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Measuring Small-Group Environments

A Validity Study of Scores From the Salter Environmental Type Assessment and the Group Environment Scale

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This concurrent validity study of Salter Environmental Type Assessment scores was conducted with the Group Environment Scale. A principal components factor analysis with varimax rotation of 191 college students' responses suggested two factors that accounted for 51% of the variance. The factor-analytic results and concurrent validity coefficients were consistent with previous research with both assessments and theoretical assumptions behind the two approaches to measuring group climate. Implications for the assessment of groups are discussed.

Keywords: *Group Environment Scale; Salter Environmental Type Assessment; small-group dynamics; factor analysis; concurrent validity*

Attention to the influence of group dynamics has become relatively ubiquitous in educational and psychological practice. In both instances, the small-group behavioral environment provides a vital outlet for individuals' behaviors, as well as a source of feedback on those behaviors. Because the characteristics of behavioral environments, including small groups, can be as varied as the people in them, facilitating adjustment and growth is best achieved within a person-environment interaction (PEI) framework, in which the needs of a person are juxtaposed against the demands of the environment (Armstrong & Yarbrough, 1996; Lofquist & Dawis, 1991; Strange, 1994). Before any intervention can be made and evaluated, however, effective measurement of the person and the environment must be ensured (Huebner & Lawson, 1990; Winston et al., 1997). This article provides an overview of an integrated approach to measuring both the individual and the group climate that fits within the broader PEI framework. A validity study of the environmental assessment approach is also provided.

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Psychological Types and the Myers-Briggs
Type Indicator (MBTI)

Operating within the interactional framework, this discussion starts with understanding the nature of people in groups. One of the most popular approaches to describing nonpathological differences among individuals is grounded in Jung's (1921/1971) theory of psychological types, which was subsequently elaborated by Myers and Briggs (Myers, McCaulley, Quenk, & Hammer, 1998; Myers & Myers, 1980). In the psychological-type approach, people are seen as being oriented to one of two types of psychic (stimulus) energy. Extraverts (E) prefer to interact with the external world of people and things around them. Introverts (I) prefer the subjective energy from within themselves, such as ideas, feelings, thoughts, or perceptions. Within these preferred worlds, people must use two different adaptive processes: perception (P) and judgment (J). The perceptive process relies on two functions. Individuals with sensing (S) preferences prefer to take in information through their five senses and to be focused in the here and now. Intuition (N) is built on a "sixth sense," and people with this preference tend to be creative and imaginative. Finally, people make decisions in two ways. People with a thinking (T) orientation use analytical, cause-and-effect reasoning that is based on objective appraisal. People with a feeling (F) preference prefer to make value-oriented judgments and to check objective data with their personal beliefs.

Myers and Briggs also developed the MBTI (Briggs & Myers, 1998) as a measure of psychological type preferences. The use of the MBTI in various kinds of group contexts (e.g., therapeutic, educational, work, family) has proved to be a powerful venue for applications of type theory (Myers et al., 1998). Psychological type constructs provide a nonthreatening language with which people can appreciate differences among group members and offer an organizing framework for accomplishing tasks, in which individual skills are used effectively to meet collective goals. But just because an individual has particular personality traits does not necessarily mean the behavioral environment or group setting provides an opportunity to use them, and often, the demands or "presses" of the environment can run counter to these dispositions. For example, an individual who prefers structure and logical order in the environment (TJ on the MBTI) may be so challenged by the unstructured and free-flowing approach used in a particular task group that he or she wants to terminate involvement in it.

