The Relationship Between Cognitive Style and Individual Psychological Climate: Reflections on a Previous Study

Scott G. Isaksen and Kenneth J. Lauer
Creativity Research Unit
Creative Problem Solving Group - Buffalo

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Abstract

Isaksen and Kaufmann (1990) conducted an exploratory study into the relationship between cognitive style and individual perceptions of creative climate. Clapp and Kirton (1994) raised questions regarding the theoretical constructs and methodology used in this study. This article reviews the original research, addresses those questions raised by Clapp and Kirton and makes recommendations for future research.
Introduction

Isaksen & Kaufmann (1990) performed an exploratory study that sought to determine if a relationship exists between cognitive style and individual perceptions of climate for creativity and change. They explored this relationship by examining how people of strongly different cognitive styles perceived the climate for creativity and change in their organizations. Clapp and Kirton (1994) responded to this study by challenging the theoretical relationship of the two instruments used in the original study. Their response highlighted key points, both theoretical and methodological, requiring further explanation and investigation. The purposes of this article are threefold. First, to provide a more complete reporting of the original study conducted by Isaksen and Kaufmann (1990); second, to respond to the points, questions, and issues offered by Clapp and Kirton (1994); and third, to lay out an agenda for research and inquiry relating to climate for creativity, change, and cognitive style.

The impetus for the original study stemmed from work in the person-environment (P-E) fit domain (Lewin, 1936; Murray, 1938). This domain historically stems from the argument that behavior is attributed either to the characteristics of the person or to elements within the environment. The third position, and the keystone for the P-E fit domain, is that both intra-personal characteristics and the environment influence behavior (Caplan, 1983; Holland, 1966; Pervin, 1987; Schneider, 1987a).

The second major reason for pursuing the inquiry into the relationship between climate for creativity and change and creative style was the development of an emerging program of creativity research which has been characterized as interactionist and ecological (Isaksen, Puccio & Treffinger, 1993; Puccio, 1993). There are important conceptual and practical linkages for creativity research and practice using an ecological framework among the four main areas of person, process, product, and situation.

In order to better understand which creative problem-solving approaches work best for whom, and under what circumstances, we need appropriate measures and clear concepts within all four main areas. Researchers and practitioners will need to understand individual differences in cognitive style as well as the situational conditions related to effectively learning and applying creative problem-solving approaches. The SOQ is designed to assess situational conditions related to creativity in such a way that it does not prescribe what climate is perfect for creativity to occur for any individual, group, or organization. Rather than providing a simplistic and ubiquitous normative goal toward which everyone should strive (e.g., KEYS by the Center for Creative Leadership) our approach to measurement of climate provides a profile aimed at implementing organizational improvement initiatives.

Our research (Isaksen, Lauer & Ekvall, In press) has shown that higher scores on a dimension of creative climate are not always an indicator of higher creative output. In fact a score too close to the maximum can indicate “too much of a good thing”. This is in contrast to the work of others (Center for Creative Leadership, 1996).

The study of both cognitive style and organizational climate has recently captured the international attention of organizations striving to create more productive and competitive working environments (Brown & Leigh, 1996; Ford & Gioia, 1995; Jurcova & Zelina, 1995; McNabb & Sepic, 1995; Pasmore, 1994). By understanding the elements that effect the people within these organizations, actions may be taken
in which to improve the work environment in light of both environmental (social and climatic) and psychological (intra-individual) factors.

Before responding to Clapp and Kirton's (1994) points regarding the methodology used in the Isaksen and Kaufmann study, a review of the original study seems prudent for those just entering this discussion. In order to re-examine this study effectively, original data was re-compiled and re-analyzed.

The 1990 Study Revisited

The original study (Isaksen & Kaufmann, 1990) was designed to investigate the extent to which the concepts of individual psychological climate and cognitive style were related. These two constructs are both intra-personal variables (at the individual level of analysis) and they have been described as conceptually linked in that both help to predict creative behavior.

The study sought to determine if those with strong preferences for adaptive or innovative approaches to creativity style and managing change held different individual perceptions of the climate for creativity and change. Since both climate and cognitive style were thought to be predictive of creative behavior, the original hypothesis was that we should find some relationship between the two measures. Since no earlier empirical investigations of these two variables could be discovered, the study was considered exploratory.

Procedure

Sample

An aggregated population of 646 subjects from eight different public and private organizations located in the Northeast and Central United States participated in the study. Upon recompiling the data from the original 1990 study, 12 participants from the original organizations who were not available at the time of the original study were included. The senior author conducted Creative Problem Solving programs with these organizations and the data was obtained from the participants in accordance with the research policy of the Creative Problem Solving Group - Buffalo.

Two-hundred and fifty-six of these participants came from an entire rural elementary school district and one suburban elementary school. Six different organizations provided 378 subjects (83 from a technical center within a large manufacturing company; 25 managers of a mid-west information company; 23 branch managers; 211 R&D managers within a large manufacturing company; 40 members of an R&D facility within a liquor manufacturing company; and eight senior managers of a public service organization). The subjects included about 55% males (n=351) and 45% females (n=291). The gender of four subjects' was unknown.

