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The Journal of the Section on Personnel Administration and Labor Relations of the American Society for Public Administration.
The Kirton Adaptation-Innovation Inventory

Validity Issues, Practical Questions

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The Kirton Adaptation-Innovation Inventory (KAI) is designed to measure propensity to innovate versus propensity to adapt, a personality dimension claimed significant for understanding and building organizational effectiveness. This article presents a series of validity checks for the KAI, reports two serendipitous findings, then tests Kirton’s hypothesis that a team composed of extreme adapters or extreme innovators is less effective than a team balanced on this dimension.

Organizations, public and private, face turbulent and uncertain environments. Downsizing, rightsizing, and contracting out threaten the jobs of public sector managers, supervisors, and front line workers. Restructuring, decentralization, and empowerment are recommended for meeting the challenges of fast-changing environments. However, adjusting blocks and lines on an organization chart, or creating task forces and cross-functional work groups, will not automatically transform an organization’s behavior. Perhaps working with people, and allowing change to emerge from the natural dispositions of the group members, can bring organizational effectiveness.

The Kirton Adaptation-Innovation Inventory (KAI) purports to measure a natural disposition, an individual’s propensity to innovate. The 32-item measure was published in Kirton (1976) and has been tested and validated in several languages and cultures (Tullett & Kirton, 1995; Tullett, 1997). Given the importance of innovation to the public sector and the dearth of alternative research instruments to measure the propensity to innovate, the KAI merits investigation. If the KAI is a valid measure of innovativeness, and the theory is substantiated that groups diverse as to KAI scores are particularly effective, then the KAI can be an important management tool for human resources managers in composing the makeup of their work force. This research reports a variety of validity checks for KAI, and then tests the theory that teams diverse on the KAI perform more effectively than teams dominated by either adaptors or innovators. These two hurdles constitute a strenuous test for the KAI.

THEORETICAL FOUNDATION AND RATIONALE FOR THE KAI

The KAI is based theoretically upon requisite variety, a principle spanning the physical, natural, and social sciences (Ashby, 1956). Requisite variety assumes that diversity within a system enhances the likelihood of system success in the face of external challenge. Research substantiating the requisite variety principle appears in the literature on communication (Thompson, 1991), social relations (Sirog, 1990), alcohol rehabilitation (Steerman, 1990), education (Foden & Mason, 1986), leadership (Fisher, 1985), and organizations (Follett, 1918/1998; Miller, 1990; Weick, 1987, 1991).

Follett (1918/1998) insists that the diversity of neighborhoods strengthens both the effectiveness of their organizations as well as democracy. In organization theory, Miller (1990) adopts requisite variety principles in describing the Icarus Paradox, where the organization’s strength, which generated the initial success, eventually leads to the organization’s downfall. The specialized organization filled with similar-minded individuals remains effective only so long as its abilities, skills, and products connect with demand in the environment. Without requisite variety, the organization lacks sensitivity to environmental changes. The organization having requisite variety more easily senses and adjusts to the changing environment.

The KAI connects requisite variety theory to the management of an organization’s human resources. Everyone has a decision-making style. Decision-making style is stipulated as an integral aspect of personality—stable over time, incident, and culture and uncorrelated with cognitive capacity, cognitive techniques, or personality traits (Kirton, 1989, chap. 1; Clapp, 1993; Murdock, Isaksen & Lauer, 1993). One’s decision-making style ranges on a continuum from innovative to adaptive. The extreme innovator starts each issue on a fresh page from innovative to adaptive. The extreme adaptor or innovator starts each issue on a fresh page from innovative to adaptive. The extreme innovator starts each issue on a fresh page from innovative to adaptive. The extreme adaptor or innovator starts each issue on a fresh page from innovative to adaptive. The extreme innovator starts each issue on a fresh page from innovative to adaptive. The extreme adaptor or innovator starts each issue on a fresh page from innovative to adaptive. The extreme innovator starts each issue on a fresh page from innovative to adaptive. The extreme adaptora...
controlled organization may produce goods and services which are superior to alternatives, but clients are not yet ready to accept the new concepts. A cohesive decision-making team including both adaptors and innovators is more likely sensitive to environmental challenges.