Although the MBTI provides a viable means to identify this person's psychological type preferences, determining the level of logically ordered structure, or lack thereof, in the group is another matter. Besides naturalistic observation, one recognized strategy is the "type average" (Hammer, 1994), whereby the frequencies of particular types are computed and compared. For example, if a group has four extraverts and one introvert, it would be labeled "extraverted" in this approach. Although human aggregate measures offer meaningful information, they may also ignore other salient aspects of the behavioral environment (e.g., the history, task, and/or leader) that contribute to its distinctiveness (Strange, 1994). A more objective

approach to environmental assessment that respects the PEI demand for parallel measures that work in harmony is needed (Salter & Vandiver, 2002; Winkel, 1985). For group climates, few of these types of measures exist (Winston et al., 1997), and continuing study of the scores produced by these instruments is indicated (DeLucia-Waack, 1997).

Environmental Types and the Salter Environmental Type Assessment (SETA)

Of note, the need to view human behavior within an interactional framework is apparent in Jung's (1921/1971) early writings (although he did not use these terms). He noted the impact of "collective" (para. 692) processes on individual functioning and the problems that can sometimes result from a mismatch. Elaborating on this notion, Myers and Myers (1980, pp. 189-192) later addressed the problem of type falsification and resulting stress that may occur when people must function in environments with demands that are in opposition to their personality preferences. Salter (2000b) subsequently labeled this mismatch "type incongruence" (pp. 4-5) and developed a theory of environmental types and the SETA (Salter, 2000a) to study this process more closely.

Salter (2000b) used two parallel strategies to create this overall approach to describing and measuring behavioral environments. First, a theoretical taxonomy of environmental types was created by examining Jungian references to collective processes, the growing body of MBTI research related to the behaviors of different psychological types in different situations, and the emerging environmental research related to the functioning of behavioral environments within the PEI framework. Second, to operationalize this environmental taxonomy, the SETA was developed (discussed below). Through the years, revisions to the taxonomy and to the instrument reflected advancements in the other. Among the environmetric studies that have been conducted (pp. 23-37), one line of inquiry has involved testing the concurrent validity of SETA scores with those from the social-climate assessments developed by Moos (1994b). Our study continues this line of research.

By design, the four dimensions of environmental types parallel those in the psychological model (Salter, 2000b). Extraverted environments "pull" people into the action with presses toward involvement and interaction. Introverted environments "push" responsibility back to individuals for the quality of the interactions, thus allowing for reflection and consideration of experiences. Perceiving processes accentuate the process of generating more elements: the pieces and parts of the environment. Whereas sensing environments focus on existing environmental elements (people, things, rules, or values) and reward people's attention to them, intuitive environments focus on creativity, discovery, and new relationships among elements. The judging processes concern formation of a collective reality in the environment, thereby providing the necessary structure by which individuals can make judgments. Thinking environments maintain objective sets of logical operations that are based

on a central, depersonalized truth or science. In contrast, feeling environments rely on values and networks of connections to support a shared reality.

Social-Climate Assessments and the SETA

To explore PEIs in multiple areas of human services practice, Moos (1994b) and his associates developed some of the first empirically based perceptual measures of "the 'personality' of a setting or environment" (p. 2), all of which are grounded in his social ecology theory. Even though many of these theoretical constructs are assumed to transcend a variety of behavioral environments (e.g., involvement, control), the environmental assessments that were developed are specific to particular domains (e.g., classroom, work, family, living, etc.). As elaborated below, two of these domain-specific instruments have been used thus far in concurrent validity studies of SETA scores: the Work Environment Scale (WES; Insel & Moos, 1974) and the University Residence Environment Scale (URES; Gerst & Moos, 1974). Our study used a third social-climate measure, the Group Environment Scale (GES; Moos & Humphrey, 1974).

Correlational studies of SETA scores and those from the URES and WES have shown most of the expected relationships between theoretically related subscales (Salter, 2002; Salter & Irvin, 2003). For example, higher levels on the interpersonal-domain dimensions (involvement, cohesion, and support) have been consistently associated with both environmental extraversion and feeling in both work and living environments. Also as expected, systems-maintenance (e.g., order and organization) and systems-change (e.g., innovation) processes found in social ecology theory are consistent with judging and perceiving, respectively. The anticipated relationships between the personal-growth dimensions and S-N and T-F have been more mixed. Salter and Irvin (2003) suggested two reasons: (a) the terminology in the social-climate assessments is 30 years old and may not mirror current vernacular used by the college students in these samples, and (b) some of the social-climate scales (e.g., Academic Achievement) contain more "content" than the SETA scales, which are focused more on "style."