Instruments

The Kirton Adaption-Innovation Inventory (KAI) is a 32-item instrument on which
respondents are asked to indicate the degree of ease or difficulty they have in maintaining specific adaptive or innovative behaviors over a long period of time. The range of scores is theoretically 32-160 on the KAI with a mean of 96. There is a great deal of literature regarding its validity and reliability (Kirton, 1987). Research (Mudd, 1986) has shown the actual mean for the general population to be 95.0, with a standard deviation of 14.9 (n=1719), a reliability of .86 (internal consistency; n=2777), and consistent factorial composition into three subscales. The three subscales include: sufficiency of originality; efficiency; and rule/group conformity.

Originality - A low score on this subscale indicates a preference to produce few, focused, useful, and relevant original ideas. A high score indicates a preference to produce many, varied, and seemingly unfocused original ideas.

Efficiency - A low score on this subscale indicates a preference for being thorough and efficient in handling tasks. A high score indicates less of a concern with efficiency, reliability, or mastering the details of the task.

Rule/Group Conformity - A low score on this subscale indicates a preference to operate within rules and structures and conform to situational constraints. A high score indicates less of a concern with conforming to rules or building and maintaining a consensus.

The KAI has been shown to be a measure independent of potential cognitive level (e.g., IQ; Kirton, 1994a), and manifest level (e.g., management competency, Hammerschmidt, 1996; Schroder, 1994). Additional studies have shown the KAI to be related to personality measures relevant to experience seeking and other measures of cognitive style, and to be more a measure of style than level of creativity (Kirton, 1994b; Mudd, 1986).

The Creative Climate Questionnaire (CCQ) was originally developed by Ekvall (1983) and validated by Ekvall, Arvonen and Waldenstrom-Lindblad (1983). The instrument grew from a program of research conducted in Sweden during the 1980's concerning organizational conditions that stimulate or hamper creativity. It is a measure of climate which is defined as an attribute of the organization composed of behaviors, attitudes, and feelings which characterize life in the organization. Climate exists independently of the perceptions and understanding of the members of the organization (Ekvall, 1996). The CCQ was translated into English by Ekvall, Isaksen, and his colleagues. The version of the instrument used in this study, called the Situational Outlook Questionnaire (SOQ), has fifty questions. The SOQ consists of five questions for each of the ten dimensions. Each item is scored from zero to three; zero standing for “not at all applicable” and three for “applicable to a high degree.” Results are reported here in a 0 - 3.00 format.

The dimensions of the SOQ include:

Challenge - The emotional involvement of the members of the organization in its operations and goals. A high challenge climate exists when the people are experiencing joy and meaningfulness in their job, and therefore, they invest much energy. Low challenge means feelings of alienation and indifference; the common sentiment and attitude are apathy and lack of interest for the job and the organization.

Freedom - The independence in behavior exerted by the people and tolerated within
the organization. In a climate with much of this kind of freedom people are making contacts to give and receive information and discuss problems and alternatives; they plan and take initiatives of different kinds and make decisions. The opposite climate would include people who are passive, rule-fixed, and anxious to stay inside the frames and established boundaries.

Dynamism/Liveliness - The eventfulness of life in the organization. In the highly dynamic situation, new things are happening all the time and alterations between ways of thinking about and handling issues often occur. There is a kind of psychological turbulence which is described by people in those organizations as “full speed,” “go,” breakneck,” and the like. The opposite situation could be compared to a slow jog-trot with no new surprises. There are no new projects; no different plans. Everything goes its usual way.

Idea Support - The ways in which new ideas are treated. In the supportive climate, ideas and suggestions are received in an attentive and kind way by bosses and co-workers. People listen to each other and encourage initiatives. Possibilities for trying out new ideas are created. The atmosphere is constructive and positive. When idea support is low, the reflexive “no” is prevailing. Every suggestion is immediately refuted by counter-argument. Fault-finding and obstacle-raising are usual styles of responding to ideas.

Playfulness/Humor - The spontaneity and ease that is displayed. A relaxed atmosphere with jokes and laughter characterizes the organization that is high in this dimension. The opposite climate is characterized by gravity and seriousness. The atmosphere is stiff, gloomy, and cumbrous. Jokes and laughter are regarded as improper.

Debate - The occurrence of encounters and clashes between viewpoints, ideas, and differing experience and knowledge. In the debating organization, many voices are heard and people are keen on putting forward their ideas. Where debates are missing, people follow authoritarian patterns without question.

Conflict - The presence of personal and emotional tensions (in contrast to idea tensions in the debate dimension) in the organization. When the level of conflict is high, groups and single individuals hate each other and the climate can be characterized by “warfare.” Plots and traps are usual elements in the life of the organization. There is gossip and slander present. In the opposite case, people behave in a more mature manner; they have psychological insight and control of their impulses.

Trust/Openness - The emotional safety in relationships. When there is a strong level of trust, everyone in the organization dares to put forward ideas and opinions. Initiatives can be taken without fear of reprisals and ridicule in the case of failure. The communication is open and straightforward. Where trust is missing, people are suspicious of each other and take initiative cautiously because of the high price mistakes bring. They also are afraid of being exploited and robbed of their good ideas.

