Evidence Supporting VIEW

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VIEW

An Assessment of Problem Solving Style℠

Introduction

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This resource presents a summary of the descriptive statistics for all VIEW dimensions and elements. It also presents an overview of the evidence supporting the reliability and validity of the VIEW instrument.

The descriptive statistics include mean, median, mode, range, standard deviation, Cronbach's Alpha, standard error, skew, and kurtosis for each of the three VIEW dimensions and also for the three subscales of the Orientation to Change (OC) dimension. The online and print editions compare favorably, and the intercorrelations among VIEW's three dimensions are all of very low magnitude. The correlations of VIEW's dimensions with age or gender are also negligible. There is a slight tendency for female subjects to have a Person-oriented Ways of Deciding preference and for male subjects to have a Task-oriented preference. This result is similar to findings for other similar inventories in its direction, as well as in its modest magnitude. There is a small but significant correlation between age and the OC dimension – particularly on the Structure and Authority sub-scale (the negative correlation suggests that the direction is for older subjects to be associated with Explorer preferences), although the small magnitude of the correlation indicates that this is a very weak relationship. Taken together, these results support the claim that the dimensions of VIEW are independent. Intercorrelations among the three elements of OC reflect their common foundation as elements of the OC dimension, rather than suggesting that they are separate dimensions that are independent of OC. This report also presents the distributions for the OC (and sub-scales), MP, and WD dimensions, a summary of the interactions among dimensions, the distributions by occupational sectors, by language choices, and distributions of VIEW results for several translations of VIEW into languages other than English.

Drawing upon contemporary perspectives for understanding the nature of reliability and validity, this report also presents current information relating to the VIEW instrument. With respect to reliability, the data provide support for the claim that scores on the VIEW instrument are stable, and that the instrument meets or exceeds the customary standards and expectations for reliability over time. The results for internal consistency also exceed the generally accepted criterion (coefficients >.70), and therefore support the claim for the internal consistency of VIEW. The report also provides a review of evidence relating to validity, including evidence based on test content, response processes (and differentiating level and style of creativity), internal structure, relations to other variables, and evidence based on uses and consequences of testing.

The report concludes that VIEW demonstrates evidence of reliability and validity. However, we are actively involved in continuing research and development with the instrument.

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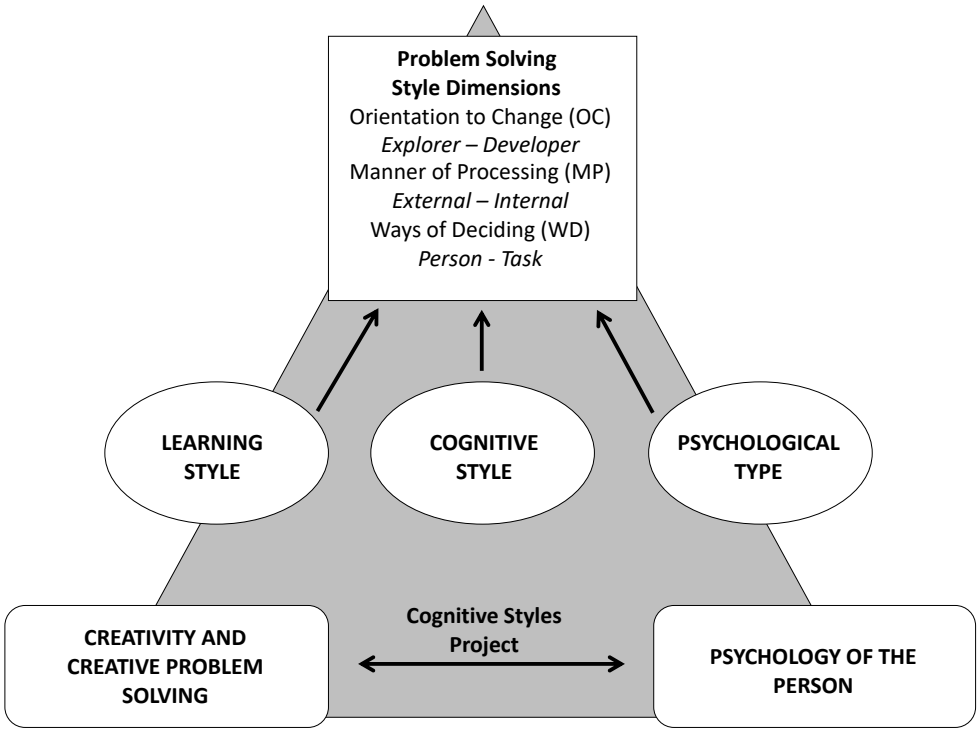
Evidence Supporting VIEW: An Assessment of Problem Solving Style

The purpose of this technical resource is to provide a summary of the evidence that supports VIEW: An Assessment of Problem-Solving Style. The first section will overview the support for the conceptual foundations of VIEW. This resource also presents a summary of the descriptive statistics for all VIEW dimensions and sub-scales. It also includes an overview of the evidence supporting the reliability and validity of the VIEW instrument.

Support for the Conceptual Foundations of VIEW

We have detailed the conceptual model and theoretical underpinnings within the *Foundations of VIEW* technical resource. We assert that VIEW is based on two basic foundations: creativity and creative problem solving, and the psychology of the person. These two foundations have been explored in detail through the Cognitive Styles Project. The evidence from this project is listed in more detail within the *VIEW Literature and Resources* technical resource.

Figure 1: VIEW's Conceptual Model



VIEW has shown its ability to identify preferences for learning and applying various aspects of Creative Problem Solving (CPS). VIEW does not try to measure these directly, as this would 'muddle' style with process (something to be avoided). Rather, the styles identified within VIEW have shown relationships

to reported preferences for learning and using specific tools, guidelines, stages, and components of CPS by using independent measures. Other studies included within this technical resource highlight relationships to other aspects of creativity.

The conceptual model (see Figure 1) also outlines that VIEW is based on the psychology of the person. Problem-solving style preferences operate between the deeper aspects of personality and actual behavior, so we would expect that the VIEW assessment would correlate appropriately to measures of personality, but not so much that style and personality would be the same thing – we would not expect complete overlap. Research applying measures of personality has shown this to be true.

The VIEW assessment is a unique integration of three main constructs related to individual differences: learning style, cognitive style, and psychological type. The evidence within this resource supports this claim.

VIEW has also shown its efficacy to provide impact when individuals are provided feedback and insight into their problem-solving style as they approach non-routine, creative challenges. In other words, when individuals use VIEW, there are clear and significant benefits to the outcomes of their teamwork (e.g. Main, Delcourt, & Treffinger, 2019).

The authors of VIEW clearly asserted that VIEW was designed to be a measure of style, and not contaminated by level-oriented factors. The research, thus far, supports this claim.

There is ample empirical support for the conceptual foundations for VIEW. The authors of VIEW have been actively engaged in the conduct of VIEW research, and have been supportive of other independent scholars and researchers. Our efforts are most often aimed at submitting this research to peer review, and our intention is to continue this work.

Descriptive Statistics

Since the initial launch of the VIEW assessment, the authors and publisher/distributor have maintained a database on those who completed the measure and agreed to have their results included. The source of this data is derived by those who are qualified to use the assessment, so this is not a randomized sample, but rather a collection of numerous samples of convenience. All data has been collected in conformance with the APA's ethical policies, as well as those of the Data Protection regulations.

The current master database for VIEW used for these analyses includes 64,880 subjects. Based on 62,227 subjects who provided age data, the mean age was 33.3 (SD = 14.8; range, 10 - 94). The database includes 29,856 male respondents (46.5%), 34,309 female respondents (55%), and 720 respondents (1.1%) who declined to state their gender.

Table 1 summarizes several important descriptive statistics for each of VIEW's three dimensions: Orientation to Change (OC), Manner of Processing (MP), and Ways of Deciding (WD), and the three

subscales of OC, Novelty (NV), Structure and Authority (SA), and Search Strategy (SS), based on 64,880 respondents.

Table 1: Summary of Descriptive Statistics for VIEW (N=64,880)

Statistic	Orientation to Change				Manner of Processing	Ways of Deciding
	Total OC	NV	SA	SS		
Mean	74.88	19.33	20.29	21.87	29.55	35.21
Std. Dev.	15.7	5.58	5.4	5.5	9.15	8.3
Median	75	19	20	22	29	35
Mode	72	20	20	23	32	32
Minimum	18	5	5	5	8	8
Maximum	126	35	35	35	56	56
Skew	-0.205	-0.006	-0.026	-0.367	0.232	-0.14
Kurtosis	0.094	-0.335	-0.221	-0.114	-0.217	-0.172
Alpha Rel.	0.862	0.872	0.871	0.872	0.856	0.856
SEM	5.83	1.99	1.94	1.97	3.47	3.15

Comparison of Online and Paper Editions

The complete data set combines data from both the earlier print (no longer available) and on-line editions of VIEW. For a sample of convenience of users who have responded to both the print and the on-line forms (N=177), the results indicate that both forms yield highly comparable results. The correlations between the two formats are: OC, r = .923; MP, r = .917; and WD, r = .978; each of these correlations is significantly different from zero ($p<.01$). The means and standard deviations for all three dimensions are comparable, and do not differ significantly, as noted in Table 2, below.

Table 2: Comparison of Means Between On-Line and Paper Editions of VIEW

Dimension	On-Line Edition	Paper Edition		
	Mean (S.D.)	Mean (S. D.)	T	p
OC	55.88 (21.00)	54.41 (20.00)	<1	n.s.
MP	25.18 (11.69)	25.76 (12.16)	<1	n.s.
WD	30.41 (9.69)	30.29 (10.10)	<1	n.s.

Intercorrelations Among VIEW's Dimensions, Age, and Gender

Table 3, below, presents data regarding the intercorrelations among VIEW's three dimensions, and the correlations of both age and gender with each of the three VIEW dimensions. The intercorrelations among VIEW's three dimensions are all of very low magnitude. The Orientation to Change (OC) dimension correlates 0.12 (p<.01) with Manner of Processing (MP) and .11 with Ways of Deciding (WD). The correlation of MP with WD is 0.13 (p<.01). The correlations of VIEW's dimensions with age or gender are also negligible. For age, the correlations are: Orientation to Change, *r* = -0.09 (p<.01); Manner of Processing, *r* = 0.05; and, Ways of Deciding, r = -0.09 (p<.01). Although these correlations are statistically significant (probably by virtue of the large sample size), note that the magnitude of the relationship is very weak (accounting for a very small amount of the variance). For gender the correlations are: Orientation to Change, *r* = 0.12 (p<.01); Manner of Processing, *r* = 0.02; and, Ways of Deciding, r = -0.27 (p<.01). Again, the significant correlation between gender and OC is indicative of a weak relationship (accounting for only 2% of the variance). The relationship between gender and WD is somewhat stronger, but still accounts for only 10% of the variance; it suggests a slight tendency for female subjects to have a Person-oriented preference and for male subjects to have a Task-oriented preference. This result is similar to findings for other similar inventories in its direction, as well as in its modest magnitude.

Table 3: Inter-Item Correlation Matrix (N=64,880)

	OC	MP	WD	NV	SA	SS	Age	Gender
OC	1.00	0.12	0.11	0.83	0.80	0.74	-0.09	0.12
MP		1.00	0.13	0.18	0.05	0.04	-0.05	0.02
WD			1.00	0.03	0.00	0.25	0.09	-0.27
NV				1.00	0.52	0.45	-0.09	0.10
SA					1.00	0.41	-0.19	0.18
SS						1.00	0.10	-0.02
Age							1.00	-0.21
Gender								1.00

All Correlations are significant at the 0.01 level, except between SA and WD.

These data support the conclusion that the three dimensions of VIEW are independent. There are some significant correlations of the scores on the three VIEW dimensions with age or gender. There is a small but significant correlation between age and the Orientation to Change dimension (the negative correlation suggests that the direction is for older subjects to be associated with Explorer preferences), although the small magnitude of the correlation indicates that this is a very weak relationship. Similarly, there is a small, but significant correlation, between OC and gender, also suggesting a very weak relationship, in the direction of associating a Developer preference with Female subjects. Finally, as Table 3 indicates, we found a greater preference for the Person style on the WD dimension among female respondents, and a greater preference for the Task style among male respondents. Based on psychological type theory and research (Myers, McCaulley, Quenk, & Hammer, 1998), this was not a surprising finding.

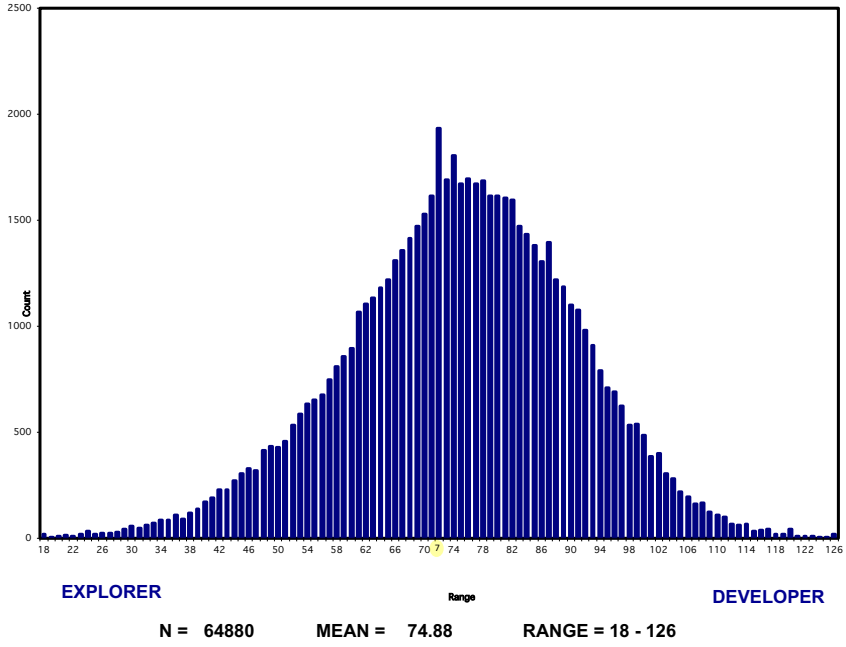
The intercorrelations among the three OC subscales were: Novelty (NV) correlated .52 with Structure and Authority (SA) and .45 with Search Strategy (SS). The correlation between SA and SS was .41. The shared variance among the three elements reflects their common foundation as elements of the OC dimension, rather than suggesting that they are separate dimensions that are independent of OC. All three of the subscales correlate strongly and significantly with the overall OC dimension, as expected.

By virtue of the size of the master database, the correlations reported above were statistically significant. Keep in mind that this indicates that the coefficients obtained are reliably different from zero; it suggests that the relationship reported is not a "chance" result. It does *not* indicate that there is a relationship of substantial degree between the variables; we must assess the magnitude of the relationship independently. We hold that, while we can be *confident* in the results we obtained, those results indicate relationships between any two of the variables that are generally weak or negligible in relation to practical implications.