The 10 subscales of the GES are organized into the three dimensions of social climates, as described in Moos's (1994a) theory, and appear related to different SETA subscales. The Relationship dimension addresses personal relationships within a group (the Cohesion, Leader Support, and Expressiveness subscales). These subscales were expected to be related to extraversion and feeling. The Personal Growth dimension concerns whether a group aids personal growth and progress toward goals (the Independence, Task Orientation, Self-Discovery, and Anger and Aggression subscales). These subscales appear related to combinations of the four functions of environmental types: sensing, intuition, thinking, and feeling. Independence, self-discovery, and a lack of anger and aggression would seem to correspond to an openness (intuition) that respects individual differences (feeling). On the other hand, task orientation would seem to be focused on the details of a group's task (sensing) and

its logical and effective execution (thinking). Finally, the Systems Maintenance and Change (SMC) dimension concerns how clearly structured the environment is and its responsiveness or ability to change (the Order and Organization, Leader Control, and Innovation subscales). These constructs parallel judging and perceiving, respectfully. Specifically, the changeability of innovation would seem related to perception, and order and organization and control would be related to judging.

Both environmental type and social ecology theories describe dynamic processes, and expectedly, multiple correlational relationships were found between scores on the SETA and the URES and WES. Using a factor-analytic strategy to identify higher interactions among the various scale scores produced analogous results (Salter, 2002; Salter & Irvin, 2003). In both studies, two distinct factors emerged. One factor contained environmental extraversion, intuition, and feeling, with higher levels of the interpersonal dimensions and innovation. Such a factor seems consistent with a positive social climate that combines a recognized focus on people with some room for creative expression. The second factor contained the J-P and most expected SMC dimensions (e.g., order and organization, clarity). Such overall positive findings prompted this study, and we anticipated comparable patterns of interactions in small-group environments using similar factor-analytic strategies.

Method

Participants

The 191 participants in this study were college students who volunteered to participate in ongoing research as part of their academic experience. Of this group, 132 were 1st-year students attending a state university in the Northeast. The remaining 59, who ranged from sophomore to master's students, were studying for careers in counseling at a nearby research university. Of the larger sample, 54% were women and 36% were men, with 9% not responding. No attempt was made to ascertain this convenience sample's generalizability to all college students and group environments.

Instrumentation

GES. The GES was designed to measure the relevant dimensions of the social climates of group settings. It was created through both theoretical and empirical methods (primarily factor analysis). Nine true-or-false items constitute each of the 10 scales of the GES, for a total of 90 items. A score on a scale is the summation of the total number of items answered toward the positive side of the construct, ranging from 0 to 9. A low score indicates a deficit or lack of that environmental characteristic in the setting. In his standardization samples of more than 2,400 individuals from

305 groups, Moos (1994a) found internal consistencies for GES scores that ranged from .69 to .86 and 1-month retest reliability estimates ranging from .69 to .83. Research with the GES has involved a range of applications to social, task-oriented, psychotherapy, and support groups.

SETA. Similar to the social-climate assessments, the SETA was created with a mixture of strategies. One source of items was the behavioral correlates of the psychological types found in MBTI research. Items were also based on theoretical notions found in the emerging taxonomy of environmental types. Subsequent content and factorial validity studies led to the current version, SETA Form B. Each SETA scale is composed of 15 response pairs, for a total of 60. One third of the items are phrase questions (e.g., "The atmosphere of this environment is typically (A) hushed (B) noisy"). The other two thirds of the items are word pairs (e.g., "(A) facts (B) imagination").

