inscape publishing

The *Personal Profile System*®
2800 Series
Research Report

The *Personal Profile System*®

Research Summary

For over thirty years, the *Personal Profile System*® has been available to assist people in understanding themselves and others. It has offered an easy-to-use, inexpensive, and popular vehicle for self development to participants and facilitators world-wide. The theoretical model on which this instrument is based comes from a 1928 publication by Dr. William Moulton Marston called *The Emotions of Normal People*.

Marston's Model was the basis for the original *Personal Profile System* which was developed by researchers at the University of Minnesota in 1972. In 1994, Inscape Publishing undertook extensive research, based on a stratified random sample of the US workforce, to revise, re-norm, and re-validate the instrument. The result of this research was the *Personal Profile System 2800 Series*.

The purpose of this report is to detail the research behind the *Personal Profile System 2800 Series*. Information on content development, research methodology, sample population demographics, reliability, and validity is provided. Conclusions show that the *Personal Profile System 2800 Series* is the most valid and reliable DiSC® instrument currently available.

The *Personal Profile System*® 2800 Series

Origin of the Instrument

The *Personal Profile System* is based on William Moulton Marston's two-axis, four-dimensional model, described in his 1928 book, *The Emotions of Normal People*. The model divides behavior into four dimensions: Dominance, influence, Steadiness and Conscientiousness (DiSC).

Marston developed the descriptive categories that made a practical application of his model possible. While Marston devised a system to understand and describe human behavior, Marston himself never developed an instrument or assessment tool to measure behavior. Later, authors and researchers expanded on his model and developed a variety of applications. Based on Marston's Model, the *Personal Profile System* was created and first published in 1972. It is designed to be self-administered, self-scoring, and self-interpreting.

Development of the Original *Personal Profile System*

The original *Personal Profile System* consisted of twenty-four sets of four words constructed with words used by Marston (1928). Each term was included on the basis of consistency with Marston's Model. Each set of four words contained one term thought to be related to each of the four dimensions. The words were presented in a forced-choice format.

The original instrument was validated and normed in 1972 on a sample of 1,000 people (752 males and 248 females) from a business population. The occupational distribution was: 432 executives and supervisors, 183 sales people, 55 engineers, 63 applicants, 35 technical, 113 clerical, 43 students, 18 machine operators, 58 miscellaneous. Presumably, the sample was largely Caucasian.

The 1994 Research

As a result of a renewed commitment to maintaining quality, accuracy and validity, Inscape Publishing conducted research in 1993 and 1994 in two different areas: literature survey and data collection and analysis.

The *Personal Profile System*® was evaluated to determine what changes were necessary to contemporize the application of the DiSC® model and improve the reliability of the instrument. Based on a research sample of over 3,000 respondents, it became clear that revisions to the items and scales were necessary.

Information on proposed revisions and improvements which had been gathered for several years from customers, distributors and Carlson Learning Company staff was reviewed and incorporated into the analysis of the instrument. A Delphi process was used to identify and evaluate new items for the *Personal Profile System.* Many content experts participated in this process.

Forced-Choice Format

The forced-choice format of the original instrument was retained because it is designed to minimize the bias introduced by the effects of social desirability and response style. In free-choice instruments, individuals may differ considerably in how they approach making responses; some may select many items or others may select few.

For example, if a Likert rating scale is being used, some people may tend to rate all of their choices in the higher ranges, others will rate themselves consistently in the lower ranges and still others will go right down the middle. By requiring everyone to use the same MOST and LEAST choice format in responding, the variance introduced by response style is eliminated.

Research Methodology

After a decision to expand and revise the *Personal Profile System* had been made, Inscape Publishing requested that a research study be conducted to determine the viability of changes to the instrument.