Distribution of Scores: Orientation to Change (OC)

Figure 2 presents the total distribution of scores for the OC dimension, based on the current master data set (N=64,880). This figure uses a histogram to enable us to inspect the distribution of the subject responses on the OC dimension visually, and helps us to interpret the central tendency and distributions of responses, to clarify the data that we presented numerically in Table 1. The distribution for OC, presented in Figure 2, shows a generally normal 'bell-shaped' curve that is slightly skewed to the right of the scale (or "negatively skewed"). The observed mean of 74.8 and the median of 75 are slightly higher than the theoretical mean of 72 for the scale; the mode for this dimensions is 72. (In a "perfectly" normal distribution, the mean, median and mode would all be identical, and would be 72 for this scale.) The responses on the scale range from 18-126, which does represent the full range of possible scores for the scale. The standard deviation (SD) is 15.7 and the reliability of this dimension, using Cronbach's Coefficient Alpha, is .86. The standard error of measure (SEM) for OC is 5.83. (Thus, given an observed score, there is a 68.22% probability that the person's true score would be that score ±5.83.)

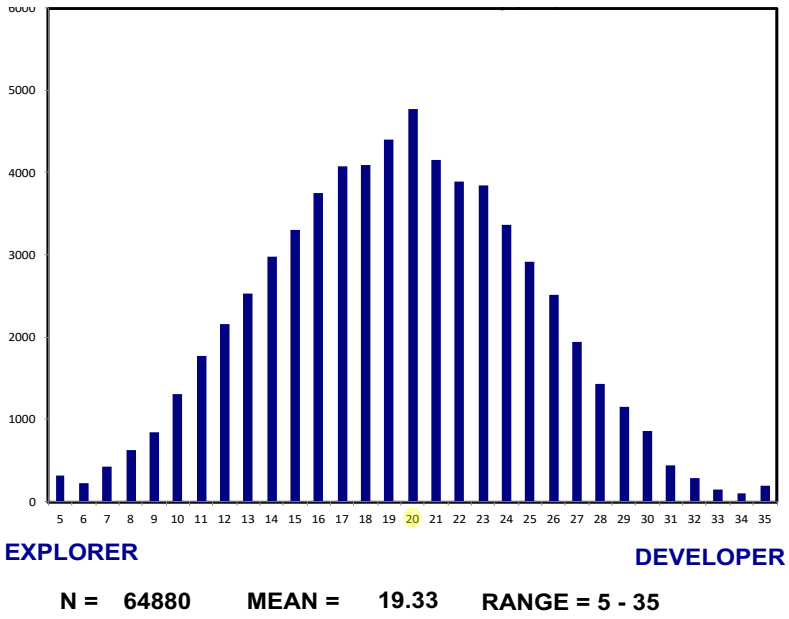
Figure 2: Distribution of Scores for Orientation to Change (OC



Following additional research on the OC dimension, we identified three subscales, or elements, that contribute to the overall "orientation to change" construct. These are: novelty (NV), structure and authority (SA), and search strategy (SS). These elements are described in greater detail in a separate technical resource: *The Foundations of VIEW*.

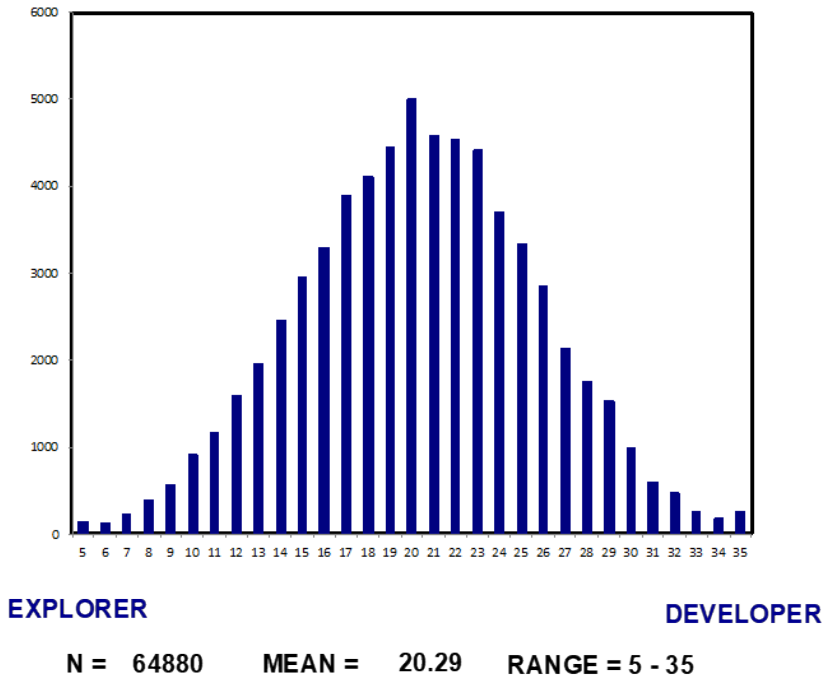
Novelty (NV). For this sub-scale, as reported in Table 1, the mean score is 19.3, with a standard deviation of 5.6 and a range from 5 to 35 (the full range of scores possible to attain for the element). The median is 19, and the mode is 20. The skew is -0.006 and the kurtosis is -0.34; like the overall OC distribution, this represents a slightly negatively-skewed distribution. The Cronbach Alpha reliability is .87, and the Standard Error of Measure is 1.99. Figure 3 presents the distribution of scores for the NV sub-scale.

Figure 3: Distribution of Scores for Novelty (NV)



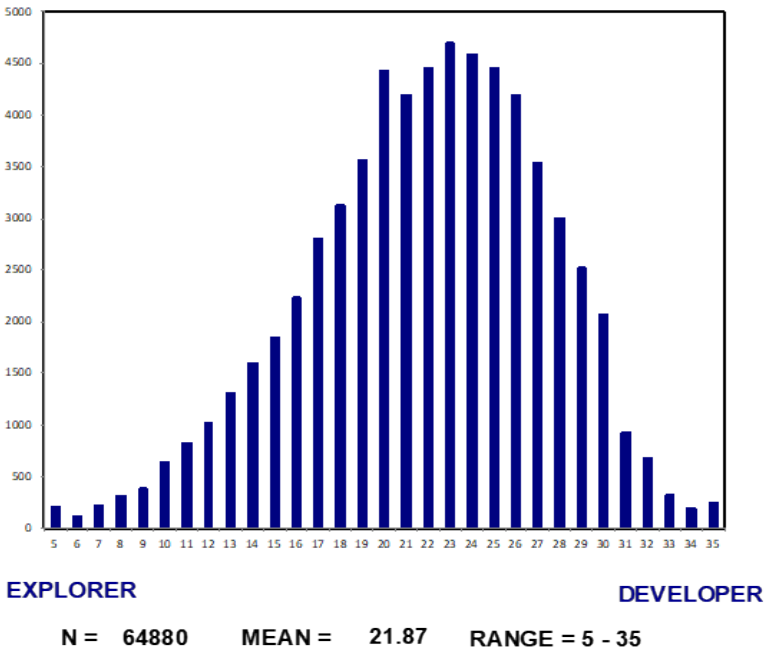
Structure and Authority (SA). For this sub-scale, as reported in Table 1, the mean score is 20.3, with a standard deviation of 5.4 and a range from 5 to 35 (the full range of scores possible to attain for the element). The median and the mode are 20. The skew is 0.026 and the kurtosis is -0.22 The Cronbach Alpha reliability is .87, and the Standard Error of Measure is 1.94. Figure 4 presents the distribution of scores for the SA sub-scale.

Figure 4: Distribution of Scores for Structure and Authority (SA)



Search Strategy (SS). For this sub-scale, as reported in Table 1 (above), the mean score is 21.9, with a standard deviation of 5.5 and a range from 5 to 35 (the full range of scores possible to attain for the element). The median is 22, and the mode is 23. The skew is -0.37 and the kurtosis is -0.11; the distribution is slightly positively skewed. The Cronbach Alpha reliability is .87, and the Standard Error of Measure is 1.97. Figure 5 presents the distribution of scores for the SS sub-scale.

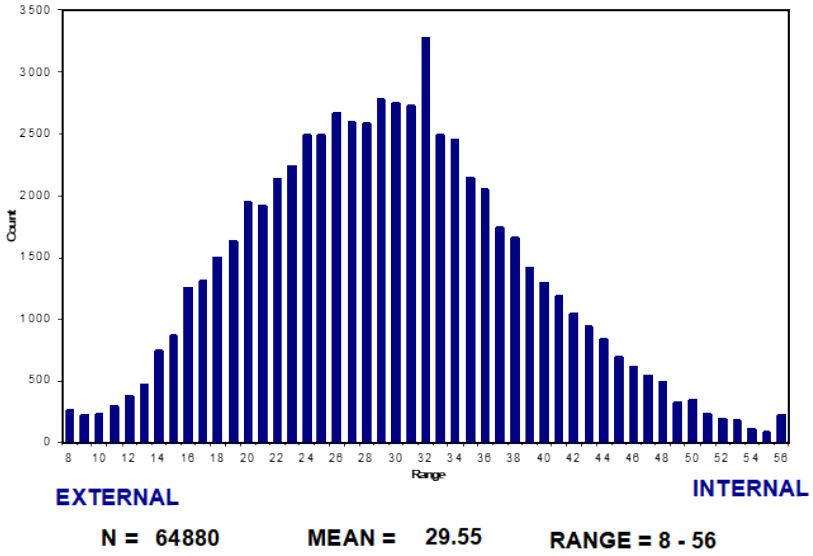
Figure 5. Distribution of Scores for Search Strategy (SS)



Distribution of Scores: Manner of Processing

Figure 6 presents the distribution of responses for the Manner of Processing (MP) dimension of VIEW. For this dimension, the 'bell shape' of the distribution is slightly platykurtic, with a slight positive skew. That is, the distribution is slightly "steeper" than a perfectly normal distribution, and slightly skewed to the left (the External style). This result is consistent with data from research on other measures of related constructs. The observed mean of 29.6 is slightly lower than the theoretical mean of 32 for the scale, while the median is 29 and the mode is 32; the responses span the entire 8 – 56 point range of the scale. The standard deviation (SD) for this scale is 9.2, and the Cronbach's Alpha reliability is .86. Therefore, the standard error of measure (SEM) for the MP dimension is 3.47. (Thus, given an observed score, there is a 68.26% probability that the person's true score would be that score ±3.47.)

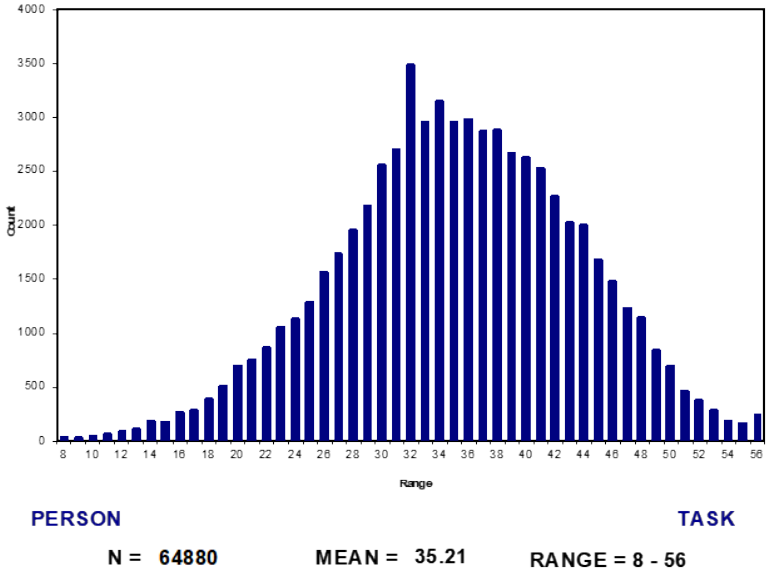
Figure 6: Distribution of Scores for Manner of Processing (MP)



Distribution of Scores: Ways of Deciding

Figure 7 presents the distribution of results for the Ways of Deciding (WD) dimension of VIEW. The distribution shown here is generally normal ("mesokurtic"), although slightly negatively skewed i.e., skewed slightly to the right). The observed mean of 35.2 is higher than the theoretical mean of 32 for the scale. The median is 35 and the mode is 32, and, as for the MP scale, the WD responses spanned the entire 8 – 56 point range of the scale. The standard deviation (SD) for this dimension is 8.3, and the Cronbach's Alpha reliability is .86. Therefore, the standard error of measure (SEM) for the WD dimension is 3.15. (Thus, given an observed score, there is a 68.26% probability that the person's true score would be that score ±3.15.)

Figure 7: Distribution of Scores for Ways of Deciding (WD)



Interactions Among VIEW's Dimensions

Figure 8 presents the number of subjects in each of the eight categories representing interactions of all three VIEW dimensions, based on the current master data base (N=64,880).

The distribution of scores across the eight combinations in Figure 8 differs from the pattern that might be expected by chance (i.e., 12.5% of the cases in each of the eight combinations). There is no conceptual reason, however, to believe that the scores would be distributed on a chance or random basis. Despite the fact that the master data base contains a large number of subjects, it is nonetheless an accumulation of samples of convenience and opportunity, and therefore, not strictly a random sample of the total population of all adolescents and adults. In addition, it may not necessarily be accurate to assume that problem-solving style preferences are random in their interactions within the population.

Figure 8: Frequency of Scores By Interaction of VIEW Dimensions

	Explorer		Developer	
	External	Internal	External	Internal
Person	8854 (13.6%)	5921 (9.1%)	8654 (13.3%)	6829 (10.5%)
Task	8195 (12.6%)	6284 (9.7%)	9966 (15.4%)	10177 (15.7%)

Therefore, we cannot conclude with certainly that the combinations that seem "over-" or "under-represented" in the distribution reflect greater or smaller incidence of those combinations in the population.

Since the previous editions of this *Technical Manual* in 2004, 2007, and 2014, there have been slight increases for the Explorer-External-Person category, and in the Developer-Internal-Person category, as well as the Developer-Internal Task categories. There are slightly fewer cases in the Explorer-Internal Person and Explorer-Internal Task-oriented categories than might be expected by chance. Both External and Internal Task-Oriented Developer categories are represented more frequently than might be expected by chance (15.4% and 15.7%). We will continue to monitor these patterns over time.

Distributions of Scores: Occupational Sectors

With the introduction of the on-line edition of VIEW in 2002, which contained expanded demographic questions for respondents that were not available in the print edition, we were able to learn more

about the characteristics and style preferences of various groups. At the present time, we have received 31,812 responses (or 88% of the total data base) for which it was possible to classify the respondents by occupational sector. The responses vary widely in number, ranging from samples of less than 200 to more than 13,000, and the respondents also vary in actual classification. For example, "business" respondents may be from small or large organizations, may vary widely in job functions or settings, or may occupy positions of varying status or responsibility. The "K-12 education" category includes both students and teachers, and the "religious organization" category includes both professional clergy and lay leaders.

It is important, therefore to treat these data as preliminary and exploratory rather than as definitive indicators of occupational differences in problem-solving style. Tables 4, 5, and 6 present the data for the OC, MP, and WD dimensions respectively.