Risk-Taking - The tolerance of uncertainty exposed in the organization. In the high risk-taking case, decisions and actions are prompt and rapid opportunities are taken and when time does not permit detailed investigation and analysis people will “take a gamble” and put their idea forward. In a risk-avoiding climate there is a cautious, hesitant mentality. People try to be on the “safe side.” They decide “to sleep on the
matter.” They set up committees and they cover themselves in many ways before making a decision.

Idea Time - The amount of time people can (and do) use for elaborating new ideas. In the high idea time situation, the possibilities exist to discuss and test impulses and fresh suggestions that are not planned or included in the task assignment; and people tend to use these possibilities. In the reverse case, every minute is booked and specified. The time pressure makes thinking outside the instructions and planned routines impossible.

Studies (Cabra, 1996; Ekvall, 1987 & 1996; Ekvall, et al. 1983; Lauer 1994; Isaksen, Lauer & Ekvall, In press; Isaksen, Winsemius & Lauer, In preparation) support the validity and reliability of the SOQ. Lauer (1994) provided an extensive literature review and found support for the conceptual validity of Ekvall’s original 10 dimensions. Further studies (Ekvall, et. al. 1983; Ekvall, 1987 & 1996; Nystrom & Edvardsson, 1980) indicate substantial differences in organizations described as “creative” by productivity from those described as “stagnated.” Higher scores on the nine positive dimensions with a lower score on the negative dimension (conflict) indicate a climate more conducive to creativity. Scores on the CCQ have consistently discriminated those organizations that are able to successfully develop new products or services from those that are not. The SOQ is, however, not a direct measure of organizational stagnation or progressiveness.

Britz (1995) and Isaksen, Lauer and Ekvall (In press) found consistent patterns of responses across work situations deemed by the respondents as being “best case” they have experienced as well as “worst case.” Across these studies, it was found that there was generally no “ideal” score for any of the dimensions of creative climate. These results were consistent with those of Ekvall (1983 & 1996). As such, a “perfect” score of a three on the positive dimensions, with a perfect score of a zero on the negative dimension (conflict) did not necessarily indicate a “best case” scenario.

Therefore, results of the SOQ are not designed to indicate a theoretical or cross-situational ideal. Rather, they act as a barometer gauging the general perception of how these dimensions are perceived within a given climate. Nor are they to be treated as though the dimensions all fall on a larger single continuum. Factor analysis has repeatedly shown multiple dimensions associated with the climate conducive to change and creativity (Ekvall, Arvonen & Waldenstrom-Lindblad, 1983; Cabra, 1996). The scores on the SOQ are best used as a profile and can help to identify strengths and potential weaknesses within any specific working situation.

Results and Discussion

The means and standard deviations for the entire population and for male and female groupings for each instrument are provided in Table One. The data reported in Table One is fairly similar to those reported in the original study. The additional 12 subjects beyond those reported in Isaksen and Kaufmann (1990) provided only minor variations. Gender differences are observed for both the SOQ and the KAI.

Correlational results, which were not included in Isaksen and Kaufmann (1990),
are presented here in Table Two. None of the correlations show a strong relationship between the KAI and the SOQ. Thirteen out of forty correlations between the total groups’ KAI and SOQ scores were significant. Eighteen out of forty correlations between KAI and SOQ were significant for the 291 females. Only one of the forty correlations was significant for the 351 males.

Table 1. SOQ & KAI Means and Standard Deviations - Males/ Females.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Entire Group (N=646)</th>
<th>Males (n=351)</th>
<th>Females (n=291)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Challenge</td>
<td>2.33</td>
<td>.48</td>
<td>2.28</td>
</tr>
<tr>
<td>Freedom</td>
<td>1.87</td>
<td>.52</td>
<td>1.85</td>
</tr>
<tr>
<td>Idea Support</td>
<td>1.82</td>
<td>.61</td>
<td>1.83</td>
</tr>
<tr>
<td>Dynamism</td>
<td>2.12</td>
<td>.53</td>
<td>2.07</td>
</tr>
<tr>
<td>Play/Humor</td>
<td>1.82</td>
<td>.59</td>
<td>1.75</td>
</tr>
<tr>
<td>Debate</td>
<td>1.88</td>
<td>.53</td>
<td>1.84</td>
</tr>
<tr>
<td>Trust</td>
<td>1.63</td>
<td>.58</td>
<td>1.64</td>
</tr>
<tr>
<td>Conflict</td>
<td>.81</td>
<td>.63</td>
<td>.91</td>
</tr>
<tr>
<td>Risk-taking</td>
<td>1.46</td>
<td>.53</td>
<td>1.43</td>
</tr>
<tr>
<td>Idea Time</td>
<td>1.45</td>
<td>.57</td>
<td>1.46</td>
</tr>
<tr>
<td>KAI</td>
<td>100.03</td>
<td>17.20</td>
<td>103.32</td>
</tr>
<tr>
<td>KAI - O</td>
<td>44.52</td>
<td>8.33</td>
<td>45.55</td>
</tr>
<tr>
<td>KAI - E</td>
<td>19.10</td>
<td>5.47</td>
<td>19.89</td>
</tr>
<tr>
<td>KAI - R</td>
<td>36.39</td>
<td>7.68</td>
<td>37.88</td>
</tr>
</tbody>
</table>

Given that the overall correlational results did not show any clear relationships between psychological climate and cognitive style, we sorted the subjects to provide for two groups which should show very different cognitive orientations. Even though the KAI is a continuum, and not a dichotomy, it is possible to examine any specific dis-

Table 2. KAI / SOQ Correlations.

