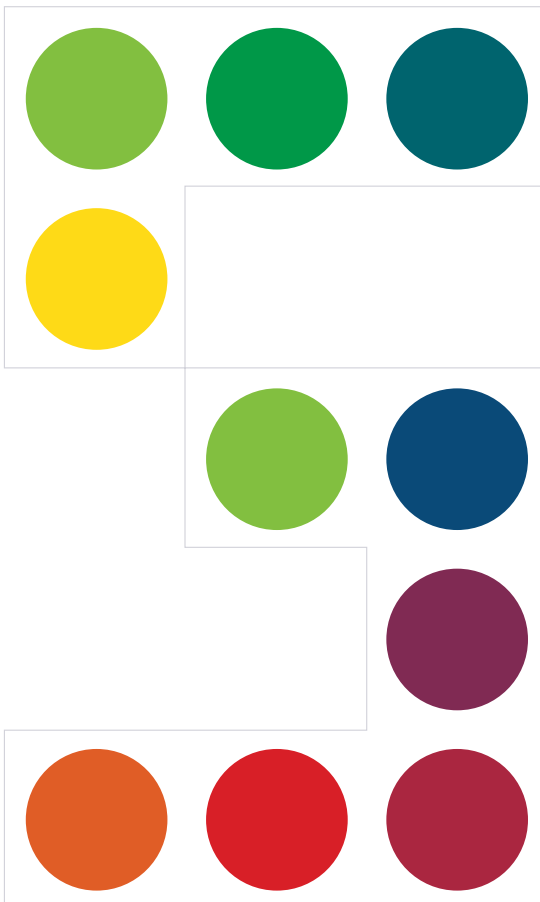


Facet5

••••• **Reliability
and validity**



Contents

Reliability	3
Stability of Facet5	6
Internal Consistency of Facet5	8
Summary	9
Validity 10	
Construct validity	12
Facet5 and 16PF – n = 193	12
Facet5 and 16PF – n = 131	14
Facet5 and FIRO-B	15
Facet5 and the Kirton Adaption – Innovation Scale (KAI)	18
Facet5 and OPQ32n	22
Facet5 and Core Self Evaluation scale	26
Facet5 and Strategic Leadership Review (3DV)	34
Facet5 and Career Anchors	38
Facet5 and a custom 360	40
Facet5 and SPQ Gold	42
Concurrent or predictive validity	51
Graduate Scientists	52
Account managers – finance	53
Call Centre Operators – inbound	54
Recruitment consultants	56
Trainee accountants	58
Management assessment centre	59
Executive assessment centre	60
Comments from inter-departmental survey	63
References & notes	65

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Reliability

Reliability can mean two things. First it means that the questionnaire will give similar results each time it is used on the same person. Second, it can mean that the items in the questionnaire measure what they are supposed to measure consistently i.e. that they are a fair and even sampling of the domain. The first of these which is perhaps the most intuitively obvious, is usually called test-retest reliability. Also sometimes Dependability if the time between the first and second testing is short or Stability if the time is longer. The second is sometimes called Consistency. These two are fundamentally different but the term Reliability is used for both.

A profile like Facet5 is only useful if the information it gives is generally reliable. If a person completes the questionnaire a second time will they come up with broadly the same scores? More importantly will the results be interpreted in broadly the same way and would similar conclusions be drawn?

There are many technical definitions of reliability each of which is subtly different from the others. For example:

Consistency

Consistency is actually a measure of the way the profile is constructed. Put simply, once the domain has been conceptualised, Consistency tells you whether the items are a fair and even reflection of the domain. It is important because the response to any individual item is made up of the respondent's genuine position on the scale plus an element of error. And we rarely know how much error is attached to any individual score. But if a response to an item contains a high proportion of error, and if that item is a major contributor to the overall score, then the score will be overly affected by the error. But if the item is no more important than any other item, then the effect of error will be less. That is what Consistency measures – how evenly do the items contribute to the overall score. Or how sensitive is the overall score to each individual item.

Coefficient Alpha and Split Half reliability

The most common measures of Consistency are Split Half and Cronbach's Alpha.

To compute Split Half consistency we divide the test into two halves and calculate scores for each scale based on only half the items - are they similar? This tells us whether the important items are evenly spread throughout the questionnaire. (If there is an unequal number of items in each half there are adjustments to be made to balance them up.)

However there are numerous ways that a set of items can be split in half. You can take the first half and compare them to the second half. You can split the list into odd and even numbers. Each of these different splits may produce a slightly different reliability coefficient. To get around this Cronbach (1951) created a new measure which is the equivalent of splitting the item set in every possible way and computing the correlation coefficient at each step. This has become known as Cronbach's alpha or just α . This technique is widely accepted as the most useful measure of reliability.

Test developers use α 's to decide which items to include when they construct a scale. The full calculation of α for a scale also shows how the individual items contribute to the scale and what would happen if it was removed. They are an essential part of the continuing review of any psychometric instrument.

Dependability, stability or test – retest reliability

This is the concept that makes most practical sense. It is common to be asked:

If I do it again will I get the same results?

There are number of factors that can influence this. The most obvious and significant is the time between the first and second administration. If the time delay is very short (say a week or two) then you would expect the person to be in a similar frame of mind and not to have changed his/her core views very much. Therefore the results should be quite similar. This has therefore been called 'dependability' rather than reliability. If the time frame is longer the term used is Stability. But they are the same thing and measured in the same way. You simply compare the scores at the first and second sitting. But there are factors other than the questionnaire itself that can affect the test-retest results. Many reported test-retest results are artificial. A group of students will be asked to complete the questionnaire twice just to test it. With Facet5 we have tried to avoid such an artificial sample and to capture retest data from the real world.

People complete Facet5 twice for any number of reasons including:

- Mistake – they forgot that they had done it before. This is not uncommon with selection candidates.
- Deception – they just want to see if they can sneak a 'better' set of scores. Again selection candidates are more likely to try this especially if they were not appointed the first time - they may believe that the Facet5 profile influenced the decision.
- Interest – they want to see if they've changed in some way since the first time.
- Time – it has been a long time since they did it the first time and we wanted to work with more up-to-date information. This would normally be the case if we knew that a person had completed it more than 3 years previously.
- Mischief – they want to see if they can move the scores in a specific direction. This is often the case with observers on assessment and development programmes where Facet5 is being used and they have a little spare time.

In an ideal world we would like to see a sample of people who completed the questionnaire and then had nothing to do with Facet5 until they were asked to complete it again at least year later. This doesn't happen. Again in a perfect world we would like to have nobody who was 'playing' with the data or attempting to deliberately distort it. In our samples we knew we had people from each of these groups – we were not always sure who was who.

Each of these approaches to evaluating Reliability yields a statistic that is a type of correlation co-efficient. Therefore the figures produced can range from 0 to 1. (Negative reliability statistics are conceivable but would make for interesting interpretation.)

What is acceptable reliability?

There are different opinions as to what is acceptable for a reliability coefficient and to some degree it depends on what is being measured. For a ruler you would really look for a Dependability/Stability of 1.00. You really don't want to get different measures each time. For height it might be a little less reliable because people grow taller if they are young and shorter as they age. But in the short term you wouldn't expect much variation. Kline (1999)¹ suggests that the acceptable level of Consistency as measured by Cronbach's α is 0.7. He also suggests it might be higher for constructs like intelligence. This is widely accepted. But even Kline suggests that there can be situations where lower values are acceptable.

For example the 16PF reports some much lower Consistencies (α) as a result of taking a very broad domain definition policy. To understand this, consider the situation where a test asks the same question 10 times. You would expect the same answer 10 times and as a result the Consistency would be perfect. It would score 1.0. But it would be a very narrow definition of the scale. Most tests ask a broad range of questions that relate to the core factor. As the questions range further from the core so the Consistency will drop. So a lower Consistency can in fact be a deliberate act in order to broaden the measure.