Table 4: VIEW by Occupational Sector: Orientation to Change

Sector	N	Mean	SD	Range
Business	22,906	73.3	15.4	18 - 126
K-12 Education	12,478	75.5	16.2	18 - 126
Higher Education	11,400	76.6	15.7	18 - 126
Religious Organization	240	72.7	16.0	36 - 126
Arts Organization	384	70.8	15.2	18 - 116
Government	2,270	74.4	15.4	18 - 126
Military	257	73.3	17.0	26 - 119
Other Non-Profit	2,703	72.3	15.7	19 - 119
None of these	6,374	76.5	15.2	18 - 126
No Response	1,780	75.9	15.3	18 - 126
No Code Reference	4,119	76.7	14.5	19 - 126
Master Database	64,880	74.2	15.5	18 - 126

The means on Orientation to Change are generally comparable across these broad occupational sectors. The most Developer-oriented occupational sector appears to be those in government and educational organizations. The most Explorer sector seems to be arts organizations. However, if we look more closely within any of these sectors we are more likely to observe meaningful differences. For example, an advertising sample's mean within the business sector was 58, while an insurance management sample was 85 – illustrating that the more proximal work context may attract different styles. It stands to reason that specific samples within particular business organizations will demonstrate an appropriate skew.

Table 5: VIEW by Occupational Sector: Manner of Processing

Sector	N	Mean	SD	Range
Business	22,906	28.2	8.7	8 - 56
K-12 Education	12,478	30.4	9.5	8 - 56
Higher Education	11,400	30.3	9.3	8 - 56
Religious Organization	240	29.7	9.5	8 - 56
Arts Organization	384	30.8	8.7	8 - 56
Government	2,270	29.0	8.7	9 - 56
Military	257	29.9	9.1	8 - 56
Other Non-Profit	2,702	28.2	8.6	8 - 56
None of these	6,374	30.3	9.3	8 - 56
No Response	1,780	29.5	8.7	8 - 56
No Code Reference	4,119	32.3	9.1	8 - 56
Master Database	64,880	29.3	9.0	8 - 56

In general, the results for specific occupational sectors are quite similar across sectors and in relation to the results for the overall master database. The most internally oriented sector appears to be those in the arts organizations and education. The most externally oriented sector appears to be those in business and non-profit organizations. Again, there can be within sector differences that will be meaningful. For example, a sub-sample of those within the marketing/sales function within the business sector was more External (MP mean = 22) than those within the financial services function (MP mean = 35).

Table 6: VIEW by Occupational Sector: Ways of Deciding

Sector	N	Mean	SD	Range
Business	22,906	37.4	7.7	8 - 56
K-12 Education	12,478	32.9	8.3	8 - 56
Higher Education	11,400	34.7	8.5	8 - 56
Religious Organization	240	31.1	8.4	12 - 54
Arts Organization	384	32.8	7.6	13 - 56
Government	2,270	35.8	7.9	10 - 56
Military	257	37.9	8.3	13 - 56
Other Non-Profit	2,703	34.6	8.3	9 - 56

None of these	6,374	34.7	8.2	8 - 56
No Response	1,780	34.1	8.1	8 - 56
No Code Reference	4,119	33.0	8.1	8 - 56
Master Database	64,880	34.8	8.2	8 - 56

In general, the results for specific occupational sectors are quite similar across sectors and in relation to the results for the overall master database. The military, government and business sectors scored somewhat higher, on average, on the WD dimension (i.e., in the Task direction) than the educational or religious groups. There seems to be fewer differences among the sectors on the MP dimension. Here again, within any specific sector we are likely to see meaningful differences. A sample of participants at a conference for interdenominational clergy had an average WD score of 27. They were more person-oriented deciders than those who attended a program within the Pentagon (average WD = 47).

VIEW is often applied in organizational or business settings. The table below (Table 7) shows the descriptive results for nearly 23,000 participants who work in a wide variety of businesses.

Table 7: Results from Organizations and Businesses

N=22,906						
Statistic	**Orientation to Change**				**Manner of Processing**	**Ways of Deciding**
	Total OC	**NV**	**SA**	**SS**		
Mean	73.3	18.5	19.1	22.7	28.2	37.4
SD	15.4	5.5	5.2	5.3	8.7	7.7
Median	74	18	19	23	28	38
Mode	74	17	20	25	29	41
Range	18-126	5-35	5-35	5-35	8-56	8-56
Skew	-0.178	0.070	0.086	-0.476	0.296	-0.331
Kurtosis	0.003	-0.434	-0.216	-0.061	-0.183	-0.009
Alpha	0.87	0.87	0.86	0.86	0.86	0.86
SEM	5.61	2.02	1.92	1.96	3.24	2.88

The results for those completing VIEW who work inside organizations are generally similar to the full master database results. The next table displays the results for those who work in different functions within organizations (See Table 8).

Table 8: VIEW Results for Different Functions within Organizations

Orientation to Change (OC)

Function	N	Mean	SD	Range
Marketing	1950	76.2	15.2	22-120
R&D	1834	71.5	16.0	18-114
Administration	4208	73.6	15.0	19-120
Sales	1911	72.7	14.2	32-122
HR/OD	983	72.5	16.1	24-114
Manufacturing	1407	75.0	13.8	28-120
Cust Service	522	77.0	14.9	30-120
Consultant	1628	69.4	16.6	20-122
Accounting	1291	77.7	14.6	23-122
IT	1897	73.3	15.0	18-120
Legal	644	78.2	14.2	27-120

Novelty (NV)

Function	Mean	SD	Range
Marketing	19.2	5.42	5-34
R&D	18.3	5.69	5-35
Administration	18.7	5.40	5-35
Sales	18.1	5.31	5-35
HR/OD	18.2	5.69	5-34
Manufacturing	19.2	5.25	6-35
Cust Service	19.8	5.58	5-34
Consultant	17.4	5.69	5-35
Accounting	20.0	5.33	5-35
IT	18.7	5.39	5-35
Legal	20.0	5.05	5-34

Structure and Authority (SA)

Function	Mean	SD	Range
Marketing	18.6	5.04	5-35
R&D	18.1	5.25	5-34
Administration	19.0	5.10	5-35
Sales	19.1	4.83	5-35
HR/OD	18.1	5.18	6-34
Manufacturing	19.3	4.78	5-34
Cust Service	20.3	5.16	5-35
Consultant	18.1	5.34	5-35
Accounting	19.8	5.25	5-35
IT	19.0	5.22	5-35
Legal	19.6	4.95	5-35

Search Strategy (SS)

Function	Mean	SD	Range
Marketing	21.6	5.37	5-35
R&D	22.5	5.59	5-35
Administration	23.0	5.14	5-35
Sales	22.7	5.03	5-35
HR/OD	22.8	5.41	5-35
Manufacturing	23.4	4.85	5-35
Cust Service	23.4	5.18	5-35
Consultant	21.7	5.58	5-35
Accounting	24.2	5.23	7-35
IT	22.9	5.23	5-35
Legal	24.7	4.78	7-35

Manner of Processing (MP)

Function	N	Mean	SD	Range
Marketing	1950	27.5	8.63	8-56
R&D	1834	29.8	9.06	8-56
Administration	4208	27.4	8.42	8-56
Sales	1911	27.0	8.05	8-53
HR/OD	983	27.0	8.39	8-53
Manufacturing	1407	27.4	8.46	8-56
Cust Service	522	28.5	8.70	8-56
Consultant	1628	28.2	8.62	8-56
Accounting	1291	29.7	8.58	8-56
IT	1897	28.4	8.93	8-56
Legal	644	30.4	8.81	8-56

Ways of Deciding (WD)

Function	N	Mean	SD	Range
Marketing	1950	36.4	7.67	9-56
R&D	1834	39.2	7.29	10-56
Administration	4208	37.7	7.39	10-56
Sales	1911	36.7	7.43	11-56
HR/OD	983	34.0	7.97	12-55
Manufacturing	1407	39.2	6.98	14-56
Cust Service	522	35.9	7.91	8-56
Consultant	1628	36.7	7.92	10-56
Accounting	1291	39.5	7.29	9-56
IT	1897	37.9	7.47	10-56
Legal	644	40.0	6.85	16-56

Although these results have not been tested for significance, the tendency is for consultants and those in research and development functions to score more toward an Explorer preference, and those from legal, accounting, and customer service more toward a Developer preference for Orientation to Change. The functions with the relatively stronger Internal preferences are legal, accounting, and research and development. Those with the stronger Task preference appear to be legal, accounting, manufacturing, and research and development.

The following table (see Table 9) provides VIEW results for those who work at different levels of hierarchy within organizations.

Table 9: VIEW Results at Different Levels within Organizations

Orientation to Change (OC)

Level	N	Mean	SD	Range	Alpha	SEM
Senior/Upper Management	6029	69.5	15.1	18-126	.87	5.52
Middle Management	7459	74.1	14.8	18-122	.86	5.51
Supervisor	1345	76.4	15.2	26-117	.85	5.89
Clerical/Other Staff	1470	79.0	15.1	21-124	.85	5.79
Consultant Contractor	1443	71.0	16.3	23-122	.88	5.56

Novelty (NV)

Level	Mean	SD	Range	Alpha	SEM
Senior/Upper Management	17.2	5.4	5-35	.87	1.97
Middle Management	18.7	5.4	5-35	.86	2.00
Supervisor	19.8	5.4	5-33	.85	2.10
Clerical/Other Staff	20.8	5.4	5-35	.85	2.10
Consultant Contractor	18.0	5.6	5-35	.88	1.93

Structure and Authority (SA)

Level	Mean	SD	Range	Alpha	SEM
Senior/Upper Management	17.8	4.9	5-35	.87	1.81
Middle Management	19.2	5.0	5-35	.86	1.86
Supervisor	19.8	5.2	5-35	.85	2.03
Clerical/Other Staff	21.2	5.2	5-35	.85	2.00
Consultant Contractor	18.7	5.4	5-35	.88	1.86

Search Strategy (SS)

Level	Mean	SD	Range	Alpha	SEM
Senior/Upper Management	22.4	5.4	5-35	.87	1.99
Middle Management	23.3	5.1	5-35	.86	1.90
Supervisor	23.3	5.4	5-35	.85	2.09
Clerical/Other Staff	23.0	5.2	5-35	.85	1.99
Consultant Contractor	21.7	5.6	5-35	.88	1.90

Manner of Processing (MP)

Level	N	Mean	SD	Range	Alpha	SEM
Senior/Upper Management	6029	26.6	8.42	8-56	.87	3.08
Middle Management	7459	27.6	8.36	8-56	.86	3.10
Supervisor	1345	30.0	8.98	8-56	.85	3.49
Clerical/Other Staff	1470	30.9	8.99	8-56	.85	3.45
Consultant Contractor	1443	29.1	9.07	8-56	.88	3.18

Ways of Deciding (WD)

Level	N	Mean	SD	Range	Alpha	SEM
Senior/Upper Management	6029	38.0	7.43	9-56	.87	2.72
Middle Management	7459	37.8	7.36	9-56	.86	2.73
Supervisor	1345	37.5	7.69	11-56	.85	2.99
Clerical/Other Staff	1470	34.9	8.34	8-56	.85	3.20
Consultant Contractor	1443	36.6	8.16	9-56	.88	2.83

These results have not been tested for significance, but there are a few noticeable differences. Senior and upper levels of management tend to share a more Explorer preference, particularly when

compared to clerical or general staff levels. Senior and upper levels of management also appear to be more External and Task-oriented, again, particularly compared to clerical and general staff within organizations. Both functional and level differences should be to topic of further research, particularly related to the potential tensions or cognitive gaps that are likely.

Distribution of Scores: Nationality

The demographic questions for respondents in the on-line edition also ask subjects to report their nationality. Note that these data are based on responses to the English language edition of VIEW. The data reflect only a portion of the total master database (47,750 of the total of 64,880 or 74%) for whom responses were given for the "Country" item. These should be considered preliminary data. (As the use of VIEW in the native languages of respondents increase over time, we will also be better able to assess cross-cultural variations in problem-solving styles.) Table 10 presents the current data for the English edition from those who completed from 15 different countries.

Table 10: VIEW Responses By "Nationality" Selected (English Edition)

Country (N)	OC— Mean (SD)	MP— Mean (SD)	WD—Mean (SD)
Australia (249)	70.6 (14.8)	28.4 (9.0)	36.8 (7.6)
Canada (2054)	72.7 (16.7)	29.1 (8.9)	35.1 (8.5)
China (1996)	81.6 (13.4)	31.5 (7.6)	35.0 (7.0)
Germany (878)	75.7 (13.8)	28.3 (8.5)	36.7 (7.7)
Finland (75)	69.5 (14.5)	28.0 (10.0)	37.2 (8.3)
France (766)	71.4 (14.8)	28.2 (8.6)	37.2 (7.4)
Great Britain (6072)	73.2 (15.6)	27.8 (8.4)	37.2 (7.8)
India (1164)	75.1 (15.1)	28.6 (8.6)	36.1 (7.9)
Italy (696)	70.9 (14.8)	26.6 (8.2)	36.9 (7.7)
Japan (569)	69.6 (15.1)	32.1 (9.8)	35.3 (8.1)
Korea (991)	75.3 (16.6)	31.8 (9.8)	32.6 (8.7)
Netherlands (743)	67.5 (15.9)	27.6 (8.3)	33.2 (7.7)
Norway (1541)	76.6 (14.5)	27.9 (8.9)	34.7 (7.6)
Singapore (6717)	75.9 (15.3)	30.7 (9.3)	33.1 (7.8)
United States (23239)	74.9 (15.9)	29.7 (9.3)	35.8 (8.6)

VIEW in Other Languages

We have been actively engaged in research and development to make VIEW available in languages other than English. We follow the translation procedures outlined by the American Psychological Association (2003), and Geisinger (2003). The translation process starts with creating a forward translation from English to its target language. The next step is to conduct a back-translation from this initial translation in English and make adjustments to ensure linguistic relativity. Then a research edition is prepared and applied to allow for analysis of item performance and factor structure. Again, modifications are made to ensure close fit to the original measure. In most cases, additional research is conducted to examine if the new translation performs similarly to the English version.

On-line editions of VIEW are currently available in Dutch, Chinese, Korean, French, German, Japanese, Spanish, and Norwegian. Additional research evidence supporting the Dutch edition has also been completed (Isaksen, DeSchryver, & Onkelinx, 2010). The six-month test-retest correlations for the Dutch edition (N = 98, all $p < .01$) are: OC, $r = .83$, MP, $r = .77$, and WD, $r = .81$. The correlations with other instruments are quite similar to those for the English versions of the same comparisons. The correlation between the Dutch VIEW and a Dutch edition of Kirton's KAI, for example, are: OC, $r = -.72$; MP, $r = -.01$, and WD, $r = .00$. Correlations with the Dutch version of the MBTI® also follow the same pattern as those of the English editions. VIEW's OC correlates significantly with MBTI- S/N ($r = -.49$) and MBTI-J/P ($r = -.63$). VIEW's MP correlates with MBTI-E/I ($r = .34$), and WD correlates with MBTI-T/F ($r = -.55$).

Similar research was conducted in order to create the German translation and were reported in Hoßbach and Lange (2015), and for the Chinese translation in Chiu (2008).

Table 11 summarizes the current data regarding the completed translations. The table includes results for the three main dimensions of VIEW along with the three subscales or elements contained within the Orientation to Change (OC) dimension. These include Novelty (NV), Structure and Authority (SA), and Search Strategy (SS).