<table>
<thead>
<tr>
<th>Entire Group Total</th>
<th>Challenge</th>
<th>Freedom</th>
<th>Idea Support</th>
<th>Dynamism</th>
<th>Play/Humor</th>
<th>Debate</th>
<th>Trust</th>
<th>Conflict</th>
<th>Risk-taking</th>
<th>Idea Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>KAI total</td>
<td>-.121**</td>
<td>-.065</td>
<td>-.006</td>
<td>-.074</td>
<td>-.063</td>
<td>-.066</td>
<td>-.050</td>
<td>.145***</td>
<td>-.067</td>
<td>.021</td>
</tr>
<tr>
<td>KAI - O</td>
<td>-.056</td>
<td>.015</td>
<td>.086</td>
<td>.009</td>
<td>-.039</td>
<td>.020</td>
<td>-.008</td>
<td>.116**</td>
<td>.008</td>
<td>.066</td>
</tr>
<tr>
<td>KAI - E</td>
<td>-.110**</td>
<td>.050</td>
<td>.017</td>
<td>-.085*</td>
<td>-.007</td>
<td>-.082*</td>
<td>-.051</td>
<td>.049</td>
<td>-.068</td>
<td>.024</td>
</tr>
<tr>
<td>KAI - R</td>
<td>-.138***</td>
<td>-.097*</td>
<td>-.068</td>
<td>-.119**</td>
<td>-.103**</td>
<td>-.117**</td>
<td>-.070</td>
<td>.167***</td>
<td>-.115**</td>
<td>-.044</td>
</tr>
</tbody>
</table>

| Females Total      | -.196*** | -.080   | -.086        | -.090    | -.082      | -.122* | -.084 | .140*    | -.132*     | -.062     |
| KAI - O            | -.082    | .009    | .001         | .0005    | -.054      | -.011  | -.007 | .108     | .001       | .061      |
| KAI - E            | -.225*** | -.135** | -.084        | -.142**  | -.022      | -.142* | -.135*| .077     | -.170**    | -.084     |
| KAI - R            | -.207*** | -.084   | -.142**      | -.115*   | -.121*     | -.173**| -.099 | .147*    | -.193***   | -.162***  |

| Males Total        | -.026    | -.036   | .062         | .017     | .007       | .008   | -.036 | .092     | .011       | .083      |
| KAI - O            | -.006    | .006    | .074         | .048     | .013       | .067   | -.019 | .079     | .038       | .064      |
| KAI - E            | -.004    | .025    | .091         | -.016    | .052       | -.013  | -.002 | -.010    | .022       | .103      |
| KAI - R            | -.049    | .090    | -.006        | .077     | -.035      | -.041  | -.058 | .126*    | -.031      | .041      |

* = p ≤ .05
** = p ≤ .01
*** = p ≤ .001
tribution and identify a subset that is more adaptive or more innovative. The subjects in this study were sorted by identifying two groups, each one-half standard deviation above or below the observed mean on the KAI. In accordance with the notion of cognitive gap, as reported in the literature (Clapp & deCiantis, 1987; Kirton & McCarthy, 1988; Kirton & deCiantis, 1994), this one standard deviation difference should result in two groups with distinctly different preferred approaches to problem solving, decision making, and creativity. This one standard deviation separation is commonly used in KAI research (Clapp, 1991; Hammerschmidt, 1996; Puccio, Joniak & Talbot, 1995). Kirton and deCiantis (1994) noted, "...more than one standard deviation causes difficulties in integration and begins to raise noticeable problems of communication and strains in goodwill." (pg. 86).

If this is an accurate observation, then it is likely that these two styles may also differ in how they view their climates, especially with reference to problem-solving and creative behavior. This resulted in one group identified as having a stronger innovative orientation (n=212) and another identified as having a stronger adaptive orientation (n=204). Means and standard deviations for the two selected groups on the KAI and SOQ are shown in Table Three. The means for the more adaptive and innovative groups are nearly 39 points apart.

**Table 3. SOQ & KAI Means and Standard Deviations - Adaptors/ Innovators.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>More Innovative (n=212)</th>
<th>More Adaptive (n=204)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenge</td>
<td>2.24 .50</td>
<td>2.38 .47</td>
</tr>
<tr>
<td>Freedom</td>
<td>1.81 .55</td>
<td>1.89 .50</td>
</tr>
<tr>
<td>Idea Support</td>
<td>1.80 .66</td>
<td>1.83 .55</td>
</tr>
<tr>
<td>Dynamism</td>
<td>2.06 .56</td>
<td>2.17 .51</td>
</tr>
<tr>
<td>Play/Humor</td>
<td>1.79 .59</td>
<td>1.87 .56</td>
</tr>
<tr>
<td>Debate</td>
<td>1.83 .60</td>
<td>1.91 .49</td>
</tr>
<tr>
<td>Trust</td>
<td>1.58 .62</td>
<td>1.65 .55</td>
</tr>
<tr>
<td>Conflict</td>
<td>.91 .70</td>
<td>.70 .56</td>
</tr>
<tr>
<td>Risk-taking</td>
<td>1.40 .57</td>
<td>1.50 .46</td>
</tr>
<tr>
<td>Idea Time</td>
<td>1.44 .62</td>
<td>1.41 .53</td>
</tr>
<tr>
<td>KAI</td>
<td>119.31 8.37</td>
<td>80.44 8.40</td>
</tr>
<tr>
<td>KAI - O</td>
<td>51.96 5.58</td>
<td>36.77 6.46</td>
</tr>
<tr>
<td>KAI - E</td>
<td>23.59 4.59</td>
<td>15.10 3.80</td>
</tr>
<tr>
<td>KAI - R</td>
<td>43.74 5.14</td>
<td>28.57 4.53</td>
</tr>
</tbody>
</table>