To gain some perspective, the following table shows the stabilities reported by some reputable personality models:

Model	Range of reported Stabilities
15FQ	0.68–0.89
16PF	0.28–0.63
Birkman Method	0.52–0.84
FIRO – B	0.71–0.85
MBTI	0.60–0.75
NEO-PI	0.63–0.83
OPQ	0.64–0.91
OPQ Concept 5.2	0.57–0.67
Saville Wave	0.71–0.91
StrengthsFinder	0.52–0.81
DiSC	0.70–0.84

These figures are all taken from the published data. It is clear from this table that most reputable models fit within the 0.6 to 0.9 range. Too much should not be read into the 0.28 score for the original 16PF.

Stability of Facet5

We have a number of tests of the Stability of Facet5.

Original sample – 1990

The initial development sample provides a small number of people who completed Facet5 twice. The re-test reliabilities are shown below.

Factor	Stability
Will	0.84
Energy	0.85
Affection	0.81
Control	0.85
Emotionality	0.92
n = 20	

Sample from internal testing in UK company

This was another small sample of data collected from existing Facet5 clients.

Factor	Stability
Will	0.83
Energy	0.83
Affection	0.61
Control	0.82
Emotionality	0.90
n = 24	

Sample n = 107

When we amalgamated the databases that we had collected we were able to identify 107 people who had completed the questionnaire twice. Since we actually knew the circumstances of most of these we could say with confidence that the time delay was at least 3 months in all cases and as long as 3 years in some. The results are shown below.

Factor	Stability
Will	0.86
Energy	0.81
Affection	0.84
Control	0.79
Emotionality	0.85
n = 107	

Sample n = 111 – 2004

A subsequent sample following the switch to web based data collection produced the following re-test results.

Factor	Stability
Will	0.66
Energy	0.69
Affection	0.67
Control	0.74
Emotionality	0.73
n = 111	

Sample of 29 Swedish students

This analysis was in response to interest from a Swedish university who were interested in testing the re-test reliability of Facet5. 30 Students took part but one of them only completed Facet5 once. The re-test reliabilities are in the table below:

Factor	Stability
Will	0.85
Energy	0.87
Affection	0.86
Control	0.60
Emotionality	0.74
n = 29	

Internal Consistency of Facet5

We have had the opportunity to compute the internal Consistencies for Facet5 on many occasions. In these tables, all computed values are Cronbach's α .

English language versions

Development sample

n = 693	Will	Energy	Affection	Control	Emotionality
Coefficient α	.75	.71	.80	.78	.81

Later sample n = 240 UK respondents

n = 240	Will	Energy	Affection	Control	Emotionality
Coefficient α	.66	.75	.77	.78	.75

Larger sample created in 2004 from web based data collection

n = 6534	Will	Energy	Affection	Control	Emotionality
Coefficient α	.68	.71	.77	.74	.74

Large sample created in 2004 from web based data collection

n = 7430	Will	Energy	Affection	Control	Emotionality
Coefficient α	.75	.74	.77	.74	.74

Translated versions

Brazilian data n = 3503

n = 3503	Will	Energy	Affection	Control	Emotionality
Coefficient α	.62	.63	.65	.66	.70

This was a sample of people from Brazil who completed the questionnaire in Portuguese. Most of them were first year students at Fundação Dom Cabral, a leading business school.

Danish data n = 790

n = 790	Will	Energy	Affection	Control	Emotionality
Coefficient α	.71	.71	.74	.72	.75

These results are for 790 people who completed Facet5 in Danish

German data

n = 1186	Will	Energy	Affection	Control	Emotionality
Coefficient α	.57	.72	.70	.65	.75

These results are for 1186 people who completed Facet5 in German. The lower figure for Will appears to be linked to a small number of items which need to be retranslated.

Japanese data 2007 n = 393

n = 1186	Will	Energy	Affection	Control	Emotionality
Coefficient α	.73	.72	.70	.71	.75

A sample of people who completed Facet5 in Japanese in 2007.

Summary

It can be seen from all these tables that the internal consistency of Facet5 (Cronbach's α) are at or above the expected level of 0.7 in almost every case. Facet5 is a dynamic model and is under constant development. These analyses are used to assist this development.

Validity

It is not sufficient for a test to be reliable. For example it is conceivable that a test could consistently report that a person was stunningly attractive to the opposite sex but without some independent corroboration it may be dangerous to proceed to implement a plan based on it. To determine whether a set of results will be of use they must also be **valid** i.e. they must actually mean what they imply.

As with reliability, there are many ways of telling whether a test is valid². However those that would appear to be most important for practitioners are:

Face validity

Face validity refers to the external view of the process or model, i.e. Does it look as if it is going to give the information required. While this is a non-statistical measure, it is still vitally important for personality measures. This is because personality measures rely on the integrity of the respondent and if the person has no faith in the process, then it is unlikely they will take it seriously.

Facet5 has attempted to ensure face validity in three ways:

- 1 to only use work based language
- 2 to avoid the use of idiom or slang as far as possible
- 3 to use an item structure which is not obvious thereby making it difficult to identify so-called 'correct' responses.

Construct validity

Construct validity refers to the degree to which the model is felt to measure the theoretical characteristic (or 'construct') which it says it is measuring. Facet5 has attempted to ensure construct validity by thorough research into the field of personality theory and other people's findings. For example if Facet5 attempts to measure the construct of 'Will', does it seem to exist as a similar factor in other people's work?

Content validity

Content validity is a very important concept since it demands that a personality model should make sure it is covering the whole domain of the factors it claims it is measuring. A good example would be 'Will' where it is known that stubbornness, commitment and independence are all aspects of 'Will'. Content validity is the degree to which the model covers the domain or 'content' of the factor under discussion. For example, some questionnaires measure Emotionality entirely by the element of 'Confidence'. While Confidence is certainly an element within the domain of Emotionality, it is by no means the whole domain. Such issues as anxiety, optimism, and physical reactions are also part of the domain and must be included. Facet5 attempts to cover this important domain very broadly. The domains covered by Facet5 can be seen in the description of the the model.

Concurrent or predictive validity

These are similar concepts in that they both ask whether the model predicts some specific outcome. For example if Facet5 states that a person has scored very high on 'Will' then this should be recognised in some other, independent way. For example a third party could be asked to give independent ratings of the respondent on behaviours which are known to relate to Will. If the ratings agree then the construct can be said to have predictive or concurrent validity.

More often people use the term to mean the degree to which test scores can predict a particular outcome. If, for example, sales performance is measured and then compared to Facet5 profiles, this would be a measure of concurrent validity. If the profiles were collected but no action taken until data on job performance was available this would be referred to as predictive. The two terms are very similar but the subtle difference is important.

Predictive and Concurrent validity can only be established through studies where a specific outcome was required. This outcome may be a reduction in staff turnover, increased sales success or something similar. For examples of Facet5 in this type of application users should refer to the authors where such studies are available or to the **Facet Live** section of the Facet5 web site. Studies are continuing on a regular basis and are published as they become available.

To evaluate the construct validity of Facet5 we have compared Facet5 results to results obtained on a number of other models. These studies are shown below.

Correction for unreliability

Raw validity coefficients were corrected for attenuation due to unreliability in both predictor and criterion using the formula $R_{xy} = r_{xy} / \sqrt{r_{xx} r_{yy}}$ and using the reliability estimates as follows:

Element	Will	Energy	Affection	Control	Emotionality	Supervisors rating
Reliability	0.75	0.71	0.8	0.78	0.81	0.6

The estimate for rater reliability (0.6) follows advice in the literature although some have suggested this may be actually too high.