Respondents must pick the item responses that better describe the environment being assessed (scored –1 or +1). Differentials are computed, with resulting raw scores ranging from –15 to +15. For example, a student who gave 12 responses toward extraversion and 3 responses toward introversion would have a differential raw score of –9. Similar to the MBTI tool's approach, these differentials are used when sorting scores into four dichotomous type categories (E-I, S-N, T-F, and J-P). Because these dichotomies may be problematic (Bernstein & Teng, 1989), we chose to use the raw differential scores in the factor analysis.

The environmetric properties of SETA scores have been addressed on several fronts. A confirmatory factor analysis of 1,000 SETA profiles provided by college students showed the four-factor model to fit the data best (Salter & Vandiver, 2002). A generalizability study of SETA scores across four environmental domains (educational, group, work, and living) showed reliability estimates that ranged from .78 to .88 (Salter, 2003b). Previous construct studies have been reported in the *SETA Manual* (Salter, 2000b, pp. 26-30), including scale independence and artifactual effects from the MBTI instrument. As noted above, SETA scores have also been shown to have concurrent validity with those from other social-climate assessments. Finally, behavioral studies include examinations of the "chilly" classroom climate for women (Persaud & Salter, 2003; Salter, 2003a) and stress in student affairs offices (Karras, 1990). The SETA is still an experimental form, however.

Procedure

In different classroom environments, the GES and the SETA were administered together to participants, as per their respective protocols (Moos, 1994a; Salter, 2000b). Respondents were placed on their own recognizance to complete the assessments and return them to the researchers. Students were asked to assess groups with which they were recently or currently involved. To obtain a broad range of responses, a group was defined as "any collection of individuals who see themselves as a group." The choice

of groups was left to the participants, however. Even though the students were not required to reveal the actual groups they referenced for their assessments, to encourage honest ratings, 156 (82%) provided interpretable responses. The noted groups included 25 peer groups (e.g., groups of friends), 21 workplace groups (e.g., fitness instructors, bartenders, counselors), 23 educational groups (e.g., study groups), 11 living groups (e.g., suitemates, fraternity brothers), 10 volunteer groups, 12 church-affiliated groups, 15 clubs, and a surprising number of sports teams (39).

Data Analysis

Descriptive data, including reliability estimates, were screened for anomalies. Then, similar to the approach used by Salter (2002) and Salter and Irvin (2003) for studies with the SETA and by Saggino and Kline (1995) for a study of MBTI scores, the product-moment correlations among the SETA subscale differential scores and GES scale scores were examined. There were no missing values, and the sample size of 191 was viewed as sufficient for the subsequent analysis. Then, a principal components factor analysis of SETA and GES scores was conducted.

Multiple strategies were used to determine the factors that were retained and interpreted in the factor analysis (Henson, Capraro, & Capraro, 2004). First, the scree plot showed a break in directionality between the second and third eigenvalues. This observation was consistent with the results of a parallel analysis (Thompson & Daniel, 1996), which involved comparing the SETA and GES eigenvalues with a factor analysis of a random data set with the same parameters (sample size, number of variables, and range of responses). The first two observed eigenvalues were larger than their random counterparts. Of note, in a subsequent analysis, we also observed that the third, unretained factor was defined by only one variable (anger and aggression). Its initial eigenvalue was 1.117. Finally, because the correlation between the two factors was small in an oblique rotation (.017), we chose to pursue the orthogonal approach with the varimax procedure. Pattern/structure-coefficients greater than or equal to .57 were considered meaningful for our interpretation (in light of the gap in coefficients that were greater than .49 but less than .57 for this sample).