KAI: THEORY AND OPERATIONALIZATION
Assuming that personality is composed of abilities, traits, and styles, the KAI measures cognitive style—one's preferred or characteristic manner of processing information. Conceptually, KAI has three dimensions:
1. Rule/Group Conformity (R)
2. Efficiency (E)
3. Sufficiency vs Proliferation of Originality (O)

Rule/group conformity (R) is the degree to which one works within the accepted structures or rejects critical elements of such structures. Innovators may overlook or ignore pressures to conform to consensual views on what is needed and how to get it; adaptors are more likely to abide by system dictates (12 items). Examples of conformity items include "A person who likes the protection of precise instructions" (Q29), and "A person who prefers colleagues who never rock the boat" (Q32).

Efficiency (E) exemplifies Weber's notion of the legal-rational bureaucracy. The efficient manager emphasizes precision, reliability, and efficiency. Innovation is discontinuous to the existing system, thereby to be rejected as hindering efficiency (7 items). Sample items for efficiency include "A person who is thorough" (Q14), and "A person who is consistent" (Q17).

Sufficiency vs proliferation of originality (O) taps the number and scope of innovative ideas the subject generates. The innovator regularly reinvents the wheel; the adaptor offers fewer ideas and these ideas tend to lie within present practices and procedures (13 items). Representative items are "A person who has original ideas" (Q21), and "A person who is stimulating" (Q19). Validation studies have supported Kirton's factor structure (Bagott & Foxall, 1995; Murdock et al., 1993; Clapp, 1993; Foxall & Hackett, 1992).

Individuals respond to items by indicating their level of agreement on a 1-5 scale, with scores in a theoretical range from 32 to 160. Empirical results show a mean score of 95; with 67% of the scores (one standard deviation) lying between 79 and 113 (KAI Report Back Form 1985). In multi-factor space, each of the 32 items reportedly loads on the appropriate dimension 83% of the time (Kirton, 1989, chapter 1).

TEST POPULATION
Our evidence to test KAI is drawn from three respondent-groups: middle-level state managers, international managers studying in the United States, and university students.

Middle-level state managers (N=203). From 1983 to 1990 Cunningham coordinated an annual three-week management development program spread over three months for 25-28 middle-level state managers. Participants filled in the KAI instrument prior to orientation and again three months later, on the next to last day of the program. KAI scores were debriefed after the second test only, so the correcting effects of test-retest carry-over should be minimal. In the fall of 1988, participants from the 1983 through 1987 management classes were mailed the KAI and asked to fill it in. Therefore, from this training program the 1983, 1984, and the 1988-1990 classes were tested twice, and classes 1985-1987 were tested three times. Personal interviews with participants occurred from 1984-1989, and a quasi-experiment was conducted in 1985.

International managers (N=122). Since 1988 Cunningham has taught at training programs held in the United States for international managers. Participants in these programs are sponsored by the U.S. government or by foreign governments. Middle-level public managers from around the world completed the KAI and were debriefed.

Students (N=262). From 1985 to 1988 various student classes filled in the KAI. Some were beginning university students, some were upper division undergraduates, and some were graduate students.

This research project did not emerge from a pre-conceived design. Initially, information was collected so students and managers could learn about themselves and share their experiences with cohorts. The respondents constitute accidental populations. The evidence presented here testing the validity of the KAI consists of fragments. No single piece of evidence can or would be convincing alone. The strength lies in the consistency. Perhaps surprisingly, all the fragments point in the same direction. Triangulation, bringing multiple data sets to bear on a single theoretical problem, is applauded in evaluation research as a method for assuring validity of the findings (Campbell, 1979, Filatoff, 1979; Trend, 1979).