Table 11: Descriptive Statistics for VIEW Translations

Statistic	ORIENTATION TO CHANGE				MANNER OF PROCESSING	WAYS OF DECIDING
	Total OC	*NV*	*SA*	*SS*		
Korean (N=658)						
Mean	74.6	20.2	19.1	22.2	31.7	31.9
SD	17.7	6.6	5.3	6.1	10.2	8.9
Range	24 - 110	5 - 35	5 - 34	5 - 35	8 - 56	9 - 56
Alpha	.87	.87	.87	.87	.87	.86
Japanese (N=369)						
Mean	69.3	18.1	17.3	21.1	32.5	35

SD	15.1	5.5	4.7	5.9	9.8	8.3
Range	34 - 113	5 - 31	6 - 34	5 - 35	8 - 56	12 - 56
Alpha	.84	.84	.83	.84	.83	.83
Spanish (N=456)						
Mean	77.2	19.2	21.2	22.7	28.3	37.5
SD	16.1	5.9	5.9	5.6	8.7	7
Range	24 - 111	8 - 56	16 - 56	5 - 33	8 - 53	5 - 56
Alpha	.85	.84	.84	.85	.85	.85
Dutch (N=2,641)						
Mean	75.8	19.8	20.7	21.9	28.8	32.6
SD	15.7	5.5	5	5.4	8.4	7.4
Range	25 -110	5 - 32	7 - 35	5 - 35	8 - 56	9 - 56
Alpha	.87	.87	.86	.87	.86	.86
Chinese (N=1,164)						
Mean	82.7	21.7	21.4	24.6	31.7	34.5
SD	13.7	5.4	4.6	5.2	7.2	7
Range	49 - 118	8 - 34	10 - 33	11 - 34	11 - 56	11 - 56
Alpha	.82	.81	.81	.81	.81	.81
French (N=459)						
Mean	71.8	16.9	19.6	23.0	26.7	36.4
SD	13.37	5.22	4.46	5.27	7.82	6.77
Range	33 - 103	5 - 28	8 - 32	11 - 33	8 - 56	16 - 56
Alpha	.80	.80	.51	.66	.80	.72
Norwegian (N=683)						
Mean	75.1	19.6	19.7	22.2	27.9	33.1
SD	13.5	4.8	5.1	4.7	9.1	7.3
Range	23 - 126	5 - 35	5 - 35	5 - 35	8-54	12-53
Alpha	.87	.87	.87	.86	.87	.86

German (N=382)						
Mean	76.9	19.6	20.0	23.0	29.6	36.0
SD	14.4	5.9	4.8	4.9	9.1	8.1
Range	23 - 126	5 - 35	5 - 35	5 - 35	8-55	8.56
Alpha	.87	.87	.86	.86	.86	.86

As with any translation effort, we continue to learn more about cultural differences and language nuances that will guide future improvements and development. For example, as we have developed the three sub-scales of the Orientation to Change dimension, there appear to be challenging nuances particularly on the Structure and Authority element. Our future efforts will focus on increasing sample sizes, gathering additional reliability and validity data, and gaining a better understanding of statistical differences. We will also continue to investigate the feasibility of translations into other languages.

Understanding Reliability and Validity: A Contemporary Perspective

In dealing with *reliability* and *validity,* this section addresses the broad question, "What can we determine about the quality of the instrument?" While technical criteria and standards are generally viewed as holding considerable importance in the evaluation of any educational and psychological instrument, it is also essential to keep some "caveats" clearly in mind in approaching this topic. Treffinger, Feldhusen, and Renzulli (2001) expressed several cautions to keep in mind:

Although we often say, almost glibly, that any instruments we use … must be "valid and reliable," we need to use those terms with considerable caution. The terms *validity* and *reliability* represent important principles in testing and measurement, but they are not as absolute and fixed as some people seem to assume. In addition, … there will be many variations of productivity and accomplishment over time.

- Instruments are not simply put through a single, fixed, and standard procedure that leads to a final pronouncement that they are valid or invalid, reliable or unreliable. Determining validity and reliability are ongoing processes, and there are several dimensions of both terms. Questions about an instrument ask about the extent and nature of the evidence that supports, or fails to support, an instrument for particular purposes and uses, for certain subjects, and under specific conditions or circumstances. As a result, it is always necessary to ask, "Given the evidence available, valid and reliable for what? In what respects? For whom? And, under what conditions?"

- The evidence for validity and reliability, and how we choose to interpret it, may also depend on assumptions we make about the underlying construct we are seeking to measure. For example, traditional indexes of reliability often rest on the assumption that the variable being measured is a relatively stable trait in a population. With complex human behavior, such as creativity or

high-level talent in any specific domain, it is certainly necessary to raise questions about that assumption. Is it plausible to assume that every product of a [talented or creative] writer reach the highest levels of quality, originality, or acclaim? What happens to traditional assumptions about stability of measurement when the behavior, by its very nature, is highly variable?

- The validity and reliability of an instrument is not necessarily universal across all ages, groups, and contexts of test use. There may be strong evidence supporting a test's validity for certain purposes or with certain ages, but not equally for other uses.

Albert Einstein once said, "Not everything that can be counted, counts; not everything that counts, can be counted." When we are dealing with [complex dimensions of] human behavior, we must exercise great caution to be fully respectful of our limitations, and of the perils of seeking to apply a number, a category, or a label to the characteristics and needs of individuals.

Callahan, Lundberg, and Hunsaker (1993, p. 136) also presented several important cautions for test users. These included:

1. Do not rely solely on assessments of an instrument offered by its authors. Consider all available data and external reviews and evaluations whenever possible.

2. Remember that instruments that yield good reliability data on heterogeneous groups may not be reliable for homogeneous groups.

3. Tests are never simply valid or invalid.

4. If predictive or construct validity evidence is not available but the instrument appears to have adequate content validity for use in your situation, consider using the instrument on a pilot basis to gather data.

Linn and Gronlund (1995, p. 49) posed five important cautions when using the term *validity* in relation to testing and assessment. These were:

1. Validity refers to the appropriateness of the interpretation of the results of an assessment procedure for a given group of individuals, not to the procedure itself.

2. Validity is a matter of degree; it does not exist on an all-or-none basis.

3. Validity is always specific to some particular use or interpretation.

4. Validity is a unitary concept [based on various kinds of evidence].

5. Validity involves an overall evaluative judgment. It requires an evaluation of the degree to which interpretations and uses of assessment results are justified by supporting evidence and in terms of the consequences of those interpretations and uses.

It is also important to remember that *no measurement is completely free of error,* and that, as Thorndike (1997, p. 155-156) noted succinctly, "even with the best measures available, predictions in psychology and education are approximate.… [H]ealthy skepticism is required to keep from over-interpreting test scores, particularly when, as is usually the case, we are making predictions about individuals." As a beginning step in the "healthy skepticism" advocated by Thorndike, test users must certainly be mindful of the *standard error of measurement* (an estimate of how much a person's score might change from one test administration to another, which can be determined by the test publisher) and the *standard error of estimate* (an index of the error that might be made in forecasting performance on one measure from performance on another, which is unique to the predictor criterion being considered) for any instrument, and not rely mindlessly on any single numerical score as if it were absolute.

Norris and Ennis (1989) also cautioned readers about the challenges of interpreting and applying technical information concerning measures of critical thinking, and their observations are also pertinent to [style] assessment. They proposed:

Reliabilities appear in test manuals as stark, apparently unambiguous numbers, quite different from the picture we have painted…. We have said that it is difficult to know what level of reported reliability is desirable in a technique for gathering information on critical thinking. To say otherwise would, in our view, be misleading. People gathering information on critical thinking must realize the primitive state of the art. Good sense is demanded in judging the level of reliability needed for the use to which the information will be put. Clearly, the more individual-specific and important the use for the information, the greater the reliability needed. However, reliability in the sense of consistency is not enough. (pp. 48-49)

Mindful of these cautions, we present evidence of several kinds and formats supporting the reliability and validity of VIEW. The criteria for reliability address the extent to which evidence shows that VIEW measures with stability, consistency, and accuracy. Next, we discuss validity, or the extent to which there is evidence verifying that VIEW can support certain interpretations and uses of its results and their implications for individuals and groups or teams. Evaluating validity includes evidence based on: the instrument's content; responses to the instrument and the assessment process; the instrument's internal structure, relationships to other variables, and evidence regarding consequences and uses of the instrument *(Standards for Educational and Psychological Testing;* American Educational Research Association, 2014). Keep in mind that validity is a complex topic, and cannot be determined simply by examining a single numerical value.

Reliability

This section presents data on the stability and internal consistency of VIEW. The data from our developmental studies indicated that VIEW meets the customary expectations regarding reliability to support use in research and training contexts, in relation to both *stability* and *internal consistency.*

Stability

A reliability study involving stability, as reflected in test-retest results over a one-month interval, was carried out with 48 middle school students and nine adults. The correlations were .90, .60, and .65 for the OC, WD, and MP dimensions respectively. In another study of stability involving 23 adults over a one-month period, the correlations were .85, .80, and .77 respectively. Nineteen subjects completed VIEW again after two months. The two-month stability correlations were .93 for the OC dimension, .93 for MP, and .84 for the WD dimension.

An additional test-retest study was carried out with 49 undergraduate students in a teacher education program in an urban setting in the Northeastern United States. The two-month test-retest correlations were: .83 for OC, .84 for MP, and .75 for WD. These data indicate that scores on VIEW are relatively stable over periods of time up to a two-month interval.

We have also gathered data for a 12-month, test-retest reliability study. For an adult sample (N=52), the 12-month test-retest reliability coefficients were: Orientation to Change, r = .74; Manner of Processing, r = .83, and Ways of Deciding, r = .81.

These data provide support for the claim that scores on the VIEW instrument are stable, and that the instrument meets or exceeds the customary standards and expectations for reliability over time.

Internal Consistency

As noted above, we examined the internal consistency of VIEW's three dimensions using Cronbach's coefficient Alpha. The coefficient Alpha results for the current master database (N=64,880) were .86 for OC, .86 for MP, and .86 for WD. The coefficient Alpha for the three sub-scales of OC were .87 for Novelty, .87 for Structure and Authority, and .87 for Search Strategy. These results exceed the generally accepted criterion that internal consistency should be >.70, and therefore support our claim for the internal consistency of VIEW.

Validity

Demonstrating validity, is an on-going process, not an "event" that can be established definitively in a single study or a specific set of results. Therefore, validation of VIEW, like any other instrument, requires an ongoing program of research by the developers and the active contributions of many other researchers over a period of years; it is also influenced by the goals and actions of those who use the instrument and its results in various contexts. We are committed to establishing and maintaining systematic inquiry in our own work, to encouraging research with VIEW by other investigators, and to supporting effective and appropriate application by all users. Our validation efforts, including both

quantitative and qualitative procedures, have been ongoing and continuously expanding over the decades-long history of VIEW's availability. Below is a discussion of those efforts across five interrelated sources of evidence comprising a contemporary understanding of validity, as identified above. They are: test content, response processes, internal structure, the relation to other variables, and the uses and consequences of the VIEW assessment.

Evidence Based on Test Content

The first source of evidence supporting VIEW's validity for its intended uses and interpretations involves the relationship of its items to the theoretical and conceptual rationale for the inventory. We presented the foundations for VIEW's development, and described the specific rationale for each of VIEW's three dimensions and six styles in another technical document called *Foundations of VIEW* (Selby, Treffinger, & Isaksen, 2021). The pool of items was reviewed and discussed extensively in relation to the theoretical rationale and relevant literature by each of the three authors, independently as well as collaboratively, and has been refined continuously through the multiple stages of the instrument's development (see also: *Historical Development of VIEW*). In each stage, we used statistical item analysis data to examine all items and to identify areas of concern. We questioned items, for example, if the responses were not distributed across all response choices, if the mean score for any item was appreciably higher or lower than the central point (4), or if an item demonstrated negative discrimination (i.e., the mean score for that item was low for people who generally scored high on that dimension, or vice versa). We reworded or replaced such items for the next round of data collection and analysis. In the current edition of VIEW, the items have mean scores between 3.4 and 5.0 on a 7-point scale, and all items in each of the three dimensions discriminate significantly ($p<.001$ or beyond) between high- and low-scoring samples.

Houtz (2002) provided evidence for the construct validity of VIEW in a study of the relationship between VIEW results and problem-solving choices made by 29 graduate students in a teacher education program. He found that the choices of problem-solving strategies made by subjects were consistent with the hypothesized differences between styles for each of the three VIEW dimensions. The results of this study supported VIEW's content and rationale in relation to style differences in problem-solving behavior.

Selby, Shaw, and Houtz (2003, 2005) studied the construct validity of VIEW in another teacher education study involving 57 graduate students. Subjects were asked to rate 16 personality type descriptions based on the psychological type descriptions from the MBTI®, and to rate themselves on a questionnaire based on the "Big Five" personality characteristics (see also: Selby, Treffinger, & Isaksen, 2014).They also responded to an adjective checklist representing left- or right-brain style preferences. The subjects' ratings of type, personality, and hemisphericity were consistent with the researchers' hypotheses regarding such preferences in relation to VIEW's six styles and three dimensions.

Schoonover and Treffinger (2003) also reported on differences in the preference for, and use of, generating and focusing tools between Explorers and Developers (in the Orientation to Change

dimension of VIEW). Their report supported the rationale for the content of VIEW. Isaksen and Geuens (2006) examined the preferences for and perceived value of various aspects of CPS using all three dimensions of VIEW, and the profile of relationships was consistent with VIEW theory.

Treffinger, Selby, and Isaksen (2008) reported on more than five decades of research and development on making the Creative Problem Solving process and tools accessible across a wide range of ages and contexts. They concluded that recent evidence indicated that when individuals, in both school and corporate settings, understand their own style of problem solving, they are able to learn and apply process tools more effectively, and when teams appreciate the styles of their individual members, their problem solving efforts are enhanced. They proposed that evidence supports the conclusion that individual style differences provide an important key to understanding the interaction of person, process, product, and press when managing change.

Evidence Based on Response Processes

Even before we began development of the VIEW instrument, we began to address a basic issue in the study of creativity that we characterize broadly as the "level/style issue." In short, many early approaches to inquiry on creativity considered *level* of creativity (considering high or low creativity as it might be differently manifested among individuals, for example). We observed that individuals, working alone or in collaboration with others, had creative characteristics, but activated and applied them in varied ways, at different times, and in response to differing tasks and conditions. This led to a shift from asking, “How creative are you?” to the challenging question, “How are you creative?” Our efforts moved beyond looking at *level* of creativity to considering *style* of creativity (varied ways of expressing and applying creativity).