Results

In our examination of the response distribution, the full range of responses (0 to 9) was observed on all GES scales, except Task Orientation and Independence (1 to 9). The means for GES scale scores ranged from 4.28 to 7.00 and their standard deviations from 1.65 to 2.72. None of the four SETA scales produced the full range of possible raw scores (–15 to +15). On the first three scales, the response distribution was attenuated toward introversion (+11), intuition (+13), and thinking (–11). The J-P scale had a range of –13 to +13. The SETA raw scores had means ranging from –0.05

Table 1
SETA Type Table

ISTJ	ISFJ	INFJ	INTJ
4	1	2	4
ISTP	ISFP	INFP	INTP
3	3	5	2
ESTP	ESFP	ENFP	ENTP
3	14	40	36
ESTJ	ESFJ	ENFJ	ENTJ
15	56	36	2

Note: SETA = Salter Environmental Type Assessment; I = introversion; S = sensing; T = thinking; J = judgment; F = feeling; N = intuition; P = perception; E = extraversion.

Table 2
Cronbach's α Values and Pearson's Product-Moment
Correlation Coefficients (r) for SETA and GES Scores

GES scale (α)	SETA Scales (α)[a]			
	E-I (.70)	S-N (.67)	T-F (.73)	J-P (.71)
Cohesion (.76)	−.49	.13	.45	−.25
Leader Support (.74)	−.43	−.01	.22	−.27
Expressiveness (.59)	−.26	.30	.33	.19
Independence (.32)	−.15	.16	.18	<.01
Task Orientation (.52)	−.29	−.09	.13	−.36
Self-Discovery (.74)	−.24	.24	.43	.17
Anger and Aggression (.80)	.07	−.03	−.23	.19
Order and Organization (.69)	−.25	−.23	.03	−.57
Leader Control (.74)	−.03	−.36	−.28	−.41
Innovation (.58)	−.19	.43	.46	.26

Note: SETA = Salter Environmental Type Assessment; GES = Group Environment Scale; I = introversion; S = sensing; T = thinking; J = judgment; F = feeling; N = intuition; P = perception; E = extraversion.
a. Direction of positive is toward introversion, intuition, feeling, and perception.

to −8.55 and standard deviations from 5.33 to 6.18. The environmental type profiles from the 191 respondents are listed in Table 1. Because of their low reliability (α = .32), as reported in Table 2, scores on the GES Independence scale were dropped from further consideration (see Henson, 2001, for more discussion).

The modest correlational findings reported in Table 2 were generally consistent with the expected directions of relationships, as noted above. Increasingly large scores on the Relationship dimension scales (Cohesion, Leader Support, and Expressiveness) were associated with both extraversion and feeling. Similarly, the SMC dimension scores (for Order and Organization, Leader Control, and Innovation) also

Table 3
Two-Factor Varimax Rotation of Principal
Components Solution for SETA and GES Scores

Scale	Factor I: Functions	Factor II: Attitudes	h^2
GES Innovation	**.710**	.064	.508
SETA T-F	**.706**	.311	.594
GES Self-Discovery	**.681**	.090	.472
SETA S-N	**.669**	−.116	.461
GES Expressiveness	**.658**	.061	.437
GES Leader Control	**−.606**	.373	.507
GES Order and Organization	−.339	**.783**	.727
GES Leader Support	.097	**.773**	.607
GES Cohesion	.366	**.716**	.647
GES Task Orientation	.006	**.678**	.460
SETA J-P	.486	**−.591**	.585
SETA E-I	−.371	**−.574**	.467
GES Anger and Aggression	.007	−.368	.136
Trace	3.345	3.264	
% of postrotation variance	25.734	24.106	

Note: Values in boldface type are interpreted pattern/structure-coefficients. SETA = Salter Environmental Type Assessment; GES = Group Environment Scale; I = introversion; S = sensing; T = thinking; J = judgment; F = feeling; P = perception; E = extraversion.

correlated predictively with the J-P scale results. As in previous studies, however, the relationships between Personal Growth dimension scales (Independence, Task Orientation, Self-Discovery, and Anger and Aggression) and the S-N and T-F scales were mixed. Only the direction of the relationships between Self-Discovery and intuition and feeling seemed consistent with the underlying theories. The modest correlation of thinking to Anger and Aggression was not unanticipated either.