Construct validity

The construct validity of Facet5 is confirmed by numerous studies comparing scores on Facet5 with concurrent scores on other tools. Data for these studies is provided by our own business partners around the world. This data appears in many different formats and lends itself to a variety of analytical methods. The following studies are indicative.

Facet5 and 16PF – n = 193

The 16PF was created by Raymond Cattell after much research and still stands proud as a respected measure. It measures, as its name implies, 16 Personality Factors. The relationship between Facet5 and these 16 factors is shown in the following table. The figures shown are correlation coefficients and as such can vary from 1.00 meaning there is a perfect relationship between the Facet5 scores and the 16PF scores through to -1.00 meaning that there is a perfect but inverse relationship. Correlations of around 0.0 indicate that there is no link between the two sets of scores at all.

Correlations between Facet5 and 16PF n = 193

16PF Reliabilities			Facet5 reliabilities				
			0.75	0.71	0.8	0.78	0.81
16PF Primary Factor		Will	Energy	Affection	Control	Emotion	
0.80	A	Cool – Warm	0.02	0.44	0.04	0.29	-0.14
0.43	B	Intelligence	0.04	-0.16	-0.05	-0.36	0.20
0.66	C	Emotional – Calm	0.09	0.20	0.14	0.15	-0.48
0.65	E	Submissive – Dominant	0.47	0.41	-0.28	-0.04	-0.14
0.74	F	Sober – Enthused	0.30	0.74	-0.12	-0.09	-0.19
0.49	G	Expedient – Conscientious	-0.01	-0.08	0.29	0.72	0.04
0.80	H	Shy – Bold	0.24	0.71	0.04	0.20	-0.46
0.85	I	Tough – Tender	0.03	-0.16	0.09	0.05	0.02
0.75	L	Trusting – Suspicious	0.21	-0.06	-0.51	-0.08	0.19
0.67	M	Practical– Imaginative	0.29	0.01	0.05	-0.46	-0.09
0.35	N	Natural – Calculating	-0.28	-0.37	0.18	0.67	-0.07
0.70	O	Assured – Apprehensive	-0.18	-0.31	-0.09	-0.12	0.55
0.50	Q1	Conservative – Liberal	0.36	0.20	-0.21	-0.33	-0.11
0.37	Q2	Group – Individual	-0.05	-0.76	-0.26	-0.46	0.37
0.36	Q3	Undisciplined – Controlled	-0.06	-0.05	0.04	0.68	-0.19
0.66	Q4	Relaxed – Tense	0.01	-0.06	-0.15	-0.38	0.45

Note that these correlations are corrected for reliability. The reliability estimates used are shown in the table. From this table the meaning of the Facet5 factors can be easily extracted.

- W+ people are Dominant , Liberal Minded
- E+ people are Warm, Outgoing, Group Oriented but also quite Dominant and Enthusiastic.
- A+ people are trusting
- C+ people are Conscientious, Practical, Controlled and Calculating (in a social sense).
- Em+ people are Tense, Apprehensive, Emotional and socially awkward.

Clearly Facet5 and the 16PF are measuring largely similar characteristics. To further assess the similarity between Facet5 and the 16PF we subjected the latter to a Principle Components analysis of the 16 Primary Factors. The first step is to correlate the 16 factors among themselves and to see which are related. Factor analysis then groups the items according to this interrelationship. This analysis clearly indicated that five factors would seem to be a good solution for this 16PF data. (For the statisticians among you there were five factors with eigenvalues greater than 1.00 and the scree curve takes a marked break at that point. Therefore 'little jiffy' says 5!) The meaning of these factors is shown in the table below.

Factor analysis of 16 PF

Factor	Items	Loading	Description	Facet5 factor correlating
Factor 1	Q4	0.78	Tense	Emotionality
	O	0.74	Apprehensive	
	H	0.65	Shy	
	C	0.76	Emotional	
Factor 2	A	0.79	Warm	Energy
	F	0.60	Enthused	
	Q2	-0.66	Group	
Factor 3	E	0.79	Dominant	Will
	Q1	0.66	Liberal	
	L	0.49	Suspicious	
Factor 4	G	0.63	Conscientious	Control
	Q3	0.60	Controlled	
	N	0.48	Calculating	
Factor 5	M	0.38	Imaginative	Affection
	I	0.87	Tender	

This table shows that the relationship between Facet5 and the 16PF is very clear and all in the expected direction.

Facet5 and 16PF – n = 131

The second sample contained 131 profiles collected by a consulting organisation in Adelaide, South Australia. There were 74 males and 55 females. They were predominantly assessed for development/guidance purposes. The relationship between Facet5 and the 16PF results is shown in the table below.

Correlations between Facet5 and 16PF

16PF Reliabilities			Facet5 Reliabilities				
			0.75	0.71	0.8	0.78	0.81
16PF Primary Factor		Will	Energy	Affection	Control	Emotion	
0.80	A	Cool – Warm	0.09	0.51	0.09	0.03	-0.37
0.43	B	Intelligence	0.07	-0.03	-0.04	-0.42	0.04
0.66	C	Emotional – Calm	0.06	0.29	0.05	0.21	-0.71
0.65	E	Submissive – Dominant	0.67	0.63	-0.47	-0.16	-0.12
0.74	F	Sober – Enthused	-0.09	0.65	0.05	0.03	0.01
0.49	G	Expedient – Conscientious	0.24	0.27	0.13	0.89	-0.23
0.80	H	Shy – Bold	0.23	0.69	0.18	0.18	-0.39
0.85	I	Tough – Tender	-0.38	-0.29	0.49	0.08	0.35
0.75	L	Trusting – Suspicious	0.18	-0.04	-0.38	-0.28	0.25
0.67	M	Practical – Imaginative	0.10	-0.13	0.00	-0.23	-0.26
0.35	N	Natural – Calculating	-0.58	-0.60	0.33	0.19	0.30
0.70	O	Assured – Apprehensive	-0.25	-0.32	0.01	-0.01	0.66
0.50	Q1	Conservative – Liberal	0.56	0.07	-0.51	-0.46	-0.09
0.37	Q2	Group – Individual	0.19	-0.74	-0.34	-0.08	0.41
0.36	Q3	Undisciplined – Controlled	-0.36	-0.09	0.36	0.81	-0.35
0.66	Q4	Relaxed – Tense	-0.02	-0.28	-0.20	-0.15	0.74

Note that again these correlations are corrected for reliability. The reliability estimates used are shown in the table. In this study the following emerged:

- Will equates to Dominant, Natural and Liberal
- Energy equates to Warm, Dominant, Enthused, bold, Natural and Group
- Affection links to Submissive, Tender, Conservative
- Control links to Conscientious, Conservative and controlled. It is also linked to less Intelligent
- Emotionality links to Emotional, Apprehensive and Tense with a much lower link to Individual

Facet5 and FIRO-B

A sample of 138 people completed both Facet5 and the FIRO-B as part of assessment for either specific job applications or for career development. The sample contained 40 females and 98 males. The tables below show the relationship between the FIRO-B scores and Facet5.

Correlations corrected for attenuation

	Will	Energy	Affection	Control	Emotionality
Expressed Inclusion		0.58	0.34		
Wanted Inclusion		0.57			
Expressed Control	0.47	0.52			
Wanted Control					0.34
Expressed Affection		0.55	0.38		
Wanted Affection		0.50	0.39		

Correlations with an absolute value < 0.3 are suppressed for clarity. Correlations are corrected for unreliability.

It is clear that Will, Energy and Affection have a complex effect across most of the FIRO-B elements. Control is less involved although this is not surprising when we look at the description of the FIRO-B elements. We can get a better picture when we look at the interaction between the two tools.