Since we had clearly different groups according to KAI theory, we submitted these two groups to discriminant analysis (Hair, Anderson & Tatham, 1987) to determine if they would show any significant differences in their orientation to individual psychological climate. The discriminant function allows for analysis of both groups across all climate variables. If there is a difference in how the two groups view climate, the two groups should remain distinctly separate with regard to any particular climate dimension.

The results of the discriminant analysis are shown in Table Four. This table includes the percentage of classification for the overall analysis, as well as by each dimension of the SOQ. Both challenge and conflict are found to be optimal predictor variables, which is consistent with the original study. The re-analysis showed that
there were also significant differences for both the dynamism and risk-taking dimensions of the SOQ. These results indicate that adaptors view more challenge, dynamism, and risk-taking within their individual psychological climates than innovators. Also, innovators view more conflict within their climates than adaptors.

Table 4. Discriminant Function Analysis & Percentage of Classification SOQ & KAI Wilks’ Lamda (U-Statistic) and Univariate F-Ratio (n=416).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wilks’ Lamda</th>
<th>F</th>
<th>Significance</th>
<th>% of Classification (total group 58.8%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenge</td>
<td>0.9804</td>
<td>8.26</td>
<td>0.004 **</td>
<td>54.1</td>
</tr>
<tr>
<td>Freedom</td>
<td>0.9946</td>
<td>2.26</td>
<td>0.134</td>
<td>51.0</td>
</tr>
<tr>
<td>Idea Support</td>
<td>0.9994</td>
<td>0.21</td>
<td>0.647</td>
<td>51.9</td>
</tr>
<tr>
<td>Dynamism</td>
<td>0.9894</td>
<td>4.41</td>
<td>0.036 *</td>
<td>53.9</td>
</tr>
<tr>
<td>Play/Humor</td>
<td>0.9954</td>
<td>1.92</td>
<td>0.167</td>
<td>54.6</td>
</tr>
<tr>
<td>Debate</td>
<td>0.9956</td>
<td>1.84</td>
<td>0.176</td>
<td>54.6</td>
</tr>
<tr>
<td>Trust</td>
<td>0.9965</td>
<td>1.46</td>
<td>0.228</td>
<td>50.0</td>
</tr>
<tr>
<td>Conflict</td>
<td>0.9739</td>
<td>11.05</td>
<td>0.001 ***</td>
<td>53.3</td>
</tr>
<tr>
<td>Risk-taking</td>
<td>0.9906</td>
<td>3.91</td>
<td>0.049 *</td>
<td>56.5</td>
</tr>
<tr>
<td>Idea Time</td>
<td>0.9995</td>
<td>0.20</td>
<td>0.656</td>
<td>52.4</td>
</tr>
</tbody>
</table>

* = p ≤ .05
** = p ≤ .01
*** = p ≤ .001

There are a number of possible explanations for these findings. Since we deliberately chose individuals with different cognitive styles, we should expect to see differences in individual perceptions and interpretations of behavior which characterize life in organizations. In short, their point of view would be different, even in similar contexts. Adaptors may see certain behavior which is outside the norm, while innovators may wonder what the norms are in the first place. The same may be true for dynamism or pace of life in the organization. Given the same observed behavior, adaptors would see things moving faster than innovators.

The findings relating to conflict and challenge do appear consistent with Kirton and deCiantis (1989, 1994) and Kirton and McCarthy (1988) and are described in more detail in Isaksen and Kaufmann (1990).

This presentation of the re-analysis of the original study provides more evidence and detail to support the findings that correlational analysis shows relatively little quantitative relationship between psychological climate and KAI. We continue to find that discriminant function analysis does show that more adaptive and innovative individuals have significantly different SOQ scores on some of the SOQ dimensions. It is important to note that the results of the earlier analysis showed two dimensions were significant while the revised data set showed differences on four dimensions. We will now turn our attention to responding to Clapp and Kirton (1994).

Response to Clapp and Kirton

Clapp and Kirton (1994) provided commentary on the 1990 study and laid out a
number of broad issues requiring further explanation and investigation. Clapp and Kirton (1994) placed the investigation of preferred cognitive style and individual psychological climate within the level-style debate; interpreted the SOQ as designed to measure a single continuum of level of stagnation or progressiveness; and were unaware of the observed factor structure of the SOQ which lead them to make some incorrect assumptions. We will take each one of these issues in turn and provide more explanation and response.