TESTING KAI
Validity is defined as how well has been measured what was intended to be measured (Guion, 1980) and as the accuracy of inferences about test scores (Tenopyr, 1977). Inferences are based upon a theoretical/truth component—the subjective judgment that the concept in question is reasonably represented by the operational tests which measure it; and a pragmatic, utilitarian component—the scores derived from tests fall into an interpretable pattern based on empirical evidence (Messick 1988). Validity can be categorized as construct, content, and criterion validity.1

CONSTRUCT VALIDITY
The KAI concepts of originality, efficiency, and rule conformity are theoretically independent of each other. Sufficiency of originality need not imply lesser or greater efficiency or rule conformity. Nor should one's high efficiency necessarily imply lesser originality or lesser conformity.4 The KAI is operationalized by asking respondents to indicate their ease or difficulty in presenting themselves, consistently, over a long period, in various situations (the 32-item instrument; Kirton 1989, chap. 6). For the three dimensions (subcales) plus the overall KAI to meet Kirton's criteria for construct validity, the individual items should load most heavily on the predicted subscale, in the predicted direction, and the three subscales must be positively, but modestly, positively intercorrelated. Factor analysis of the data described above confirm these expectations.

The results of factor analyses include: factors, which are estimations of latent variables underlying a data set; factor loadings, which are correlations between the original variable and the underlying factor (Hair, Anderson & Tatham, 1987, p. 249); and measures of the variance explained by the factors extracted from a given data set.

Factor loadings are considered significant if they are greater than ±.30 (Hair, Anderson & Tatham, 1987, p. 249), and a variable is associated with that factor whose "loading" is the highest for that variable. For example, Q2's Rules Conformity loading is .35, its efficiency loading is .27, and its originality loading is .21.5 From this, we say that Q2 loads on the first factor, while Q21 (loadings .04, .04, .70, respectively) loads on the...
third factor, originality.

Table 1 presents the factor loadings and the amount of variance explained by those factors. All variables for a given factor load at greater than .30, and in every case, the next highest loading score is statistically significantly smaller than the score for the factor chosen as its primary loading dimension. Twenty-five of the thirty-two items (78%) load strongest on the predicted factor, with three factors accounting for 33% of the variance. Such a result supports the "ncnic, "NCNII, 11(h1I, "NI"(NIIlNllClll NtrllClClCl. Since explained variance is a function of the degree to which the items are measuring the same thing, accounting for a high proportion of variance would suggest item redundancy. On the other hand, too little variance accounted for indicates the absence of a unique, clearly defined dimension. With each of the three factors accounting for a respectable proportion of the variance, the three-factor solution is a reasonable interpretation. The subgroup personality measures also correlate moderately with each other and with the KAI overall score, indicating that subscales are tapping a common underlying phenomenon; see Table 2.

CONTENT VALIDITY
Content validity checks whether all significant aspects of the domain are included in the measure. This is difficult to determine, for there are not clearly defined behaviors to match adaptive and innovative attitudes, except perhaps at the extremes. Dimensions of Kirton's conceptual meaning were operationalized by choice-pairs of phrases to create an alternative measure (Altkirt); see Appendix. Respondents chose the one statement from a two-statement pair which better describes themselves. With a Pearson's r of .65, KAI and Altkirt appear to be tapping the same dimension; see Table 3. Altkirt does not dispute a content validity claim.

CRITERION VALIDITY
Criterion validity can be established by showing KAI scores appropriately relating to other measures, either as predictors or as measures of similar content. Here, KAI scores will be checked for (a) consistency with a content analysis of leadership stories told by managers, (b) stability over time (to test the assumption that KAI scores are personality measures which do not change easily), and (c) consistency when managers carry out a task within a group fairly homogeneous with respect to KAI scores. Content analysis of leadership stories. In the 32-item KAI, Kirton sets the agenda by defining the dimensions and constructing the items. Respondents assess their comfort level with Kirton's items. The instructions read: "How easy or difficult do you find it to present yourself, consistently, over a long period of time as..." In 1985 each middle manager was interviewed privately during the management development program and asked to tell leadership stories about situations in which he or she was involved. The interviews, which lasted from 20 minutes to over an hour, were audiotaped and transcribed. These stories are assumed to represent typical ways that the manager presents self. Because the stories which managers tell are self-generated and personal, the respondent is obviously describing a management style which is comfortable to him or her. The stories bridge the cognitive style/behavior gap, for the stories are self-reports of a manager's behavior. The manager's comfort level is reflected by the customary behavior present in the story. The coder's challenge is to determine whether the manager's comfort level lies in adapting or in innovating.

