The creative environment scales: Work environment inventory

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ABSTRACT: The Creative Environment Scales Work Environment Inventory (WEI) is a new paper-and-pencil instrument designed to assess stimulants and obstacles to creativity in the work environment. Unlike many instruments that are designed as comprehensive descriptions of the work environment, the WEI focuses on those factors in the work environment that are most likely to influence the expression and development of creative ideas. Designed to be used at any level within any function of an organization, the WEI is intended as an organizational development instrument to improve the climate for creativity. Conceptually grounded in previous empirical and theoretical work on creativity and innovation, the WEI has been administered to 645 respondents drawn from five different groups. Factor analyses, scale reliabilities (internal consistencies), and between/within scale correlations indicate a high degree of integrity in the WEI scales. Furthermore, test-retest reliability is high. Preliminary validity analyses indicate that the WEI does discriminate between different work environments, and that some of the scales are significantly related to creativity within the organization.

Creative work is done by creative people. This person-centered belief appears to be the prevailing laypersons' view of creativity, and it is the view that dominated creativity research until the past decade or so. Nearly all of the pioneering work on creativity focused on personality characteristics of outstanding creative individuals (e.g., Barron, 1955; Helson, 1965; MacKinnon, 1962), cognitive abilities involved in creative achievement (e.g., Guilford, 1956), the development of tests to identify creative individuals (e.g., Torrance, 1966), or methods for training the creative skills of individuals (e.g., Gordon, 1961; Parnes, 1967; Stein, 1974).

More recently, however, there has been a growing realization that an exclusive focus on the person leads to a serious neglect of another potent influence on creativity: the social environment. There is now a grow-

ing body of literature examining the creativity effects of social factors as macroscopic as political fragmentation and cultural diversity (e.g., Simonton, 1975) or as microscopic as individual-based evaluation, competition, restricted choice, and reward (e.g., Amabile, 1979, 1982a; Amabile, Hennessey, & Grossman, 1986). In addition to the personality psychology of creativity that was already well-established by 1975, we now have a developing social psychology of creativity (cf. Amabile, 1983a, 1983b).

One important outgrowth of this attention to environmental effects on creativity has been an increasing interest in the ways that work environments might influence the creativity of employees (e.g., Bailyn, 1985; Cummings, 1965; Delbecq & Mills, 1985; Drucker, 1985; Kanter, 1983; Pelz & Andrews, 1966). Although it has been defined in a variety of ways by researchers, creativity is generally taken to mean the production of novel and appropriate ideas by individuals or small groups of individuals working closely together (Amabile, 1982b, 1983a, 1988a). The work environment is generally defined as the social climate of an organization, although physical environmental variables may also be included. In our own work, we follow definitions closely related to those of Ekvall (1983) and Schneider (1975). Organizational climate is seen as

> a conglomerate of attitudes, feelings and behaviours which characterize life in the organization. The climate has originated, evolved and continues to develop in the ongoing interactions between individuals (personalities) and the organizational setting. Each organization member perceives the climate, and can describe it in light of his or her own perceptions. (Ekvall, 1983, p. 2)

Moreover, perceptions of climate (as evidenced in self-reports) are seen as psychologically meaningful: "Climate perceptions are psychologically meaningful molar descriptions that people can agree characterize a system's practices and procedures" (Schneider, 1975, pp. 474-475).

These perceptions can, presumably, be assessed through questionnaires. Currently, there are a number of questionnaires designed to assess perceptions of the work environment. Nearly all of these were designed as comprehensive descriptions of the general work environment (e.g., Halpin & Croft, 1963; House & Rizzo, 1972; Lawler, Hall & Oldham, 1974; Likert, 1967; Litwin & Stringer, 1968; Moos, 1986; Payne & Pheysey, 1971; Pritchard & Karasick, 1973; Taylor & Bowers, 1972)

The *Creative Environment Scales: Work Environment Inventory* (WEI) is a 135-item questionnaire designed to assess stimulants and obstacles to creativity in work environments. In contrast to the majority of work environment instruments, which are general in scope, the WEI focuses on those factors in the work environment that are most likely to influence the expression and development of creative ideas.

The WEI is conceptually grounded in previous empirical and theoretical work on creativity and innovation, including work from our own laboratories (Amabile, 1983; 1988a; 1988b; Amabile & S. Gryskiewicz, 1987) and work by other researchers (e.g., Andrews & Farris, 1967; Cummings, 1965; Hage & Dewar, 1973; Havelock, 1970; Kanter, 1983; Kimberley, 1981; King & West, 1985; Pelz & Andrews, 1966; Peters & Waterman, 1982; West, 1986). The basic theoretical model underlying the WEI proposes that individual creativity within an organization depends, in addition to the individual's own skills and motivations, on three

basic components of the organization: (a) skills in innovation management occurring primarily at the level of the local supervisor; (b) motivation to innovate, evident as a commitment to innovation at the organizational level; and (c) resources, including materials, personnel, and time.

Skills in innovation management include management at both the level of the organization as a whole and the level of individual departments and projects. There is already a considerable body of evidence on the elements of this component. The management skills and styles that appear to be conducive to individual creativity include: (a) an appropriate balance between freedom and constraint (Amabile & S. Gryskiewicz, 1987; Andrews & Farris, 1967; King & West, 1985; Pelz & Andrews, 1966; Peters & Waterman, 1982; West, 1986); (b) goal-setting that is focused at the level of overall missions and outcomes, but loose at the level of procedural progress toward those goals (Amabile & S. Gryskiewicz, 1987; Bailyn, 1985); (c) management that is participative and collaborative (Kanter, 1983; Kimberley, 1981); (d) work assignments that are well matched to both skills and interests (Amabile & S. Gryskiewicz, 1987); (e) open communication systems for top-down, bottom-up, and lateral communication (Amabile & S. Gryskiewicz, 1987; Cummings, 1965; Kanter, 1983); (f) frequent, constructive, and supportive feedback on work efforts (Amabile & S. Gryskiewicz, 1987; Kanter, 1983; Peters & Waterman, 1982; Ashford & Cummings, 1985); (g) equitable and generous reward and recognition of creative efforts as well as creative successes; in addition to the traditional tangibles of awards, money, and advancement, the reward system should abundantly include intrinsic rewards such as increased autonomy in selection of work assignments, increased autonomy concerning work scheduling and methods, and enhanced opportunities for professional growth (Amabile & S. Gryskiewicz, 1987; Ashford & Cummings, 1985; Cummings, 1965; Kanter, 1983; Peters & Waterman, 1982); (h) diffuse decision influences, where the input of many people is sought on crucial decisions (Kanter, 1983; Zaltman, Duncan, & Holbeck, 1973); (i) an absence of most formal and complex management structures (Kimberley, 1981); (j) managers who are models of professionalism (Kimberley, 1981); (k) an absence of unnecessary layers of hierarchy (Kanter, 1983); (l) abundant access to power channels for innovative problem-solving (Kanter, 1983); (m) an absence of both internal competition and frequent threatening evaluation (Amabile & S. Gryskiewicz, 1987; Kanter, 1983); (n) an absence of excessive arbitrary time pressures (Amabile & S. Gryskiewicz, 1987); (o) enthusiastic support and frequent collaboration between groups, departments, and divisions (Amabile & S. Gryskiewicz, 1987); and (p) challenging work (Amabile & S. Gryskiewicz, 1987).

