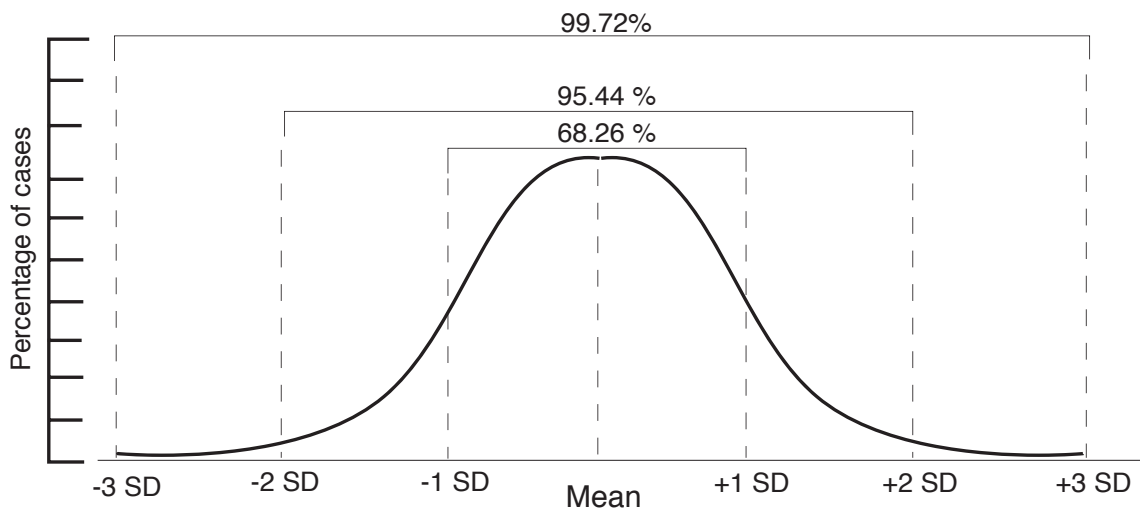


# Technical Manual

## INSIGHT Inventory®



## IV. TEST DEVELOPMENT

### Historical Use of Adjectives as Test Items

Adjective checklists can be traced to work done in 1930 by Hartshore and May. These psychologists were the first to use the adjective checklist as a measure of personality (or character, as they called it). They published a book titled *Studies in the Nature of Character* and purported the use of 80 pairs of antonyms as a way to measure character.

Allport and Odbert (1936) expanded this theory and attempted to identify all the English adjectives which would describe personal behavior. They identified 17,953 words and stimulated a good deal of research in how these could be reduced into a smaller list that would be manageable as a personality measure.

Cattell, in the 1940's, used a newly-developed statistic, factor analysis, to reduce Allport's work to a smaller, more manageable list which resulted in 12 primary traits.

Gough followed with research in the 1940's and then published the first widely used adjective checklist in 1950. His inventory used a yes/no response format.

### INSIGHT Item Selection

Allport and Odbert's (1936) descriptive list of adjectives provided the base for item selection. This was followed with a review of the literature on personality differences to create a list of adjectives more commonly used in today's language. Added to this list were adjectives used by both professionals and lay people in everyday language to describe the differences between people. Descriptive reports of established and validated psychological inventories such as the Minnesota Multiphasic Personality Inventory, Sixteen Personality Factors, Strong-Campbell Interest Inventory, and Myers-Briggs Type Indicator were also reviewed. A master list was generated from a combination of all of these.

The first master list of words was screened to select those words commonly used by people when describing others and which were considered neither latently positive nor negative. Also, words were chosen that had a clearly bipolar nature in their everyday use. For example, the word "talkative" was selected because a person can conceivably be either "talkative" or "not talkative," and both descriptions would fit into the flow of normal conversation. After the master list was reduced by this criterion, the resulting list of words was submitted to the formal statistical procedure of factor analysis.

## Factor Analysis

Factor analysis is a technique used to reduce a set of items to a smaller set of “factors” that explain the variance among the items. The statistical result of this procedure is a list of correlations of each test item with each factor (factor loadings). Essentially, this provides a way to define the smaller number of underlying traits the adjectives measure and a way to eliminate adjectives which do not contribute to a key trait.