### Table 1. Kirton Adaptation Inventory, Rotated Factor Matrix (N=587)

<table>
<thead>
<tr>
<th>Item</th>
<th>Rules (R)</th>
<th>Efficiency (E)</th>
<th>Originality (O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q24</td>
<td>0</td>
<td>.72</td>
<td>.05</td>
</tr>
<tr>
<td>Q29</td>
<td>0</td>
<td>.64</td>
<td>.17</td>
</tr>
<tr>
<td>Q32</td>
<td>0</td>
<td>.60</td>
<td>.00</td>
</tr>
<tr>
<td>Q2</td>
<td>0</td>
<td>.53</td>
<td>.22</td>
</tr>
<tr>
<td>Q30</td>
<td>0</td>
<td>.50</td>
<td>.21</td>
</tr>
<tr>
<td>Q10</td>
<td>0</td>
<td>.48</td>
<td>.02</td>
</tr>
<tr>
<td>Q20</td>
<td>0</td>
<td>.44</td>
<td>.14</td>
</tr>
<tr>
<td>Q8</td>
<td>0</td>
<td>.42</td>
<td>.37</td>
</tr>
<tr>
<td>Q28</td>
<td>0</td>
<td>.41</td>
<td>.24</td>
</tr>
<tr>
<td>Q13</td>
<td>0</td>
<td>.40</td>
<td>.31</td>
</tr>
<tr>
<td>Q7</td>
<td>0</td>
<td>.39</td>
<td>.27</td>
</tr>
<tr>
<td>Q2</td>
<td>0</td>
<td>.35</td>
<td>.27</td>
</tr>
<tr>
<td>Q14</td>
<td>0</td>
<td>.05</td>
<td>.67</td>
</tr>
<tr>
<td>Q17</td>
<td>0</td>
<td>.08</td>
<td>.65</td>
</tr>
<tr>
<td>Q25</td>
<td>0</td>
<td>.30</td>
<td>.58</td>
</tr>
<tr>
<td>Q22</td>
<td>0</td>
<td>.19</td>
<td>.54</td>
</tr>
<tr>
<td>Q4</td>
<td>0</td>
<td>.09</td>
<td>.53</td>
</tr>
<tr>
<td>Q23</td>
<td>0</td>
<td>.18</td>
<td>.49</td>
</tr>
<tr>
<td>Q15</td>
<td>0</td>
<td>.18</td>
<td>.47</td>
</tr>
<tr>
<td>Q9</td>
<td>0</td>
<td>.15</td>
<td>.47</td>
</tr>
<tr>
<td>Q6</td>
<td>0</td>
<td>.08</td>
<td>.33</td>
</tr>
<tr>
<td>Q21</td>
<td>0</td>
<td>.04</td>
<td>.04</td>
</tr>
<tr>
<td>Q19</td>
<td>0</td>
<td>.05</td>
<td>.03</td>
</tr>
<tr>
<td>Q11</td>
<td>0</td>
<td>.13</td>
<td>.11</td>
</tr>
<tr>
<td>Q23</td>
<td>0</td>
<td>.12</td>
<td>.12</td>
</tr>
<tr>
<td>Q28</td>
<td>0</td>
<td>.26</td>
<td>.07</td>
</tr>
<tr>
<td>Q26</td>
<td>0</td>
<td>.34</td>
<td>.17</td>
</tr>
<tr>
<td>Q5</td>
<td>0</td>
<td>.01</td>
<td>.15</td>
</tr>
<tr>
<td>Q12</td>
<td>0</td>
<td>.04</td>
<td>.35</td>
</tr>
<tr>
<td>Q31</td>
<td>0</td>
<td>.10</td>
<td>.24</td>
</tr>
<tr>
<td>Q3</td>
<td>0</td>
<td>.25</td>
<td>.25</td>
</tr>
</tbody>
</table>