The *motivation to innovate* is the basic orientation of the organization toward creativity and innovation. Innovation can be defined as the successful implementation of creative ideas within an organization. Obviously, a part of that process is the encouragement of creativity in individuals. This encouragement should come, ideally, from the highest levels: the chairman, president, or CEO. The role of middle management in the motivation to innovate can, however, also be important. These levels of management are often responsible for communicating and interpreting the orientation of those at the highest levels.

The motivation to innovate can be viewed as a corporate vision; ideally, the president (or chairman or CEO) envisions a future for the organization that rests on innovation, and then formulates that vision into a concise and compelling communication. The overall goal of innovation is clear, and most likely, the general areas of innovation are part of the mission statement. On the basis of existing information (Amabile & S. Gryskiewicz, 1987; Cummings, 1965; Hage & Dewar, 1973; Havelock, 1970; Kanter, 1983; Kimberley, 1981), it appears that the most important elements of the motivation to innovate are: a value placed on innovation in general, an orientation toward risk (vs. an orientation toward maintaining the status quo), a sense of pride in the organization's members and what they are capable of doing, and an offensive strategy of taking the lead toward the future (vs. a defensive strategy of simply wanting to protect the organization's current position).

Resources in the task domain include everything the organization has available to aid work in the task domain. The task domain is the general area which has been targeted for creativity. These resources include a wide array of elements: people with knowledge of the feasibility of implementing particular innovations, people who have familiarity with relevant markets, people with other types of relevant experience in the domain, funds allocated to this work domain, material resources (such as existing means of production within the organization), systems of production, market research resources, data bases of relevant information, and the availability of personnel training in relevant areas. These various resources can be found in a variety of departments and divisions within organizations, including finance, manufacturing (or the equivalent function), personnel, training, and organizational development, in addition to the more traditional "creative" areas (e.g., R&D).

Perhaps because the necessity of resources is so obvious, it has received relatively less research attention than the management-style factors. However, the importance of resources has been clear in our own research (Amabile & S. Gryskiewicz, 1987).

The WEI was designed to specify elements of these three main components within organizations, and to provide a means for assessing employee perceptions of those elements. The instrument may appropriately be administered to employees at all levels and in all functions of an organization. The WEI has two primary purposes: First, testing hypotheses about the impact of environmental factors on creativity; and second, to improve organizational development and the climate for creativity, both at the level of departments and the overall level of the organization. Of the 135 items on the WEI, 3 allow for open-ended written responses (which can be typewritten, edited to ensure anonymity, and presented as part of the feedback given to the target organization), and 32 numerical-response items are experimental (included for research purposes only). The WEI scales being used in the current scoring system consist of 100 numerical-response items. Single numerical items which, during the development process, were dropped from inclusion in particular scales are occasionally analyzed individually for research or feedback purposes.

Development

The development of the WEI went beyond a review of theory and research on creativity in organizations. In order to identify the details of important elements, we designed an investigation to specifically capture the broad range of environmental factors that might influence creativity in organizations (Amabile & S. Gryskiewicz, 1987). Thus, rather than relying on those factors that researchers had chosen to study in the past, we conducted an observational study to allow employees to identify crucial environmental factors.

An initial set of WEI items was developed from content analysis of critical-incident interviews with 120 Research and Development scientists from a variety of organizations. Each was asked to describe the personal and environmental factors present in (a) a high-creativity event from his or her work experience, and (b) a low-creativity event from his or her work experience (Amabile & S. Gryskiewicz, 1987). Detailed content analysis of interview transcripts by teams of independent raters (cf. Amabile & N. Gryskiewicz, 1988) yielded nine categories describing *Environmental Stimulants to Creativity* (factors appearing repeatedly in the high creativity stories) and nine categories describing *Environmental Obstacles to Creativity* (factors appearing repeatedly in the low creativity stories). Subsequent content analyses of additional interviews conducted with other employee functions outside of R&D (e.g, Marketing, Manufacturing, Sales) confirmed the utility and generality of these initial categories. WEI items were written to cover the main elements of each of the categories, often using wording borrowed from the interview responses. Additional items were written to cover the major creativity components outlined in the theory of organizational creativity, as described above. As a result, the original version of the WEI included 18 environment scales (nine stimulants and nine obstacles). The number of items on the scales ranged from 3 to 11 items, depending on the conceptual complexity of the category.

The WEI is currently in its third revision. Version 1 of the WEI was a working draft on which no data were collected. Approximately 600 Version 2 WEIs were administered, and Version 3 was created through additions, deletions, and revisions of items from Version 2. These changes were made after consideration of, first, item analyses and other statistical analyses. Items were revised or eliminated if distributions of responses were clearly non-normal, or if the item showed a poor item-total correlation with its scale. Items were added if the internal consistency of a scale did not meet an acceptable level (.70 or higher). The second consideration was respondents' comments on each item in semi-structured focus groups. Items were revised or eliminated if respondents reported difficulty understanding the items or answering the items, or if they found the items open to multiple interpretations. The third consideration was feedback from client organizations on the comprehensiveness and utility of the instrument. Items were added to enrich scales with environmental factors deemed important by organizations participating in this research process.

Scales

Original scoring protocols for Version 3 data followed *a priori* scales developed from the

theoretical framework described above and the content-analyzed interviews. Revisions in scale construction followed conceptual considerations, item analyses, factor analyses, scale reliability analyses, and own-scale/other-scale correlations. Items were included on scales according to these criteria:

1. The item fit conceptually on the scale.

2. In factor analysis, the item had its primary loading on the same factor as other items from the same scale.

3. In scale reliability analyses, the item did not lower the alpha (internal consistency) of the scale.

4. In own-scale/other-scale analyses (between/within analyses), the item correlated more strongly with its own scale than it did with other scales.