Predicting FIRO-B scores from Facet5

Given the obvious relationship between the two tools it is likely that we can predict one from the other. To test this we conducted 6 regression analyses where the dependent variable was the FIRO-B element and the independent variables were the Facet5 sub-factors. In each case the Facet5 factors were entered stepwise with f-enter set at 0.05 and f-remove at 0.1. The results were:

Inclusion Expressed (Ie) Multiple R = 0.619 Sig = 0.000	People who want to involve others tend to be more sociable and less confrontational.
Inclusion Wanted (Iw) Multiple R = 0.561 Sig = 0.000	People who want others to involve them are sociable, tend to worry a bit more and again avoid confrontation
Control Expressed (Ce) Multiple R = 0.56 Sig = 0.000	People who want to assume responsibility themselves are more enthusiastic and less helpful towards others.
Control Wanted (Cw) Multiple R = 0.397 Sig = 0.05	People who are happy for other people to assume control are more anxious and dependent
Affection Expressed (Ae) Multiple R = 0.627 Sig = 0.000	People who like to become involved with other people on a personal level are sociable, more dependent, idealistic but can be critical of others
Affection Wanted (Ai) Multiple R = 0.565 Sig = 0.000	People who need others to become close to them are more sociable and dependent.

FIRO-B – reduced structure

Recent studies have suggested that in fact there are only two factors present in the FIRO-B: One was called Dominance and is made up of Expressed and Wanted Control while the other has been called Socio-Emotional Affect which has everything else in it. (Mahoney, 2005), (J. Dancer, 2006). We tested our data in the same way and produced the following results.

Eigenvalues

These were extracted following a principle Component analysis followed by a Varimax rotation to retain an orthogonal solution.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.53	42.1	42.1%
2	1.09	18.1	60.2%
3	0.94	15.7	75.9%
4	0.63	10.4	86.3%
5	0.46	7.6	94.0%
6	0.36	6.0	100.0%

This table suggests that two factors will account for 60.2% of the total variance. Following rotation these factors had the following factor loadings.

FIRO-B element	Factor 1 Socio Emotional Affect	Factor 2 Dominance
Expressed Affection	0.81	
Wanted Inclusion	0.81	
Wanted Affection	0.80	
Expressed Inclusion	0.75	
Wanted Control		0.75
Expressed Control		-0.70

Note that the labels applied are those suggested by Mahoney et al. Factor loadings lower than 0.3 have been suppressed for clarity.

Correlation of FIRO-B factors with Facet5

Facet5 Factor	Computed FIRO-B Factor	
	Factor 1 Socio Emotional Affect	Factor 2 Dominance
Will	-0.211 (sig 0.01)	-0.358 (sig 0.000)
Energy	0.531 (sig 0.000)	-0.220 (sig 0.01)
Affection	0.304 (sig 0.000)	0.163 (sig 0.05)
Control	0.030 (sig 0.728)	0.070 (sig 0.411)
Emotionality	-0.075 (sig 0.379)	0.272 (sig 0.001)

From this it is clear that Will is the main contributor to the second factor labelled Dominance. Energy and Affection are the main contributors to the factor labelled Socio Emotional Affect.

Facet5 and the Kirton Adaption – Innovation Scale (KAI)

This data emerged from a large scale assessment centre run by a global consultancy across Asia. Participants were at least Senior Managers, and mostly General Managers and above. They were not all graduates although many were. They were from various disciplines. This data is collated from a number of assessment centres which were conducted as part of a major integration project linking three large corporations. The total number of people who were evaluated through the assessment centres was 283. However not everybody completed each element. The breakdown can be seen in the table below.

Cases	KAI	Facet5
Valid	83	280
Missing	198	3

As can be seen, nearly all rated participants completed Facet5 (280) but fewer people completed the KAI. This meant we had 83 cases of data for comparison.

Facet5 descriptive statistics

The descriptive statistics for the Facet5 main factors is shown below:

Facet5 Main Factors (n = 280)	Minimum	Maximum	Mean	Std. Deviation
Will	1.0	10.0	5.9	1.9
Energy	1.0	10.0	5.1	2.0
Affection	1.0	10.0	5.7	1.8
Control	1.5	10.0	6.7	1.6
Emotionality	1.1	9.9	5.6	1.7

It can be seen that this sample is very close to the theoretical distribution in all factors except for Control. This group is slightly more disciplined and dutiful than the average.

Facet5 sub-factors

At the sub-factor level the descriptive statistics are as follows:

Facet5 sub-factors (n = 280)	Minimum	Maximum	Mean	Std. Deviation
Determination	1	10	7.6	2.0
Confrontation	1	10	4.1	2.1
Independence	1	10	5.9	2.4
Vitality	1	10	4.9	2.2
Sociability	1	10	4.5	2.2
Adaptability	1	10	6.0	1.8
Altruism	1	10	5.8	1.8
Support	1	10	5.3	2.0
Trust	1.2	10	6.0	1.7
Discipline	1.4	10	6.6	1.8
Responsibility	1.5	10	6.9	1.5
Tension	1.1	10	5.9	2.0
Apprehension	1.1	10	5.4	2.0

It is interesting to see that although overall Will had a mean of 5.9, one factor, Determination, was much higher at 7.62. But conversely Confrontation was lower at 4.1. So we have a group of people who appear strongly committed but who tend to avoid directly assertive behaviour. They are also, as a group, quite disciplined and responsible with a prudent, work oriented approach.

Descriptive statistics for the KAI

In this application the KAI is scored so that high scores equate to Innovative and low scores to Adaptive. The descriptive statistics for the KAI are:

n = 83	Minimum	Maximum	Mean	Std. Deviation
Sufficiency of Originality (SO)	35	64	47.80	6.070
Efficiency (E)	9	25	15.65	3.937
Rule/Group Conformity (RO)	22	56	33.46	6.481
KAI Score	74	138	96.90	12.425

A sample mean score for the KAI is 100 so a mean of 96.9 suggests that this group is slightly more Adaptive (less Innovative) than the norm. We must remember that in this application higher scores are more innovative.

Kirton indicated in the original research for the KAI that although it is possible to extract three sub-factors from the KAI item, these sub-factors are themselves highly correlated. He suggests that this confirms the unidimensionality of the A-I concept. In our data the sub-factors correlated as follows:

Intercorrelation of KAI sub-factors

	E	RO	KAI Score
SO	.037	*.395	*.707
E		*.532	*.612
RO			*.883

* = Sig @ .00 level

A factor analysis of this produces a single overall factor.

Interaction between Facet5 and the KAI

In this study both the KAI and Facet5 showed significant links to the overall competency ratings used in the assessment centre. This should not be surprising since Facet5 is a broad personality profile and the KAI measures a psychological construct that is rooted in personality. Therefore we would expect to find a link between the two measures. This can be seen below:

Correlations between Facet5 and the KAI (N = 83)	Sufficiency of Originality	Efficiency	Rule/Group Conformity	Overall
KAI Score				
Will	*.278	-.045	*.267	*.261
Energy	†.519	*.267	*.228	†.457
Affection	.026	.066	*-.224	-.083
Control	†-.294	†-.312	†-.394	†-.448
Emotionality	†-.375	-.093	-.045	*-.236

* = Sig @ .05 level † = Sig @ .00 level

Clearly there are strong links between the KAI and all Facet5 main factors with the exception of Affection. Conversely Facet5 is linked more closely to Sufficiency of Originality, Rule/Group Conformity and the overall KAI than to Efficiency. The relationship with the Facet5 sub-factors is similar as shown below:

Facet5 sub-factor	Suff. of Originality	Efficiency	Rule/Group Conformity	KAI Score
Determination	†.337	.083	†.342	†.369
Confrontation	*.258	-.090	*.221	.213
Independence	.118	-.076	.144	.109
Vitality	†.531	*.248	.250	†.469
Sociability	†.446	†.292	.149	†.388
Adaptability	†.508	.264	*.249	†.462
Altruism	.044	.084	-.178	-.045
Support	-.010	.066	*-.247	-.113
Trust	.041	.033	*-.227	-.088
Discipline	†-.306	†-.347	†-.423	†-.480
Responsibility	*-.269	*-.264	†-.345	†-.395
Tension	-.208	-.111	.019	-.127
Apprehension	†-.441	-.046	-.106	†-.285