**Factor Eigenvalue Cum Pct of Variance**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Cum Pct of Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.66</td>
<td>17.7</td>
</tr>
<tr>
<td>2</td>
<td>3.11</td>
<td>27.4</td>
</tr>
<tr>
<td>3</td>
<td>1.85</td>
<td>33.2</td>
</tr>
</tbody>
</table>

Note. In the KAI item 1 is a "dummy" statement which is not scored; scored items are 2 through 33.
Kirton provides 14 characteristics of adapters, and their corresponding innovator characteristics (Kirton, 1989, pp. 8-9). Respondents' stories were read and coded thematically by Bobic and Davis separately. Each theme dimension was allocated one point, so each respondent's score ranged from 1 to 14. The coders then discussed and justified their assessments of each respondent's score on each of the 14 dimensions. On the initial pass, 80 percent agreement was achieved between the coders. Respondents who received different scores lay close to the midpoint. Consultation resolved those disputes.

Change over time. Kirton (1989, chap. 1) insists that KAI is a measure of personality, therefore stable over time and not easily changed. Van der Molen (1989) and Clapp (1993) offer supporting evidence. Goldsmith (1989) reports that training programs appear to have no impact on KAI scores. KAI stability has important implications for organizations which invest in training programs to teach people to be innovative.

If training programs can teach innovative behavior, then not only does KAI theory err in assuming the adaptation-innovation dimension as an integral aspect of personality, but organizations are spending money wisely as they train people to innovate, assuming that their organization lacks innovativeness. However, if Kirton and others are correct on this issue, organizations seeking to change their culture should consider recruitment, replacement, or building diverse teams rather than training to achieve the needed balance of managerial styles over the whole cognitive style range.

State manager training sought to encourage empowerment, risk-taking, and innovation. This intensive residential program took state managers away from their work sites into a campus environment where they worked with practitioners and academics in an experiential program incorporating both individual and group projects. If the program increased propensity to innovate, participants should have gravitated toward the innovative pole of the KAI in the three-month interval between orientation and program conclusion. Enthusiastic evaluation of the program by participants suggests that their KAI scores should have moved toward the innovative end of the spectrum; yet aggregate KAI scores did not budge, see Table 4. The slight changes are random.

This evidence supports the argument that training cannot easily change KAI scores. Perhaps the message of the training program takes longer to soak in. In that case, scores should rise in one to three years after the management development experience. Some participants filled in KAI protocols one to three years after the program was concluded. The results are found in Table 5. Aggregate scores remain stable across time, which supports the original finding that training programs do not change KAI scores.

However, racial differences emerge. Table 6 contrasts the mean KAI score before and after training. Because of the small number of black respondents for whom information from three time points is available, the data are pooled for all respondents from 1985 through 1987. Black managers before training are less innovative than their white peers. At the end of the training program, KAI scores for black managers remain unchanged. However, after one to three years, innovation propensity among black respondents has increased to the point that they are as innovative as their white colleagues, who remain unchanged.

This is a small data set (7 black managers and 43 white managers) from which to extract a firm conclusion, but the findings offer an idea to explore. Perhaps minorities have a narrower range of behaviors acceptable to majorities. Successful minority managers are sensitive to the parameters of group norms, and stay within them. The training program encouraged managers to go beyond the boundaries. The reinforcement of superiors, peers, and instructors that innovative behavior is acceptable, even desirable, may have fallen on a fertile field among minorities, who broke barriers to achieve these management positions and who may have constrained their natural innovative inclinations in order not to risk damaging their careers.

Work environment may influence one's innovative or adaptive attitude. The influence of work environment is reported significant in Holland, Bowskill & Bailey (1991), who found a regression to the mean where new employees' KAI scores differed from the mean of the organization, but no change where new employees' KAI scores did not differ from the mean.