### Factors

Form F of the INSIGHT Inventory contained 36 items which were submitted to principal components factor analysis, once each for the Work Style items and for the Personal Style items. Using a sample of 1,540 adults, eight factors were identified with eigenvalues greater than one for each solution. Using an oblique rotation of the factors, the four theoretical factors (Getting One’s Way, etc.) were each accounted for by two of the eight factors found through the factor analysis. Six items from each of the Work Style and Personal Style analyses failed to load well enough on any of the factors and were discarded. At that time, two new items were added, leading to the final 32 item version of the INSIGHT Inventory currently in use.

The 32 item inventory was then resubmitted to factor analysis using new samples of 589 adults and 1,021 high school and college students. Separate analyses were run on each sample, but those yielded identical factor structures. Thus, the results which are reported are for a combined sample of adults and students. That four factor solution is reported below, which accounts for 42 and 43.6 percent of item variance respectively for the Work and Personal Styles. An oblique rotation of the factors was performed, which allows for factor intercorrelation.

Factor loadings of each item with each of the four primary factors are listed below. Tables 1 and 2 list item loadings for the pattern matrices, giving an indication of the relative importance each item carries for a particular factor. Tables 3 and 4 show factor intercorrelations.

Subsequently, four scales were developed based on the factor loadings, with eight separate items loading on each of the four scales. Loadings are given for each item with each factor, but are sorted according to the scale with which they are associated. As can be seen from Tables 1 and 2, in nearly all cases, the items load highest with the scale to which they were eventually assigned, although there are some minimal differences between the Work/School Style and Personal Style factor analyses. In the end, parsimony and consistency of scoring were additional issues in arriving at each item’s assignment to its scale. Table 5 shows correlations of all 8 and students for Adult and School Forms.

Table 1

Work Style Factor Analysis Pattern Matrix				
Adjective	Factor 1	Factor 2	Factor 3	Factor 4
	Getting One's Way Indirect-Direct	Responding to People Reserved-Outgoing	Pacing Activity Urgent-Steady	Dealing with Detail Unstruc.-Precise
W5 – Demanding	.65	-.04	-.16	.11
W13 – Forceful	.64	-.06	-.17	-.02
W9 – Domineering	.62	.09	-.19	-.03
W25 – Intense	.49	-.02	-.01	.11
W1 – Competitive	.49	.07	-.05	.10
W18 – Strong-Willed	.46	.25	-.01	.09
W16 – Convincing	.39	.25	.24	.08
W22 – Decisive	.28	.13	.09	.31
W11 – High Spirited	.01	.75	.02	.09
W21 – Enthusiastic	-.07	.71	-.02	.22
W17 – Good Mixer	.01	.70	.06	.02
W2 – Talkative	.03	.68	-.12	-.05
W26 – Life of the Party	.18	.63	.06	-.22
W7 – Animated	.02	.50	-.09	-.06
W30 – Charming	.21	.50	.32	-.06
W27 – Daring	.34	.45	.12	-.18
W31 – Laid-Back	-.12	.22	.63	-.16
W10 – Easygoing	.07	-.04	.62	-.27
W6 – Serene	.09	-.21	.58	-.02
W24 – Tolerant	-.29	.10	.56	.16
W14 – Mild	-.09	-.30	.55	.01
W20 – Even-Tempered	-.25	.11	.52	.22
W3 – Patient	-.23	.03	.49	.23
W28 – Restrained	.07	-.47	.30	.12
W32 – Organized	-.15	.06	-.08	.72
W15 – Systematic	-.08	-.01	-.02	.71
W12 – Structured	-.04	.04	-.05	.66
W23 – Detailed	.13	-.03	.04	.66
W4 – Accurate	.07	-.06	.04	.63
W8 – Perfectionistic	.22	-.05	-.04	.59
W19 – Exacting	.26	-.04	.03	.58
W29 – Particular	.27	-.21	.08	.42
W19 – Exacting	.26	-.04	.03	.58
W29 – Particular	.27	-.21	.08	.42