Dorval (1990) examined level and style of creativity, and [the preference for] imagery., using the Torrance Tests of Creative Thinking (TTCT), the Kirton Adaption Innovation questionnaire (KAI), the Revised Minnesota Paper Form Board (MPFB), and the Individual Differences Questionnaire (IDQ) with 160 undergraduate students. Results of the study suggested that the relationship between creativity and imagery is more complex than the literature suggests. Tefft (1990 a&b) examined level and style using the Torrance Test of Creative Thinking (TTCT), the Myers-Briggs Type Indicator (MBTI) and the Kirton Adaptation-Innovation Inventory (KAI). The results indicated that MBTI and KAI were measures of style while the TTCT was a measure of level. Isaksen and Dorval (1993) suggested the value of making a distinction between creative ability and creative style, and began to identify implications for research and practice in the field of creativity that contributed to the rationale for developing VIEW as an assessment of style, rather than level. Selby and Treffinger (2001, 2003) addressed issues and resources for assessing creativity, with an emphasis on looking beyond "cutoff scores" on a single test, developing profiles of creative strengths, and considering style as well as level. In addressing the creativity level and style question, they emphasize the potential importance of style in identifying creative strengths and talent development in young people. Houtz (2002) also expressed the need to investigate *how* people exhibit creativity (style), rather than emphasizing only research on *how much* creativity individuals can demonstrate (level).

From the origins of VIEW's development, then, the primary goal was to shift the focus of attention from responses that emphasized level of creativity to response processes that illuminate the person's style of creating, solving complex problems, and managing change. The development of VIEW emphasized the importance of maintaining a clear distinction between level and style in response processes, increasing our understanding and appreciation of diverse styles of creativity and their contributions to understanding, defining, assessing, and nurturing creativity, and improving creative abilities (e.g., Isaksen, 2004a, 2004b, Isaksen, 2013; Treffinger, Selby, & Schoonover, 2012; Woodel-Johnson, Delcourt, & Treffinger, 2012).

Evidence of Style versus Level. Houtz and Selby (2008; 2009) conducted construct validity studies using VIEW, the Torrance Tests of Creative Thinking (non-verbal) and other measures. Their samples were graduate and undergraduate students. They found no relationship between actual creative thinking production and VIEW problem-solving style.

Woodel-Johnson, Delcourt, and Treffinger (2012) studied the relationships between creative thinking abilities and problem-solving styles among high school students and to provide additional evidence relating to the ongoing inquiry and discussion regarding level and style in assessing creativity. There were no significant correlations between VIEW's three dimensions and scores on the Verbal or Figural forms of the Torrance Tests of Creative Thinking. Results supported the hypothesis that level and style of creativity are independent.

Isaksen, Kaufmann, and Bakken (2016) used the Cattell 16PF in their study of personality factors. This measure includes a scale called reasoning that is a proxy assessment of general intelligence. Extremely low and non-significant correlations were found between all dimensions of VIEW and this scale.

Robertson (2017) studied the effects of both cognitive load and VIEW problem-solving styles on creative productivity with 180 adults. He found no relationship between problem-solving style and creative productivity.

Face Validity. Evidence based on response processes also involves respondents' perceptions and self-awareness of style. In two early stages of the development process of the VIEW instrument, we gathered qualitative data regarding subjects' responses to the VIEW inventory and their perceptions of the accuracy and clarity of their results. In one study, we asked a group of 23 adults in a CPS training program to complete a questionnaire at the conclusion of the program, in which we posed the question, "Did your overall score [on VIEW] agree with your own personal assessment of your style preference?" In this group, 18 responded "yes," three answered "only partly," no one answered "no," and two participants did not respond. As part of a middle school study, 10 parents voluntarily returned a survey asking how well the measure described their perception of their child's typical behavior when solving problems. Four responded "very much so," six responded "mostly," while none responded "somewhat" or "not at all."

Selby (2004) compared VIEW scores with self-ratings by a small group (N=13) of students in a graduate research methods course and found correlations of .80 for OC, .66 for MP, and .66 for WD. The VIEW scores also demonstrated general agreement with the participants' narrative self-description of their style preferences.

Isaksen and Kaufmann (2013) administered VIEW to 128 students (50 males and 78 females; average age 34, with a range from 18 to 56) in an undergraduate organizational psychology class at the Norwegian Business School approximately one week before class. During the class session, the students received a 15-minute briefing regarding the three dimensions and six styles of VIEW. As each dimension was presented, they were asked to estimate their scores. In general, the participants were able to estimate their actual scores successfully. The correlations between estimated and actual scores were .732 (OC), .668 (MP), and .68 (WD), all $p<01$. Similar results were found when doing a similar exercise with professionals from a global engineering organization.

Response Styles. Isaksen and Kaufmann (2013) and Isaksen, Kaufmann and Bakken (2016) also investigated response styles and acquiescence on a personality inventory among students in their study. Since the participants also completed VIEW, they were able to examine the relationships between problem-solving style and their response styles. The 16PF (Cattell, Eber, & Tatsuoka, 1970) includes three response style indicators. The Acquiescence scale measures the tendency to answer "true" to an item regardless of its content. The 16PF includes 103 true-false questions and a raw score of 70 or higher indicates an acquiescent response set. The results for this sample indicated that the VIEW respondents did not generally respond randomly or indecisively. Only five subjects had scores in the 70's. The Impression Management scale is essentially a social-desirability scale with high scores indicating socially desirable responses and low scores reflecting a willingness to admit to undesirable characteristics. Raw scores at 21 or higher fall above the 95th percentile on the normed sample and indicate the possibility of subjects responding in a socially desirable fashion. Only one VIEW subject obtained a score of 21 for this sample. The Infrequency scale is designed to indicate if a respondent answers a relatively large number of responses in a way that is different from most people. Raw scores of seven or greater are at the 95th percentile and indicate a relatively uncertain response orientation. Only five VIEW participants had scores above seven.

Evidence Based on Internal Structure

We have gathered evidence supporting the claim that the internal structure of VIEW is consistent with the three dimensions it purports to represent. Factor analytic studies provide valuable evidence regarding the extent to which an instrument actually measures what it purports to measure, and specifically regarding the extent to which items that purport to measure specific dimensions or scales are interrelated in ways that are consistent with those expectations.

We designed the VIEW instrument's items to represent three dimensions: Orientation to Change (OC), Manner of Processing (MP), and Ways of Deciding (WD). In three separate stages of VIEW's development, we conducted exploratory factor analyses (employing Principal Component Analysis extraction methods, with Varimax rotation procedures and Kaiser Normalization, converging in five iterations) to evaluate the extent to which our three hypothesized factors would be supported by the evidence.

Selby, Treffinger, Isaksen, and Lauer (2004a, 2004b, 2007) reported data on the factor structure of the VIEW inventory, which supported the assertion that VIEW comprises three relatively independent dimensions, based on data from 3,676 subjects. The factor analysis for the current data base of 64,880

subjects indicates that the structure still supports the same structural model. Seventeen of the 18 items for the OC dimension load from .369 to .733 on one factor, and no other items load as high as .35 for that factor. All eight items of the MP dimension load from .560 to .748 on one factor. None of those items load as high as .10 on any other factor, and no other items load greater than .16 on the MP factor. For the WD dimension, all eight items load from .564 to .760 on one factor. None of those items loads more than .11 on any other factor, and only one item from another factor loads as high as .30 on the WD factor. Table 12 presents the summary results of the factor analysis for the current master data set using principal components analysis (converging in 5 iterations).

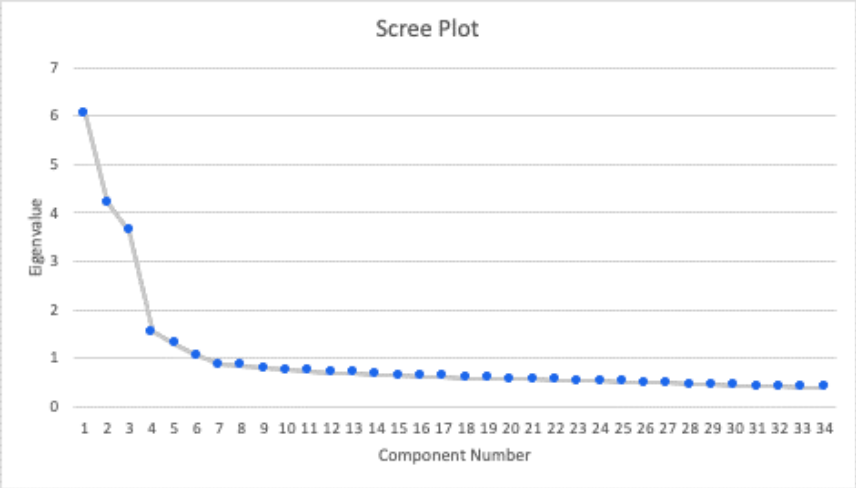
Table 12: Factor Analysis of VIEW Items (N=64,880)

	Component		
	1	2	3
OC-1	.641		
OC-2	.383		
OC-3	.467	.312	
OC-4	.553		
OC-5	.522		
OC-6	.639		
OC-7	.590		
OC-8	.543		
OC-9	.624		
OC-10	.722		
OC-11	.629		
OC-12	.733		
OC-13	.435		
OC-14	.529		
OC-15	.515	.324	
OC-16	.638		
OC-17	<.30		
OC-18	.369		
MP-1			.748
MP-2			.710
MP-3			.740
MP-4			.711
MP-5			.560
MP-6			.707
MP-7			.720
MP-8			.677
WD-1		.675	
WD-2		.564	
WD-3		.568	
WD-4		.700	

WD-5		.649	
WD-6		.760	
WD-7		.645	
WD-8		.739	

Figure 9 presents the Scree plot, illustrating graphically the support for using a three-factor solution to interpret VIEW results.

Figure 9: Scree Plot for VIEW Factor Analysis (N=64,880)



Costello and Houtz (2005) conducted factor analyses of VIEW data from 88 masters-level graduate students. In accordance with the recommendations of Harris and Harris (1971), the researcher computed a variety of exploratory factor procedures to obtain the clearest pattern of factor loadings. The results confirmed the selection of three interpretable factors, and the item structure and loadings compared favorably with the reported results. Houtz, Zusho, Doheny, Selby, Treffinger, and Isaksen (2008) used the database of over 10,000 VIEW scores, confirmatory factor analyses tested both three- and five-factor solutions. VIEW demonstrated a sound factor structure. Breen, Selby, Zusho, and Houtz (2009) conducted exploratory and confirmatory factoring procedures for VIEW with 330 female graduate students (ranging in age from 20 to 74) In every combination of exploratory factorings, the items corresponding to the two dimensions, Manner of Processing and Ways of Deciding, had clear primary loadings on their respective dimensions. When forced into three-factor solutions, the 18 items corresponding to the dimension of Orientation to Change had primary loadings on the first factor, with MP and WD dimensions the second and third factors, respectively. Confirmatory factor analysis suggested, however, that the three-factor solution was not the best "fit" for the current data. The analyses in this study suggested that the dimension of Orientation to Change is complex, and may involve other factors or even hierarchical factors.

Proestler and Vazquez (2011) also examined the factor structure of VIEW. The researchers constructed an initial model according to perspectives in the literature. It described direct paths between the questions and area or constructs of OC, WD and MP. The initial model was not consistent with the

appropriate goodness of fit criteria and was modified over two different steps to a preferred or final model. The final model represented small but significant correlations between the constructs (OC-WD .13, OC-MP .12 and MP-WD .09) and the factor structure of VIEW was within high significant correlations between the new parcels within the construct (.69 to .88) and small but significant correlations in between the parcels of one construct to another construct (.06 - .11). This suggested that the parcels were accurate representing the construct they stood for, but had influences on the other construct. Especially OC and WD demonstrated a relationship reflecting their item fit. The researchers recommended further research to determine how well the items actually represent their construct and which parcels of items would be theoretically the best concerning the construct validity of the VIEW.

Isaksen and Aerts (2011) reported the results of confirmatory factor analysis for VIEW on a sample of 19,065 individuals. This resulted in a goodness-of-fit index (GFI) of .86, an adjusted goodness of fit index (AGFI) of .85, a normal fit index (NFI) of .82, and a root mean square error of approximation (RMSEA) of .06, indicating an adequate fit of the three-dimensional model.

Selby (2013) investigated the extent to which, as subjects' overall preference for either the Explorer or Developer style became more well defined, their scores on each of the three OC elements (Novelty, Structure and Authority, and Search Strategy) would tend to move to either end of the OC dimension while those with moderate OC preferences might score on the other side of the mean. Thus, those with a moderate OC preference for Developer might prefer an Explorer's approach to one of the three elements. The researcher tested this using data from 867 respondents. The results confirmed expected patterns.

Further investigation of the OC dimension, containing 18 items, led to the development of three subscales or elements. Each of these sub-scales focused on a singular sub-factor. One for individuals' preference for Novelty. One for preferences surrounding Structure and Authority. The third for Search Strategy. Those items loading most heavily on each of these sub-factors were selected for inclusion into each subscale.

Table 13: Factor Analysis of the OC Dimension

	Component		
	1	2	3
OC-1	.520	.365	
OC-10	.588	.508	
OC-17		.327	
OC-2SS			.658
OC-3SS			.717
OC-13SS			.650
OC-14SS			.528
OC-15SS			.655
OC-4NV		.735	
OC-6NV		.658	
OC-9NV		.726	
OC-11NV	.339	.516	
OC-12NV	.465	.617	
OC-5SA	.669		
OC-7SA	.616		
OC-8SA	.622		
OC-16SA	.671	.316	
OC-18SA	.468		.380

Extraction Method: Principal Component Analysis
a. Rotation converged in 5 iterations

We conducted numerous exploratory factor analyses and reliability estimates on the OC scale to identify those items that most clearly loaded on the three theoretical sub-scales. The current factor analysis on 64,880 subjects in our database is presented above in Table 13. Three OC items were excluded from the subscales based on our earlier analysis, and this exclusion was confirmed. OC item 17 has been consistently problematic (based on earlier factor analytic work – see Table 13 above), and two other items clearly contribute to the overall OC dimension but co-load on two of the sub-scales. The remaining items load most heavily on the assigned subscale, providing support for designating them accordingly.

Evidence Based on Relations to Other Variables

We have studied correlations between scores on the VIEW instrument and several other measures that represent the theories and models that influenced us in designing and developing our instrument representing current evidence of concurrent validity.

Dunn and Dunn Learning Style. We conducted a correlational study in our first round of development, with 191 subjects who completed our instrument and the Productivity Environmental Preference Survey (PEPS; Dunn, Dunn & Price, 1991). The results indicated, as expected, that subjects with an Explorer preference tended to prefer Informal Design, while subjects with a Developer preference scored higher on Motivation and Persistence.

A second study involving 28 adults who were administered our instrument and PEPS also yielded several significant correlations in the expected direction. While studying new and difficult material, Developers preferred Quiet, Formal Design, and Structure, while Explorers preferred Sound, an Informal Design, and little or no imposed Structure. Those with an External processing style also preferred Mobility, working with Peers, and working in the presence of Authority figures. Subjects with an Internal processing style preferred to work Alone and had no preference for Mobility.

The next study involved the responses of 118 North Carolina Senior High School Students, whose VIEW results were correlated with scores on the Dunn and Dunn Learning Style Inventory (Dunn, Dunn, & Price, 1993). These data yielded significant correlations ($p \leq .05$ or beyond) in the expected directions. Developers preferred Quiet, were high in Motivation and Persistence, preferred Structure and were motivated by Authority figures. Explorers had a preference for Sound, preferred low external Structure, and were not motivated by Authority figures. Students who preferred Internal processing also preferred Quiet, Learning Alone, learning in a set manner, and learning Visually. Those with an External style of processing preferred learning with Peers, in the presence of an Authority figure, and learning in Several Ways, often with Sound in the background.

