicate that previously obtained values of intraclass correlation coefficients for climate research ranged from .00 to .50, with a median of .12. Of the 18 possible estimates of perceptual agreement (6 dimensions in each of 3 plants), 4 exceeded previously obtained values of this statistic, ranging from .56 to .79. Ten exceeded the median reported in these studies by at least 100 percent (range .24 to .42). Two roughly equaled median value of .12 (.10 and .14), and two intraclass correlation coefficients were unacceptable (.00 and .06 for closeness of supervision in Plant 2 and management insensitivity in Plant 3, respectively).

Results

Multivariate analysis of variance was used to test Propositions 1 and 2. The propositions were concerned with the main effects of climate membership on work performance and job satisfactions. The results of these analyses are presented in Table 2.

Table 2
Relationships Between Membership in Collective Climates and Performance and Satisfaction

	Plant 1			*Plant 2*			*Plant 3*		
Dependent Variable	*F(2,29)*	*P*	R^2	*F(1,30)*	*P*	R^2	*F(7,108)*	*P*	R^2
Multivariate—									
Work attitudes	3.76	.05		15.03	.001		2.14	.01	
Univariate—									
Work attitudes	2.23								
Work satisfaction	2.23	.13	.07	10.42	.01	.23	3.28	.010	.12
Supervisor satisfaction	.77	.47	.00	26.37	.001	.45	4.80	.001	.08
Co-worker satisfaction	1.44	.25	.03	10.49	.01	.23	4.90	.001	.19
Pay satisfaction	.74	.48	.00	1.65	.21	.02	1.83	.001	.04
Promotion satisfaction	8.79	.001	.33	44.36	.001	.58	7.38	.001	.28
Univariate—									
Job performance	5.14	.010	.21	6.81	.010	.16	1.83	.09	.05

Membership in a collective climate was significantly related to job satisfaction in Plants 2 and 3, but not in Plant 1 (with the exception of satisfaction with promotions). In some cases, these results were quite strong. Climate explained 58 percent of the variance in promotion satisfaction, and 45 percent of the variance in satisfaction with supervision in Plant 2. The possibility that these results are because of common method variance is diminished in light of the failure to obtain significant results in the first plant. Guion (1973) and Johanneson (1973) have argued that climate and satisfaction are redundant. If this were the case, climate and satisfaction should have been consistently and strongly related. The absence of such effects in Plant 1 and the lack of consistency across the three plants does not support the equivalence of these constructs.

Performance was associated with membership in collective climates in Plants 1 and 2 ($F(2,29)=5.14$, $p<.01$ and $F(1,30)=6.81$, $p<.01$, respectively). Performance was weakly related to collective climate in Plant 3 ($F(7,108)=p<.09$). Climate explained 21 percent of the variance in performance in Plant 1, 16 percent in Plant 2, and 5 percent in Plant 3. The strong relationship between climate and performance in Plants 1 and 2 is noted. Most previous climate research has not used performance as a criterion variable. In cases in which it has been used, results generally have been inconsistent and weak (Hellriegel & Slocum, 1974; Joyce & Slocum, 1979). Payne and Pugh noted that although "psychologists developed the concept of climate to measure the interaction of environment and personality (by operationalizing the E in Lewin's equation $B=f[P,E]$) and thus better predict behavior, there have been relatively few studies that have related these two variables" (1976, p. 1163). Research that jointly uses collective climates and individual difference measures (i.e., need for achievement, locus of control, etc.) promises to increase the proportion of explained variance in work performance.