General population sample: N = 1601 adults and students

Table 2

<b>Personal Style Factor Analysis Pattern Matrix</b>				
<b>Adjective</b>	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>	<b>Factor 4</b>
	Getting One's Way Indirect-Direct	Responding to People Reserved-Outgoing	Pacing Activity Urgent-Steady	Dealing with Detail Unstruc.-Precise
P30 – Demanding	.71	-.03	-.11	.08
P18 – Forceful	.70	-.02	-.05	.05
P22 – Domineering	.69	-.06	-.10	.06
P26 – Strong Willed	.47	.21	.06	.11
P5 – Intense	.37	.06	-.01	.27
P10 – Competitive	.35	.20	-.01	.09
P28 – Convincing	.31	.30	.20	.11
P1 – Decisive	.14	.16	.03	.32
P13 – High Spirited	-.01	.75	-.02	.07
P2 – Enthusiastic	-.01	.74	-.05	.01
P16 – Talkative	-.12	.73	-.06	.17
P7 – Good Mixer	.01	.70	.06	-.05
P20 – Life of the Party	.16	.64	.02	-.15
P11 – Animated	.08	.54	.30	.01
P24 – Charming	.12	.49	-.01	-.05
P32 – Daring	.30	.48	.08	-.11
P21 – Mild	-.03	-.29	.65	-.01
P29 – Laid-Back	.08	.10	.62	-.26
P8 – Serene	.14	-.18	.60	.04
P25 – Even-Tempered	-.10	.32	.60	-.09
P17 – Easygoing	-.28	.05	.57	.16
P31 – Tolerant	-.34	.15	.53	.13
P15 – Patient	-.37	.09	.50	.16
P3 – Restrained	.17	.49	.32	.05
P14 – Exacting	.10	-.01	-.03	.72
P12 – Organized	-.20	.04	-.06	.72
P19 – Structured	.05	-.01	-.01	.71
P9 – Accurate	-.02	-.11	.04	.71
P27 – Perfectionistic	-.01	-.02	.02	.69
P23 – Systematic	-.01	.01	.11	.66
P6 – Detailed	.11	-.03	-.09	.66
P4 – Particular	.18	-.08	-.03	.57

General population sample: N = 1601 adults and students

**Table 3**


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**Work Style  
Factor Correlation Matrix**

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	<b>Factor 1</b> Getting One's Way	<b>Factor 2</b> Responding to People	<b>Factor 3</b> Facing Activity	<b>Factor 4</b> Dealing With Detail
Factor 1	1.00			
Factor 2	-.09	1.00		
Factor 3	.00	.09	1.00	
Factor 4	.26	.18	-.13	1.00

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**Table 4**


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**Personal Style  
Factor Correlation Matrix**

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	<b>Factor 1</b> Getting One's Way	<b>Factor 2</b> Responding to People	<b>Factor 3</b> Facing Activity	<b>Factor 4</b> Dealing With Detail
Factor 1	1.00			
Factor 2	.01	1.00		
Factor 3	.08	-.09	1.00	
Factor 4	.21	.16	-.10	1.00

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## V. RELIABILITY

**Reliability** is the degree of consistency with which a test measures what it is said to measure. Error in test measurement can be caused by mood, fatigue, misunderstanding of instructions, nervousness, or familiarity with the same or similar tests. No test can measure psychological traits so accurately that each time an individual takes it they score exactly the same. However, some tests are more reliable than others, and this can be determined by reviewing the reliability statistics.

Reliability coefficient is a generic term. Different reliability coefficients and estimates of measurement error can be based on various types of evidence; each suggests a different meaning.

### **Test - Retest**

Test-retest reliability involves administering the same test on two separate occasions, typically a few weeks apart, and computing a coefficient that indicates how similar the scores were.

### **Alternate Forms**

Alternate forms reliability is computed by creating two parallel forms of the test and administering them both to the same people. (The INSIGHT Inventory has no alternate form.)

### **Internal Consistency**

Internal consistency can be measured by computing a coefficient alpha. This compares the response to each item of a trait to the response on every other item measuring that same trait. It answers the question as to how well the items are measuring the same trait. This is a statistical computation and does not require alternate forms or test-retest.