We tested the influence of work environment on KAI scores. The governor in office from January 1979 until January 1987 not only encouraged training to improve management, he also preached to cabinet members and other top level officials the philosophy of empowerment and devolution of authority. Cabinet members were expected to work with their own line and staff to create more effective state government. The commissioner made the decisions in the department; the governor's staff members were subordinate, and stayed out of department matters unless invited in. Informal conversations with middle managers during

### Table 2. Pearson's r among Subscales (N=587)

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Originality</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>.49</td>
<td>.44</td>
</tr>
<tr>
<td>O</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>KAI</td>
<td>.88</td>
<td>.77</td>
</tr>
</tbody>
</table>

### Table 3. Pearson's r: Altkirt with KAI and Subscale, Student Sample

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Originality</th>
<th>Efficiency</th>
<th>KAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altkirt</td>
<td>.62</td>
<td>.50</td>
<td>.40</td>
</tr>
<tr>
<td>N=84</td>
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<td></td>
<td></td>
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</table>

### Table 4. KAI Mean: Pre- and Post-Training by Year, State Managers

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre-training</th>
<th>Post-training</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>100.8</td>
<td>99.9</td>
</tr>
<tr>
<td>1986</td>
<td>104.8</td>
<td>104.9</td>
</tr>
<tr>
<td>1987</td>
<td>105.7</td>
<td>108.2</td>
</tr>
<tr>
<td>1988</td>
<td>98.6</td>
<td>96.7</td>
</tr>
<tr>
<td>1989</td>
<td>97.6</td>
<td>96.2</td>
</tr>
<tr>
<td>1990</td>
<td>99.8</td>
<td>101.6</td>
</tr>
</tbody>
</table>

KAI stability has important implications for organizations which invest in training programs to teach people to be innovative.
TABLE 5. Kirton Scores: Pre-training, Post-training and Follow-up*

<table>
<thead>
<tr>
<th>TEST ADMINISTERED</th>
<th>1985</th>
<th>1986</th>
<th>1987</th>
</tr>
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<tbody>
<tr>
<td>N=16</td>
<td>N=18</td>
<td>N=16</td>
<td></td>
</tr>
<tr>
<td>Pre-training</td>
<td>98.44</td>
<td>103.28</td>
<td>106.56</td>
</tr>
<tr>
<td>Post-training</td>
<td>99.56</td>
<td>105.11</td>
<td>108.31</td>
</tr>
<tr>
<td>1 to 3-year follow-up</td>
<td>102.75</td>
<td>107.61</td>
<td>106.81</td>
</tr>
</tbody>
</table>

*Includes only those state managers who have scores for all three observations.

TABLE 6. Mean Kirton Scores and Standard Error Over Time by Race, State Managers Only

<table>
<thead>
<tr>
<th>Race</th>
<th>Pre</th>
<th>Post</th>
<th>Follow-up</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>103.4</td>
<td>105.3</td>
<td>105.8</td>
<td>43</td>
</tr>
<tr>
<td>Standard Error</td>
<td>2.5</td>
<td>2.2</td>
<td>2.5</td>
<td></td>
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<tr>
<td>Black</td>
<td>98.9</td>
<td>98.9</td>
<td>104.6</td>
<td>7</td>
</tr>
<tr>
<td>Standard Error</td>
<td>4.7</td>
<td>4.7</td>
<td>3.9</td>
<td></td>
</tr>
</tbody>
</table>

the summer training programs indicated that participants understood the governor's message and appreciated the opportunities for innovation offered by this managerial philosophy.

The next governor adopted a contrary managerial philosophy. Policy decisions were made by the governor's personal staff, and cabinet members were subordinate to staff on policy matters. Deviation from existing policy had to be cleared by commissioners through the governor's staff. Commissioner and middle manager innovation was not encouraged. The managerial environment emphasized adaptation rather than innovation. Several managers expressed their discomfort at having decisions imposed upon them by the governor's staff. One cabinet member stated privately that he sometimes learned from the newspaper about decisions affecting his department. This management style differs sharply from the previous governor.

Note from Table 4 that KAI pre-training scores from 1983-1987 (first governor) are at or above 100. Pre-training scores for 1988-1990 (second governor) do not reach 100. The differences between the two governors are consistent over the data set, and support a speculation that while training may have no effect on KAI score, the culture of the workplace appears to have an impact. An innovative workplace culture fosters higher KAI scores; an adaptive workplace culture encourages adaptation. Emphasizing the influence of the environment is compatible with the Deming argument (Bowman, 1994) that the workplace environment and task structure are significant sources for organization effectiveness. The inference from this finding is that to effect change, the organization executive should restructure the environment or redesign the job rather than fire employees. Sending people to training programs may teach specific work behaviors, but does not appear to generate an innovative orientation. However, a suppressed innovative attitude can be encouraged when the executive communicates by words and deeds that risk-taking and innovation are encouraged.

