

THE GREGORC STYLE DELINEATOR: INTERNAL CONSISTENCY AND ITS RELATIONSHIP TO KIRTON'S ADAPTIVE-INNOVATIVE DISTINCTION

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The primary purpose of the studies was to examine the relationship between the Gregorc Style Delineator and Kirton's adaptive-innovative distinction. The structure and internal consistency of the Style Delineator were also examined. Two samples ($N = 109$, $N = 135$) were given the Style Delineator and the Kirton Adaption-Innovation Inventory. Results showed that the Style Delineator's sequential types and random types (irrespective of concreteness or abstractness) were KAI adaptors and innovators, respectively. Factor analysis of responses to the Style Delineator revealed several orthogonal factors, although factor-items were dispersed among the subscales. Cronbach's alphas indicated that the KAI was reliable, but the alphas for the Style Delineator's 4 subscales ranged from .23 to .66. Issues regarding the construction of the Style Delineator were discussed.

MESSICK (1984) indicated:

Sometimes quite disparate measures are used to assess ostensibly the same cognitive style in different studies, while on other occasions

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highly similar instruments serve to tap purportedly distinct styles (p. 59).

The primary purpose of the present research was to examine the relationship between the Gregorc Style Delineator (1982a) and Kirton's Adaption-Innovation Inventory (1977), both measures of cognitive style. Assuming the psychometric soundness of the instruments chosen, it was expected that significant relationships existed between Kirton's Adaption-Innovation theory and Gregorc's mediational channel approach.

Kirton's (1976) theory of cognitive style identified a bipolar dimension on which the innovator and the adaptor are on opposite ends. When confronted with a problem, the adaptor turns to traditional or conventional procedures in order to find solutions. In contrast, innovators will typically redefine the problem by approaching it from a novel perspective.

Kirton's measure of style, the Kirton Adaption-Innovation Inventory, has been found to have scores which are normally distributed in the population (Kirton, 1977; Goldsmith, 1985). Factor analyses of the Kirton Adaption-Innovation Inventory (KAI), show that it is unidimensionally bipolar. Also it has three stable, reliable factor traits with internal reliabilities estimated at .80 (Keller and Holland, 1978; Mulligan and Martin, 1980; Goldsmith, 1985).

Gregorc's (1982b) mediation theory postulates two dimensions, perceiving and ordering of information. People's preferences can range from concrete to abstract and from sequential to random on the respective dimensions. Because individuals will tend to prefer one aspect of each dimension, four styles result. The styles are: concrete sequential (CS); concrete random (CR); abstract sequential (AS) and abstract random (AR). A CS style would prefer direct, hands-on experiences in a logical order. A CR style would prefer a trial and error approach and would make intuitive leaps along the way. An AS style would prefer rational and sequential presentations. AR learners prefer to receive information in an unstructured manner and would organize their material through reflection. Each of these channels were described in greater detail by Gregorc (1982b).

Gregorc's current measure, The Gregorc Style Delineator, consists of 40 words arranged in ten sets of four words. Individuals rank the four words from the least to the most descriptive of themselves, scored from 1-4 respectively. The total score for each of the four subscales is the sum of the rankings of the ten words comprising the subscale. The raw score for each subscale ranges from 10 to 40.

However, Sewall (1986) noted that the alpha coefficients may be spuriously high. Since "the words which comprise a scale are all in the same row . . . an individual could consciously or unconsciously bias the results by consistently ranking the words in a particular row either high or low" (p. 47). Also, there is no evidence indicating that the Delineator's four subscales were uncorrelated or that the two dimensions (perception, order) were orthogonal.

The present studies originated from questions about the Delineator's subscales and dimensions as well as Sewall's point and Messick's concern about style measures. Specifically, the research examined the following: (a) the relationship between Kirton's adaptive-innovative styles and Gregorc's mediational channels, (b) the independence of the Style Delineator's subscales, and (c) the internal consistency of the Style Delineator's subscales.