For most of the 100 items in the current WEI scales, all four of these criteria were met. These scales are close to the original *a priori* scales, the major difference being that some items were dropped if they did not meet the statistical criteria. It should be noted that ongoing revision and development of the WEI scales will continue.

Because the original WEI scales were revised in response to initial data analyses, and because an effort was made to reduce redundancy (e.g., an environmental stimulant scale called *Sufficient Resources* and an environmental obstacle scale called *Insufficient Resources*), the current version of the WEI contains only 12 environment scales.

There are eight scales describing *Environmental Stimulants to Creativity*. Each is listed below with the item that showed the highest item-total correlation on internal consistency analysis:

1. *Freedom* (4 items): freedom in deciding what to do in one's work or how to do it; a sense of control over one's own work. Sample item: "I have the freedom to decide how I am going to carry out my projects."

2. *Challenge* (5 items): a sense of having to work hard on challenging tasks and important projects. Sample item: "I feel challenged by the work I am currently doing."

3. *Resources* (9 items): access to appropriate resources, including people, materials, facilities, and information. Sample item: "Generally, I can get the resources I need for my work."

4. *Supervisor* (14 items): a supervisor who sets goals appropriately, supports the work group within the organization, values individual contributions, and serves as an intelligent, enthusiastic work model. Sample item: "My supervisor's expectations for my project(s) are unclear." (Reverse-scored)

5. *Coworkers* (11 items): a diversely skilled work group in which people communicate well, are open to new ideas, constructively challenge each other's work, trust and help each other, and feel committed to the work they are doing. Sample item: "There is free and open communication within my work group."

6. *Recognition* (4 items): fair, constructive feedback on work, leading to appropriate recognition and reward of good efforts; an atmosphere where employees' interests as well as their skills are recognized. Sample item:

"People are recognized for creative work in this organization."

7. *Unity and Cooperation* (6 items): a cooperative, collaborative organizational atmosphere in which there is a lively flow of ideas around a shared vision. Sample item: "There is a generally cooperative and collaborative atmosphere in this organization."

8. *Creativity Supports* (11 items): an organizational atmosphere in which creativity is encouraged and mechanisms exist to foster the expression and development of creative ideas. Sample item: "New ideas are encouraged in this organization."

There are four scales describing *Environmental Obstacles to Creativity*. Each is listed below with the item that showed the highest item-total correlation on internal consistency analysis:

1. *Time Pressure* (5 items): too much work to do in the time allotted. Sample item: "I have too much work to do in too little time."

2. *Evaluation* (9 items): threatening evaluation procedures; an atmosphere of excessive negative criticism of work. Sample item: "Destructive criticism is a problem in this organization."

3. *Status Quo* (4 items): an emphasis in the organization on avoiding risks and doing things the way they have always been done. Sample item: "Management avoids controversial ideas in this organization."

4. *Political Problems* (6 items): areas of the organization serving as hindrances to each other's work, through destructive competition, excessive concern about protecting territory, and other political problems. Sample item: "There are many political problems in this organization."

Two Assessment Scales are included on the WEI for validation purposes. They are designed to assess the overall creativity and productivity of work in the organization:

1. *Creativity* (6 items): a creative, innovative organization or area of an organization, where a great deal of creativity is called for and where people believe they are actually producing creative work. Sample item: "My area of this organization is creative."

2. *Productivity* (6 items): an efficient, effective, and productive organization or area of an organization. Sample item: "Overall, this organization is effective."

Item and Response Formats

Items on the WEI are written to be descriptive of the work environment. They are both positively and negatively valenced (e.g., "The tasks in my work are challenging;" "We do not have sufficient personnel for the projects I am currently doing;" "There is a lively and active flow of ideas;" "My supervisor has poor interpersonal skills.")

The WEI instructions state that the purpose of the questionnaire is to obtain an accurate picture of the respondent's current work environment. It also states that the instrument is a survey, not a test, and stresses the confidentiality of all responses. Respondents are instructed to answer the questions by giving their impressions of their cur-

rent work environment. The instructions also define several key terms that appear repeatedly in the questions, such as "current work environment," "work group," "supervisor," "projects," "this organization," and "my area of this organization."

A 4-point response scale is presented on the WEI, purposely avoiding a midpoint in order to force respondents away from a neutral default option: (1) *never or almost never true of your current work environment*; (2) *sometimes true of your current work environment*; (3) *often true of your current work environment*; or (4) *always or almost always true of your current work environment*. This format stands in contrast to that used by most work environment instruments, where respondents are given a *strongly disagree-strongly agree* scale. The decision was made to use the "how often true" format in order to more accurately capture the *frequency* with which the respondents experience each aspect of their environment. For example, when respondents consider the item, "I feel that I am working on important projects," they may decide that they feel this way *most* of the time. Their experience will be more accurately captured by the "often true of your current work environment" option than by a "slightly agree" option.

Comparison with Other Instruments

Table 1 presents a review of eight instruments, including the *Work Environment Inventory*, which were specifically designed to assess the work environment for creativity and innovation. Of these instruments, four are proprietary.[1] Most of the eight instruments were designed for use in most areas, functions, and levels of organizations.

Table 1 also reviews the theoretical development, format, and psychometric characteristics of each of the instruments. In each of these areas, the review reveals several similarities between the WEI and the other instruments, and some important differences. The differences include:

1. **Item Source:** Unlike the other instruments reviewed, the WEI is based on both theory and research conducted specifically for the development of the instrument. The *Creative Climate Questionnaire* (Ekvall, Arvonen, & Waldenstrom-Lindblad, 1983) and the *Innovation Assessment* (Arthur Young, 1985) are both based on theory and reviews of previous research. The *Siegel Scale of Support of Innovation* (Siegel & Kaemmerer, 1978) and the *Innovation Climate Index* (Arthur D. Little, 1985) were developed from analyses of previous studies. The *Creativity Audit* (Rickards & Bessant, 1980) and the *Innovation Audit* (Pinchot & Company, 1985) were both based on the personal experience of the authors.

Interestingly, the *Climate for Creative Productivity Index* (CCPI; Witt & Beorkrem, 1989) is based on the same theoretical model as the WEI (Amabile, 1983a, 1988a). The major differences between the CCPI and the WEI are the WEI's comprehensive coverage of environmental factors, larger data set, and more complete psychometric information.