* = Sig @ .05 level † = Sig @ .00 level

This table clearly confirms the previous one but it also shows that the tendency to be Innovative or Adaptive is not related to Independence or in fact to Altruism in any way. One aspect (Sufficiency of Originality) is linked to Tension but the other Emotionality links are to Apprehension. With correlations of this magnitude it is likely that we could produce an estimate of KAI scores from a known Facet5 profile. By entering the KAI scores as dependent variables and Facet5 sub-factor scores as independent variables we can create regression equations to predict the KAI from Facet5. These four Regression results follow:

- 1 Predicting KAI (Sufficiency of Originality) from Facet5 Multiple $R=.664$ $p=.000$. Original people are Goal Focused, Enthusiastic, Consensual, Outgoing, Optimistic, Independent, Creative, Confident
- 2 Predicting KAI (Efficiency) from Facet5 Multiple $R=.539$ $p=.020$. Efficient people are Structured, Outspoken, Prudent, Independent thinking, and Optimistic
- 3 Predicting KAI (Rule/Group Conformity) from Facet5 Multiple $R=.609$ $p=.001$. non-conforming people are Goal Focused, Creative, Permissive, Critical and Consensual
- 4 Predicting Overall KAI from Facet5 Multiple $R=.685$ $p=.000$. Overall Innovative people are Goal Focused, Creative, Consensual, Enthusiastic, Permissive, Independent and Critical

From this it is clear that there are strong links between Facet5 and the KAI and all are in the expected directions.

Facet5 and OPQ32n

A sample of 125 people who were attending a series of assessment/development centres in a financial institution. Facet5 had been administered previously for other purposes. OPQ32n was administered as part of the centre. There were 107 cases where both Facet5 and OPQ data were available. Of these 83 were male and 24 were female.

Results

The table below shows the raw correlations between the 32 OPQ scores and the 5 main Facet5 factors. Correlations are corrected for attenuation.

Correlations corrected for attenuation

	Will	Energy	Affection	Control	Emotionality
Persuasive	0.34	0.48			-0.45
Controlling	0.36	0.59			-0.58
Outspoken	0.59	0.47			
Independent	0.82		-0.32	-0.43	
Outgoing		0.82			
Affiliative		0.73			-0.32
Socially Confident		0.77			-0.48
Modest	-0.30	-0.48			0.42
Democratic	-0.30	0.32			-0.30
Caring		0.52	0.45		-0.43
Data Rational					

	Will	Energy	Affection	Control	Emotionality
Evaluative	0.33				
Behavioural		0.42			-0.34
Conventional		-0.46		0.46	0.31
Conceptual		0.29		-0.41	
Innovative		0.39			-0.34
Variety Seeking		0.32		-0.47	-0.37
Adaptable					
Forward Thinking					-0.41
Detail Conscious				0.45	
Conscientious				0.48	
Rule Following		-0.33		0.56	
Relaxed		0.36			-0.85
Worrying		-0.74			0.92
Tough Minded					-0.39
Optimistic		0.55	0.31		-0.64
Trusting			0.53		-0.33
Emotionally Controlled	-0.38	-0.51			
Vigorous					
Competitive					
Achieving	0.54	0.81			-0.65
Decisive	0.51	0.36			

To simplify this table we can look at which OPQ factors relate to Facet5 in the table below:

Facet5 factor	OPQ scales that correlate > 0.3. (-) means negative relationship
Will	Independent, Outspoken, Achieving, Decisive
Energy	Outgoing, Achieving, Socially Confident, Affiliative
Affection	Trusting, Caring
Control	Conventional, Rule Following, Conscientious, Detail Conscious
Emotionality	Relaxed(-), Worrying, Optimistic(-), Controlling(-)

The Difference between Facet5 and OPQ32

Because of the different structure of Facet5 and the OPQ differences such as shown in the previous tables make it difficult to really understand where the two questionnaires are similar and where they are different. To try and make this clear we did a final analysis where we analysed the 32 OPQ scales and the 13 Facet5 scales simultaneously. We produced a Principle Components analysis with the number of factors constrained to 5 to match the Facet5 structure. We rotated it using a Promax rotation for additional clarity and have shown the scales with a primary factor loading > 0.5 and a secondary factor loading of < 0.4 . This can be seen in the table below.

Factor	OPQ Scale	Facet5 Scale
1	Forward Thinking(-)	Apprehension
	Achieving(-)	Tension
	Worrying	
	Persuasive(-)	
	Relaxed(-)	
	Controlling(-)	
	Innovative(-)	
	Optimistic(-)	
2	Affiliative	Sociability
	Outgoing	Adaptability
	Socially Confident	Vitality
	Caring	
3	Detail Conscious	Responsibility
	Conventional	Discipline
	Conscientious	
	Rule Following	
	Variety Seeking(-)	
4	Independent	Confrontation
	Decisive	Determination
	Outspoken	Independence
5	Trusting	Support
	Adaptable	Trust
		Altruism

This table shows a general consistency between Facet5 and the OPQ in terms of what they are measuring. There are some OPQ scales that do not link closely to Facet5 (Evaluative, Modest, Conceptual, Competitive, Behavioural, Tough-minded, Data Rational, Vigorous, Democratic,

Emotionally Controlled) although some of them can be estimated from a combination of Facet5 scores. This can be seen in the table below.

Relationship between selected OPQ scales and Facet5 sub-factors

OPQ Factor	Mult R	Sig	W1	W2	W3	E1	E2	E3	A1	A2	A3	C1	C2	Em1	Em2
Emotionally Controlled	0.55	0.00	-.127	†-.31	†-.27	†-.35	†-.36	†-.35	-.058	-.026	-.068	.188	.132	-.013	*.24
Modest	0.52	0.00	-.174	*-.24	-.155	†-.35	†-.33	†-.34	.036	.069	.005	.168	.157	*.21	†.36
Democratic	0.50	0.01			†-.27	*.21		*.24						*-.20	
Competitive	0.48	0.04													
Behavioural	0.44	0.1				v.26	*.23	†.25						*-.19	
Tough Minded	0.41	0.23												v-.31	
Vigorous	0.40	0.24			*-.20										
Evaluative	0.39	0.29			*.25										
Conceptual	0.36	0.46										v-.26	v-.27		
Data Rational	0.32	0.73				*-.20	*-.20								

* = Sig @ .05 level † = Sig @ .00 level

Interpretation

The following OPQ scales can be predicted reasonably well from a combination of Facet5 sub-factors.

Emotionally Controlled	Low Will, Low Energy, High Apprehension
Modest	Low confrontation, Low Energy, High Emotionality
Democratic	Low Independence, High Vitality and Adaptability, Low Tension
Competitive	Independence, Energy, Low Affection, Low Emotionality
Behavioural	High Energy, Low Tension

Tough Minded, Vigorous, Evaluative, Conceptual, Data Rational do not appear to relate strongly to Facet5.

Summary

As would be expected, the OPQ and Facet5 are measuring similar domains. It does appear that there are some things that the OPQ covers that are difficult to extract from Facet5.

Conversely, the OPQ seems to have a very narrow coverage of Affection which might be unfortunate in evaluating those situations where Affection is a significant factor.