Method

Subjects

The sample for Study 1 consisted of 109 undergraduates enrolled in a multi-section course in creative problem-solving at SUNY College at Buffalo during the spring semester, 1984-85. The course is a one semester elective at the sophomore level. Sample 1 consisted of 35.8% males and 64.2% females. The sample for Study 2 consisted of 135 undergraduates, 40.2% were males and 59.8% females enrolled in multiple sections of the same course during the fall semester, 1985-86.

Procedure

Data for Study 1 and Study 2 were collected during the first three class meetings of the spring semester, 1984-1985, and the fall semester, 1985-1986. Three hundred thirty-nine undergraduates were given the following: Kirton Adaption-Innovation Inventory (KAI), Gregorc Style Delineator, Transaction Ability Inventory, and a pilot research instrument comprised of 132 items. The instruments were administered by each instructor in the fifteen different sections of the course. Complete data were obtained on 109 undergraduates, Study 1, and 135 undergraduates, Study 2. The purpose of the studies was not discussed prior to administering the instruments. All subjects were given standardized oral instructions for completing each instrument. After completing the last instrument, all subjects were debriefed. All subscale scores were verified by the instructor. Unfortunately, the counter-balancing procedure

TABLE 1
Correlations Between the Delineator Subscales and the Kirton Adaption-Innovation Inventory and between Subscales

Delineator subscale	Delineator subscale				KAI
	1	2	3	4	
1. Concrete sequential	=	.29*** ^a	-.58**	-.64**	-.56**
		.28*** ^b	.59**	-.64**	-.56**
2. Abstract sequential		=	-.54**	-.50**	-.26*
			-.53**	-.45**	-.38**
3. Abstract random			=	.02	.29**
				.00	.29**
4. Concrete random				=	.50**
					.55**
5. Cronbach's alphas	.55	.23	.56	.57	.79
	.66	.25	.60	.61	.82

^a Sample 1, $N = 109$.

^b Sample 2, $N = 135$.

* $p \leq .002$. ** $p \leq .001$.

for administering the instruments was not followed in two of the sections in Study 1. Consequently, in Study 2, the researchers briefed the instructors on counter-balancing and checked the order of administering the instruments.

Results

The correlations between the Style Delineator's subscale scores and the Kirton Adaption-Innovation (KAI) total scores were significant at the level of $p \leq .002$ (see Table 1). In both samples the concrete sequential (CS) scores and abstract sequential (AS) scores were inversely related to the KAI total scores. Also as shown in Table 1 the concrete random (CR) and abstract random (AR) scores were positively related to KAI total scores. In both samples, sequentials (CS, AS) on the Style Delineator appeared to be adaptors on the KAI and the randoms (AR, CR) appeared to be innovators, irrespective of concreteness or abstractness. The concrete-abstract dimension appeared to be weak.

To check further the contention that only the Style Delineator's S-R dimension correlated with KAI total score, four summed scores were generated. These "broader" measures were obtained by pairing and summing the Style Delineator's subscale scores as follows: CS + AS, CR + AR, CS + CR, and AS + AR. The correlations for the KAI total score and the summed sequential scores and the summed random scores for the two samples were:

-.54, -.61 ($p < .001$) and +.55, +.60 ($p < .001$). The correlations for the KAI total score and the summed concrete scores and summed abstract scores were nonsignificant. Again, only the Style Delineator's S-R dimension appeared to relate to KAI total scores, with summed sequentials appearing to be KAI adaptors and summed randoms appearing to be KAI innovators.

Also, Pearson product-moment correlations were calculated for all pairings of the Style Delineator's subscale total scores. As shown in Table 1, the coefficients for the CS-CR pairs and the AS-AR pairs were significant ($p \leq .001$) and ranged in value from -.53 to -.64 indicating that the S-R dimension was differentiating CS's from CR's and AS's from AR's. However, the coefficients for the CR-AR pairs were not significant (see Table 1). While the coefficients for the CS-AS pairs were significant, the values were only .29 and .28 ($p \leq .001$). The C-A dimension did not differentiate either CR's from AR's or CS's from AS's. Moreover, these correlations revealed that only the Delineator's AS and CR subscales appeared to be uncorrelated.