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[1]Although the WEI is a proprietary instrument, it is available free of charge for research purposes. Interested researchers should contact either Teresa M. Amabile, Department of Psychology, Brandeis University, Waltham, MA, 02254 *or* Luke Novelli, Center for Creative Leadership, P.O. Box P-1, Greensboro, NC 27402.

Instrument	Item Source	Domains/Scales	Format	Subjects/Samples	Factor Structure	Scale Reliabilities	Test-Retest	Validity
Siegel Scale of Support of Innovation (Siegel & Kaemmerer, 1978)	Analyses of Previous Studies	5 dimensions: • leadership • ownership • norms for diversity • continuous development • consistency	61 items, agree-disagree scale	• 1899 teachers and students from 6 traditional schools • 71 teachers and students from 2 innovative schools	3 factors: • support for creativity • tolerance of differences • personal commitment	.86-.94	NA	Differentiated Between Traditional & Alternative Schools
The Creativity Audit (Rickards & Bessant, 1980)	Personal Experience	10 scales: • track record • managerial attitudes toward market place • managerial attitudes toward ideas & creativity • organizational structure • management style • communications • human resources • reward systems • planning and control systems • general environment	33 items, agree-disagree scale	• 242 managers & technical professionals from a range of organizations	5 factors: • commitment to innovation • group process (cohesiveness, equity) • planning responsibility • inertial tendencies • group dynamism (risk-taking)	NA	NA	NA
Creative Climate Questionnaire (Ekvall, Arvonen, & Waldenstrom-Lindblad, 1983)	Review of Theory and Research	4 domains: • mutual trust & confidence, support for ideas, open relationships • challenge & motivation, commitment to organization's goals & operations • freedom to seek information & show initiative • pluralism in views, knowledge & experience, exchange of opinions & ideas	50 items, agree-disagree scale	• 192 R&D personnel from several different companies • 234 researchers & engineers from a large engineering company • 100 employees of 3 small industrial companies	6 factors: • challenge • support for ideas • trust • freedom in job • dynamism • tension • a "global" scale added which is a composite, 12 items from first 6 scales	.71-.90	NA	Differentiated Between Successful & Unsuccessful Departments

239

Table 1 (continued)

Instrument	Item Source	Domains/Scales	Format	Subjects/Samples	Factor Structure	Scale Reliabilities	Test-Retest	Validity
Innovation* Assessment (Arthur Young, Inc. 1985)	Review of Theory and Research	• Importance/ priority of innovation to company • Innovation management in division and company overall • Innovation facilities and barriers • Internal entrepreneurship • Innovation results and management	32 items, variety of response formats	NA	NA	NA	NA	NA
The Innovation* Audit (Pinchot & Company, 1985)	Personal Experience	Fundamental Innovation Factors: • values & goals that support innovation • sponsorship • rewards • turfiness • idea generation Freedom Factors: • bootleg slack • teams • patience & continuity • tolerance of small beginnings • mistakes & failures • controls & approvals • self-selection & multiple options	NA	NA	NA	NA	NA	NA
Climate for Creative Productivity Index (Witt & Beorkrem, 1989)	Amabile's (1983a, 1988a) Model of Creativity & Innovation	Single scale: Climate for Creative Productivity	39 items	76 R&D Scientists	NA	.85	NA	• Significant Correlations with Effectiveness & Usefulness Ratings • Accounts for Variance Beyond Job Satisfaction

Table 1 (continued)

Instrument	Item Source	Domains/Scales	Format	Subjects/Samples	Factor Structure	Scale Reliabilities	Test-Retest	Validity
Innovation* Climate Index (Arthur D. Little, 1985)	Analyses of Previous Studies	• organizational structure, management systems, style & values • innovation policies & objectives • emphasis on interpersonal skills • deferring short-term profits, reward innovators • appropriate environment for innovators • informal communications	25 Factors, Scale-Rated, Comparing Current & Ideal Climates	Employees in Several Corporations	NA	NA	NA	NA
Creative* Environment Scales: Work Environment Inventory (Amabile, 1987)	Amabile's (1983a, 1988a) Theory; Research; and Semi-Structured Interviews	Environmental Stimulants to Creativity: • freedom • challenge • resources • supervisor • coworkers • recognition • unity • supports Environmental Obstacles to Creativity: • time press • evaluation • status quo • politics Assessment Scales: • creativity • productivity	100 Items, Scale-rated	Employees in 5 Different Organizations/ Work Groups ($N = 645$)	10 Factors, Largely Reflecting the Stimulants & Obstacles Scales	.72-.93	82-.97	• Differentiates Work Environments • Significant Differences (in Predicted Direction) Between Real & Ideal Environments for Creativi • Some Scales are Significar Concurrent Predictors of Creativity

241

Note: *Proprietary instrument. Others are published in the public domain. NA = the data either were not collected or have not been made available

2. **Domains/Scales:** The instruments cover a very wide diversity of characteristics, with four categories appearing most frequently:(a) support for creativity/diversity/innovation; (b) freedom; (c) rewards for innovation; and (d) communication/trust/unity. The *Innovation Assessment* (Arthur Young, 1985) is similar to the WEI in its inclusion of both facilitators *and* inhibitors of creativity. The *Creative Climate Questionnaire* (Ekvall et al., 1983) is similar to the WEI in its inclusion of challenge as a stimulant to creativity. The WEI differs from other instruments in its explicit inclusion of resources as a stimulant to creativity, and its inclusion of time pressure, evaluation, status quo, and political problems as obstacles to creativity.

3. **Format:** The number of items on these questionnaires ranges from 25 to 100, with most response formats utilizing an agree-disagree scale. Only the WEI uses a frequency ("how often true") scale.

4. **Subjects/Samples:** Reported sample sizes range from 71 to 1,899, with most samples composed of employees in business organizations. Subjects for the *Siegel Scale of Support of Innovation* (Siegel & Kaemmerer, 1978) were teachers and students.

5. **Factor Structure:** Four instruments (including the WEI) report a factor analysis. In each of these cases, the content of the factors is similar to that of the domains/scales, but the number of factors may differ considerably from the number of domains/scales.

6. **Scale Reliabilities:** Three instruments (including the WEI) report scale reliabilities (internal consistencies). The range of those reliabilities is acceptable (above .70).

7. **Test-Retest Reliabilities:** None of the instruments except the WEI reports test-retest reliabilities.