Woodel-Johnson (2010) and Delcourt (2013) reported on correlations between VIEW and the *Building Excellence* instrument (BE; Rundle & Dunn, 1996-2010), also based on the Dunn and Dunn model, involving 105 secondary school students in three talent domains (visual arts, science, and athletics). The researchers found significant relationships between learning styles and problem-solving styles, and both similarities and differences among students talented in athletics, science, and visual arts. Students talented in the visual arts, for example, were significantly more global than those with talents in athletics, while the athletes demonstrated a greater preference for structure than either of the other two talent groups. The students in the science talent group demonstrated significantly greater preference for an Internal Manner of Processing style than those in the other two groups. VIEW's OC dimension was significantly correlated with the sound, light, and seating preference variables in BE's Environmental dimension, with Developers preferring quiet rather than sound present, direct light, and formal seating. On BE's Emotional dimension, the Developer style was significantly correlated with task preference, conformity, and structure. In relation to Sociological preferences, Explorers and Person-oriented students on VIEW's WD dimension preferred greater variety in groupings for learning. VIEW's WD dimension, was also significantly correlated with: learning in large groups (less preferred by students with the Task style); higher Motivation among Task style students; and significant positive correlations between WD and the BE Conformity and Structure variables. VIEW's MP dimension was significantly and negatively correlated with BE's Sociological elements of learning in pairs, small groups, large groups, and with an authority figure present (i.e., preferred by students with an External MP style), and BE's Learning Alone element was significantly positively correlated with MP (i.e., preferred by students with an Internal style).

Kirton's KAI. Twenty-three educators were administered our instrument and the KAI (Kirton, 1987). The correlation between the OC scores and the KAI total score was .89 ($p<.05$). Since, in the early stages of our work, the OC scale was reversed (so that low scores represented the Developer style), this result was in the expected direction. These results were obtained before we developed the Processing and Deciding scales.

In another study with 48 adult professionals who responded to our instrument and the KAI, the correlation with the total KAI score and the OC dimension was .73 ($p<.01$). The WD and MP dimensions correlated -.14 and .24 respectively.

In another study (Isaksen & Kaufmann, 2013) a sample of convenience of 151 individuals (89 males and 62 females, with a mean age of 37.6, ranging from 18 to 47) completed both VIEW and the Kirton Adaption-Innovation Inventory (KAI). The KAI assessment includes three ipsative sub-scales: *Sufficiency of Originality* (preferring to produce a small number of novel ideas that are immediately relevant and useful or preferring to generate many novel and unusual ideas); *Efficiency* (preferring to work with a problem definition as given and to work closely within an existing structure or to redefine the problem and move freely outside structure and boundaries); and, *Rule-Group Conformity* (preferring rules and authority well-defined to guide action, or to freely modify or move away from such constraints). Table 14 presents the correlations between the KAI results and VIEW scores (including VIEW's three principal dimensions and the three OC sub-scales).

As expected, scores on VIEW's Orientation to Change (OC) dimension correlated significantly and strongly with the total KAI score such that VIEW's Explorers were related to KAI's Innovators. The other two dimensions of VIEW did not correlate significantly with the KAI. VIEW's OC scores also correlated with KAI's three sub-scales. OC was related to KAI's Sufficiency of Originality scores such that VIEW's Explorers correlated with the KAI Innovator. The next strongest correlation was between VIEW OC scores and the KAI Rule-Group Conformity sub-scale.

Table 14: VIEW and KAI Results (N=151)

VIEW	KAI Total	KAI SO	KAI E	KAI RGC
OC	-.795*	-.76*	-.453*	-.68*
MP	-.156 ns			
WD	-.075 ns			
Novelty		-.704*	-.321*	-.485*
Structure		-.605*	-.458*	-.661*
Search		-.607*	-.416*	-.548*
VIEW	**KAI Total**	**KAI SO**	**KAI E**	**KAI RGC**
OC	-.795*	-.76*	-.453*	-.68*
MP	-.156 ns			

WD	-.075 ns			
Novelty		-.704*	-.321*	-.485*
Structure		-.605*	-.458*	-.661*
Search		-.607*	-.416*	-.548*

* p <.001

Myers-Briggs Type Indicator. A study involving 20 graduate and undergraduate students at an urban university in New York City examined the correlations of VIEW scores with scores on the Myers-Briggs Type Indicator (Myers et. al., 1998). The results were significant and in the expected directions. The OC dimension correlated .67 with Sensing/Intuition and .61 with Judging/Perception, and lower with Thinking/Feeling (.44) or Extraversion/Introversion (-.27). The Developer style was more strongly indicative of a Sensing and Judging MBTI preference. The Processing (MP) dimension correlated .59 with the MBTI Extraversion/Introversion scale, in the expected direction, and only minimally with other MBTI® scales (-.17 with S/N, -.15 with J/P, and .02 with T/F). The Deciding (WD) dimension of VIEW correlated .49 with the Thinking/Feeling scale of the MBTI, also in the expected direction, and minimally with the other MBTI scales (.24 with S/N, .20 with J/P, and .11 with E/I).

Temperament. Sokolowska (2006) studied psychological temperament—characteristics of an individual that remain stable across changes in age, environment, or experience—and problem-solving styles. She reported statistically significant relationships between the VIEW OC dimension and certain dimensions of temperament. Developers, for example, tended to delay immediate processing of their own experience, while Explorers processed their own experiences quickly and preferred working without set boundaries. Developers took time to analyze given information and situations, and Explorers challenged given structures and preferred to deal quickly with situations at hand. Subjects with an Internal MP style preferred working alone and in quiet settings, while those with an External MP style sought collaboration with others and sought input from others.

Coping style. Maghan (2007, 2008) examined the relationship between coping style and problem solving style. The researcher hypothesized that individuals' self-reported coping style would be congruent with their generalized problem solving style and that when responding to a problem situation, participants would prefer coping strategies consistent with their preferred style. Developer and Internal problem-solving-styled participants across all conditions reported higher stress ratings, suggesting greater sensitivity to stressful situations. Additionally, there were significant correlations between the *VIEW* and *COPE* scores, suggesting that Explorer, External, and Task-oriented problem-solving-styled individuals were more likely to use Restraint as a coping strategy, all of which suggests that in the context of a personal problem, individuals may be more likely to recognize that any problem will take time to solve, perhaps requiring "new thinking" (Explorer style), help from others (External style), and "hard" choices to be made (a Task-oriented decision-making style).

Maghan (2017) followed up and created three experimental conditions using vignettes with 107 community college students. She confirmed that there were significant correlations between the VIEW and COPE scores, suggesting that Explorer, External, and a Task-oriented problem-solving-styled individuals were more likely to use Restraint as a coping strategy, all of which suggest that in the

context of a personal problem, individuals may be more likely to recognize that any solution will take time to solve, perhaps requiring "new thinking" (Explorer style), help from others (External style), and "hard" choices to be made (a Task-oriented decision-making style).

***Attributions for Success and Failure*.** Houtz, Matos, Park, Scheinholtz, and Selby (2006, 2007; Selby, Matos, Park, Scheinholtz & Houtz, 2007) studied a sample of 52 female graduate students who completed VIEW and provided attributions for their success and failures according to several categories of reasons. Attributions were in the form of percentages to the categories of skill or ability, effort devoted to the task, task difficulty, chance or other factors, after Weiner's theory of motivation. Women scoring more Developer than Explorer on VIEW attributed a greater percentage of their failures to uncontrollable factors, theorized to be because individuals with a Developer style are more organized, deliberate, and planful in their work efforts.

Multicultural Personality Questionnaire (MPQ). Burger, Marino, Ponterotto, and Houtz (2008, 2009), in a study of 51 graduate psychology students (45 female and 6 male, ranging in age from 22 to 75), administered *VIEW* and the *Multicultural Personality Questionnaire (MPQ).* The researchers computed partial correlations among *VIEW* and *MPQ* scores, controlling for age and gender. Among *VIEW* scores, only the correlation between OC and WD was significant, suggesting that a Developer style and Task-oriented style were positively related as were an Explorer style and Person-oriented style. Among *MPQ* scales, there were numerous significant correlations. Correlations of MPQ with VIEW-OC suggested that an Explorer style, open-mindedness, social initiative, emotional stability, and flexibility were positively related. Correlations with MP suggested that External style, social initiative, and flexibility were positively related. There were no significant relationships observed between problem solving style and cultural empathy or between Ways of Deciding and multicultural personality orientation. One disappointing result was the lack of significant correlations of Ways of Deciding with cultural empathy. *VIEW* theory would have suggested a correspondence between a Person-oriented style and greater cultural empathy. The sample's very high mean (and corresponding "restriction of range") on Cultural Empathy may have accounted for the absence of correlation with problem solving style. Houtz, Ponterotto, Burger, and Marino (2010) examined the relationship between problem-solving styles and multicultural personality dispositions among 91 graduate students in the U.S. Cultural Empathy, Open-mindedness, Social Initiative, and Flexibility correlated significantly with Explorer and External problem-solving styles, as predicted.

***Personal Characteristics Checklist*.** Landers, Houtz, and Selby (2012) studied 103 undergraduate and graduate students (25 males and 78 females, ages 19-40) who completed VIEW and a 40-item self-checklist of personal characteristics. On OC, the Explorer style correlated significantly with rule-bending, being easy-going, curious, humorous, and restless, while the Developer style correlated significantly with being a goal-setter, detail-oriented, clear-headed, conscientious, logical, organized, and results-oriented. For MP, External style was associated with being a team leader, a consensus-builder, seeking group activities, and being person-oriented were correlated; the Internal style correlated with being a quiet thinker, a loner, and independent-minded. On WD, the Person-oriented style was correlated with being a peace-maker, while the Task-oriented style correlated with being a completer, results-oriented, a goal setter, and clear-headed.

Cattell's 16PF. Isaksen, Kaufmann, and Bakken (2016) conducted a study to examine the deeper personality foundations of VIEW using the well-established Cattel 16 Personality Factor Questionnaire. Participants (N=165) completed both VIEW and the 16PF. The pattern of results from the 16 facets and global scales for the 16PF provided support for the three dimensions of VIEW. The correlations ranged from .008 to .487 indicating that the relationships did not indicate overlap, but appropriate relationships that were consistent with VIEW's conceptual foundations. Table 15 illustrated the patterns of relationships between personality and VIEW styles.

Table 15: Correlations between 16PF and VIEW

16PF Primary Scales	VIEW: OC	VIEW: MP	VIEW: WD
Warmth	**-.159***	**-.238****	**-.380****
Reasoning	-.095	-.105	.122
Emotional Stability	-.102	**-.245****	.055
Dominance	**-.216****	**-.201****	.012
Liveliness	**-.280****	**-.300****	**-.255****
Rule Conscious	**.320****	-.046	**.182***
Social-Boldness	**-.239****	**-.326****	.046
Sensitivity	-.087	-.050	**-.337****
Vigilance	-.127	.112	-.023
Abstractedness	**-.402****	.042	-.114
Privateness	.037	.083	**.194***
Apprehension	.188	**.263****	-.129
Openness to Change	**-.404****	**-.188***	-.093
Self-Reliance	.101	**.401****	.141
Perfectionism	**.250****	**.230****	**.199***
Tension	-.106	.008	.008
Response Indices			
Acquiescence	-.186	.032	-.046
Impression Management	-.002	-.077	.059
Infrequency	-.063	-.025	-.025
16PF Global Scales			
Extroversion	**-.223****	**-.381****	**-.313****
Anxiety	-.022	**.207***	-.071
Tough-Mindedness	**.447****	**.197***	**.361****
Independence	**-.365****	**-.246****	-.037
Self-Control	**.487****	**.190***	**.278****

Note. $N = 165$. * $p < .05$, ** $p < .01$

Conflict Styles. Gashi (2020) studied the relationship between VIEW problem-solving styles and the Thomas-Kilman conflict mode instrument with 123 school superintendents. She found that a Competing (assertive and uncooperative) conflict management approach positively correlated with a Task-focused (logical, efficient) problem solving style. Age, gender, and experience did not alter these

findings although there were a few significant gender differences. Participants also indicated that they spend substantial time each day in their work dealing with conflicts, but that they had not had specific conflict management training in their professional preparation.

Relation to Work Environment for Creativity and Innovation. Early work to examine the relationship between creative climate and cognitive style was conducted by Isaksen and Kaufmann (1990). They used the KAI and the Creative Climate Questionnaire (CCQ). Since Adaptors and Innovators correlate with Developers and Explorers, respectively, this study provided some insight into potential individual differences reflected by VIEW and some of the dimensions of creative climate. Specifically, Developers (Adaptors) are more likely to perceive more Challenge, and Explorers (Innovators) were more likely to perceive more Conflict. Clapp and Kirton (1994) commented on this study and raised several empirical and conceptual issues. This prompted a rebuttal and extension of the original study (Isaksen and Lauer, 1999) that laid out key issues related to the study of the relationships between style and work environment.

Following this series of studies, VIEW was utilized to study relationships between problem-solving style and various aspects of organizational climate that influence creativity and innovation. Aerts (2008) conducted an initial study and found that there were significant differences between individuals of stronger contrasting problem-solving styles and the climate in best and worst-case work environments. Babij (2008) conducted an organizational case study that also illustrated meaningful differences between style and climate, and pointed out a few organizational implications. Isaksen (2009) and Aerts, Isaksen, and Isaksen (2009) began to complement the quantitative results on the Situational Outlook Questionnaire with the narratives provided by the open-ended questions. This effort provided deeper insights into problem-solving style differences and perceptions of the work environment that supports or hinders creativity and innovation.

Isaksen and Aerts (2011) examined relationships of the constructs of problem-solving style and climates for creativity by assessing their best and worst-case climates. They administered two short forms of an organizational climate for creativity measure in which 213 individuals identified specific best and worst-case experiences. They used VIEW to measure problem-solving style. Results confirmed that significant differences between best and worst workplace climates existed, and suggested that problem-solving styles makes a difference for some creative climate dimensions. Aerts (2012) presented a case study involving two major communications firms and an aerospace engineering organization. People, organizations and societies benefit when there is an appropriate fit between individuals and their environments, especially when it comes to innovation. Aerts elaborated on the findings of two case studies in the telecommunications industry dealing with different style preferences when innovating. He also described the findings of a research project within a large professional aerospace organization and elaborated on the role of organizational climate and leadership influence on innovation. Integrating both cases, Aerts proposed that problem-solving styles make a difference for some dimensions of creative climate and should be taken into account when leading or managing people engaged in creative efforts. This finding was further supported by Skovli and Myhre (2015).

Hoßbach (2017; 2019) provided additional research into the differences between both problem-solving style and gender with psychological climate. A multi-method approach was taken to assess the climate for creativity from a quantitative and qualitative perspective. Assessments of creative climate in a best- and worst-case work situation were collected from 123 participants. The results suggest that participants of different problem-solving styles and gender had different perceptions of the climate in which they felt most or least creative. Especially those tending towards an exploratory approach to problem-solving perceived a larger difference of creative climate in their best- and worst-case situation and had different perceptions concerning the degree of autonomy that supported or inhibited their creativity. Participants tending towards an external approach to problem-solving reported higher levels of interaction, support for ideas and risk-taking as supportive to their creativity. Furthermore, higher levels of trust were observed as an enabling condition among participants preferring a person-oriented approach to problem-solving. Gender differences were mainly found concerning the perception of risk-taking and the quality of interpersonal relationships as well as the negative impact of personal tensions. Furthermore, potential interaction effects between gender and problem-solving style were observed.

