RATIONAL AND INTUITIVE STYLES: COMMENSURABILITY ACROSS RESPONDENTS' CHARACTERISTICS'

By: W. M. Taggart, Enzo Valenzi, Lori Zalka, and Kevin B. Lowe

Taggart, B., Valenzi, E., Zalka, L., & Lowe, K. B. (1997) Rational and intuitive styles: Commensurability across respondent characteristics. Psychological Reports, 80(1), 23-33.

Abstract:

This study was designed to examine differences in responses to the six rational/intuitive scales of the Personal Style Inventory in relation to gender, age, ethnic group, birth country, occupation, and industry. Data were collected from 495 participants in training programs in Australia, England, New Zealand, and the United States. Multivariate analysis of variance indicated no differences among groups on the six scales which then are not sensitive to the characteristics so separate norming scores are not indicated. Lack of differences between sexes contrasts with the finding that women score more intuitive than men on other style assessment tools. Findings are not, however, consistent. And, since characteristics other than gender may show similar disparate results, further study of rational-intuitive commensurability is needed.

Article:

It is well known that people differ in their relative preferences for rational and intuitive ways of dealing with situations. Measurement of personal style frequently is used in personnel development for individual counseling and in group training programs to assess participants' preferences on relevant attributes. Scoring norms for assessment tools may differ from one group to another. Ideally, the meaning and interpretation of scores should be the same, that is commensurable, for the various groups of participants in an organization or a program. Then the same raw-score conversion table applies for all participants regardless of their gender, age, ethnic group, birth country, industry, or occupation. This commensurability of scale scores across participants' characteristics facilitates the completion and interpretation of personal results in real-time settings.

Recently, assessment of the intuitive dimension of cognitive style has emerged as a significant theme in development of management. A compelling case for the world-wide implications of this emerging emphasis appears in the report of a recent study of intuition in management (Parikh, Neubauer, & Lank, 1994). In a nine nation survey of senior and top managers, they found that 54% were guided equally by intuition and rationality while 8% said they were guided more by intuition (p. 63). The Personal Style Inventory (Taggart & Hausladen, 1993) provides an effective and efficient assessment of preferences for rational/intuitive styles.

The early assessment tool designed to help individuals in management understand their preferences for rational/intuitive styles was published as the Human Information Processing Survey (Taggart & Torrance, 1984). The three scales provide scores for an individual's left-dominant (rational), right-dominant (intuitive), and integrated (rational/intuitive) behavior preferences. The Personal Style Inventory evolved as a second-generation measure from extensive field experience with the survey. For the inventory an idea pool of 500 behavior and assessment terms was generated and sorted into six scales (Taggart & Valenzi, 1990). This pool was used to express behaviors and preferences for an original set of 90 items grouped into 15 paired items for each of the three paired scales. Factor analysis was used to select the final five items for each scale.

The inventory includes 30 behavioral items (five for each scale) to assess six information-processing modes classified as either a rational or an intuitive style. Responses are based on a 6-point rating scale of frequency anchored by 1 (never) and 6 (always). Adverbial anchors for the numerical scale were selected based on a

magnitude-estimation scale procedure (Bass, Cascio, & O'Conner, 1974). The scales are paired on three "how do you" themes with contrasting rational and intuitive styles relative to each theme:

How do you prepare for the future?
Rational planning by developing proposals *or*
Intuitive vision by generating scenarios

How do you solve problems?
Rational analysis as a specialist *or*
Intuitive insight as a generalist

How do you approach work?
Rational control procedure-oriented *or*
Intuitive sharing people-centered

Using this framework, the inventory presents a more detailed assessment of individuals' rational/intuitive preferences than the earlier study and thereby increases their self-awareness.

The present study was designed to examine differences in responses to the inventory that are related to typical respondents' characteristics of gender, age, ethnic group, birth country, occupation, and industry. The broad question we sought to answer was whether the mean scores vary by characteristic. While no a priori hypotheses were developed, the outcomes have clear implications for the use of the inventory. Significant evidence of non-commensurability would require group norms by characteristic for individual interpretation and understanding of the scores. On the other hand, the presence of commensurability across characteristics would facilitate the interpretation and use of scores for the purposes described above.