8. **Validity:** Four of the instruments (including the WEI) report validity evidence. For both the *Siegel Scale of Support of Innovation* and the *Creative Climate Questionnaire*, the validity data consist of differentiation between environments that differed on criteria relevant to creativity. In addition to such differentiation data, validity data for the WEI consists of significant differences between real and ideal climates for creativity, and significant concurrent predictions of rated creativity in organizations. Validity data for the *Climate for Creative Productivity Index* consist of concurrent correlations with effectiveness measures and discrimination from job satisfaction.

Overall, the WEI seems to be the most similar to the *Creative Climate Questionnaire* (Ekvall et al., 1983) in the environmental factors that it includes and the psychometric approach taken to scale development.

Normative Samples

Normative data ($N=645$) on the WEI have been collected on five different groups, representing all professional levels within organizations and all functional groups (i.e., marketing, manufacturing, R&D, sales, personnel, and so on). The five groups are listed below with fictional names:

1. *Government Lab* ($n = 68$), a federal government research and development organization concerned with materials manufacturing processes.

Table 2 *WEI Scale Norms: Means and Standard Deviations*

	Govt Lab	Chem Inc.	Educ Inst.	Text Inc.	Mid-West	Over-All
n	68	254	127	100	96	645
ENVIRONMENTAL STIMULANTS						
Freedom	3.10	2.62	2.96	3.07	3.26	2.90
	0.61	0.69	0.68	0.58	0.48	0.68
Challenge	2.95	2.83	2.97	3.04	3.23	2.96
	0.70	0.64	0.60	0.64	0.52	0.64
Resources	2.43	2.92	3.01	3.29	3.11	2.97
	0.59	0.54	0.53	0.55	0.59	0.59
Supervisor	2.81	2.80	2.99	3.13	2.98	2.92
	0.81	0.71	0.74	0.62	0.54	0.70
Coworkers	3.01	2.96	3.13	3.23	3.24	3.08
	0.61	0.54	0.58	0.49	0.41	0.55
Recognition	2.49	2.27	2.74	2.86	2.92	2.57
	0.77	0.67	0.67	0.66	0.55	0.72
Unity	2.49	2.17	2.71	2.82	2.88	2.52
	0.70	0.66	0.62	0.62	0.57	0.70
Supports	2.71	2.45	2.86	3.09	3.02	2.74
	0.63	0.52	0.50	0.52	0.47	0.58
ENVIRONMENTAL OBSTACLES						
Time Press	2.57	2.93	2.93	2.49	2.90	2.82
	0.61	0.69	0.70	0.64	0.56	0.68
Evaluation	2.04	2.52	2.20	2.13	2.00	2.27
	0.50	0.55	0.52	0.55	0.45	0.56
Status Quo	2.47	2.59	2.14	1.93	2.20	2.33
	0.83	0.63	0.65	0.54	0.64	0.69
Politics	2.51	2.59	2.27	2.24	2.14	2.40
	0.70	0.61	0.52	0.49	0.55	0.60
ASSESSMENT SCALES						
Creativity	2.73	2.50	2.54	2.74	3.07	2.65
	0.61	0.63	0.61	0.61	0.53	0.64
Productivity	2.58	2.72	3.18	3.21	3.20	2.94
	0.74	0.59	0.54	0.47	0.49	0.62

Note: Standard errors of the mean range between .04 and .11 for the separate norm groups, and between .02 and .03 for the "Overall" group.

Table 3
Results of Principal Components Analysis of WEI Items

	Factors									
	1	2	3	4	5	6	7	8	9	10
ENVIRONMENTAL STIMULANTS TO CREATIVITY										
Freedom (4)								4		
Challenge (5)							5			
Resources (9)						9				
Supervisor (14)			14							
Coworkers (11)				11						
Recognition (4)		4								
Unity (6)		6								
Supports (11)		10						1		
ENVIRONMENTAL OBSTACLES TO CREATIVITY										
Time Press (5)							5			
Evaluation (9)		4				4	1			
Status Quo (4)		3								1
Politics (6)				1	5					
% Variance Accounted for by Factors	10.3	8.6	5.6	5.0	4.8	3.6	3.6	2.6	1.9	1.3
Eigenvalues	27.4	4.6	3.3	2.8	2.5	1.8	1.5	1.4	1.1	1.0

Note: The number in parentheses represents the number of items in that scale, and the entries in the Table denote the number of items on a particular scale that showed a primary loading on that factor.

2. **Chemical Inc.** ($n = 254$), the chemicals research and development arm of a major oil company ($2+ billion); only the R&D function included.

3. **Educational Institution** ($n = 127$), a nonprofit educational institution ($13 million) carrying out research and training on effective management and leadership; all functions included.

Table 4
Correlations Between WEI Scales (N = 645)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ENVIRONMENTAL STIMULANTS TO CREATIVITY														
1. Freedom	----	.33	.34	.45	.47	.49	.49	.52	-.22	-.53	-.35	-.42	.53	.43
2. Challenge		----	.27	.38	.45	.48	.45	.53	.19	-.31	-.27	-.27	.60	.51
3. Resources			----	.43	.38	.46	.48	.52	-.31	-.45	-.40	-.46	.34	.51
4. Supervisor				----	.57	.62	.59	.61	-.20	-.57	-.45	-.49	.48	.53
5. Coworkers					----	.59	.60	.60	-.09	-.48	-.33	-.43	.54	.56
6. Recognition						----	.68	.77	-.15	-.62	-.49	-.53	.57	.60
7. Unity							----	.78	-.22	-.73	-.55	-.67	.56	.70
8. Supports								----	-.17	-.70	-.62	-.57	.61	.66
ENVIRONMENTAL OBSTACLES TO CREATIVITY														
9. Time Press									----	.37	.16	.27	-.07	-.09
10. Evaluation										----	.59	.70	-.48	-.54
11. Status Quo											----	.55	-.34	-.46
12. Politics												----	-.35	-.50
ASSESSMENT SCALES														
13. Creativity													----	.55
14. Productivity														----

Note: All correlations were statistically significant, except the correlation between Time Pressure and Creativity.

4. *Textiles Inc.* (*n* = 100), a *Fortune 100* textile manufacturing company ($2+ billion) specializing in man-made fibers (marketing, manufacturing, and R&D represented).

5. *Midwest* (*n* = 96), a sample of business leaders from a wide variety of professions and organizations in a Midwestern state.

It is important to consider the unit of analysis for these normative groups. Even though each sample contained somewhat different functional groups (R&D only, for example, or R&D plus marketing and manu- facturing), all individuals within the sample were asked to give their impressions of their organizational climate. Indeed, most questions on the WEI refer either implicitly or explicitly to the organization; very few refer to the specific department or area within the organization. The Midwest sample presents a special case. In that sample, each respondent was from a different organization. Thus, it can be considered a "baseline" group.