The findings regarding the impacts of race and work environment on KAI scores were not predicted; they appeared as serendipitous findings in the data analysis. The speculation we offer that (a) a member of minority identity group or (b) working in a controlling environment constitute conditions which depress one's propensity to innovate constitute reasonable hypotheses, but demand further testing. These findings may seem at odds with the overarching theme of a stable, unchanging personality factor which affects how each person responds to the work environment. However, paradox rather than consistency is a reality both in life and in the work place. None of us responds identically to the same stimulus both at home and at work, nor on different days of the week. Quinn (1988) argues that competent managers must be inconsistent, must respond paradoxically to the situations they face. One has a basic orientation, yet deviates from that consistency in specific situations. There is no isomorphism between personality and response to a decision situation.

Decision groups. Homogeneous groups of adaptors and innovators should arrive at decisions which reflect the modal characteristics of their KAI score. A group of adaptors should arrive at an adaptive decision; a group of innovators should reach an innovative decision. If the KAI measures adaptation and innovation accurately, and if the theory that homogeneous groups of adaptors and innovators will arrive at less effective decisions, then the following quasi-experimental research task should support that hypothesis.

The 1985 management training class was split into three groups, and KAI score (in addition to gender and department distribution) was a major criterion in dividing the participants. High KAI scorers and low KAI scorers were assembled into homogeneous groups. A third group was composed of scorers falling near, and on either side of, the KAI mean of 98. The three groups were charged with the same task: over the next three months you are to develop a proposal for addressing the disposal of nonhazardous solid waste for the state. Speakers were brought in to address the topic; participants visited several solid waste disposal sites, and each group spent many hours in individual and group research. Because this report would be presented in both oral and written form to the state's Department of Health and Environment, participants were committed to an outstanding product. The commissioner of the department would attend the oral presentation.

The groups worked on their proposals all summer. During the last week of training, each group in a "dress rehearsal" presented its recommendations to a panel of four solid waste experts. The experts commented on each of the three plans, and evaluated the plans along several dimensions using a 1-10 scoring scheme. Innovativeness was measured by the dimension "departure from standard practice." An adaptive score approaches the "standard practice" pole; an innovative score approaches the "sharp departure" pole. The project teams scored as predicted by the KAI theory. Aggregating a mean among the scores of the four experts, the innovator team achieved a mean score of 7, the adaptor team scored 3, and the middle team scored 5. Again, the validity of the KAI measure is confirmed. When innovators get together, the decision will be innovative; when adaptors get together, the decision will be adaptive. Also in line with diversity theory, the experts evaluated the
middle group as offering the best project plan.

These three tests of criterion validity support the KAI as a valid measure of decision-making style, corroborating previous evidence for construct and content validity. Scores remain stable over time, and Kirton's hypothesis that balanced teams outperform teams of homogeneous adapters or innovators is confirmed.

POLICY IMPLICATIONS
Organizations face the paradoxical challenge of maintaining the satisfaction level of their current stakeholder base while seeking new opportunities and more effective ways of developing, producing, and delivering the product or service. Because individuals differ in their propensity to welcome or seek change, the work group which incorporates and celebrates a wide spectrum of their current stakeholder base while seeking change, the work group which incorporates and celebrates a wide spectrum of their current stakeholder base while seeking change will be more successful than organizations which ignore such information about their employees when building teams.

SUMMARY
Based upon multiple data sets and multiple methods, this research finds the KAI to be a valid measure of the adaptation-innovation dimension of managerial decision style. Factor analysis supports tri-dimensionality for the overall KAI, and confirms the internal structure of subscales. Triangulation by employing an alternative method of testing adaptation-innovation (Altikrit), a content analysis of manager stories, and expert evaluation of three groups' project proposals argue that KAI measures the innovation-adaptation continuum.