Reliability of test scores can vary by population make up, size of sample, and form of reliability computed. Results should be interpreted specific to this data.

Internal consistency reliabilities for all scales of the INSIGHT Inventory are listed in Table 6. They range from .71 to .85 with an average of .77. Test-retest reliability was examined on a group of 90 college students, with six weeks between administrations. These are listed in Table 7 and range from .54 to .82 with an average of .73.

Corrected item to scale correlations can be found in Table 8.

Nunnally (1978) states that reliability coefficients in the 70's and 80's are acceptable for purposes for which the INSIGHT Inventory is used. All the coefficient alphas are in that range, as are the test-retest reliabilities for the School Scales. Several of the Personal Scales' test-retest coefficients fall

below .70. This could suggest less stability for those scales, but even those results are based on a fairly small sample and should be viewed with this in mind. The coefficient alphas are based on a much larger sample and, in general, are quite high for this type of instrument.

Also listed in Table 6 are the standard errors of measurement. Based on the scale's standard deviation and its reliability, standard areas of measurement can be used to define a range around a person's score within which the "true" score is likely to fall. This allows us to say, for example, that since the S.E.M. for Work Scale D is 3.0, 19 times out of 20, when a person's test shows 32, their actual score would be between 29 and 35. We know that there is some variation in the way people fill out such instruments, thus the score on a particular day may not be their "True" score. The S.E.M. gives us a way of estimating how close to their true score a given score is likely to be.

**Table 6**

**Internal Consistency Reliability  
and Standard Error of Measurement**

	Work/School Style				Personal Style			
	A	B	C	D	A	B	C	D
Coeff. $\alpha$	.73	.81	.71	.81	.71	.82	.71	.85
S.E.M.	3.1	3.2	3.5	3.0	3.4	3.2	3.5	2.9

N= 1602 Adults and Students

**Table 7**

**Test - Retest Reliability  
INSIGHT Inventory**

School Style				Personal Style			
A	B	C	D	A	B	C	D
.78	.75	.82	.76	.64	.77	.54	.69

Time period between administrations: Six weeks  
Sample: 90 Undergraduate students; University of Kansas

**Table 8**

<b>Corrected item-scale correlations</b>						
		<b>Correlation</b>				
<b>Item</b>		<b>With Work/ School Scale</b>		<b>With Per- sonal Scale</b>		
<b>SCALE A</b>	Competitive	W1	.41	P10	.30	
	Demanding	W5	.51	P30	.52	
	Domineering	W9	.49	P22	.52	
	Forceful	W13	.47	P18	.49	
	<b>Getting One's Way</b>	Convincing	W16	.33	P28	.31
	Strong Willed	W18	.42	P26	.44	
	Decisive	W22	.33	P1	.26	
	Intense	W25	.37	P5	.36	
<b>SCALE B</b>	Talkative	W2	.57	P16	.61	
	Animated	W7	.41	P11	.42	
	High Spirited	W11	.62	P13	.64	
	Good Mixer	W17	.57	P7	.61	
	<b>Responding to People</b>	Enthusiastic	W21	.53	P2	.55
	Life of the Party	W26	.63	P20	.59	
	Daring	W27	.46	P32	.45	
	Charming	W30	.48	P24	.49	
<b>SCALE C</b>	Patient	W3	.43	P15	.47	
	Serene	W6	.40	P8	.35	
	Easygoing	W10	.43	P17	.45	
	Mild	W14	.45	P21	.46	
	<b>Pacing Activity</b>	Even Tempered	W20	.44	P25	.50
	Tolerant	W24	.48	P31	.48	
	Restrained	W28	.23	P3	.12	
	Laid-back	W31	.37	P29	.38	
<b>SCALE D</b>	Accurate	W4	.53	P9	.56	
	Perfectionistic	W8	.54	P27	.59	
	Structured	W12	.52	P19	.58	
	Systematic	W15	.56	P23	.61	
	<b>Dealing with Detail</b>	Exacting	W19	.56	P14	.65
	Detailed	W23	.59	P6	.62	
	Particular	W29	.43	P4	.51	
	Organized	W32	.53	P12	.56	

n = 1602 General population Adults and Students