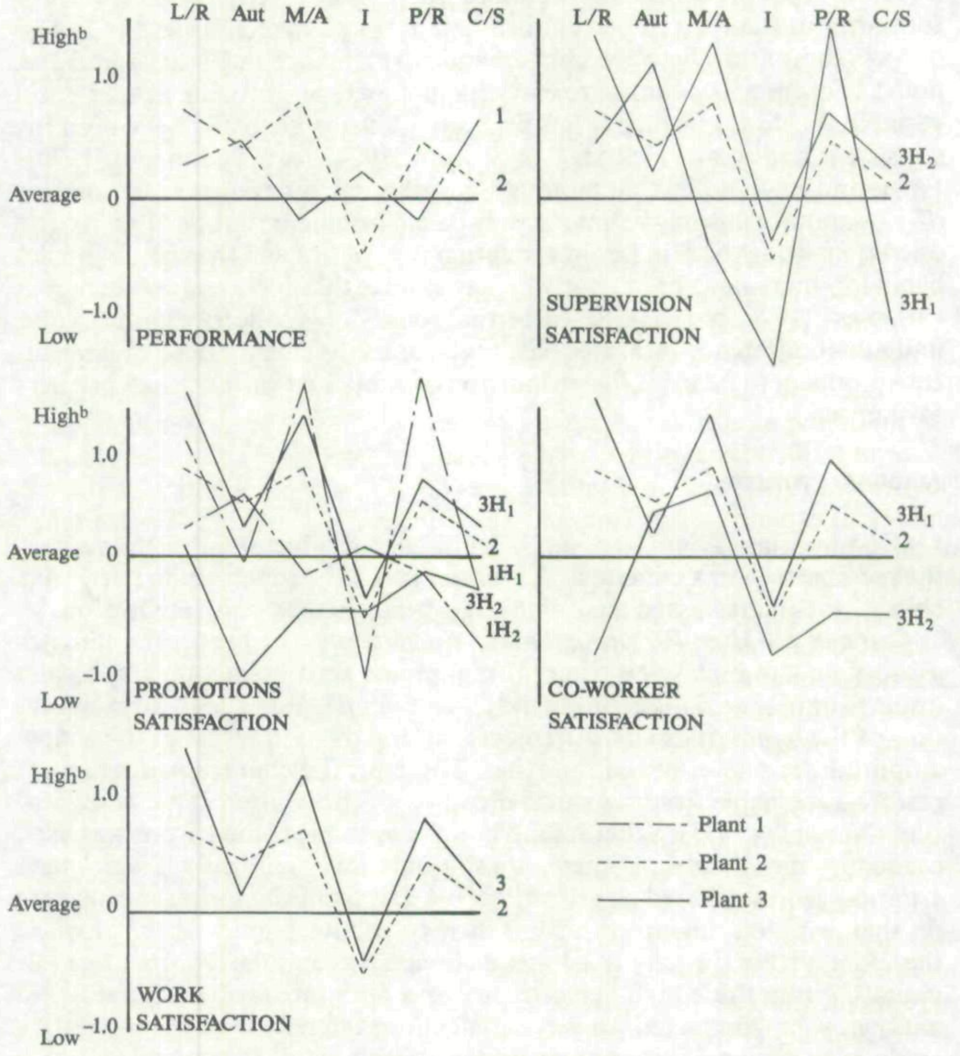
Additional Analyses

Two important issues have not been discussed. First, what factors affect the membership in a climate and, second, how is membership in particular collective climates associated with high performance and satisfaction.

Climates for High Performance and Satisfaction. The profiles of climates associated with high levels of performance and satisfaction are graphically displayed in Figure 1. Presenting the climates in this way allows an examination of the similarities and differences among them in terms of the shape, amplitude, and level of their profiles. These profile characteristics are not readily discernable from statistical measures of the relationship among profiles (Nunnally, 1978). Scheffé's method for multiple comparisons was used to identify the climates. Climates are shown in this figure only if their mean criterion scores differed significantly ($p<.05$) from the lowest mean score on that criterion dimension within their respective plants. These profiles, therefore, depict the pattern of mean climate perceptions reported by individuals within these high performance and high satisfaction climates. No analyses were conducted for pay satisfaction; the results of the univariate analyses of variance were not significant in any plant. In some plants, two climates had significantly higher satisfaction scores than others. These climates are shown in Figure 1 as the higher (H_1) or lower (H_2) *high satisfaction* climate for that particular facet of satisfaction. Designating one climate as high and the other as low is relative; both climates were significantly higher than other lower satisfaction climates for that plant.