METHOD

Subjects

The 495 subjects were participants in 40 supervisory and management training programs using the Personal Style Inventory in Australia (n=102), England (n=124), New Zealand (n=109), and the United States (n=160). The programs were public offerings with self-selected participation. The average workshop size was 13 participants, with a range from 5 to 30. The six characteristics of respondents were gender, age, ethnic group, birth country, industry, and occupation. In the Appendix (pp. 31-33) are the values of the frequencies, means, and standard deviations for each scale on each characteristic.

Analysis

Respondents' scores to the 30-item survey were summed into the six scales identified by Taggart and Valenzi (1990). For each characteristic such as age, gender, etc., a separate multivariate analysis of variance was performed on scores on the six scales. The analysis was used because intercorrelations among the scales were substantial. Interactions between respondents' characteristics were not posited because there were no a priori reasons to expect them. Nevertheless, a series of ad hoc multivariate analyses of variance included multiple independent variables to test for interactions. The number of significant interactions was fewer than the number expected by chance.

Statistically significant results from the multivariate analysis of variance were explored further in two ways to assess more precisely the nature of group differences. First, a multiple descriptive discriminant analysis was performed for each characteristic in which the scales were the discriminant or outcome variables and the characteristics were the grouping variables. Stepwise discriminant analyses using the Wilks method were performed in SPSS Release 4.1 (SPSS, 1990). This method causes all variables to be entered in the order of their contribution to group separation. The stepwise analysis was not done as a variable selection procedure but to provide F-to-remove statistics to assess importance of variables for the discriminant functions as recommended by Huberty and Morris (1989; Huberty, 1994). The higher the F-to-remove value the more the

variable contributes to group separation (Huberty, 1994; Huberty & Morris, 1989). These were obtained after Step 6 when all outcome variables of the inventory are in the equation.

Second multivariate contrasts between groups were examined to assess whether any group pairs were significantly different. The discriminant analysis was not cross-validated with an independent sample because our purpose was to examine the commensurability of scale scores across groups rather than to predict group membership for classification. Using the entire sample provided a more accurate and powerful test of group differences.

RESULTS

Coefficients alpha and intercorrelations of scores on the six scales of the inventory were compared with those of the original study (Taggart & Valenzi, 1990). The lowest alpha in the original study was .53 for the Control scale. Data from the present study measured coefficient alpha at .35 for Control and from .64 to .73 for the remaining five scales. Because the reliability of the Control scale was lower in this study, we decided to retain the variable in the analyses but only for exploratory purposes. The question of the unacceptable coefficient alpha for Control is being addressed in a separate study in which improvement of the reliabilities of all six scales is undertaken. Also, the correlations among the scales were similar in size and sign to those of the original study. The correlations, descriptive statistics, and coefficients aloha for the study variables are reported in Table 1. As shown in Table 2, the multivariate analysis of variance gave statistically significant effects (p .05) for four of the six characteristics, ethnic group, birth country, industry, and occupation.

TABLE 1

CORRELATION MATRIX FOR STUDY VARIABLES ($N = 495$)

	M	*SD*	Range	1	2	3	4	5	6	7
1. Planning	20.4	4.2	9–30	.72						
2. Analysis	18.6	4.5	8–30	.46†	.73					
3. Control	18.0	3.0	9–26	.34†	.44†	.35				
4. Vision	21.9	3.6	11–30	.06	–.14†	.03	.69			
5. Insight	19.5	3.7	9–30	–.08	–.41†	–.05	.50†	.64		
6. Sharing	20.4	3.5	11–29	.11*	.07	–.22†	.19†	.20†	.64	
7. Age	36.7	8.4	22–64	.06	.04	.00	–.02	.09	.00	

Note.—Coefficients alpha on the diagonal. Correlation coefficients and means were not computed for the categorical variables gender, ethnic group, birth country, industry, and occupation. *$p < .05$. †$p < 01$

TABLE 2

SUMMARY FOR RESPONDENTS' CHARACTERISTICS

Characteristic	*df*	Error *df*	Λ	*F*
Sex	6	486	.991	0.71
Age	18	1.245	.947	1.33
Ethnic Group	12	248	.847	1.79*
Birth Country	18	1 033	.925	1.61*
Industry	30	1,562	.895	1.47*
Occupation	24	1,215	.887	1.78*

*$p < .05$.