Scale means and standard deviations for each normative group and for all groups combined are presented in Table 2.

Table 5
WEI Scale Reliabilities With All Norm Groups Combined
(N = 645)

	Number of Items	Mean Inter-item Correlation	Alpha
ENVIRONMENTAL STIMULANTS TO CREATIVITY			
Freedom	4	.39	.72
Challenge	5	.47	.82
Resources	9	.39	.85
Supervisor	14	.49	.93
Coworkers	11	.37	.87
Recognition	4	.51	.81
Unity	6	.58	.89
Supports	11	.40	.88
ENVIRONMENTAL OBSTACLES TO CREATIVITY			
Time Press	5	.43	.79
Evaluation	9	.33	.82
Status Quo	4	.41	.74
Politics	6	.34	.75
ASSESSMENT SCALES			
Creativity	6	.48	.85
Productivity	6	.59	.89

Table 6
WEI Scale Reliabilities (alphas) by Norm Group

	Gov't Lab	Chem Inc.	Educ. Inst.	Text. Inc.	Mid-West
n	68	254	127	100	96
ENVIRONMENTAL STIMULANTS TO CREATIVITY					
Freedom	.67	.69	.61	.73	.63
Challenge	.89	.79	.72	.86	.79
Resources	.84	.82	.80	.85	.84
Supervisor	.95	.94	.89	.93	.91
Coworkers	.89	.86	.85	.87	.81
Recognition	.84	.79	.62	.81	.75
Unity	.90	.87	.86	.87	.84
Supports	.90	.84	.82	.88	.85
ENVIRONMENTAL OBSTACLES TO CREATIVITY					
Time Press	.74	.84	.74	.81	.68
Evaluation	.77	.81	.73	.82	.77
Status Quo	.82	.69	.56	.59	.71
Politics	.80	.76	.66	.65	.75
ASSESSMENT SCALES					
Creativity	.85	.84	.78	.88	.75
Productivity	.92	.86	.86	.84	.92

Scale Characteristics

A factor analysis (principal components, Varimax rotation) was carried out on the work environment items on the WEI. The most interpretable pattern of factors was obtained when the number of factors was limited to 10. These 10 factors are presented in Table 3, with an indication of the number of items per scale that loaded primarily on each factor. As can be seen, Factor 1 is a quite general factor including many aspects of organizational environment. Factor 2 concerns the supervisor's interaction with and planning for the work group. Factor 3 concerns coworkers, and Factor 4 concerns resources. The other factors deal with various other aspects of work environment. In general, our environment scales fit well within the factor patterns. All items in 8 of the 12 scales have their primary loadings on just one factor. On three additional scales, all but one item have their primary loadings on just one factor. Only the Evaluation scale items are clearly split into two factors.

Table 7
Own-Scale/Other-Scale Correlations (N = 645)

	Number of Items Correlating More Highly with Another Scale	
	(By > .01)	(By > .05)
ENVIRONMENTAL STIMULANTS		
Freedom (4)	1	0
Challenge (5)	0	0
Resources (9)	1	0
Supervisor (14)	0	0
Coworkers (11)	0	0
Recognition (4)	1	0
Unity (6)	0	0
Supports (11)	0	0
ENVIRONMENTAL OBSTACLES		
Time Press (5)	0	0
Evaluation (9)	0	1
Status Quo (4)	1	0
Politics (6)	0	0
ASSESSMENT SCALES		
Creativity (6)	0	0
Productivity (6)	0	0

Note: The number in parentheses represents the number of items in the scale.

Table 8
Test-Retest Reliabilities for WEI Scales

ENVIRONMENTAL STIMULANTS TO CREATIVITY

Freedom	.89
Challenge	.91
Resources	.88
Supervisor	.97
Coworkers	.95
Recognition	.94
Unity	.94
Supports	.96

ENVIRONMENTAL OBSTACLES TO CREATIVITY

Time Press	.82
Evaluation	.93
Status Quo	.93
Politics	.93

ASSESSMENT SCALES

Creativity	.93
Productivity	.91

Factor analysis of the items on the Assessment Scales produced fairly clear results. Of the two factors yielded by the analysis, the first seems to represent "Productivity." On that factor, all six items from the Productivity scale have their primary loading; all loadings are .58 or higher. The second factor seems to represent "Creativity." On that factor, five of the six items from the Creativity scale have their primary loading; all loadings are .57 or higher. The remaining item on the Creativity scale had loadings that were similar on the two factors (.59 on Factor 1 and .49 on Factor 2).

Table 4 displays zero-order correlations between all WEI scales, including the Assessment scales. (These correlations were computed with the data from the 645 indi-

vidual respondents because the construct of interest is the intraindividual perception of similarity between various aspects of the environment.) As can be seen, most scales were correlated moderately with most other scales. Of the 91 intercorrelations, only 14 are below .30, and only 14 are above .60. This suggests that, although these various aspects of organizational environment form an interconnected network, few (if any) of the scales can be considered essentially redundant.

Scale reliabilities (internal consistencies) were quite strong, as can be seen in Table 5. All 14 reliabilities are above .70, 12 are .75 or higher, and 10 are above .80. As can be seen in Table 6, this pattern of high scale reliabilities held up within each of the five norm groups. Of the 70 reliabilities listed for these norm groups, only 11 are below .70, and only 5 are below .65.

Table 9

Differences Between Groups on WEI Scales

	Univariate F*	Gov't Lab	Chem. Inc.	Educ Inst.	Text. Inc.	Mid-West
ENVIRONMENTAL STIMULANTS TO CREATIVITY						
Freedom	23.55	2^a	$5^{a,b,c}$	4^b	3^c	1^b
Challenge	7.28	4	5^a	3	2	1^a
Resources	27.84	$5^{a,b,c}$	$4^{a,d}$	3^b	$1^{b,d}$	2^c
Supervisor	5.41	4	5^a	2	1^a	3
Coworkers	7.86	4	$5^{a,b}$	3	2^a	1^b
Recognition	26.57	$4^{a,b}$	$5^{c,d,e}$	3^c	$2^{a,d}$	$1^{b,e}$
Unity	34.39	$4^{a,b}$	$5^{a,b,c}$	3^c	2^a	1^b
Supports	39.33	$4^{a,b}$	$5^{a,b,c}$	$3^{c,d}$	$1^{a,d}$	2^b
ENVIRONMENTAL OBSTACLES TO CREATIVITY						
Time Press	11.68	$4^{a,b,c}$	$1.5^{b,d}$	$1.5^{a,e}$	$5^{d,e,f}$	$3^{c,f}$
Evaluation	25.85	4^a	$1^{a,b,c,d}$	2^b	3^c	5^d
Status Quo	24.28	$2^{a,b}$	$1^{c,d}$	$4^{a,d}$	$5^{b,e}$	3^c
Politics	15.41	2^a	$1^{b,c,d}$	3^b	4^c	$5^{a,d}$
ASSESSMENT SCALES						
Creativity	16.26	3^a	5^b	4^c	2^b	$1^{a,b,c}$
Productivity	31.91	$5^{a,b,c}$	$4^{d,e,f}$	$3^{a,f}$	$1^{b,d}$	$2^{c,e}$