The results for performance show that different climate profiles were associated with high performance in Plants 1 and 2. These results could be because of differences in the nature of the work performed within the different plants. Plant 1 performed primarily assembly and maintenance

Figure 1
High Criterion Climates from Three Plants[a]



[a]L/R = level of rewards; Aut = autonomy; M/A = motivation to achieve; I = management insensitivity; P/R = peer relations; C/S = closeness of supervision; H_1 = higher and H_2 = lower high satisfaction climate.

[b]Climate scores were standardized across all 13 climates to allow a common scale for comparison. This procedure is recommended by Nunnally (1978).

operations; Plant 2 performed machine shop and sheet metal fabrication operations and also produced custom fire engine bodies. The different work processes suggest a distinction between the two plants in terms of technology (Slocum & Sims, 1980; Van de Ven & Delbecq, 1974).

The climates for high job satisfaction also can be examined for similarities and differences. An interesting finding is the *similarity between the shape of climate profiles from different plants associated with relatively high levels of specific facets of satisfaction.* Shape refers to the pattern of "peaks" in the profile, as opposed to the amplitude of these peaks, or the average level of the profile (Nunnally, 1978). Contrary to the results for performance, there are specific configurations of climate scores that are associated with various facets of job satisfaction across plants. Climates rated relatively high in rewards, motivation to achieve, and peer relations; average in autonomy and closeness of supervision; and relatively low in management insensitivity scored highest in satisfaction with work across plants. Similarities in the patterns of "peaks" in the profiles of collective climates from different plants were found for promotions, supervision, and co-worker satisfaction as well.

Previous research has paid very little attention to the configuration of climate scores. Given the origin of climate in Gestalt psychology (Koffa, 1935) and field theory (Lewin, 1936) and subsequent recognition of the need for multidimensional measurement (Barker, 1968; Evan, 1968; Taguiri, 1968), the neglect of configurational analysis is surprising. Only Frederiksen (1968), Schneider (1974), and Jones and James (1979) have examined patterns of climate to explain satisfaction and performance. The similarities in shape obtained in this research reemphasized the importance of configurational analysis.

When a single plant had more than one climate scoring significantly higher in satisfaction than other climates from that plant, these relatively high satisfaction climates (shown in Figure 1 and H_1 or H_2) also could be compared. In this case the relevant comparison is within rather than between plants. *Generally, these climates tend to have the same shape (with the exception of $1H_1$) but different amplitudes or mean levels.* The differences in level are logical. For promotion satisfaction, climate $3H_1$ is described as higher in rewards and motivation to achieve than the somewhat less satisfied group, $3H_2$. For satisfaction with co-workers, climate $3H_1$ reported higher levels of peer relations than $3H_2$, although closeness of supervision was higher for $3H_1$ than $3H_2$.

These analyses support the validity of climates formed on the basis of agreement. Climate was related to job satisfaction and performance at practically and statistically significant levels. Similar patterns of climate scores were associated with high levels of job satisfaction across plants. When a plant was found to contain more than one climate for high job satisfaction, differences in the amplitude and level of these climates were consistent with expected differences in the respective satisfaction scores.

Factors Associated with Membership in Collective Climates. If membership in different collective climates is associated with varying levels of satisfaction and performance, it becomes important to understand the factors that are associated with such membership. Two variables that potentially act as antecedents of climate membership are personal and organizational variables. In cases in which both individual and organizational variables have been utilized jointly as predictors of climate, the limited evidence suggests that organizational characteristics have explained more variance in climate perceptions than personal characteristics (Dunham, 1977; Herman, Dunham, & Hulin, 1975; Newman, 1975). Consistent results, when found, often have been with positional measures of structure: job level (Gavin, 1975); hierarchical level (Schneider & Snyder, 1975); organizational membership (Drexler, 1977); work group membership (Herman et al., 1975; Newman, 1975). Positional measures of structure actually index several potential determinants of climate perceptions, including supervision, technology, co-workers, and so on. Despite this, relationships between organizational variables and climate perceptions have been unstable (Schneider & Reichers, 1983).