This study was designed to give results based on a stratified random sample that matched the general population of the working public in the United States. Specifically, the study's design matched the educational level, heritage, age, and gender characteristics of the American workforce. Employees from a variety of job categories, levels of responsibility, and industries were also sought. Data were obtained from five locations:

- Atlanta, Georgia

- Boston, Massachusetts

- Houston, Texas

- Irvine-Los Angeles, California

- Minneapolis, Minnesota

Several Instruments were completed by subjects:

- *Personal Profile System*® (Version 6.1)

- *Personal Profile System*® (Version 7.0)

- *Profile* Adjectives on a Likert-scale

- Demographic Profile

Subjects had up to forty minutes to complete the aforementioned instruments, all of which were administered at a single location in each of the target cities. Data were gathered in October, 1993, and no unusual circumstances were encountered during the process. Data were sent to Inscape Publishing and entered for analysis. These analyses were performed by the St. Paul, Minnesota firm, Evalcor. Important analyses included the following:

- analysis of the means on MOST and LEAST scales of the old and new *Personal Profile System* instruments across demographic and gender variables

- reliability analysis for the MOST, LEAST and Graph III scales

- correlation analysis

- factor analysis of the adjectives as responded to on the Likert scale

From this data, the *Personal Profile System 2800 Series* was developed and released in 1994.

1996 Research with Expanded Sample

Research on the *Personal Profile System*® has continued since 1994. *Personal Profile System* response forms and demographic data have been obtained from a number of different sources and by early 1996, data from a total of 812 respondents were available for analysis.

One of the questions this expanded research sought to answer was relative to the effect of a larger research sample on reliabilities. While the 1993 research sample had been carefully drawn, the question remained whether the addition of twice as many respondents would appreciably change the results that were obtained during the development of the *Personal Profile System 2800 Series*.

Analysis showed that research on a larger number of respondents changed the results only slightly, but positively. With the larger sample size, reliabilities increased by a small amount for both MOST and LEAST on each of the four scales, and the distribution of scores better approximated a *normal* or bell-shaped curve.

Demographic Data N=812 Respondents

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Table 1. Demographic Characteristics *Personal Profile System*® Respondents (N=812)

Gender:	Male	45%
	Female	55%
Education:	High school diploma or less	28%
	Some post-secondary	27%
	College graduate	30%
	Graduate or professional degree	15%
Employment:	General clerical	8%
	Secretarial/administrative	7%
	Sales	8%
	Technical	7%
	Warehouse or general labor	6%
	Supervisory	6%
	Mid-level management	10%
	Executive	4%
	Professional	25%
	Other	22%
Heritage:	African-American	10%
	Asian-Pacific	2%
	Caucasian	80%
	Hispanic	5%
	Native American	2%
	Other	2%

Analysis and Results

Reliability is determined to insure that the items on a scale accurately reflect the scale itself. It is customary to calculate the estimated reliability of behavioral measurement scales and to report them in terms of the internal consistency reliability as measured by Cronbach's *alpha* coefficient.

Reliability

The reliability coefficients for the four scales of the *Personal Profile System®* are reported in Table 2.

Table 2. Reliability Coefficients

	Graph I	Graph II	Graph III
D	.85	.84	.92
i	.79	.74	.87
S	.77	.78	.88
C	.72	.74	.85

Validity

There are many ways to measure validity. One approach is to determine the extent to which the association among scores represents the theory and model on which the instrument is based.

In the DiSC® model, Scales D (Dominance) and S (Steadiness) are, to some degree, opposites. So, we would expect to find that those two scales will be somewhat inversely related (negatively correlated).

In the same way, Scales i (Influence) and C (Conscientiousness) are, to some degree, opposites. We would also expect them to be inversely related.

If each scale measures something different from other scales, the correlation among scales should be smaller than the reliability of the individual scale. This condition is met when the value of a reliability coefficient is significantly larger than any of the correlations in the same row and column as that number.

Table 3 shows reliability coefficients along with inter-scale correlations, to reveal the relationships found for the sample. Note that the reliability coefficients have been adjusted using the Spearman-Brown Formula to compensate for any underestimation due to scale length.

Table 3. Adjusted Reliability Coefficients and Inter-Scale Correlations Among Total Scores (N=812)

	D-Most	i-Most	S-Most	C-Most	D-Least	i-Least	S-Least	C-Least
D-Most	**.92**							
i-Most	-.07	**.89**						
S-Most	-.73	-.21	**.88**					
C-Most	-.18	-.63	.11	**.84**				
D-Least	-.79	-.04	.73	.26	**.92**			
i-Least	.10	-.67	.13	.56	-.07	**.85**		
S-Least	.73	.18	-.74	-.20	-.78	-.15	**.88**	
C-Least	.33	.60	-.33	-.64	-.46	-.56	.33	**.86**

(Note: Adjusted reliability coefficients are shown in bold along the diagonal of the table. Inter-scale correlations are shown below the diagonal.)