Evidence Based on Uses and Consequences of Testing

Importance bearing on the validity of results obtained from VIEW also comes from documentation of the instrument's effective application across a variety of goals, purposes, and situational contexts. VIEW has been shown to be a powerful and valuable tool, for adolescents and adults, in many different organizations, and for a variety of purposes. This section presents an overview of the successful applications and impacts of VIEW across ages, places, and settings.

Learning and Applying CPS. Schoonover and Treffinger (2003) examined the influence of style preferences on how people learn and apply creative problem solving tools. Style influenced people's efforts to customize their learning and application of process tools and the ways that individuals strive to "make tools their own." Developers, for example, sought to gain detailed understanding of tools to become confident in applying them appropriately, while Explorers used a broad, general grasp of tools to use as a starting point for their own variations and modifications. Learners who differed in style also varied in their emphasis on personal applications of tools, or on applications to tasks less focused on their own immediate situation or interests. Person-oriented deciders, for example, emphasized applications with personal and interpersonal relevance and applications.

In addition, Isaksen and Geuens (2006, 2007) examined the relationships between VIEW and preferences for learning and using the specific tools, guidelines, stages, and components of the current version of Creative Problem Solving. There were significant relationships between all three dimensions of VIEW and various creative problem solving tools, guidelines, and process stages.

Taking a related line of inquiry, Houtz and Selby (2008, 2009) investigated relationships among style, figural creative thinking scores, and scores on a problem-solving inventory. Forty-two undergraduate and graduate students completed VIEW, the non-verbal Torrance Test *Thinking Creatively with Pictures*, and the *Problem Solving Inventory* (PSI). The TTCT-Figural measures several productivity measures, notably ideational fluency. The non-verbal form also yields one “process” score: resistance

to closure. Finally, the *Problem Solving Inventory* measures individuals' confidence in and affective control of their problem solving process, plus an indication whether an "approach" or "avoidant" style is characteristic. *VIEW* OC and WD scores were correlated significantly with TTCT resistance to closure. Explorers (OC) and Person-oriented deciders (WD) were more resistant to closure.

Learning and Instruction. Treffinger and Schoonover (2003) reported on an application of VIEW in an educational setting involving curriculum development for problem-solving based learning. A group of 32 curriculum writers responded to VIEW and to two hypothetical "exemplary problems" that might be presented to students—one written to be as biased as possible toward the Explorer style, and the other to be as biased as possible toward the Developer style. As expected, the group members with an Explorer style rated the explorer-biased sample problem higher than the developer-biased sample, whereas the group members with a Developer style rated that sample more favorably than the explorer-biased sample problem. The Explorers described the developer-biased sample as "boring, unexciting, and unappealing," while the Developers described the explorer-biased sample as "wild, unmanageable, and too open" (although several Developers acknowledged that "many people will consider it creative"). The Explorers suggested improving the developer-biased sample by removing details or by making it broader and more open-ended. The Developers proposed adding more specifics to the explorer-biased sample, defining key terms more precisely, and giving it more structure. (Interestingly, the Developers also found that the developer-biased sample needed improvement: making the details more specific, and defining several terms more precisely.)

There were no differences between the group members with External and Internal Manner of Processing styles, which was not surprising since the Orientation to Change dimension was the variable on which the sample problems focused. There was an unexpected difference on the Ways of Deciding dimension, however. The developer-biased sample problem included a requirement that called for a "happy ending" solution to the problem. The group members with a Task preference found this to be too prescriptive and judgmental, while the group members with a Person preference commented that this added warmth and human appeal to the problem.

The researchers provided the curriculum development group with feedback about their VIEW results, and then presented the results of their ratings of the sample problems. The group's discussion of the results indicated that it was a valuable learning experience, and that they were previously unaware that their personal style preferences might have a bearing on their evaluation or development of curriculum resources. As the group gathered into sub-groups to work on development of new curriculum materials, evaluations at the conclusion of the program indicated that the VIEW "experiment" and results had significant and positive effects on their interactions and products during their working sessions.

Doheny, Houtz, and Selby (2007/2008) examined the relationships between VIEW, the Classroom Activities Questionnaire, and researcher-constructed questions in a sample of 38 female teachers who taught elementary, secondary, or special education classes. Significant relationships were consistent with VIEW theory. What may be characterized as more "constructivist, student-oriented" classrooms appear associated with more Person-oriented or External problem-solving-styled teachers.

McCann (2008) summarized the problem solving and learning styles of students enrolled in a university-level Agricultural Technology program, identified relationships between problem solving and learning styles, and used problem solving and learning styles to explain students' end of course grades. Ninety-three students and six faculty members participated in the study. There were differences between degree options in Orientation to Change. Second year students were likely to be Internal processors. There were no significant differences in Ways of Deciding. However, Agricultural Technology teachers were more Task oriented problem solvers, while their students were Person oriented. Teachers were more field independent than the students. There were no relationships between problem solving and learning style. There was a high degree of association between student Ways of Deciding and Manner of Processing. Student Orientation to Change, student Manner of Processing, teacher Manner of Processing and teacher Ways of Deciding scores produced a model that significantly explained end of course grades.

Shaw, Selby, and Houtz (2009) asked 74 pre-service teachers in an urban area to respond to *VIEW* and a questionnaire in which they were to rate the importance of numerous principles of learning, teaching, and problem solving. Judges had previously classified these principles according to the six different *VIEW* problem solving styles (Explorer, Developer, External, Internal, Person-oriented, Task-oriented). Participants categorized by a particular style rated principles that matched their style more highly than non-matching principles.

Hanakis (2011) investigated whether a teacher could accurately assess his students' problem solving styles and whether students with measured styles will make choices consistent with those styles. Seventy-five high school seniors responded to VIEW. Then, students completed a survey on style titled *What Would You Do* that asked how they would choose to respond to specific situations. Lastly, the teacher received descriptions of different problem solving styles and nominated up to three students that he believed exhibited those styles. Results indicated that neither the teacher's nominations nor students' own choices on *What Would You Do* matched in the majority students' tested styles on *VIEW*. Those matches that were observed among students and the teacher, however, were in the nature of Developer, External, and Task-oriented Decider. Explanations offered included the type of school culture typically rewarded (Developer, Task-orientation) and current curriculum and age-appropriate factors, such as more group activities and peer focus in the senior teen grades (External processing style).

Matos-Elefonte (2011) studied a sample of 40 high school juniors and seniors taking the Scholastic Aptitude Tests for college admission applications, comparing their mathematics test scores to scores on VIEW. Higher mathematics achievement corresponded to a Task-oriented decision-making style. In addition, a more Explorer style was positively associated with higher education goals. The Developer style and mathematics (but not verbal) achievement both are thought to rely on logical and detail-oriented thinking. The very nature of mathematical problem solving involves recognition and application of appropriate structures (equations, theorems, etc.) and rules by which structures can be manipulated. As for the finding about Explorers, style theory suggests that Explorers are more open to rule-breaking or "rule-ignoring," so it is quite plausible that individuals taking the SATs might feel less bound by any test scores, think that they can achieve no matter what, and thus check that they have higher educational aspirations.

Treffinger and Schoonover (2012) described the implications of each of VIEW's styles for distance learning, presented comparisons of style data for university students in both classroom-based and distance courses, and described the importance of attention to style differences in both settings.

Hanakis, Houtz, and Selby (2013) studied 47 high school seniors who responded to VIEW and a survey of how they would choose to respond to specific situations. Results did not suggest major imbalances in number of students with different styles or students' responses to specific situations, but did suggest in several cases that individuals with different styles might respond differently. With respect to OC styles and the OC Search Strategy sub-scale students who chose *"Hold off interacting until you feel secure with others in the group and you have had time to think about the project"* scored more Developer than students who chose, *"Be one of the first persons to talk, sharing information about yourself and the direction you would like to see the team go."* With respect to MP styles, students who chose *"Concerned with broad actions that demonstrate flexibility, and let others worry about the details"* scored more External than students who chose other options. In addition, students who chose *"Find yourself preferring to work alone"* scored more Internal compared to students who chose other options.

Mandelbaum (2013) hypothesized that teachers with different, but well-developed problem-solving styles would have distinctly different teaching styles, in turn affecting their preferences for certain teaching practices, classroom activities, and interactions. The study involved 114 secondary private school teachers. Results revealed that teachers' high valuation of people, novelty, and autonomy when solving problems predicted their ability to teach in an individualized, social way, and predicted their utilization of caring and supportive teaching behaviors. Additionally, teachers' ability to process information internally when making decisions predicted their ability for structured and rational teaching styles.

Vazquez (2013) investigated the relationships between students' problem solving style and their achievement on standardized tests and teacher-assigned grades. Higher achieving students tended to be characterized by Developer, Internal, and Task style preferences. The strongest correlations were found between standardized achievement measures and the Manner of Processing (MP) and Ways of Deciding dimensions (WD). MP scores correlated significantly with English grades, Math grades, state achievement test scores in Language Arts, Math, and Science. WD scores were significantly correlated with state test results in Language Arts, Math, and Science. For OC, English grades correlated significantly. There were also some gender differences. The results of this study suggested that the Developer-Internal-Task-oriented styles have an advantage in the types of achievement typical in schools today.

Houtz (2011) studied 27 undergraduate students enrolled in an educational psychology class who completed VIEW. Students were then assigned to one of eight groups of 3-4 students each, equated partially for styles. Each group prepared and presented to the class a 15 minute power-point/multimedia summary of the chapter content. After the group presentation, each student in the group responded to four questions: 1) How satisfied are you with your group's overall final "product?" 2) How easy or difficult was it to get started? 3) How satisfied were you with your individual contribution? 4) Would you recommend this type of project again? In addition, for a final, individual

project, students chose one of three types of "papers" to complete this requirement. On Manner of Processing, the External-styled students recommended that the group project be used again statistically significantly more than the Internal-styled students. With respect to styles and student choices of final term project, students who chose the observation/case study assignment were more Person-oriented.

The usefulness of VIEW in informing instruction has been demonstrated in several additional studies. Delcourt, Woodel-Johnson, Burke, and Treffinger (2015) examined students' styles within designated talent areas and the relationship between the variables in order to make recommendations for selecting tools and designing instructional programs. Results supported the principle that the two selected instruments (VIEW: An Assessment of Problem-solving Styles and Building Excellence) yielded both common and unique insights into student characteristics, tested at the $p < .007$. Implications relate to the role of learning styles and problem-solving styles in individual differences and provide guidance for instructional differentiation.

In short, VIEW has been able to provide guidance for instructional differentiation and to guide students as they approach the learning process (e.g. Gartner, Hanakis, Landers, Mendelbaum, Mator-Elefonte, & Vasquez, 2013; Houtz & Selby, 2014; Southwell, 2015).

Organizations. Esposito, Roehm, Treffinger, Selby, Isaksen, and Lauer (2004) reported on applications of VIEW in IBM's Executive Business Institute. They reported that VIEW has been used successfully in consultation with executives and business leaders from organizations of several kinds and sizes, and provided case examples of successful applications with a large supermarket chain, a large insurance firm, and a very large financial services firm. Esposito et. al concluded:

At IBM we have helped clients and employees around the world to appreciate their style using the VIEW instrument. We have had very positive results in every country and every culture where we have used it. We have validated that VIEW results can help individuals test their reported preferences against their typical behavior in varied situations.… VIEW results can enable individuals to identify ways to be at their personal best, and to determine how they might benefit from the strengths of others… It can also be used in guiding groups in strategic planning, innovation, product development, project management, or other deliberate change initiatives. (2004, 11-12).

Lin (2005) used VIEW to assess the problem-solving styles of employees in the GTV Corporation and to assess differences among departments. The problem-solving style of the organization reflected a Developer preference with Person orientation and Internal focus, with an identified need of recruiting more Explorers. The compatibility between employees' job characteristics and problem-solving styles existed in half of the departments. Although no serious HR problems were demonstrated, HRM modifications are certain. The results were also distinctive from previous VIEW researches, and illustrated the great difference in problem-solving styles of individuals with different cultures.

Lua (2006) applied VIEW for both educational applications, with adult volunteers participating in the Destination ImagiNation® creative problem solving program, and with corporate clients, for organizational development applications, in Singapore. He concluded: "[T]he Singapore experience

with VIEW have been positive and the application of the instrument in various settings effective. (p. 9)."

Michotte (2010) addressed the earliest phase of product and service innovation, known as the Fuzzy Front End (FFE), seeking to help businesses improve their approach to innovation projects and increase their competitive advantage. The study sought to examine, develop and formulate best practices in the FFE. It also aimed to examine the influence of problem-solving style on generating and focusing phases of FFE projects. Third, it formulated a framework for managing the FFE. The leading research question was: 'Do individuals of specific Problem Solving styles make different levels of contribution to "front end of innovation" projects?' The results indicated that all dimensions of Problem Solving style have influence on generating and focusing, albeit on different levels and in different phases of the projects. Participants of Explorer and External style preference tended to perform better on fluency of generating. Raters viewed the options generated by People-oriented decision makers as most valuable, although ideas that initially seemed valuable did not always end up in concept development phases. Conversely, ideas that are initially overlooked may still prove to be of value in later phases.

Lofquist and Isaksen (2019) presented the results of a case study examining a Norwegian national air traffic management organization involved in a major reorganization initiative. They mapped the aggregated readiness and positioning for organizational change in the three main air traffic control centers in Norway using a mixed-method approach to person–environment fit to help organizational leaders better understand each unit's positioning for change, and more specifically, individual preferences for change styles using VIEW. The results suggest that participants at the different air traffic control centers had developed distinctly different change preferences at both the group and individual levels, and that each was distinctly different from the other units in their positioning and readiness for change.

Leadership. Isaksen and Tidd (2006) proposed a new way to look at creative leadership that integrates both leadership and management. It also provides key insights into a new and more systematic way to manage transformation. As a result, the reader will be able to discover a full range of potential outcomes from their change efforts—from radical transformation to incremental improvements.

Delgado (2019) examined the relationships between servant leadership characteristics and problem solving styles of 84 educational leaders. She found significant correlations of Manner of Processing and Ways of Deciding with the Servant Leadership attributes of Altruistic Calling and Organizational Stewardship. Though this may seem obvious, the findings suggest that individuals with more External and Person-oriented styles see Stewardship as a major aspect of leadership style. The third significant correlation was Manner of Processing and Servant Leadership attribute of Calling, suggesting that individuals with a more external problem-solving style saw leadership as involving a special professional or personal calling. Additionally, Externals and Person-oriented individuals appeared to rate more highly on Stewardship and Calling.