Terborg (1981) has suggested that facet analysis (Runkel & McGrath, 1972) could be used to explore how individual and organizational characteristics affect climate perceptions. Terborg suggests using four variable sets: "person characteristics, physical-technological characteristics, social-interpersonal characteristics, and time" (1981, p. 575). These four variable categories were employed and represented in this research as follows: person characteristics (age, education, time in position, work experience, managerial experience, and salary); physical-technological characteristics (function supervised); social-interpersonal characteristics (leadership, location in a common work area); and time (shift worked). Details concerning the measurement of these variables are presented in Joyce (1977). The results of analyses of their association with membership in collective climates are summarized in Table 3. Only simple effects of these variables were examined because of the large number of predictors and limitations of sample size. Terborg's (1981) paradigm does not indicate whether these sets or variables within these sets are independent or interdependent. It is believed that the variables probably are interdependent and the reader is cautioned about interpreting these as single variables.

The analyses were conducted using an extended series of contingency table analyses because of the categorical nature of the structural predictors and the criterion (climate membership). Values of the uncertainty coefficient are displayed along with the conventional χ^2 statistics and probability levels. Fisher's exact test was used when sample size precluded the use of χ^2 analyses. The uncertainty coefficient represents the decrease in criterion uncertainty when the predictor category is known.

In Plants 2 and 3, climate was associated with the context in which the foremen performed their jobs. Physical location was related to climate membership in Plant 2. In Plant 3, both location and function supervised showed significant relationships with climate membership. In both of these plants, the leadership style exhibited by the foreman's immediate supervisor was strongly associated with membership in a collective climate. These effects were particularly salient in Plant 2, for which the values of the uncertainty coefficient were .33 and .51 for initiating structure and consideration, respectively.

Table 3
Contingency Table Analyses—Individual and Organizational Antecedents of Collective Climates

Predictors	Plant 1 χ^2 (*df*)	Plant 1 *P*	Plant 1 Uncertainty Coefficient	Plant 2 χ^2 (*df*)	Plant 2 *P*	Plant 2 Uncertainty Coefficient	Plant 3 χ^2 (*df*)	Plant 3 *P*	Plant 3 Uncertainty Coefficient
Organizational									
Function supervised[a]	*F**[e]	.50	.01	*F**	.11	.07	11.62 (6)	.07	.05
Location[b]	1.64 (2)	.44	.06	*F**	.06	.11	17.68 (15)	.28	.07
Shift[c]	4.61 (2)	.10	.16	*F**	.41	.01	.75 (3)	.86	.00
Leader initiating structure[d]	*F**	.50	.10	*F**	.00	.33	9.13 (3)	.03	.04
Leader consideration[d]	*F**	.33	.02	*F**	.00	.51	12.96 (3)	.01	.05
Individual									
Time in position	7.67 (2)	.02	.28	1.26 (2)	.53	.03	5.25 (5)	.81	.03
Work experience	6.93 (2)	.03	.24	2.88 (3)	.41	.08	12.40 (12)	.41	.05
Management experience	2.56 (2)	.28	.09	4.82 (3)	.19	.13	8.71 (9)	.46	.04
Age	9.40 (3)	.02	.34	1.06 (3)	.77	.03	17.03 (15)	.32	.07
Education	*F**	.50	.01	.48 (3)	.79	.01	7.50 (6)	.28	.03
Salary	1.09 (3)	.78	.05	1.73 (2)	.42	.05	3.29 (9)	.95	.01

[a]Coded by the operations performed by workers.

[b]Coded by plant layout. Plant 1 had three physically distinct primary work areas; Plant 2 had three; Plant 3 had six. These areas were coded by the plant's industrial engineering staff.

[c]Plant 1 had one shift; Plants 2 and 3 operated two shifts.

[d]Leader initiating structure was measured by LBDQ, Form XII; leader consideration was measured by LBDQ, Form XII.

[e]*F** indicates reported significant levels calculated using Fisher's exact test.

In contrast, in Plant 1 climate perceptions were influenced by the foreman's time in position, work experience, and age. No effects were noted due to setting characteristics. These results are directly contrary to the results for Plant 2 and 3, for which no significant effects were obtained for individual predictors, but context factors were significantly related to membership in collective climates.