Note. *All Fs (4,632) are significant at the $p < .0003$ level. Integers denote rank-ordering of means, with 1 being the highest on that scale. Within a row, numbers sharing a superscript (a,b,c,d,e,f) are significantly different at the .05 level or better, by Scheffe's test. Actual means can be found in Table 1. The multivariate F for the Environmental Stimulants was 12.42 ($p < .001$). The mulitvariate F for Environmental Obstacles was 15.29 ($p < .001$). The multivariate F for the Assessment Scales was 25.89 ($p < .001$).

One final crucial analysis of the integrity of the WEI scales involved the computation of own-scale/other-scale correlations (between/within scale analyses). In this item-by-item analysis, the corrected item-total correlation with the item's own scale is compared with that item's correlation with each of the other scales. If results indicate large numbers of items correlating more highly with other scales than with their own, there is reason to question both the statistical integrity and the conceptual clarity of the scales. As illustrated in Table 7, this analysis lended further credibility to the WEI scales. On 9 of the 14 scales, all items correlated more strongly with their own scale than with

	CURRENT WORK ENVIRONMENT	IDEAL WORK ENVIRONMENT
ENVIRONMENTAL STIMULANTS		
Freedom	3.26	3.63
Challenge	3.23	3.71
Resources	3.11	3.71
Supervisor	2.98	3.68
Coworkers	3.24	3.76
Recognition	2.92	3.81
Unity	2.88	3.76
Supports	3.02	3.71
ENVIRONMENTAL OBSTACLES		
Time Press	2.90	2.35
Evaluation	2.00	1.37
Status Quo	2.20	1.59
Politics	2.14	1.45
ASSESSMENT SCALES		
Creativity	3.07	3.76
Productivity	3.20	3.79

Note: All differences between real (current) and ideal are significant at $p < .0001$ (2-tailed t-tests). Standard errors of the mean range between .04 and .06 for "Current Work Environment," and between .03 and .05 for "Ideal Work Environment."

any other. On 4 scales, one item correlated more strongly with another scale; however, in each case, the difference in the magnitude of the correlations was less than .05. On only the Evaluation scale was an item correlated substantially higher with another scale. There, the difference in the magnitude of the correlations was .08.

Test-Retest Reliability

Long-term test-retest reliability, which is essential in tests of personality and intelli-

gence, is not desirable in tests of work environments. To the extent that environments change over time, test indicators must also be expected to change. However, it is desirable to have short-term test-retest reliability to indicate that the instrument is not being answered in a random or capricious fashion. Forty of the original 68 Labco respondents completed a second WEI three months after the first and yielded extremely high test-retest reliabilities. As shown in Table 8, all were higher than .80, and 11 of the 14 were higher than .90.

Validity

A first step toward asserting construct validity in a work environment instrument is to demonstrate that it discriminates between different work environments. As Table 9 illustrates, MANOVAs and ANOVAs of data from the five normative groups revealed significant differences on each of the scales. Moreover, these differences formed consistent and meaningful patterns. For example, Chemical Inc. clearly had the poorest work environment. It was at or near the bottom on all stimulants, and was significantly different on stimulants from many of the other groups. As expected, Chemical Inc. was at or near the top on all obstacles, and was once again significantly different from most of the other groups on each obstacle.

In addition, because we assigned some of our scales the label "Environmental Stimulants to Creativity," and others the label "Environmental Obstacles to Creativity," it is necessary to show that the perceptions of respondents do agree with our own views about what is a stimulant to creativity and what is an obstacle. Table 10 presents data from the Midwest respondents. They comp-

Table 11
Stepwise Regressions: WEI Environment Scales as Predictors of Creativity and Productivity

	Predictors of Creativity				Predictors of Productivity		
	Beta	*t*	*p*		Beta	*t*	*p*
ENVIRONMENTAL STIMULANTS							
Freedom	.22	7.49	.001		.07	2.39	.02
Challenge	.37	11.76	.001		.17	5.69	.001
Resources	*				.23	7.12	.001
Supervisor	*				*		
Coworkers	.13	3.15	.002		.11	2.68	.008
Recognition	*				.08	2.16	.03
Unity	.13	2.97	.003		.21	5.39	.001
Supports	.19	3.78	.001		.13	2.44	.02
ENVIRONMENTAL OBSTACLES							
Time Press	*				*		
Evaluation	*				*		
Status Quo	*				*		
Politics	.09	2.42	.02		*		
ADJUSTED R SQUARE	.60				.62		

*Nonsignificant predictor

pleted the WEI under two different instructional sets. In one, they were asked to describe their current work environment; and in the other, they were asked to describe the ideal work environment for fostering their creativity. Differences between these means on all scales were significant, and all were in the direction that matched our "Stimulants" and "Obstacles" labels.

In the Government Lab sample, a separate instrument was used to assess the creativity of specific ongoing projects. Although the great variability in responses (and response rates) to this instrument renders it problematic, these data provide tentative concurrent validity for some of the scales. More specifically, rated project creativity correlated significantly with Challenge and Supervisor as assessed on project members' WEIs.