The factor analysis of the SETA and remaining GES scale scores, as summarized in Table 3, revealed a two-factor solution that accounted for 50.6% of the postrotation variance. One unanticipated outcome of this exploratory study was the nature of the two factors, which were quite reflective of the dynamics suggested in the psychological type model (Jung, 1921/1971; Myers et al., 1998). Specifically, the *attitudes* (E-I and J-P) were contained in one factor, and the *functions* (S-N and T-F) were contained in the other. The Functions factor (Factor I) was consistent with a combination of environmental intuition and feeling, and Innovation, Self-Discovery and Expressiveness. Leader Control showed a negative pattern/structure-coefficient on this factor, as well. The Attitudes factor (Factor II), relating to extraversion and judging, also contained Order and Organization, Leader Support, Cohesion, and Task Orientation. The Anger and Aggression scores appeared unrelated to either of the interpreted factors.

Discussion

The results of this study document some convergence between these two approaches to assessing the characteristics of groups. Similar to studies with other social-climate measures, SETA scores correlated with many scores on the GES, and the two interpreted factors seemed especially consistent with the proposition that environmental type characteristics are dynamic in nature. Specifically, the attitudes (E-I and J-P) were contained in one factor, and the functions (S-N and T-F) were contained in the other. For this sample, the environmental E-J combination suggests that groups with high levels of involvement were also more structured in nature. Furthermore, to manage the emphasis on the interactions among the members of the group (feeling), a certain level of openness to creative solutions (intuition) was also required. All of these dimensions seem relevant to understanding group functioning in campus settings (Taub, 1998; Winston et al., 1997).

Limitations

This study may have been limited in at least a few ways. First, in light of the ongoing discussion of factor-analytic strategies (Costello & Osborne, 2005), the sample size was likely undersized (a 1:14 ratio of variables to respondents) for an exploratory analysis of such complex dynamics. Additionally, using the SETA raw scores may have been problematic. The scores are not truly linear, nor do they fully reflect the underlying, nominal-level variables in the theory, challenges encountered by users of the MBTI, incidentally (Salter, Forney, & Evans, 2005). We can question the source of the lack of reliability for the scores on the GES Independence scale, too, which is conceptually related to environmental type constructs.

The sample was also composed entirely of volunteer respondents, who may have elected to assess groups that had provided relatively positive experiences, thus biasing the results. As matter of fact, no attempt was made to ascertain the exact group settings of all respondents or the length of time in these settings, each of which may have affected their responses. Such a feat would be a challenge, at best, because little work has been done on mapping the extent of the behavioral environments on college campuses (Salter, 2003b; Terenzini, 1994). Perhaps, with more tools at researchers' disposal, the validity of these types of studies can be enhanced by more targeted and purposeful data collection.

Furthermore, although no a priori reason existed to expect all 16 potential SETA profiles in a sample of group settings, some profiles were underrepresented in the sample, especially those with introversion and with the N-T combination. Small groups are but one of a variety of behavioral environments that students encounter (Salter, 2003b), and the known groups in this sample were clearly social in nature. Continued study of the SETA with different kinds of groups, especially task-focused ones, and nonsocial behavioral environments should help broaden the range of observed environmental

type profiles. Replication studies with other sample groups both within and outside of higher education are clearly needed.

The past decade has seen an explosion of tests and measurements—more than 20,000 new ones each year by some estimates (Cohen, Swerdilik, & Philips, 2002). Very few of these instruments have concerned measuring the climates of group settings, however, in spite of their use for a variety of educational and psychological interventions. Perhaps one problem has been a method to measure both the person and the small-group behavioral environment in meaningful ways. The combination of the MBTI and SETA instruments may be one strategy that meets this challenge. This study provides additional support for the validity of SETA scores for group environments.

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