The Level-Style Issue

The level-style issue holds a great deal of promise for creativity research (Isaksen & Dorval, 1993). Kirton (1976; 1987; 1989) has asserted the need to separate the variables of level or capacity from style or mode, just as we would the 'power of the engine' from the 'manner in which it is drawn.' It is reasonable that preferred cognitive style and potential cognitive level can both be measured by the KAI and measures of IQ respectively. Kirton has demonstrated that these two variables are clearly unrelated (Kirton, 1994). Although there is tremendous potential for clarifying creativity research and practice by separating level and style, most of the inquiry and support for this distinction resides within the general area of person, with little work done in the areas of product, process, and situation (Isaksen, 1995).

Having made the distinction between preferred style and potential level clear, there would be a variety of additional key constructs that would help us predict and understand creative behavior. For example, the process, procedures, or tools (know-how) the individual is using may contribute to the actual creative behavior of the individual. The degree to which the individual is motivated and whether or not the motivation is intrinsic or extrinsic may also have an effect. The expertise and knowledge the individual has regarding the task at hand will also provide some impact on determining creative behavior. In short, all these variables will be important in an interactionist or ecological approach to creativity research and practice.

Although there is clear support for distinguishing KAI from IQ, we have found clear relationships between the KAI and preferences for learning, and levels of applying, specific kinds of creative problem-solving tools (Hurley, 1993; Schoonover, 1996; Wheeler, 1995). We have also found this relationship with how individuals graphically describe their natural creative process (Pershyn, 1992). Certain of these preferences may provide for greater degrees of success or level of productivity depending on their fit to the task at hand or other situational factors.

In other words, some of the key variables outlined may very well be conceptually and empirically distinct. Others may necessarily be inter-related, especially when considering the actual behavior of the individual. This was the major challenge facing the aptitude-treatment line of research that attempted to understand the relationships between individual difference variables and student performance (Snow, 1992). Measures of psychological or organizational climate may not necessarily represent their domain "...from the viewpoint of either level (what or how well it is done) or style (how things are done)." (Clapp & Kirton, 1994 p. 130) The degree to which the level-style argument applies to crossing over from among the four main areas of people, processes, products and situations remains to be settled through future inquiry.

As it relates to the Isaksen and Kaufmann study, the results support a general and clear distinction between the two concepts of preferred cognitive style and psychological
climate. The low number of correlations and the small degree of variance accounted for by those that are significant supports the empirical and conceptual distinction. Since no correlation accounts for as much as 3% overlap, any relationship between preferred cognitive style and psychological climate may be viewed as trivial. This finding provides preliminary evidence which rejects our initial (and exploratory) hypothesis that these two measures would correlate due to their combined predictive power on creative behavior.

Conceptual Levels of Analysis
A major point of potential confusion when pursuing this line of inquiry is the need for similar levels of analysis. Individual psychological climate is the primary unit of analysis in order to enable the organizational measure of climate (Ekvall, 1996). It is the measure of individual psychological climate which is aggregated to obtain the organizational measure of the climate for creativity and change (James, James & Ashe, 1990). When analyzing the SOQ from an individual level of analysis, we are examining the concept of individual psychological climate.

The Isaksen and Kaufmann (1990) study attempted to keep the levels of analysis parallel by using individual psychological climate and individual preferred cognitive style. It was the relationship between these two concepts that was investigated. When the argument begins to include organizational level of stagnation or progressiveness or cognitive climate, we are now operating at the group/organizational level of analysis which was not within the scope of the original study.

Attempting to do this in the context of this study would amount to taking a social-psychological variable (the organizational attribute of climate) and treating it as though it was an intra-personal variable. It can have the same confusing effect as taking an intra-personal (trait) variable like cognitive style and muddling it with another construct called cognitive climate, which is asserted to be a social-psychological construct (Kirton & deCiantis, 1994). Keeping these levels of analysis clear will undoubtedly help us as we continue the level-style line of inquiry.

Climate As an Intervening Variable
The Clapp and Kirton (1994) commentary includes an assertion that “...psychological climate can be used to describe organizations along a continuum concerned with an increasing level of innovation.” (pg. 130) Again, psychological climate is the individual's perception of the pattern of behaviors that characterize life in the workplace, not the level of creativity of an organization. Psychological climate is a variable that is at the individual level of analysis (similar to that of cognitive style). The individual perceptions are aggregated to obtain a measure of organizational climate (James, 1982). Organizational climate is defined as an attribute of the organization, composed of patterns of behaviors that characterize life in the specific context of the workplace.

The SOQ is a measure composed of ten dimensions which describe the organization's climate for creativity and change. The measure has been shown to effectively discriminate between organizations which can be characterized as creatively productive and those described as stagnated. The SOQ does not purport to be a direct measure of the level of creativity or success of the organization, but a recent study (Ekvall & Ryhammar, In press) does suggest a significant relationship exists between most climate dimensions and creative achievements. Organizational climate plays the role of an intervening variable which stems from resources of different kinds (people, buildings, know-how, products,
concepts, funds, etc.) and has an effect on productivity, well-being, job satisfaction, and quality. As Ekvall (1996) indicated:

The climate has this moderating power because it influences organizational processes such as problem solving, decision making, communications, coordination, controlling, and psychological processes of learning, creating, motivation, and commitment. (p. 106)

From the perspective of the original study, climate is viewed as an intervening variable which effects the behavior of those within an organization. Based on work by Ekvall (1991), the complex and interactional role climate plays in influencing behavior is depicted in Figure 1. Within this diagram, cognitive style would have the most influence within the frame of psychological and organizational processes.