A principle components factor analysis, varimax rotation, of the responses to the 40 items showed the first four orthogonal factors with 6, 5, 5, and 4 items each accounted for 44% of the variance. None of the 20 items loaded on more than one factor. However, Factor 2's items appeared in all four subscales of the Style Delineator. The items for Factors 1, 3, and 4 appeared in three of the subscales. For example, the CS subscale had six items: three items loading on Factor 1, one loading on Factor 2, one loading on Factor 3, and one loading on Factor 4. Each of the remaining subscales also contained items from three of the four factors. The inclusion of Factors 5-11 (eigenvalues greater than 1.0) accounted for 81% of the variance. Eighteen items loaded on Factors 5-11, range of 2-4 items per factor, with 3 items also loading singularly on one of the first 4 factors. The remaining 15 items loaded on not more than one of the additional seven factors, 5-11. Again the 18 items were dispersed among the Delineator's subscales. Items at .30 or above were used to define a factor.

The KAI's internal consistency in both samples, using Cronbach's alphas (1951) were .79 and .82. Also, as shown in Table 1, Cronbach's alphas on the Delineator's concrete sequential, abstract random, and concrete random subscales ranged in value from .55 to .66 for samples one and two. In both samples the Cronbach's alphas for the abstract sequential subscale were .23 and .25. Since a technical manual was available only for the Style Delineator (Gregorc, 1984), all analyses were completed on that instrument.

Discussion

Kirton (1977), in part, described an innovator as "... thinking tangentially, approaching tasks from unsuspected angles" (p. 9) and an adaptor as "seeks solutions in tried and understood ways" (p. 9). Thus, Gregorc's randoms were expected to appear as innovators in Kirton's terms; conversely, Gregorc's sequentials were expected to appear as Kirton's adaptors. Correlations between KAI total scores and both the Style Delineator's subscale scores and the summed subscale scores supported the relationships. Sequentials were adaptors and randoms were innovators, regardless of concreteness or abstractness. An examination of the correlations between the Style Delineator's subscale scores indicated that the S-R dimension did differentiate subjects and the C-A dimension did not. This assessment and the alignment of the S-R dimension of the four styles with the KAI suggested that only the S-R dimension was potent in describing the differences among subjects with respect to Kirton's theory.

The correlations between the Style Delineator's subscales also showed that only the AR and CR subscales were uncorrelated. Since the Style Delineator was intended to define styles, the four subscales should be uncorrelated. A factor analysis revealed a kernel of 4-6 items for each of the first four orthogonal factors. However, each subscale had at least one item from each of the first three or four factors. Items for Factors 5-11 were also dispersed across the subscales. Several factors were orthogonal but the subscales were not factorially pure. Given that the factors were not readily interpretable, with only 2-6 items per factor, the relationship between factors and dimensions remains unresolved.

Further, a discrepancy exists between Gregorc's (1984) alpha coefficients (.89-.93) and those in the present studies (.23-.66). Sewall (1986) mentioned that by placing all the items of a subscale in the same row Gregorc may have obtained spuriously high alpha coefficients. In the present studies the total number of items, 245, may have decreased the potential effect, resulting in lower but more accurate estimates of the Style Delineator's internal consistency. Alternatively, perhaps the sheer number of items increased the subjects' fatigue or carelessness, thus, increasing error and reducing reliability. However, no corresponding decrement was noted in the alphas of the KAI. The two studies supported the internal consistency of the KAI.

Overall, Gregorc's Style Delineator appeared to be psychometrically weak. No clear dimensions emerged from its several orthogo-

nal factors. The subscales were confounded with items from various factors and lacked satisfactory internal consistency. Norms and necessary descriptive statistics were lacking (Sewall, 1986) and the measure was unnecessarily complicated by generating four style scores per subject. Clearly, an instrument with only two subscales (S-R, C-A) based on two orthogonal dimensions (ordering, perception) would give a more parsimonious representation of the four styles. Despite the appeal of the proposed four categories, there appears to be very little empirical support for their validity and reliability. It is advisable that the Style Delineator be reanalyzed and revised.

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