Facet5 and Core Self Evaluation scale

Core Self Evaluation (abbreviated to CSE) is a construct put forward by Judge to describe a combination of Self Esteem, Self Efficacy, Neuroticism and Locus of Control. Judge suggests that CSE is a broad personality trait and has created a 12 item scale to measure it directly. Further research has demonstrated that scores on CSE can be related to a wide range of other outcomes including job performance, career decisions, job satisfaction, life satisfaction, income, response to feedback, social skills, academic achievement and entrepreneurial orientation. Many of these are variants of the common construct of positive affect and are therefore core to the field of positive psychology.

Judge has demonstrated that CSE is related to other well known personality traits such as emotionality (Neuroticism), especially as defined by people like Eysenck but he maintains that it is more than simply a construct made up of basic personality elements. He has demonstrated that predictions made from CSE scores offer incremental validity beyond that made from the traditional personality factors alone.

Nearly all research relating CSE to personality traits has been done using various versions of the Five Factor Model (FFM). In particular the Neuroticism scales have shown a significant negative correlation with CSE indicating that people who are more confident, self assured and emotionally stable have stronger CSE scores.

To collect the data the CSE items were embedded within Facet5 which enabled simultaneous collection of both CSE and Facet5 data from people who were participating in a variety of HR development processes. The sample was therefore completely from the 'wild' and no special instructions were given regarding the CSE. The general instructions suggest that respondents complete the questionnaire from a work perspective i.e they were to respond in terms of their behaviour and attitudes in a work environment.

Facet5 was scored using the standard automated process (normed linear sum) and the CSE was scored as a raw linear sum of the 12 items according to Judge's instructions.

The CSES questionnaire

The original CSES questionnaire consists of 12 statements to which the person is asked to indicate whether they agree or disagree with the statement using a 5 point scale. For example:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am confident I get the success I deserve in life					

Judge's research used this format successfully but the Facet5 questionnaire uses a semantic differential format where people are asked to choose between mutually exclusive alternatives. So Judge's 12 items needed to be converted to semantic differential format for inclusion in Facet5. Judge was contacted and gave permission for us to include the items and suggested the antonymous ends of the scales that would work in the Facet5 structure. These were coded in the Facet5 questionnaire. For example the above item was modified to produce the following:

	1	2	3	4	5	
I am confident I get the success I deserve in life						I feel I don't get the success I deserve in life

The following items were entered as measures of the CSES:

	1	2	3	4	5	
I am confident I get the success I deserve in life						I feel I don't get the success I deserve in life
Sometimes I feel depressed						I rarely feel depressed
When I try, I generally succeed						Even if I try I often fail
Sometimes when I fail I feel worthless						Even when I fail I maintain my self-worth
I complete tasks successfully						I often fail to complete tasks successfully
Sometimes, I do not feel in control of my work						I feel in control of my work
Overall, I am satisfied with myself						Overall I am fairly dissatisfied with myself
I am filled with doubts about my competence						I have few doubts about my competence
I determine what will happen in my life						I have little influence over what happens in my life
I do not feel in control of my success in my career						I am in complete control of my success in my career
I am capable of coping with most of my problems						Many of my problems are beyond my ability to cope
There are times when things look pretty bleak and hopeless to me						Things rarely look bleak or hopeless to me

These were entered into Facet5 as replacements for 12 of the 23 research items within the questionnaire. This meant that the structure of the main Facet5 questionnaire was unchanged but parallel data was collected.

Sample

The CSES items were added to the Facet5 questionnaire on both the UK and AU servers and data was collected for approximately 4 weeks across the globe. This resulted in 731 cases of data.

This sample consists of the following:

Sample by Source	Frequency	Percent
AU server	263	36.0
UK server	468	64.0
Total	731	100.0

Sample by Gender	Frequency	Percent
Male	324	44.3
Female	341	46.6
Total	665	91.0
Unknown	66	9.0
Total	731	100.0

CSES score

The CSES score was constructed by simply adding the answers given to the 12 items. 6 items needed to be reversed since they had been reversed in the original questionnaire. This gave us a scale with the following distribution:

Valid N	721
Missing	10
Mean	50.63
Std. Deviation	6.82
Minimum	22
Maximum	60

Consistency of the CSES

Judge's analysis suggests that the 12 items are internally very consistent. Across a number of samples he computed Internal Consistency figures of between 0.81 and 0.87. By any normal test these reliabilities are very high and confirm that the items certainly seem to be measuring the same underlying construct. It is important however to determine whether the change from Likert scales to Semantic Differential had any effect on this. This can be seen in the table below:

Overall Alpha = 0.86	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I am confident I get the success I deserve in life	46.44	38.796	.579	.846
I rarely feel depressed	46.75	35.208	.650	.841
When I try, I generally succeed	45.98	42.511	.474	.854
Even when I fail I maintain my self-worth	46.64	36.821	.640	.841
I complete tasks successfully	46.03	43.372	.355	.859
I feel in control of my work	46.86	38.105	.481	.855
Overall, I am satisfied with myself	46.18	40.857	.584	.847
I have few doubts about my competence	46.51	39.228	.573	.846
I determine what will happen in my life	46.26	41.485	.451	.854
I am in complete control of my success in my career	46.68	38.169	.592	.845
I am capable of coping with most of my problems	46.03	42.045	.533	.851
Things rarely look bleak or hopeless to me	46.56	37.869	.635	.842

It can be seen that the overall internal consistency is almost identical to that found by Judge et al. And there is no single item which stands out as being inconsistent in this way.

Structure of the CSES

Judge et al analysed the internal structure of the CSES items using Confirmatory Factor Analysis (CFA). Their analysis showed that the CSES really was made up of a single factor. There was some suggestion that it could be broken down into 2 or even 4 factors but there was no reason to believe that this gave more information than treating it as a single measure. We also tested the factor structure although we used simple Exploratory Factor Analysis. Using SPSS we entered the CSES items into an analysis where we allowed the factors to be rotated to see if there was a clear under structure to the items.

To determine the ideal number of factors we applied both the eigenvalue less than 1 (little jiffy) and a scree test to the data with the following results:

Little Jiffy

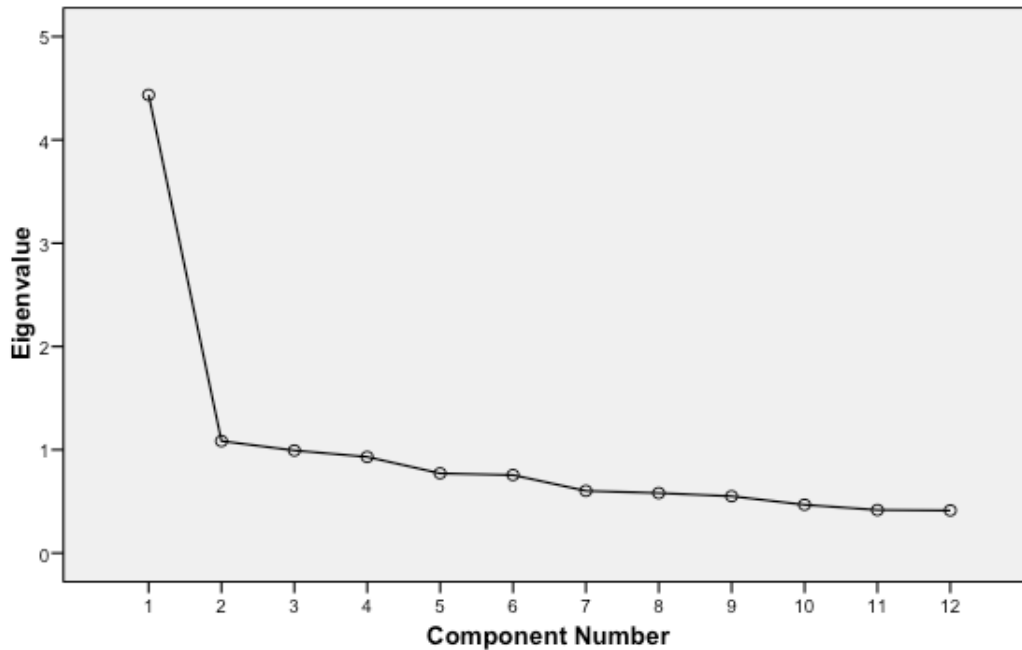
Little Jiffy is one of the simplest tests for determining the number of factors that are in a set of data. An eigenvalue is statistic that describes the amount of variation in a group of variables that can be accounted for by a particular factor. The Little Jiffy guideline says that if the eigenvalue of a factor drops below 1 then you have gone too far. The table below shows the eigenvalues for the CSES data.