The multivariate analysis of variance for the significant characteristics of respondents was examined with discriminant analysis to describe the group differences on the six scales. Differentiating group membership based on this inventory would suggest that separate norms should be developed as a function of the respondents' characteristics. The variance explained and canonical correlations for the discriminant functions are provided in Table 3 Box's M test for the equality of group covariance matrices indicated that the assumption was not violated.

TABLE 3

RANK ORDER OF *F*-TO-REMOVE, STRUCTURE *r*S OF LDFS, AND CANONICAL CORRELATIONS FOR OUTCOME VARIABLES OF PERSONAL STYLE INVENTORY

Characteristic	% Variance[a]	Canon Correl	Planning	Analysis	Control	Vision	Insight	Sharing
Ethnic Group								
F			1.21	4.82	0.16	2.14	0.22	0.23
Rank			3	1	6	2	5	4
LDF_1	68.33	0.33*	.06	.78	.46	.36	.08	.07
Birth Country								
F			2.04	1.99	1.12	1.79	2.11	1.19
Rank			2	3	6	4	1	5
LDF_1	43.03	0.18*	.13	.74	.32	−.71	−.57	.03
Industry								
F			0.59	2.49	0.86	0.78	0.49	1.50
Rank			5	1	3	4	6	2
LDF_1	55.46	0.24*	.15	.90	.43	−.21	−.59	−.10
Occupation								
F			0.94	1.65	1.29	2.80	1.63	1.95
Rank			6	3	5	1	4	2
LDF_1	40.89	0.22†	.63	80	.07	−.28	−.62	−.12
LDF_2	33.79	0.20*	.29	− 08	−.08	.73	−.08	.37

[a] Relative variance explained. *$p < .05$. †$p < .01$.

For occupation, one discriminant function was statistically significant at the .05 level and another at .01. Functions falling short of statistical significance (p = .05) were identified for ethnic group, birth country, and industry. For these five functions, ethnic group had the highest (.33) and birth country the lowest (.18) canonical correlation. These low canonical correlations suggest that these inventory variables account for little between-group variance.

For descriptive purposes, univariate F tests were used to identify statistically significant differences between group means. Group means on the scales of the Personal Style Inventory were different (p=.05) in five of 42 comparisons. These are Analysis (p=.006) and Vision (p=.03) for ethnic group, Analysis (p = .001) for industry, and Analysis (p = .02) and Vision (p=.03) for occupation. The multivariate analyses of variance for the significant and for the grouping variables which fell just short of significance were followed up with a multivariate test of the pairwise contrasts between all pairs of groups as recommended by Huberty (1994). None of the p values were significant at a.=.05 after a Bonferroni correction to protect against Type I error across all tests.

Summary of Analyses

The results of the multivariate analysis of variance and discriminant analyses for statistical significance of differences among inventory scales by the six characteristics of respondents suggest the following conclusion. From a global perspective, Table 2 shows that three of the six characteristics fell short of significance, ethnic group, birth country, and industry, while occupation was significant (p = .01). The rank order of the Fs-to-remove in Table 3 suggests Analysis is the most likely contributor to significance for ethnic group, Insight for birth country, Analysis for industry, and Vision for occupation. The coefficients of the first discriminant function for each characteristic confirm the F-to-remove rank for ethnic group and country but suggest Analysis instead of Insight for birth country and Analysis instead of Vision for occupation.

The data from Tables 2 and 3 suggest that only one or two at the most of the six inventory variables would account for the possible significant differences for the four characteristics. Within each characteristic, differences between all pairs of groups were tested with an F test. After the Bonferroni correction is applied to the p values for the individual F statistics, none remain significant. Only one reaches p =.06 for the public administration versus manufacturing pair contrast for the industry characteristic. Due to the absence of statistical significance after the omnibus data from Table 2 are analyzed in more detail, we conclude that norming the Personal Style Inventory as a function of the respondents' characteristics studied here is unnecessary.