Figure 1. A Model of Climate as an Intervening Variable.

Clapp and Kirton also suggest that the SOQ is a measure of general level of organizational success. No claims are made regarding the SOQ's ability to directly measure general organizational success. In fact, Ekvall and others are clear that many factors have an influence on the construct of climate for creativity (See Figure 2). Rather than being seen as a measure of a construct falling on a single continuum, the SOQ actually measures a family of independent dimensions aimed at understanding the patterns of behaviors within a particular work group that support creativity and change.

Organizational climate describes the atmosphere of the interpersonal functioning of the people within a given working environment. The composition of the dynamics of the individuals within an environment creates a climate in which they interact (Schneider, 1987b). Clapp (1991) described organizational climate as "...organizational attributes and behavior that are outside of any individual in the organization." (pg. 101). Psychological climate is composed of the perceptions the individual makes of the climate and may dictate appropriate behaviors for that individual within the environment (Schneider & Reichers, 1983; Koys & Decotiis, 1991). Therefore, factors contributing to the way individuals perceive their environments, such as their psychological characteristics, help to create the climate in which the individuals' perceptions occur. One such psychological characteristic may be the individual's cognitive style.
Finally, Clapp and Kirton indicated that "...challenge and conflict appear to be semantic opposites..." (page 133). They recommended combining them into a single bipolar measure because they appeared to be opposites and because these were the two dimensions which were the optimal predictor variables reported in the first study. Their suggestion would be a convenient way to handle the fact that some dimensions were significantly discriminated and others (pure from style relationship) were not.

It is not that simple. The observed factor structure of the SOQ clearly indicates that the challenge and conflict dimensions are independent of one another (Cabra, 1996; Isaksen, et al., 1995; Lauer, 1994). Instead, items on the trust dimension sometimes load negatively with the conflict dimension (occasionally, items on the conflict dimension will load negatively on the trust dimension) depending on the size and nature of the sample.

Since the dimensions of challenge and conflict are factorially independent and since they are not a direct measure of organizational productivity, it would not be appropriate to place them on a single continuum. Rather, they should be seen as two dimensions (among others) that characterize the climate of the organization.

Although these comments are in direct response to Clapp and Kirton (1994), their general interpretation and questions provided an opportunity to explore other areas for future research and inquiry. The following section will outline a few additional areas for future productive work.

**An Agenda for Future Research**

A number of major challenges exist in order to advance our understanding of both
cognitive style and climate for creativity and change. Concepts, their interpretations and their measures, need to be more carefully defined and studied. There are bound to be a number of individual difference variables which can be used to better understand how different people see their climate in different ways. Given the early stages of inquiry into this area, it may be helpful to use more qualitative modes of inquiry. Finally, using multiple levels of analysis may be helpful; but this must be done carefully to avoid confusion.

**Call for Further Conceptual Clarity**

The area of organizational climate has been around since the early 1960's. Earlier in its history, there was a call for more precision in its terminology. In fact, some even questioned the use of the term organizational climate because it was so close to other constructs like work attitudes or job satisfaction (Johannesson, 1973). Another major conceptual issue was the omnibus versus the specific nature of climate. The more generic the construct the harder it was to measure and interpret. The result was to focus the climate on a more specific set of issues like the climate for creativity and change rather than organizational climate in general. The goal is to make climate for creativity and change more clear by differentiating it from other constructs as well as finding and reporting meaningful relationships with other constructs.

The terms and variables of work environment, climate, and culture may all be related, but their definitions and assessment approaches vary (see Schneider, Brief & Guzzo, 1996). The factors and dimensions that are included within each of the terms may also vary. The SOQ is a measure of organizational climate and how conducive it is to creativity and change. Several of the SOQ dimensions have aspects with broader influence and scope than creativity and change. Ekvall (1996; 1997) has found that challenge, freedom, trust, playfulness, and low conflicts can be expected to positively influence such outcomes as productivity, quality, and well-being, as well as creativity and change.

Some dimensions may have more of an influence in some situations and less in others. Still others (like risk-taking) may show the most sizable differences across studies which differentiate more creative organizations from their more stagnated counterparts. Some dimensions (like risk-taking, dynamism, freedom, and debate) seem to make a more crucial difference between the creative climates which support radical creativity or incremental improvements (Ekvall, 1996; 1997). Special care must be taken to examine the terms and the contexts within which they are being examined in order to avoid confusion and increase clarity.

One way to make the constructs more contextually sensitive is to conduct more inquiry on task and method contingencies. If you know at what stage of a project or on what content you are working, along with some idea of the scores on the SOQ, then you can interpret the results in a more sophisticated manner.

Another area that would benefit from improved conceptual clarity is the level-style debate. Although it is very clear that the KAI is purely a measure of cognitive style, many and varied constructs also provide insight and help predict creative behavior. These constructs will require careful definition and measurement if they are to help us extend the level-style line of inquiry.