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	4.435	36.955	36.955
2	1.084	9.035	45.991
3	.993	8.275	54.266
4	.931	7.755	62.021
5	.772	6.433	68.454
6	.755	6.294	74.748
7	.602	5.018	79.766
8	.581	4.840	84.606
9	.550	4.586	89.192
10	.468	3.897	93.089
11	.417	3.473	96.562
12	.413	3.438	100.00

From this you can see that the eigenvalues drop below 1 at the 3rd factor which suggests that two significant factors exist in this data. This table indicates that the first factor has an eigenvalue of 4.435 and accounts for nearly 40% of the total variance. The second factor has an eigenvalue of 1.084 and accounts for an additional 9% of the variance.

Scree test

A scree is the collection of broken rock and rubble found at the base of a cliff. The scree test is called that because the chart it produces looks like a cross section through this rock. It is an alternative test which is essentially visual. A scree chart is a plot of the eigenvalue for each factor against the factor number. The scree chart for these eigenvalues is shown below.



This test suggests that you look at the plot for a marked break or kink in the line. This chart is very clear in that there is a dramatic break after the second factor which tends to confirm the finding from Little Jiffy.

How many factors?

It would appear from both tests that we have two separate factors in the CSES items which is one of the possible solutions that Judge et al found in their data. However there is a final test which is probably the most powerful of all which is **'Does it make sense?'**

It is clear from Little Jiffy that the second factor only just scraped in. The eigenvalue was 1.084 which is close to not being included. When we examined the actual items that were loading on each of these putative factors we got the following structure. In this case we applied a Promax rotation which is specifically designed to help clarify the differences between factors. Promax is described by one of its authors, Alan Hendrickson as providing an *'Oblique Approximation to Simple Structure'*. What this means is that in a perfect world we would have 'simple structure' where an item measures and therefore loads on one and only one factor. So it would correlate 1.0 (perfectly) with the thing it was supposed to be measuring and 0.0 with everything else. But of course this never happens in the real world. So Hendrickson created Promax to provide the optimal balance between this desirable state (simple structure) and the real world where most things are linked to a greater or lesser degree.

CSES item	Factor 1	Factor 2
I feel in control of my work	.788	
Even when I fail I maintain my self-worth	.755	
I rarely feel depressed	.654	
I have few doubts about my competence	.650	
I complete tasks successfully	.637	
Overall, I am satisfied with myself	.569	
Things rarely look bleak or hopeless to me	.468	.325
I determine what will happen in my life		.914
I am capable of coping with most of my problems		.811
When I try, I generally succeed		.610
I am confident I get the success I deserve in life		.543
I am in complete control of my success in my career		.483

The numbers in the table are the factor loadings and indicate how important each item is for that factor. Note that although some of the cells in the table are blank this is because we deliberately suppressed loadings below 0.3 for clarity. So can this be interpreted? The items loading on Factor 1 would appear to relate to feelings of self worth and work success. It's a positive, optimistic factor. But then so is Factor 2. It is also about being able to cope, confidence in life and control of a career. It is therefore quite hard to see much difference between these factors. In fact they correlate 0.619 which suggests that to a large extent they are measuring the same thing.

A rational analysis of our CSES data largely confirms what Judge et al found. It is possible to extract more than one factor out of the CSES items but doing so does not really help interpretations. In fact the simplest interpretation is that the CSES items are measuring a single underlying construct which his related to being in control of your own life, being content and satisfied with where you are and having confidence that you can cope with whatever life throws at you.

The CSES and Facet5 main factors

So we now understand that the CSES is made up of 12 items which are all measuring different aspects of the same thing. So what does it relate to more broadly? Judge et al tested it against measures such as Self Esteem, Self Efficacy and Locus of Control. They also tested it against the Big 5 scales from the NEO-PI which is a well known and researched measure. Our research now focused on how the CSES related to Facet5. The correlations between Facet5 and the CSES are shown in the table below. The first column labelled CSES is the original CSES linear sum. The second is a transformed score computed by binning the CSES score in to 10% bands. This is to help counter a fairly marked skew in the data. As can be seen the transformation resulted in higher correlations in most cases.

Correlations between CSES and Facet5	CSES	CSES Binned to 10% bands
Will	†.212	†.231
Energy	†.434	†.454
Affection	*.095	*.090
Control	†.202	†.225
Emotionality	†-.637	†-.653

* = Sig @ .05 level † = Sig @ .00 level

The strongest contributor to the CSES score was Emotionality followed by Energy. People with a strong self of Self (high CSES) have lower Emotionality and have higher Energy.

The CSES and Facet5 sub-factors

We also analysed this at the sub-factor level and got the following results. Note that in this case we only show results for the transformed scores since they produced slightly higher correlations in almost every case. Therefore the pattern of relationships was much clearer.

Correlations between CSES and Facet5 sub-factors n = 721	CSES Binned to 10% bands
Determination	*.292
Confrontation	*.112
Independence	*.189
Vitality	*.447
Sociability	*.433
Adaptability	*.404
Altruism	.034
Support	*.122
Trust	*.103
Discipline	*.234
Responsibility	*.206
Tension	*-.566
Apprehension	*-.618

* Correlation is significant at the 0.01 level (2-tailed).

Again the highest correlations were for the Emotionality sub-factors with Energy contributing as well. It is clear that CSES has nothing to do with Affection or Control and little to do with Will. To test the level of contribution of each of these sub-factors we conducted a simple linear regression analysis of all sub-factors against the transformed CSES. The process was Stepwise

with $F_{(enter)} = 0.5$ and $F_{(remove)} = 0.1$. The process produced a multiple R of 0.74 (R Square = 0.55). The results of this are shown below.

Facet5 sub-factor	R	R Square	Unstandardised Coeff		Standardised Coeff		
			B	Std. Error	Beta	t	Sig.
(Constant)			4.846	.462		10.482	.000
Apprehension	0.61	0.38	-.445	.045	-.333	-9.947	.000
Sociability	0.69	0.45	.296	.036	.221	8.190	.000
Discipline	0.70	0.49	.303	.034	.223	8.812	.000
Tension	0.72	0.52	-.332	.042	-.259	-7.825	.000
Determination	0.74	0.55	.228	.034	.176	6.720	.000

From this it can be seen that there is considerable overlap between the CSES and Facet5 at the sub-factor level. The CSES can be predicted well from 5 Facet5 sub-factors. The most important is Apprehension (which is in itself a measure of emotional well being) followed by elements of the other sub-factors.

Facet5 and Strategic Leadership Review (3DV)

The Strategic Leadership Review (also known as 3DV in some areas) is a web-based questionnaire designed to provide a multi-rater review (MRR) of 3 Transformational and 4 Transactional leadership domains. Target managers view MRRs more positively when they know who has contributed to the feedback. However reviewers who know they will be identified tend to rate higher³. We chose an approach where reviewers were nominated by target managers but were anonymous in final reports.