DISCUSSION

The construct validity of the inventory has been addressed in prior research (Taggart & Valenzi, 1990). The present analyses indicate that the scores are not sufficiently different to require separate norms by either gender, age, ethnic group, birth country, industry, or occupation. Given that this was not an explicitly intended outcome of the construction and development of the inventory, we interpret these results as suggestive of commensurability in this inventory in terms of these six characteristics. Further, our results suggest that the concerns of users such as personnel staff might have about differences in responses to the inventory as a function of the characteristics studied would be premature. However, caution in interpretation of these results is required because the samples were self-selected and consequently, random samples from the countries might lead to different conclusions. Further, the convenience nature of the sample limits the generalizability of the results. Finally, we note these results are not consistent with those of other studies. For instance, briefly consider the gender characteristic. Intuition in Decision Making: AIM (Agor, 1992) uses 12 items from the Myers-Briggs Type Indicator's (Briggs & Myers, 1993) Intuition scale to assess intuitive orientation. The selected items are used to score an individual on a range from a maximum of 12 for thinking representing a highly rational orientation through 6 for thinking and 6 for intuitive representing a balance to a maximum of 12 for intuitive representing a highly intuitive orientation. In a study of 3000 managers, Agor found that "Women consistently scored higher on the intuition scale than men in every group sampled" (Agor, 1986, p. 18).

Parikh, et al. (1994) surveyed 1300 senior and top managers in nine industrialized nations. They included both an objective scale using 10 pairs of terms that represent the intuition-analysis dichotomy and a subjective rating where the subjects responded on a 5-point scale to the question: "How do you rate yourself on intuition?" (Parikh, et al., 1994, pp. 52-57). They found that the proportions of women rating high on both the objective and self-rating scales were significantly greater than of men.

In contrast to the Agor and Parikh, et al. results, Allinson and Hayes (1996) found that women scored higher on analysis and lower on intuition than men in four samples totaling 716 respondents. (This result was not found in one sample of 130 respondents.) Their Cognitive Style Index is composed of 38 items scored on a 3-point scale of 0 (false), 1 (uncertain), and 2 (true) such that the closer to the maximum score of 76, the more analytical and closer to the minimum of 0, the more intuitive the respondent.

Kirton (1994) reported similar results using the Kirton Adaption-Innovation Inventory (1987), a measure with 32 items each of which is scored on a scale from 1 to 5 giving a theoretical range of scores from 32 to 160. Lower values are associated with the adaptor style (a rational orientation) and higher with the innovator styles (an intuitive orientation). Kirton (1994, p. 54) found that "females tend, on the average, to be more adaptive than males." Since Agor and Parikh, et al. found that women scored higher, and Allinson and Hayes, and Kirton found that men scored higher on in tuition-related scales, further theoretical and empirical study is needed to examine this disparity in results.

We conclude with several implications of our study. Scales such as those for the Personal Style Inventory which delineate the intuitive-rational dimensions in greater detail may more likely display commensurability across characteristics than more aggregate scales. More refined scales may assess constructs closer to the personality core. The closer to the essence of individual styles, the closer we may be to more commensurable dimensions of style. These disparate results highlight the need for further research on commensurability across respondents'

characteristics. Within the limitations noted earlier, the results suggest that separate norms for the Personal Style Inventory on these six characteristics are not needed. This study needs to be extended to more representative samples and to explore other characteristics that might be relevant such as education and cultural background.