Discussion

This research has provided evidence that supports the validity of collective climates as one type of aggregate climate. Multiple collective climates were obtained within three different work settings, and membership in these climates was related to performance and job satisfaction.

Nature of Collective Climates

The findings of this study may be explained partially by the intersubjective nature of collective climate (Joyce & Slocum, 1979). Collective climates represent "learned environments" for participants working within them. To the extent that these climates provide a common frame of reference for participants, they would be expected to exert potent influences on individual performance and satisfaction. James (1982) has argued that this shared assignment of psychological meaning is a prerequisite for aggregation to a larger unit of analysis. This research provides empirical support for this position by showing that when such agreement exists, the derived aggregate climates show predictable and strong relationships to facets of satisfaction and job performance.

High reliability and the existence of a learned environment are not sufficient to explain the findings obtained in this research. Different climates were equally reliable, or learned, but were related to different levels of performance or satisfaction. A number of possibilities exist to explain these results. The first, and most obvious, possibility is simply that different climates have formed to allow the attainment of different work related outcomes. Within a setting, a number of climates may arise in response to the particular needs of the situation. Consequently, there may be a climate for performance, one for co-worker satisfaction, and for any number of other criteria—that is, turnover, absenteeism, commitment, and so on. When these climates are compared along a single criterion, one or more climates will appear more functional for the attainment of that criterion. Others, which may facilitate the attainment of other outcomes, will appear less desirable. This possibility may partially explain the results of this study. Within Plant 1, one climate was associated with relatively higher levels of performance and another with higher levels of promotion satisfaction. However, within Plant 2, a single climate was associated with higher levels of performance and all facets of job satisfaction. This variation in the nature of the collective climates therefore may only partially explain the results found in the study.

One less obvious possibility concerns the relationship among the climate dimensions themselves. With respect to a particular criterion, climates may be more or less consistent to the extent that the dimensions complement one another. Frederiksen (1968) found that subjects in consistent climates (e.g., innovation and autonomy, or rules and close supervision) performed better than did subjects in inconsistent climates. Frederiksen's previous results suggested a need to research climate multidimensionally. This study found theoretically interpretable consequences of the pattern, level, and amplitude of *profiles* or configurations of climate scores. Further study using complex multidimensional climate scores seems warranted (Joyce & Slocum, 1982; Payne & Pugh, 1976).

The internal structure of the aggregate climate itself could also explain the results of this study. James (1982) has argued that a valid aggregate climate concept requires a "composition theory" specifying how individual climate perceptions may be aggregated to allow the molar description of work settings in psychological terms. A composition theory specifies how "a construct operationalized at one level of analysis (e.g., psychological climate) is related to another form of that construct at a different level of analysis (e.g., organization climate)" (James, 1982, p. 219). As noted in this paper, a number of researchers have either explicitly or implicitly suggested perceptual agreement or consensus as the basis for such a composition theory, notably James and Jones (1974), Hellriegel and Slocum (1974), Schneider (1975), Joyce (1977), Joyce, Slocum, and Abelson (1977), Roberts et al. (1978), Joyce and Slocum (1979), Schneider (1981), James, (1982), and Schneider and Reichers (1983). Perceptual agreement is only the starting point for such a composition theory. Of equal importance is the *structure* or patterning of this agreement within organizations. Climates with similar mean profiles and average within-cluster homogeneity of psychological climate perceptions may differ considerably in terms of the patterns of agreement within them. To investigate this possibility, hierarchical diagrams of interindividual psychological climate similarities could be constructed for those aggregate climates showing similar mean profiles and estimates of perceptual agreement but different criteria scores. Differences between these structures could prove to be useful in an explanatory sense, particularly in combination with additional information concerning the organization's formal and informal structure and associated task, influence, and affective communication networks.

Some prior climate research has implied a rough equivalence between concepts of consensus and perceptual agreement. It should be noted that although these concepts are related, they are not equivalent. Consensus can exist on a number of different levels, the simplest one of which is perceptual agreement. Perceptual agreement requires only that subjects agree concerning their perceptions. They do not necessarily have to interact or have any knowledge that others in the organization share their perceptions. A second level of consensus requires that those agreeing have knowledge of others who share similar perceptions of the work setting. These concepts obviously are different. With some exceptions, climate researchers have not been particularly precise in defining what they mean by agreement, consensus, shared perceptions, and the like. Some possible confusion accruing to theorizing and empirical results has occurred. At this point, further clarification and refinement of the concept of consensus in climate research is important.