There are some measures that purport to be measures of style that may not be
purely representative of a style construct. This lack of purity may cause the measure to correlate with some level measures. To understand this better we will need to identify and then examine the level of abstraction of the key measures included in the debate and determine how they relate with other measures and their underlying constructs. Further, until this conceptual clarity is obtained we may be better served to contain the level-style debate within a particular domain such as psychology as well as within a particular level of analysis, and then see if the debate will add value to social psychology or other domains.

Investigate Gender Differences

An appropriate line of inquiry in the domain of P-E fit is how gender differences relate to diversity in organizations. From a cursory examination of the information presented in Table One, a number of sizable differences are observed between males and females for both measures. In addition, the correlations between the KAI and SOQ reported in Table Two also show 18 significant relationships for females, compared to only one for males. Further analysis of male and female perceptions may help us to better understand results from the total group analysis. Different correlations may result within different organizations depending on how culturally consistent gender diversity or gender roles may be.

Kaufmann, Isaksen, and Lauer (1996) examined the “glass ceiling” effect on gender differences in upper-level management. They found a significant interaction between gender and managerial level on an innovative (KAI) preference. Females at the executive level show a strongly higher innovative preference than their male colleagues. One possible explanation for the results of this study is that the females were crossing a cultural boundary.

In respect to Kirton’s Adaption-Innovation theory and research (Thomson, 1980) it is natural for individuals who cross such boundaries to have a more innovative orientation. As it becomes more culturally acceptable for females to hold positions in senior management it would be expected that this innovative preference would dissipate. Future studies could explore this expectation and how gender roles are perceived and managed within organizations should offer another productive area for further inquiry.

Use Multiple Methods of Analysis

The subtle, yet dynamic nature of these similarities and differences between adaptors and innovators and their relationship to creative climate may not be brought out through a purely quantitative framework. A qualitative methodology (Coffey & Atkinson, 1996; Denzin & Lincoln, 1994; Miles & Huberman, 1994) would allow for more insight into the relationship by examining the similarities and differences of statements made by people in regard to their climates. The result of this type of multi-method study may provide a richer understanding of the relationship of cognitive style and perceptions of a climate for creativity.

Grivas (1996) repeated the approach conducted earlier by Isaksen and Kaufmann (1990) by using a smaller, but more homogeneous sample of 147 research and development professionals from a global consumer products company. He used the later version of the SOQ that included three open-ended narrative questions. These include asking the respondent about the most helpful and hindering aspects of their work situation, as well as about the most helpful actions they would take to improve the situation.
Grivas (1996) separated the more adaptive and more innovative scorers on the KAI and conducted correlational analysis with the SOQ. He also conducted a discriminant function analysis. These quantitative analyses showed no significant relationships or discrimination.

After performing recursive qualitative analysis and constant comparison with the narrative data, Grivas found very meaningful differences between the more adaptive and innovative subjects. Although there were many similarities, adaptors valued working in a cohesive team whereas innovators saw the team as a resource to be utilized. When it came to conflict, adaptors preferred to discuss and reach compromise, whereas innovators sought the removal of conflict. Adaptors sought direction and support from management to be creative. Innovators wanted to minimize the management's role and maximize their distance from management.

The Grivas study clearly illustrated the value of using qualitative methods. He saw no significant quantitative relationship between the SOQ and the KAI. This supports Kirton's assertion of a level-style distinction within a quantitative approach. However, Grivas was able to use qualitative methods to find clear and meaningful similarities and differences between those with more adaptive and innovative scores. Further use of qualitative methods could be very helpful for future inquiry.

**Use Multiple Levels of Analysis**

Since the Isaksen and Kaufmann study, years of development on the SOQ have followed. In its most recent incarnation, the instrument has improved validity and reliability, a tighter factor structure consisting of nine independent factors, (Isaksen, et al, 1995; Isaksen, Lauer & Ekvall, In press & In press; Speranzini, 1997) as well as, the addition of three open-ended questions. The open-ended questions provide those using the measure an opportunity to use their own voice to describe their climate. Also, by using both a quantitative method and a qualitative method, the SOQ creates a multi-method approach to the examination of climate (Dutcher, 1997; Sobieck, 1996). Future research into the dimensions of a climate for creativity may benefit greatly from the use of this new design and method.

The Isaksen and Kaufmann (1990) study only utilized the quantitative data from the SOQ. It also used an individual level of analysis by examining the concept of psychological climate. It may be fruitful to pursue additional levels of analysis in future studies. Specifically, it would be useful to examine the relationships between the SOQ and the KAI within the context of in-tact work groups or at an organizational level of analysis. This would allow a more appropriate investigation into the relationships among cognitive climate, cognitive gap, and work unit creative climate as alternative social-psychological phenomena.

The Isaksen and Kaufmann (1990) study did not include all the necessary information to provide a conclusive answer to the question of the relationship between the SOQ and the KAI. This article has provided the unique opportunity to revisit the original study, reanalyze the data set and present a more complete picture of the hypothesis driving the inquiry. The points raised by Clapp and Kirton (1994) are important to consider and pursue. At the heart of many of them is the need for conceptual clarity. We hope that this rejoinder and extension will help to continue that pursuit.
References


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