REFERENCES

Mon, W. H. (1986) The logic of intuitive decision making: a research-based approach for top management New York: Quorum Books.
AcoR, W. H. (1992) Intuition in decision making: AIM survey. El Paso, TX: ENFP Enterprises. ALLINSON, C. W., & HAYES, J. (1996) The cognitive style index: a measure of intuition-analysis for organizational research. Journal of Management Studies, 33, 119-135.
BASS, B. M., CASCIO, W. F., &O'CONNER, E. J. (1974) Magnitude estimations of expressions of frequency and amount. Journal of Applied Psychology, 59, 313-320.
BRIGGS, K. C., & MYERS, 1. B. (1993) Myers-Briggs Type Indicator, Form G—Self-scorable. (Rev. ed.) Palo Alto, CA: Consulting Psychologists Press.
HUBERTY, C. J. (1994) Applied discriminant analysis. New York: Wiley.
HUBERTY, C. J., & MORRIS, J. D. (1989) Multivariate analysis versus multiple univariate analyses. Psychological Bulletin, 105, 302-308.
KIRTON, M. J. (1987) Kirton Adaption-Innovation Inventory manual. (2nd ed.) Hatfield, UK: Occupational Research Centre.
KIRTON, M. J. (1994) Adaptors and innovators at work. In M. J. Kirton (Ed.), Adaptors and innovators: styles of creativity and problem solving. (Rev. ed.) London: Routledge. Pp. 51-71.
PARIKH, J., NEUBAUER, F., & LANK, A. G. (1994) Intuition: the new frontier of management. Oxford, UK: Blackwell.
SPSS, INC. (1990) SPSS reference guide. Chicago, IL: Author.
TAGGART, W, & HAUSLADEN, B. (1993) Personal Style Inventory. Odessa, FL: Psychological Assessment Resources.
TAGGART, W., & TORRANCE, E. P. (1984) Human Information Processing Survey. Bensenville, IL: Scholastic Testing Service.
TAGGART, W., & VALENZI, E. (1990) Assessing rational and intuitive styles: a human information processing metaphor. Journal of Management Studies, 27, 149-172.
U.S. DEPARTMENT OF LABOR. (1977) Dictionary of occupational titles. (4th ed.) Washington, DC: U.S. Government Printing Office.
U.S. DEPARTMENT OF COMMERCE. (1972) Standard industrial classification manual. Washington, DC: U.S. Government Printing Office.

APPENDIX

The first data column in Table Al (pp. 32-33) lists the frequencies for each group for each characteristic. The ns range from 132 for ethnic group (discussed in the next paragraph) to 493 for gender. "Other" and "missing" cases account for the difference between the total sample size of 495 and the smaller sample size for each characteristic: gender n=493 (missing=2), age n=449 (missing =46), ethnic group n=132 (other =5, missing =23), birth country n=374 (other =24, missing = 97), industry n=401 (other =5, missing = 89), and occupation n=358 (other =121, missing =16). "Other" represents groups for which subsample sizes were insufficient or too unequal to include in the analysis. Table Al also lists the means and standard deviations for each PSI variable for each group and for each characteristic as a whole.

Due to the limited number of noncaucasian subjects in the Australian, English, and New Zealand groups, these countries were excluded from the analysis for ethnic group. Seven ethnic classifications were used in the data collection: African American, Hispanic, American Indian, Asian, Caucasian, Malayan, and Other. However, the small United States frequencies for the American Indian (n=0), Asian (n=4), and Malayan (n=0) groups precluded meaningful interpretation. For further analysis, we eliminated these groups as well as the Other classification due to its small sample size (n=1) and the ambiguity of interpreting the group classification.

The respondents' work organizations were classified using the four digit codes from the Standard Industrial Classification Manual (U.S. Department of Commerce, 1972). These were summarized and counted into seven categories: Manufacturing (2000-3999), Transportation (4000-4999), Trade (50005999), Finance (6000-6999), Services (7000-8999), Public Administration (9000-9999), and Other (0000-1999).

Respondents' position titles were classified using the nine digit codes from the Dictionary of Occupational Titles (U.S. Department of Labor, 1977). Nine groups were consolidated based on similar types and levels of responsibility. The five larger groups were of sufficient size to identify separately in the analysis: 18 Engineers (019-061-010); 70 Trainers (166-227-010), Training Managers (166-167-010), and Consultants (189-167-010); 94 Supervisors (169-167-012) and Project Managers (189-117-030); 149 Managers (189-167-022) and Vice Presidents (189-117-034); and 27 Owner-Managers (189-167-024). Occupations for the other 121 cases were not considered sufficiently similar in responsibility or numerous in frequency for inclusion in the analysis.