Sources of Climate Perceptions

Schneider and Reichers (1983) categorize research concerning the sources of climate perceptions as either the structural or selection-attraction-attrition approaches. The structural approach proposes that it is characteristics of the organization's structure (e.g., size, span of control) that influence climate perceptions. The structural approach does not deny the influence of individual characteristics in determining the formation of climate perceptions, but primary consideration is given to structural factors. Climates should differ as these characteristics change from setting to setting. The selection-attraction-attrition argument proposes that individuals seek and are sought out by organizations to ensure an appropriate match between individual and organizational characteristics. This match then is improved through a process of attrition in which individuals move (quit, transfer) to affect better person-organization congruence, or the organization takes remedial action to correct initial mismatches through termination or transfer. Schneider and Reichers note that "similar perceptions and meanings arise and are expressed as climates due to the diminution of individual differences that has occurred through selection, attraction, and attrition" (1983, p. 34).

The results of this study provide support for both the structural and selection-attraction-attrition arguments. Within Plants 2 and 3, structural factors were related to climate membership, whereas within Plant 1 personal variables were the only ones associated with the criterion. There were no cases in which *both* personal and setting characteristics were related to climate. The lack of support for the structural position (particularly the failure to obtain location effects) in Plant 1 is especially of note. The process of formation and adjustment of climate perceptions would be expected to be consistent with models of attitude formation and adjustment. These representations of the cognitive process include the influence of social relationships and interaction between individuals perceiving a common social object—in this case, the work situation. This social relationship is defined partially by structure, and it therefore is interesting to find no relationship with structural variables in Plant 1.

One implication of this finding is a recognition that perception agreement can occur through two separate processes: *perceptual formation* and *perceptual adjustment*. When individuals perceive the situation similarly, agreement is the natural consequence, even in the absence of communication. Interaction based on physical propinquity may not be needed to produce agreement. Schneider and Reichers state that "if one combines similar structures and similar kinds of people there is little doubt that distinctive organizational climates will arise" (1983, p. 22).

When the stimulus situation varies or is ambiguous, or if individuals vary, climate perceptions would likely differ. Agreement in this case could be obtained through a process of perceptual adjustment, which is heavily influenced by social interaction. This position is what Schneider and Reichers (1983) refer to as the "symbolic interactionism" perspective. The relative importance of processes of perceptual formation and adjustment as determinants of agreement in climate perceptions is unknown. If the possibility of discrepant perceptions is high (because of differences in personal or setting characteristics), the interaction necessary for perceptual adjustment is great. Through this interaction, agreement may be achieved. If perceptual formation processes ensure similar initial climates, interaction may do little toward, and may even disturb, agreement.

A second interpretation of the failure to find significant location effects in Plant 1 is that interaction *is* important, but that it is more complex than simple within group interaction that would be reflected by common location measures. For example, members of integrating departments could spend more time in task related interactions away from their assigned work place, or informal groups composed of members from other locations may have strong influences on climate perceptions. An additional and related possibility is that interaction *off* the job may significantly influence climate perceptions. In the present study, the sample included many individuals who were related either directly or through marriage and who consequently could be expected to socialize to a significant extent away from work. If conversation covered work related topics during these family activities, climate perceptions could be influenced. Although only speculative, these considerations are possible and suggest the need for more rigorous measures of interaction, possible employing network concepts (Joyce, Walker, & Howard, 1980; Schneider & Reichers, 1983; Tichy & Fombrun, 1979).

In conclusion, it is believed that these observations (the need for multidimensional explanation, analysis of the internal structure of aggregate climates, use of refined concepts of consensus, and study of the influence of social networks), if heeded, likely will lead to more complex climate research. This work promises to contribute to the development of an adequate composition theory of aggregate climate and the subsequent usefulness of the collective climate concept.

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