Tamvakologos (2018) examined the relationship between problem-solving style and leader-follower relationships using leader-member exchange theory. One-hundred ten teachers were recruited by Qualtrics to complete surveys about supervisor and teacher problem solving styles, and teachers' perception of a positive or negative supervisory relationship. The main study hypothesis was not

supported. Neither perceived problem solving styles of supervisor nor teacher were related to supervisory relationship. Teachers who completed VIEW: An Assessment of Problem Solving Style appeared moderately Developer as opposed to Explorer and similar to the over-2000 teachers already in the VIEW database. In addition, teachers in this study appeared to judge more positive relationships with former supervisors than current ones. Teachers' age, gender, and years of experience did not affect the relationships observed.

Groups and Teamwork. Treffinger (2006) investigated the effects of awareness of group and individual problem-solving styles on problem-solving performance by adolescents participating in the Future Problem Solving Program (FPS). The sample included 35 teams of four or five students each (approximately half at the middle-school level and half at the high-school level). Students in the Experimental group (17 teams) responded to VIEW and received feedback about their individual results, their team's profile, and the implications of style for problem solving. Students in the Control group (18 teams) received no VIEW information. The Experimental group teams performed significantly better than the Control teams on an initial problem-solving task (scored by external evaluators who were unaware of the teams' groups in the research); the mean score for the Experimental teams was 77.4, and the Control mean was 63.3 ($F=5.78$, $p<.02$). The groups did not differ in an assessment of teamwork skills. As the coaches in both groups worked with the students over a period of several months (with changes in the make-up of the Control teams made by some coaches to improve their working relationships), the Experimental teams' performance on a second task remained higher than the Control teams' scores, but not significantly so, and the groups did not differ significantly on a third problem-solving task. Thus, knowledge of style and its implications facilitated initial problem-solving performance by Experimental, although the impact of adjustments in the composition of the Control teams led to improvements in their performance over an extended period of time. The findings indicated that style awareness has a facilitative effect on problem-solving performance. However, they also indicated that additional support (after the initial awareness feedback) may be important. It is also possible that the improved performance by the Control teams after their coaches' intervention in team composition may have accomplished, informally, enhancements in team functioning that approximated the effects of the style feedback for the Experimental teams. Providing style information to teams may accelerate or enhance the establishment of effectively performing teams that otherwise may require extended time and the support of experienced coaches to accomplish.

McCoy and Houtz (2011) investigated problem solving style and creative productivity. As a freshman orientation project, 456 freshmen education students created 5-10 minute multimedia PowerPoint/movie presentations in response to one of several prompts about education, learning, and teaching. Students who completed VIEW were assigned to working groups of 6 students each based on their VIEW scores such that team members were similar on the three dimensions of problem solving style. Researchers scored students' presentations for clarity of theme, supporting details, and use of multi-media to enhance the message. Generally, Developers, internal processors, and task-oriented deciders received higher ratings. Of greater import, perhaps, was that ratings for supporting details and use of media to enhance the message were higher for "style-matched" teams than non-matched teams. Follow-up satisfaction surveys revealed that Internals rated more highly than Externals that their team had a good leader. Developers more than Explorers wanted more technical support. Person-

oriented Deciders had more trouble in their team dividing up the work, and Explorers more than Developers would recommend that this project be continued.

Crumel, Purifico, Purifico, and Selby (2011) described ways that individual style preferences of board or committee members, as might typically be found in churches, homeowner groups, social or fraternal groups, or many other organizations, can inhibit or encourage group productivity and teamwork, and practical ways for members of such groups to honor their strengths and differences for more effective results.

Purifico, Crumel, Purifico, and Selby (2011) described and illustrated the importance and benefits of understanding style among educational leaders, from classroom teachers to superintendents and School Board members, with particular emphasis on working together on the challenges of change, school improvement, curriculum planning, or similar tasks that can be frustrating or rewarding. They described ways in which awareness of style can contribute to meaningful collaborative efforts.

Purifico, Crumel, Purifico, and Selby (2011) presented an informal look at the three important dimensions of personal style, highlighting the ways in which each individual brings his or her personal style to countless everyday tasks and interactions.

Lofquist (2013) described another organizational application of VIEW, demonstrating that understanding, appreciating, and effectively utilizing differences in problem-solving style has great value for those who work in organizations. The organizational applications of problem-solving style range from helping leaders better deal with diversity on their management teams and developing strategies together, to helping project and work teams understand how they can work better together to deliver improved results. From a practical point of view, problem-solving style can offer value whenever individuals and groups must work together to make change happen. The presentation summarized a case study dealing with real organizational change, focused on a three-year organizational change project within the Norwegian air navigations services provider.

Treffinger, Crumel, and Selby (2013) discussed the uses of problem-solving style and process tools to optimize leadership and team performance. Worldwide, organizations of every size are faced with complex and rapid change that threatens their survival. Based on research, theory, and field experience, effective leaders can build an inclusive environment in which members of high-performing teams have opportunities to realize their full potential. Specifically, the authors argued that when team members understand their problem-solving style along the three dimensions assessed by VIEW and the interaction of style with the Creative Problem Solving components and stages, they will increase their effectiveness in meeting creatively the challenges posed by rapid change.

Schroth, Helfer, Crawford, Dixon, & Hoyt (2015) conducted an experiment within which they compared classroom groupings that were assigned using VIEW results with those using more traditional approaches to group formation. At the end of each class, all students were given a survey asking them to evaluate various aspects of their experiences with group activities. Those students whose groups had been formed using data from VIEW reported statistically significant differences in their satisfaction with their group experiences, especially with regard to attention the group gave to new ideas, preferences for the level of structured authority, how information was handled by the

group, and the balance between task concerns and personal or interpersonal needs when making decisions.

Main, Delcourt, and Treffinger (2019) conducted an experimental study in which 75 participants from one suburban high school formed 21 teams with 3–4 members each for the Future Problem Solving Program International (FPSPI). Students were selected to participate in either the regular FPSPI or an enhanced FPSPI, where multiple group training activities grounded in problem-solving style were incorporated into a 9-week treatment period. An ANCOVA procedure was used to examine the difference in team responses to a creative problem-solving scenario for members of each group, after accounting for initial differences in creative problem-solving performance, years of experience in FPSPI, and creative thinking related to fluency, flexibility, and originality. The ANCOVA resulted in a significant difference in problem-solving performance in favor of students in the treatment group ($F(1, 57) = 8.21$, $p = .006$, partial eta squared = .126, medium), while there were no significant differences in years of experience or creativity scores. This result led researchers to conclude that students in both groups had equivalent creative ability and that participation in the group activities emphasizing problem-solving style significantly contributed to creative performance.

Career and Vocational Choice. Zmudka (2006) investigated the relationship between creativity style and choice of musical career among 74 students enrolled in one of four majors in music: music education, music therapy, instrumental performance and jazz performance, as assessed by VIEW. Subjects also provided demographic information concerning their declared major, preferred musical career, and level of education. The four groups differed significantly on the OC and WD dimensions when using preferred musical career as the category variable. No differences were found when declared major was used as the category variable. Results suggested that problem-solving style is likely to be associated with problem types found in specific musical activities and therefore a musician's preferred career in music.

Tuzzo (2007) investigated factors that contributed to the creative achievement of women. Thirty members of an international organization of women who have been recognized for their lifetime achievement in various careers and/or volunteer efforts, agreed to complete VIEW and a survey of biographical factors (e.g., background, education, interests and hobbies, creative activities and achievements, and professions). Developers rated themselves detail-oriented, reliable, conscientious, logical, as “completers,” and organized. Explorers rated themselves as rule-benders and restless. Internals rated themselves as quiet thinkers, conscientious, and as “loners.” Task-oriented Deciders rated themselves as detail-oriented while Person-oriented Deciders rated themselves as “networkers.”

Larsson (2008, 2009) studied the contributions of problem solving style, spatial ability, and visualization to simulation training of boat handling among officers from two major inland towing companies. The researcher postulated that due to the nature of the job performed by these officers they would have above average spatial ability and visualization skills, and that their problem-solving styles would be similar because of the rigors of the job of navigating an inland towing vessel. Results in the study showed above average scores in spatial ability, but below average scores in visualization ability. A large majority of Captains and pilots had similar problem-solving styles. A large majority of Captains and pilots had similar Developer problem-solving styles. OC scores for this group were about one standard

deviation higher than the theoretical mean (that is, more Developer style), and the difference was even greater for captains and pilots. Task-oriented deciders scored higher on the spatial and visualization tests.

Maghan and Houtz (2009) examined the role of problem solving style in career interests. Career development has long been an important part of the counseling field. The researchers proposed that VIEW could be used as a complement to other regularly used career interest assessments.

Crerar (2010) examined the relationship between problem-solving style and career interests or preferences as measured by the *Kuder Career Search with Person Match* among 342 eighth through eleventh grade students. Explorers displayed a preference for the Kuder Arts/Communication (Artistic) Career Cluster. Externals displayed a preference for the Kuder Sales/Management (Enterprising) Career Cluster. Students with a Person-Orientation had a greater preference for the Kuder Arts/Communication (Artistic) Cluster and the Kuder Social/Personal Services (Social) Cluster, while those who had a Task-Oriented decision-making style had a greater preference for the Kuder Outdoor/Mechanical (Realistic) Cluster and the Kuder Science/Technology (Investigative) Career.

Johnson, Jackson, Selby, and Houtz (2014) examined career interests and preferences in relation to VIEW problem-solving styles using the Kuder Career Search with Person Match assessment. Three-hundred forty-two eighth through eleventh grade junior and senior high school students from a suburban high school participated in this study. The Kuder Career Search with Person Match provides scores according to 16 career interest categories as well as Holland's RIASEC (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) model of categories of personality/career types. With respect to the Orientation to Change dimension, Explorers displayed a preference for the Kuder Arts/Communication (Artistic) Career Cluster. Externals displayed a preference for the Kuder Sales/Management (Enterprising) Career Cluster. With respect to the Ways of Deciding Dimension, those who had a Person-Oriented decision-making style had a greater preference for the Kuder Arts/Communication (Artistic) Cluster and the Kuder Social/Personal Services (Social) Cluster while those who had a Task-Oriented decision-making style had a greater preference for the Kuder Outdoor/Mechanical (Realistic) Cluster and the Kuder Science/Technology (Investigative) Career.

Steinmetz (2017) examined three of Holland's career types and VIEW with a sample of 450 adults. Findings revealed that people in Conventional type of careers were most likely to have Developer and Task-focused Problem Solving Styles. People in Enterprising careers were most likely to have an External Problem Solving Style. People in Social types of careers were most likely to be Person-focused in style. These findings enhance the career development and career choice field by helping people make more informed decisions as to appropriate careers based on their unique selves.

Fitzjarrell (2011) examined the problem-solving styles of traditional patrol officers (*N* = 106) and neighborhood policing officers (*N* = 34). One recent change in policing strategy has included a shift from traditional policing approaches to a community-oriented approach where officers are assigned to function as problem solvers in the community. This study investigated the problem-solving style differences between officers assigned to traditional patrol duties and those assigned as neighborhood policing officers. There were no significant differences in problem-solving styles between traditional patrol and neighborhood policing officers on each dimension concluding that the samples of police

officers in this study were homogeneous in their problem-solving style preferences. A singular significant difference was found between neighborhood policing officer age and the problem solving style preferences on the OC dimension.

Family and Parenting. Selby, Crumel, Purifico, and Purifico (2011) noted that family members often have contrasting personal problem-solving styles, which can create challenges for problem solving and communication, but can also be a source of strength. The authors offered practical ideas for understanding and using each person's style preferences to build and maintain strong family relationships.

Neyen, Volpe, Selby, and Houtz (2017) reported the results of two studies examining the relationship between problem-solving and parenting styles–one including 173 adults, and the other included 131 adults. Both studies used VIEW and the Parental Authority Questionnaire. Data were analyzed with stepwise hierarchical multiple linear regression. After controlling for age and gender, individuals who recalled and rated their mothers' parenting styles as more permissive were also those adults who rated their problem-solving styles as more Explorer-type, preferring to work with fewer restrictions and preferring more novel responses to problems. Other findings across the two studies were suggestive of additional theoretical relationships among problem-solving and parenting styles.

Summary: Reliability and Validity Evidence

Some conclusions we believe are justified in relation to the **reliability** of VIEW from these studies include:

1. Reliabilities meet or exceed expectations for psychological measures and, generally, are sound in comparison with other personality or style instruments.

2. Internal consistency reliabilities for all three scales of the VIEW exceed the minimal standard of .70.

3. Our data support the stability of VIEW over periods as long as twelve months.

4. When people demonstrate change on retesting, the change appears to be on one dimension, and most often in the dimension where the clarity of preference was low (i.e., subjects' scores are near the center of the scale).

5. We have not studied the use of the measure with children less than 12 years old, and we do not recommend it for use with younger children. However, our data supports the use of VIEW with students at the middle- or senior-high levels or older, as well as use with adults.

6. To date we have not found any limitations regarding use of VIEW based on occupation, gender, ethnicity, or cultural factors. We recognize, however, the need for continuing research on possible cultural or ethnicity differences.

Some conclusions we believe are justified in relation to the **validity** of VIEW from these studies include:

1. Correlations of the VIEW with other measures (i.e., MBTI, KAI, PEPS, LSI, BE) showed relationships in the manner and direction anticipated on the basis of our theoretical and conceptual review and rationale. These data support the validity of VIEW for interpretations proposed for its purposes.

2. Our efforts to elaborate, refine, and articulate the theoretical and conceptual foundation for VIEW, to develop and define the concepts of Orientation to Change, Processing, and Deciding, and to ensure that the content of VIEW is consistent with the constructs expressed, support the validity of interpretations of VIEW that we have proposed.

3. The validity of the proposed uses and interpretations of VIEW are also supported by evidence pertaining to VIEW's internal structure, based on the results of the factor analyses we have conducted.

4. The constructs we have proposed to define and measure using VIEW, and the interpretations proposed for VIEW's three dimensions and six styles, also have considerable support on the basis of several other sources of evidence, including:

    a. VIEW relates clearly and unambiguously to the dimensions it purports to measure.

    b. People who receive their results also report that "the results are an accurate reflection of their style preferences."

    c. The results of parent surveys regarding the accuracy of their child's response to VIEW indicated that the results were congruent with their observed style.

    d. Experimental evidence indicates that providing information about VIEW results and their implications can have a significant, positive impact on problem-solving performance by adolescent subjects in a team-based creative problem-solving program.

    e. There is qualitative support for the effectiveness of applications of VIEW in both educational and business settings.

5. The supporting evidence for the construct validity of VIEW also includes the item development, analysis, and revision procedures we followed, in relation to theoretical concepts and quantitative item analysis.

We believe, then, that VIEW demonstrates evidence of reliability and validity. However, we are actively involved in continuing research and development with the instrument. We continue to conduct quantitative or qualitative investigations of the reliability or validity of VIEW, predictive validity studies, long-term investigations, experimental studies by researchers, and action research by practitioners.

Finally, a much earlier version of VIEW's technical manual was submitted to the *Buros Institute of Mental Measurements* for review. Staal (2007: 835) summarized his review by stating:

“The developers of VIEW have taken a complex and dynamic construct (creative problem solving, problem-solving style) and attempted to dismantle it into three component dimensions (OC, MP, and WD). They have done an admirable job in refining the instrument over time, validating their structural model, and providing adequate validation support.”

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