Finally, it was important to determine which environment items and environment scales significantly correlated with (or concurrently predicted) creativity as assessed on the WEI. Simple correlation analyses revealed that 17 single environment items had correlation coefficients of .50 or higher with the Creativity scale (all $p < .0001$). Each is listed below with its item number, the scale to which it belongs, and the correlation with creativity:

#3. I feel that I am working on important projects. [Challenge] (.52)

#9. The tasks in my work are challenging. [Challenge] (.53)

#21. In this organization, there is a lively and active flow of ideas. [Unity and Cooperation] (.56)

#24. There is a generally cooperative and collaborative atmosphere in this organ-

ization. [Unity and Cooperation] (.50)

#44. This organization has a nurturing environment. [Unity and Cooperation] (.50)

#47. People are recognized for creative Work in this organization. [Recognition] (.51)

#57. There is an open atmosphere in this organization. [Unity and Cooperation] (.50)

#59. New ideas are encouraged in this organization. [Creativity Supports] (.53)

#68. People are rewarded for creative work in this organization. [Recognition]

#81. People are encouraged to solve problems creatively in this organization. [Creativity Supports] (.56)

#82. This organization has a good mechanism for encouraging and developing creative ideas. [Creativity Supports] (.54)

#88. I feel that top management is enthusiastic about my project(s). [No scale] (.50)

#91. In my daily work environment, I feel a sense of control over my own work and my own ideas. [Freedom] (.53)

#95. I feel challenged by the work I am currently doing. [Challenge] (.62)

#112. Ideas are judged fairly in this organization. [Evaluation, reverse scored] (.57)

#113. The tasks in my work call out the best in me. [Challenge] (.55)

#116. I am satisfied with the level of creativity called for in my daily work. [Experimental research scale] (.58)

Multiple regression analyses were used to concurrently predict Creativity scale ratings from all the environment scales, simultaneously. Results are presented in Table 11, along with results from similar analyses predicting the Productivity scale. As can be seen, 6 of the 12 Environment scales were significant concurrent predictors of creativity as assessed on the WEI Creativity scale. Only one of these scales lead to an unexpected finding: Political Problems (designated an Obstacle on *a priori* grounds) was a *positive* correlate of creativity in this analysis. Perhaps this scale is an indicator of a generally turbulent environment which might, under some circumstances, lead to (or reflect) a high level of creativity. Future research will be directed at replicating and explicating this result. At this point, because of the low Beta weight associated with this result, it is important not to over-interpret the finding.

Importantly, the WEI scales seem *not* to indiscriminately assess a general overall positive or negative view of the organization or the work it is doing. The Political Problems scale relates to creativity but not productivity, and the Resources and Recognition scales relate to productivity but not creativity. Moreover, two of the scales that relate to both creativity and productivity were considerably stronger concurrent predictors of creativity than of productivity: Challenge and Freedom. Challenge appears to be particularly important. Not only was it the strongest concurrent predictor of creativity in the regression analysis, but, as noted above, it was the strongest concurrent predictor of creativity in the analysis of Government Lab project creativity.

Four of the environment scales were unrelated to creativity and productivity. This negative result is of considerable interest because, if it is replicated in future validity studies, it would contradict not only our *a priori* predictions but also the assumptions of our Midwest respondents who rated their ideal environments for creativity. In general, however, the WEI environmental scales appear highly relevant to both creativity and productivity within organizations; the adjusted R^2 was .60 for creativity predictions and .62 for productivity predictions.

Discussion

The data presented suggest that the WEI has both internal integrity and external validity. This instrument, designed specifically to assess aspects of the work environment relevant to creativity, yields several internally consistent scales that reflect perceptions of particular environmental factors in organizations. These scales show good short-term test-retest reliability. Moreover, the scales significantly discriminate between different work environments, show significant differences in terms of respondents' real and ideal work environments for creativity, and demonstrate some concurrent validity (where predictions of creativity can be discriminated from predictions of productivity). These findings are based on a relatively large data set, drawn from several populations of working adults.

Despite these encouraging results, some limitations and puzzles are evident. Most obviously, it appears possible that not all of the environmental stimulants and environmental obstacles on the WEI actually do have an impact on creativity within organizations. One clear limitation on data interpretation is that our concurrent validity data are subject to "method variance," because the same individuals provided data on both the independent and the dependent variables used in regression. Moreover, of the eight factors identified *a priori* as stimulants to creativity (an identification that was perfectly matched by our Midwest respondents' ratings of the Ideal Environment for Creativity), only five were significant and positive predictors of creativity in regression analyses. Of those five stimulants, only Freedom and Challenge were clearly stronger predictors of creativity than of productivity. On the other hand, two stimulants that did not significantly predict creativity *did* significantly predict productivity (Resources and Recognition). Finally, of the four factors identified *a priori* as obstacles to creativity (in agreement with our Midwest respondents), only one (Political Problems) was a significant predictor of creativity--and the relationship was a positive one, contrary to our hypotheses.

It is encouraging that the WEI environmental factors accounted for such a large proportion of the variance in creativity ratings and in productivity ratings, and that there was some meaningful discrimination between creativity and productivity. However, if future analyses replicate the present findings on the relationship between specific environmental features and creativity, revision and refinement of the theory of organizational influences on creativity are warranted.

Broad practical applications of the WEI are possible. The instrument may be used not only to describe employees' perceptions of their work environment, but also to diagnose those features of the organizational climate that may need improvement in order to stimulate creativity. However, even if further research does reveal that all the "en-

vironmental stimulants" support creativity and all the "environmental obstacles" undermine creativity, wholesale application of these findings would be unwarranted. Clearly, it would be a mistake to blindly eliminate all factors identified as "obstacles" and implement to the maximum all factors identified as "stimulants."

In our own work with organizations, we have found that appropriate levels of balance in environmental factors appear most conducive to creativity. For example, even though Freedom appears to be a strong stimulant to creativity, this result should not be interpreted to mean that employee's creativity will continue to increase as they are given progressively higher levels of autonomy. On the contrary, creativity may be maximized when supervisors provide a balance by giving clear direction concerning the ultimate goal of a project, but allowing autonomy in the approach to attaining that goal. This delicate balance in *goal-setting* is the balance between what Pelz and Andrews (1966) called coordination and freedom. Similar balance points may be necessary in *reward systems, evaluation,* and *pressure* (Amabile, 1988a).

Ongoing and planned WEI research has several goals, directed at continuing to develop a valid theory of creativity within organizations, and at making the instrument maximally useful to supervisors and organizations wishing to improve the work environment for creativity: (a) the further refinement of WEI scales, following both conceptual and statistical criteria; (b) the expansion of data sets into a greater diversity of business and non-business organizations; (c) the collection of additional creativity and productivity data for further validity tests; (d) the identification of those WEI scales and single items that serve as

the best specific predictors of creativity; (e) an exploration of the relationship between and relative utility of the WEI and other instruments designed to assess the general work environment and the environment for creativity; and (f) the refinement of the theoretical model of creativity in organizations, on the basis of these data.

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