KAI appears to be tapping a stable personality dimension. A significant training experience did not significantly elevate (or lower) innovation scores. While the data indicate that one's KAI score remains stable over time, minority group status or the organization culture communicated by top management likely nudges scores to come in line with the executive's predisposition.

In each test, Kirton's theory is confirmed. In none of the tests does the KAI or Kirton's theory fail. Seeking organizational effectiveness through work-group diversity along the adaptation-innovation dimension receives support and is compatible with prior research showing that organizational effectiveness is produced by the requisite variety principle (Miller, 1993; Watson, Kuman & Michaelson, 1993; Weick, 1979). The practical management strategy for organizational effectiveness is to recruit or build diverse decision teams.

If the adaptation-innovation dimension is significant for supplying needed variety for an organization, and if the theory of requisite variety applies to organizations, then (other factors being equal) organizations which use managers' KAI scores for building diverse work teams will be more successful than organizations which ignore such information about their employees when building teams.

Notes
1. More than 110 research articles making use of the KAI are reported in the PsychINFO 1996-1999 database.
2. The list of items comprising each subscale can be found in Kirton (1976).
3. Guion (1980) and Messick (1988) state that validity is more a unitary than a trinary concept. The category separations are used here for organizational purposes.
4. Conceptually, the originality, fluidity, and rule conformity subscales are orthogonal (uncorrelated) in multidimensional space, and the overall KAI is linear in two-dimensional space. In two-dimensional space the items form a single measure; despite the orthogonal structure of the three component factors, these sub-scores will have modest positive intercorrelations. By definition, orthogonal factors are uncorrelated. However, when specific items are summed to create subscales, the factor loadings and effects of non subscale items are removed, thereby allowing for the possibility of either positive or negative correlations among subscales. In this case, as expected, the subscales showed modest positive intercorrelations. This means that the subscales are independent, yet related to the umbrella dimension of adaptation-innovation.
5. The difference between the two largest loadings is .09, (the smallest difference in our data) and is significant at p = .002 (z = 3.04).
6. In their own personal KAI scores Bobie and David score approximately one standard deviation from the mean in opposite directions. This divergence between the coders reduces the likelihood that a significant theme is overlooked, and the conversations (literally vehement arguments) between the coders after their initial independent judgments increased the likelihood of a valid interpretation of themes from the stories. The different perspectives of Bobie and David and that impact on the scoring points up the importance of seeking diversity in selecting coders. Validity is enhanced by a thorough discussion among coders with differing perspectives. Scoring done by coders with similar scores on the dimensions tested may achieve reliability, yet sacrifice validity.

References

TABLE 7. KAI Group Score and Innovative Group Behavior, State Managers

<table>
<thead>
<tr>
<th>Innovators Group</th>
<th>Middles Group</th>
<th>Adaptors Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean KAI score</td>
<td>122</td>
<td>97</td>
</tr>
<tr>
<td>*Departure from standard practice</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

*Composite expert score (1 = standard practice, 10 = sharp departure).
Appendix

A
☐ 1. Thinking characterized by precision, reliability, efficiency, prudence, discipline
☐ 2. Thinking characterized by lack of discipline, linking of unrelated ideas, unusual thought patterns

B
☐ 1. Interested in finding problems to solve
☐ 2. Interested in solving problems

C
☐ 1. If rules don’t fit, bend them a bit
☐ 2. Prefer to work within established rules

D
☐ 1. Solutions sought by tried and true methods
☐ 2. Use unproven ideas in seeking solutions

E
☐ 1. Can maintain high accuracy for long periods of work
☐ 2. Work best for short bursts of high intensity

F
☐ 1. Bending the rules for one person is unfair to the rest
☐ 2. Bending the rules if necessary makes bureaucracy human

G
☐ 1. Impractical, unpredictable, change-oriented type
☐ 2. Practical, predictable, take-care-of-business type

H
☐ 1. Command of specialized knowledge
☐ 2. Command of general knowledge

I
☐ 1. When involved in a project, I forget that other people are involved and probably should be consulted
☐ 2. When involved in a project, I am still considerate of others


