

# Australasian Personal Profile System®

## RESEARCH PAPER

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## 1994 Development of the *Personal Profile System 2800 Series*

As a result of a renewed commitment to maintaining quality, accuracy and validity, Inscape Publishing (formerly Carlson Learning Company) conducted research in 1993 and 1994 in two areas: (1) literature survey and (2) data collection and analysis.

The *Personal Profile System*® was evaluated to determine what changes were necessary to contemporise 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 minimise 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 increase the validity of the *Personal Profile System* in the international marketplace had been made, Carlson Learning Company requested that a research study be conducted in Australia and New Zealand to determine the validity and reliability for an Australasian population sample.

This study was designed to give results based on a stratified random sample that matched the general population of the working public in Australia & New Zealand. Specifically, the study's design matched the educational level, age, and gender characteristics of the Australasian workforce.

Employees from a variety of job categories, levels of responsibility, and industries were also sought. Data was obtained from five locations:

- Wellington
- Auckland
- Sydney
- Melbourne
- Perth

Data was gathered during 1996 and no unusual circumstances were encountered during the process. Data was sent to Carlson Learning Company and entered for analysis. These analyses were performed by the St. Paul, Minnesota firm, Evalcor. Important analyses included:

- reliability analysis for the MOST, LEAST and Graph III scales
- correlation analysis
- factor analysis of the adjectives

From this data, the *Personal Profile System - Australasian Version* was developed and released in 1997.

## **1996 Research of the Australasian Workforce**

All previous versions of the *Personal Profile System* had been based on American population samples. *Personal Profile System* response forms were obtained from a population sample that was representative of the work population from the most recent census.

One of the questions this research sought to answer was whether there was any significant difference between the Australasian population and the American population in terms of behaviour and in terms of their interpretation of the words in the response form for the *Personal Profile System 2800 Series*.

## **Demographic Data N=406 Respondents**

The details of the research on the sample of 406 respondents are delineated as follows. See Table 1 for the demographic characteristics of the *Personal Profile System* respondents who participated in this research.

Table 1:  
Demographic  
characteristics  
*Personal  
Profile  
System*<sup>®</sup>  
respondents  
(N=406)

<b>Gender:</b>	<b>Male</b> <b>Female</b>	<b>61%</b> <b>39%</b>
Education:	High school or less Some tertiary education Degree or Higher	50% 19% 31%
Employment:	Admin/Secretarial/Clerical Sales Technical/Trade/Mechanical Warehouse or general labour Supervisors or Managers Professional Other	24% 12% 8% 6% 20% 21% 11%
Country:	Australia New Zealand	86% 14%

## Analysis and Results:

### Reliability

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

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

	Graph I	Graph II	Graph III
<b>D</b>	.81	.84	.86
<b>i</b>	.78	.76	.83
<b>S</b>	.75	.67	.80
<b>C</b>	.70	.79	.83

Table 2: Australasian Reliability Coefficients

## 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<sup>®</sup> 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.

	D-Most	i-Most	S-Most	C-Most	D-Least	i-Least	S-Least	C-Least
D-Most	<b>.81</b>							
i-Most	-.00	<b>.78</b>						
S-Most	-.68	-.36	<b>.75</b>					
C-Most	-.30	-.60	.12	<b>.70</b>				
D-Least	-.79	-.04	.73	.26	<b>.84</b>			
i-Least	.10	-.67	.13	.56	-.16	<b>.76</b>		
S-Least	.73	.18	-.74	-.20	-.72	-.23	<b>.67</b>	
C-Least	.33	.60	-.33	-.64	-.53	-.64	.36	<b>.79</b>

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

Table 3: Adjusted reliability coefficients and inter-scale correlations among total scores (N=406)

## Results Summary

The 2800 Series of the Personal Profile System<sup>®</sup> (Disc Classic) is considerably more reliable than the 24-box instrument had been. For comparison purposes with 24-box instruments, reliability's of the 24-box DiSC<sup>®</sup> instrument are given below.

Comparing results in Table 4 with those shown in Table 3 above, you will note that reliability's were significantly improved for i and C scales. Reliability of C-Most went from .36 to .70 and C-Least from .52 to .79. Similarly, i scale reliability's increased to .78 for i-Most and .76 for i-Least.



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## Reliability of 24-Box DiSC<sup>®</sup> Instruments

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

Table 4: Reliability's of 24-box DiSC Instruments

## Reliability of Personal Profile System<sup>®</sup> 2800 Series (N=406)

As shown on Table 2, Graph III reliability's range from .80 to .86. Commonly accepted standards require learning instruments to demonstrate reliability's 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 behaviour because they are based on the individual's score on all four Dimensions of Behaviour.

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 15 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 Version 6.1 instrument to the 2800 Series instrument. This suggests that these 15 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 behaviour 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 15, 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, the American Personal Profile System® 2800 Series was revised in the following ways, resulting in the Personal Profile System - Australasian Version:

- Based on research started in 1995, the response page has been changed to reflect the different meanings of some words in the Australasian culture. Seventeen changes have been made to the American Questionnaire, based on the level to which each word correlated to the dimension it is measuring.
- The number of “N” symbols increased from 14 to 17. 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 are divided into seven equal segments to classify the Profile Patterns based on Classical Pattern shapes. These 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. The numbers have been moved in all three graphs in the Australasian Version to reflect the different norms for our population sample.
- 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 behavioural 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 behavioural 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.



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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 Australasian Personal Profile System 2800<sup>®</sup> Series make it the most valid and reliable DiSC<sup>®</sup> instrument available in Australia and New Zealand.