Results Summary

The *2800 Series* of the *Personal Profile System*® is considerably more reliable than the 24-box *Personal Profile System* 6.1 instrument had been. For comparison purposes with 24-box instruments, reliabilities of the 24-box DiSC® instrument are given below.

Comparing results in Table 4 with those shown in Table 3 above, you will note that reliabilities were significantly improved for i and C scales. Reliability of C-Most went from .36 to .72 and C-Least from .52 to .74. Similarly, i scale reliabilities increased to .79 for i-Most and .74 for i-Least.

Reliability of 24-Box DISC Instruments

Table 4. Reliabilities of 24-Box DISC Instruments

D-Most	.79	D-Least	.76
i-Most	.50	i-Least	.47
S-Most	.61	S-Least	.59
C-Most	.36	C-Least	.52

Reliability of *Personal Profile System*® 2800 Series (N=812)

As shown on Table 2, Graph III reliabilities range from .85 to .92. Commonly accepted standards require learning instruments to demonstrate reliabilities above .70. The results obtained on the *Personal Profile System 2800 Series* are considered to be very good.

Classical Profile Pattern Interpretation

The fifteen Classical Profile Patterns give the most in-depth description of an individual's behavior because they are based on the individual's score on all four Dimensions of Behavior. A more detailed description of the Classical Profile Patterns follows in the discussion on the three stages of interpretation.

A Classical Pattern table was constructed based on historical data as well as the data from the sample. Segment number combinations were assigned to Classical Profile Patterns based on rational cluster analysis. Preliminary analysis had identified fifteen Classical Patterns based on the shape of the profile or the relationship of the plotting points to each other.

These Patterns remained relatively consistent in shape from the 24-box version of the instrument to the *2800 Series* instrument. This suggests that these fifteen Patterns occur with regularity in normal populations. The same types have been identified in the past using different methodologies for assessment, which suggests that human behavior is being measured with consistency.

Cluster Analysis

Several analyses of the data were performed using different statistical methods. While as many as 100 clusters were identified in initial analyses, they strongly correlated with each other such that the 100 could be reduced to fifteen, which are more easily described and communicated.

The differences between versions or variations of each Classical Profile Pattern within a larger number of clusters are subtle and may not persist over time; the variations may be due only to errors of measurement. Individual segment number combinations are assigned to a Classical Pattern based on the degree of similarity to the classical pattern.

Conclusion

Based on this research with a representative population sample and extensive statistical analysis that demonstrated higher reliability, the 24-box *Personal Profile System*® (Version 6.1) was revised in the following ways, resulting in the *Personal Profile System 2800 Series*:

- Based on research started in 1990, the response page has been significantly improved. More than 40 changes have been made, including: word changes; changes in word groups; and the addition of four new response groups. Research indicated that the new items and changed items significantly improved the reliability of the instrument.

- The number of "N" symbols decreased from 44 to 13. The "N" symbols are used for words that do not correlate strongly with any single dimension of D, i, S or C. The "N" items remain in the instrument because the words work well for either the MOST choice or the LEAST choice but not for both choices.

- Graphs have been divided into seven equal segments to classify the Profile Patterns based on Classical Pattern shapes. The new segments eliminate the problem of numbers falling on a segment division line. The plotting points on the Graphs represent the population distribution of scores for the new response form.

- Emphasis on Graph III — Based on the redesign of the response form, the DIFFERENCE scores plotted on Graph III represent the most comprehensive picture of an individual's behavioral style. Graph I and Graph II represent only one-half of the description of the person as seen from one perspective, either MOST or LEAST. The improvements made to the response form have made the DIFFERENCE scores considerably more reliable than either the MOST or LEAST scores taken separately.

- Intensity Numbers only on Graph III — Historical, academic and sample group research indicates that Graph III is the most accurate and complete picture of an individual respondent.

- Based on the most recent research, the language used to describe the S and C behavioral dimensions has been further defined to clarify the descriptions for these dimensions.

- As a result of further analysis, Influence and Conscientiousness were demonstrated to reflect the most accurate descriptive labels for the i and C dimensions.

- Classical Profile Pattern Table numbers — Patterns are classified based on the shape of the plotting points on the Graph. Cluster analysis was used to determine the classification of the segment number combinations listed in the table.

These improvements for the *Personal Profile System*® *2800 Series* make it the most valid and reliable DiSC® instrument available.