TABLE A1
MEANS AND STANDARD DEVIATIONS OF OUTCOME VARIABLES

Characteristic	*n*	Planning		Analysis		Control		Vision		Insight		Sharing	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Sex		20.44	4.16	18.58	4.45	17.79	3.04	21.84	3.58	19.44	3.69	20.42	3.52
Men	258	20.45	4.19	18.64	4.42	17.98	3.02	21.90	3.50	19.30	3.81	20.63	3.39
Women	235	20.44	4.14	18.51	4.49	17.97	3.07	21.77	3.67	19.59	3.57	20.20	3.66
Age		20.44	4.12	18.64	4.43	17.97	3.03	21.87	3.57	19.46	3.70	20.43	3.55
≤ 20s	103	20.05	4.47	18.55	4.20	18.17	3.06	21.92	3.96	19.06	3.74	20.37	3.45
30s	185	20.44	3.81	18.51	4.26	17.75	2.89	21.94	3.49	19.19	3.64	20.35	3.50
40s	130	20.61	4.29	18.63	4.66	18.08	3.19	21.75	3.46	20.22	3.59	20.79	3.64
≥ 50s	31	21.06	4.04	19.71	5.24	18.10	3.16	21.81	3.26	19.23	4.06	19.68	3.85
Ethnic Group		20.60	4.19	18.70	4.36	17.89	3.03	22.48	3.22	19.36	3.90	20.67	3.35
African American	19	20.63	3.86	19.58	3.88	18.16	2.73	20.84	2.61	18.00	4.46	19.79	3.17
Hispanic	23	20.78	4.68	21.00	4.42	18.87	3.40	23.48	2.64	19.74	4.15	20.96	3.91
Caucasian	90	20.54	4.17	17.93	4.23	17.58	2.96	22.57	3.37	19.56	3.70	20.79	3.29
Birth Country		20.24	4.15	18.39	4.42	18.16	3.03	21.61	3.52	19.39	3.54	20.21	3.57
Australia	82	20.85	4.18	18.35	4.46	17.99	3.16	21.61	3.61	19.68	3.53	20.44	3.55
England	107	19.47	3.97	17.78	4.62	17.82	3.04	21.84	3.67	19.91	3.51	19.81	4.01
New Zeland	93	20.31	4.28	19.40	4.06	18.48	2.84	20.84	3.34	18.73	3.20	20.22	3.11
United States	92	20.50	4.14	18.13	4.39	18.36	3.09	22.11	3.34	19.21	3.82	20.46	3.52
Industry		20.47	4.07	18.72	4.36	18.10	3.02	21.75	3.62	19.44	3.67	20.51	3.60
Manufacturing	56	20.30	3.96	16.91	4.50	17.82	3.45	22.11	3.56	20.45	3.52	20.66	3.66
Transport	38	20.21	3.24	19.58	3.58	18.53	2.53	21.13	2.79	19.08	3.69	20.76	2.55
Trade	36	20.97	4.18	19.81	4.74	18.06	2.92	22.67	3.52	19.50	2.90	21.00	3.86
Finance	35	21.14	4.51	19.11	3.46	17.97	3.06	22.31	4.21	19.54	3.98	22.00	3.39
Services	135	20.19	4.08	18.17	4.23	17.73	3.11	21.70	3.98	19.67	3.62	20.28	3.66
Public Administration	101	20.63	4.26	19.62	4.53	18.65	2.78	21.34	3.20	18.67	3.86	19.96	3.69

(continued on next page)

TABLE A1 (CONT'D)
MEANS AND STANDARD DEVIATIONS OF OUTCOME VARIABLES

Characteristic	*n*	Planning		Analysis		Control		Vision		Insight		Sharing	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Occupation		20.53	4.09	18.61	4.42	17.95	2.98	22.00	3.66	19.58	3.69	20.52	3.55
Engineer	18	21.67	4.78	20.72	5.82	18.39	4.29	21.39	3.20	19.06	4.52	18.83	4.37
Trainer	70	21.03	3.93	18.69	4.47	17.63	3.08	22.87	3.65	19.39	3.55	20.80	3.40
Supervisor	94	21.12	3.83	19.39	3.47	18.17	2.77	21.53	3.57	18.88	3.53	20.84	3.44
Manager	149	19.88	4.16	18.06	4.63	17.81	2.93	21.70	3.74	19.97	3.71	20.44	3.70
Owner	27	20.07	4.25	17.37	4.36	18.44	2.85	23.41	3.34	20.70	3.74	20.52	2.58