The SLR covers 7 domains as follows:

	Domain	Description
Transformational	Creating a Vision	Visionary managers are motivating, inspiring and convincing
	Intellectual Stimulation	Making people think, re-examine their ideas - look for alternatives
	Individual Consideration	Creating an environment in which people feel valued and encouraged
Transactional	Goal Setting	Providing clear objectives for people to work to
	Performance Monitoring	Monitoring performance against the goals defined previously
	Feedback	Making sure people understand how performance matches expectations
	Development	Showing a genuine interest in and concern for others careers

Each domain is evaluated by 12 behavioural statements.

Sample

The sample was drawn from leadership programmes in the UK and Australia. These included pharmaceutical, manufacturing, banking, transportation, manufacturing and scientific research and organisations and business schools. Each target manager was asked to nominate approximately 10 reviewers from viewpoints including Direct Reports, Peers, Customers and Managers. As a result we had the following sample who had supplied SLRs.

Viewpoint	Frequency	Percent
Customer	116	4.5
Direct Report	899	35.2
Peer	963	37.7
Self	256	10.0
Manager	322	12.6
Total	2556	100.0

Descriptive statistics

Facet5 uses Sten scores (mean 5.5, SD 2) and the descriptive statistics for the five main factors are:

n = 249	Facet5 Descriptive Statistics				
Facet5 Factor	Min	Max	Mean	SD	Coeff α
Will	1.0	10.0	5.6	2.0	.75
Energy	1.0	9.9	5.5	2.0	.71
Affection	1.0	10.0	6.0	1.8	.80
Control	1.0	10.0	5.2	2.0	.78
Emotionality	1.0	10.0	5.7	1.9	.81

Strategic Leadership Review (SLR)

SLR Scores are standardised to a 1–5 scale to match the questionnaire format. For this analysis however raw scores were used. The statistics for the SLR were:

n = 247	SLR Descriptive Statistics				
	Min	Max	Mean	S. Dev	Coeff α
Vision	32	60	48.3	6.2	0.90
Intellectual Stimulation	26	60	46.3	6.3	0.86
Individual Consideration	29	60	48.1	5.7	0.90
Goal Setting	26	60	46.6	6.2	0.90
Performance Monitoring	26	59	44.8	6.7	0.89
Feedback	29	60	47.1	5.8	0.89
Development	29	60	48.1	5.8	0.91

Correlations between Facet5 and SLR self-ratings

The table below shows the correlation between managers' Facet5 scores and self ratings on the SLR.

SLR Reliability	SLR Dimension	Facet5 Factor				
		Will	Energy	Affection	Control	Emo
0.90	Vision	*0.41	*0.49	-0.03	0.09	*-0.32
0.86	Intellectual Stimulation	*0.66	*0.35	-0.15	-0.09	-0.16
0.90	Individual Consideration	-0.10	*0.25	0.25	0.20	-0.18
0.90	Goal Setting	*0.25	0.16	0.00	*0.35	*-0.26
0.89	Performance Monitoring	*0.27	0.15	0.01	*0.44	-0.20
0.89	Feedback	0.00	0.13	0.12	*0.28	*-0.24
0.91	Development	-0.02	*0.25	0.22	0.22	-0.19
	Facet5 Reliability	0.75	0.71	0.80	0.78	0.81

* Correlation is significant at the 0.001 level (2-tailed)

The SLR and Facet5 are self-report inventories and to the extent that the ratings are congruent, it demonstrates the construct validity of both tools. Indications are:

- **Creating a vision** = determined and assertive (W+), sociable and approachable (E+), more confident and stable (Em-).
- **Intellectual stimulation** = determined and outspoken (W+), involved and participative (E+).
- **Individual consideration** = communicative and sociable (E+), caring, supportive and trusting (A+), responsible (C+).
- **Goal setting** = self disciplined and responsible (C+) calm and positive (Em-), determined, assertive (W+).
- **Performance monitoring** = disciplined, responsible (C+), goal focused (W+) and self assured (Em-).
- **Feedback** = responsible, disciplined (C+) and positive (Em-)
- **Career development** = enthusiastic and consultative (E+) believers in people (A+), disciplined, responsible (C+) and positive (Em-).

The SLR asks behavioural questions directly relating to leadership behaviours. Facet5 asks a broader set of questions, some behavioural, some attitudinal, designed to cover a wider range of behaviours. In the work environment the approaches overlap and these results support this. Self ratings on Facet5 are consistent with Self ratings on the SLR providing evidence of convergent validity.

Facet5 and Career Anchors

Career or Careers? Careers Anchors is a concept first developed by Professor Edgar H Schein of M.I.T. in Cambridge, Mass., USA. According to Schein, a career anchor is a 'syndrome of talents, motives, values and attitudes which gives stability and direction to a person's career'. People conceptualise the anchor 'in terms of the major motive and value they seek to express through their career'.

Colleagues working in the Career Counselling division of a major consultancy developed a 100 item questionnaire based on Schein's model where the items are intended to help identify what kinds of criteria a person used in the past and which may be important in the future. Instructions for completion of the questionnaire included:

Think back to your recent years in your career. By what kind of criteria have you made decisions about job moves, company moves, whether or not to accept new assignments and other career decisions? Think also about the kind of criteria which are likely to be important to you as you think about future career decisions you will be making. For each question, indicate how important that criterion has been and continues to be in your career decisions.

Typical questions included:

'It is important for my work to have a routine which is fairly predictable'

Responses were collected using a 5 point Likert scale.

Sample

The sample was small and somewhat unbalanced. There were 123 cases who had completed Facet5 and of these 49 had also completed the Career Anchors questionnaire.

Results

The 100 Career Anchors items were compacted into 23 broad constructs on the basis of expert judgement. In fact Factor Analysis of the items suggests a much more parsimonious solution which is currently being investigated further as the foundation for a counselling/development model. However in the table below we are showing the correlations between Facet5 and the 23 putative Career Anchors.

Career Anchor Dimension	Facet5 Factor				
	Will	Energy	Affection	Control	Emotionality
Order	-.192	-.125	.063	†.539	.140
Power	†.493	.167	.187	*.298	-.272
Affiliation	*-.323	*.282	†.412	*.289	.153
Persuasion	*.292	*.294	.241	-.128	-.262
Creative	†.468	.174	.052	†-.392	-.136
Ego Involvement	.273	.067	-.088	†-.395	.119
Autonomy	.164	-.191	-.075	*-.297	.020
Material Reward	.036	.134	†-.436	.062	.216
Specialist or Expert	.034	.090	-.171	.028	.198
Achievement	†.379	.160	.185	.014	-.216
Variety	.203	*.320	.061	-.093	*-.328
Entrepreneurship	.275	.137	-.109	-.144	-.119
Status	.176	.106	-.011	.255	-.045
Service to others	-.021	*.291	†.502	.112	-.210
Security of Tenure	-.027	-.150	-.054	.265	-.101
Professionalism	.125	.184	.024	.267	.003
Supporting a Cause	.203	.203	†.366	.170	*-.360
Geographic Location	-.174	-.112	-.020	*-.346	.093
Status of Employer	.205	*.312	.120	.051	-.195
Task Meaning	.177	.081	.112	.069	-.164
Financial Security	.019	†-.395	.020	.207	.020
Personal Meaning	-.031	-.057	.089	.106	.037
Self Fulfillment	.205	.150	.162	-.100	.005

* Correlation is significant at the 0.05 level † Correlation is significant at the 0.01 level.

From this we can see the following:

- 1 Will is most strongly associated with a desire for Power and being Creative
- 2 Energy relates most strongly to Variety and the Status of the employer. It was negatively related to Financial Security. If the opposite of Financial Security is Financial Risk then this would suggest Energy is associated with Risk taking
- 3 Affection relates to being of Service to Others, Affiliation and Supporting a Cause while simultaneously being actively uninterested in Material Reward.
- 4 Control links broadly to a need for Order and is negatively related to Ego, Creativity and Geographic location. This might be interpreted as high Control people being happy to go wherever they are required to do a good, well defined role.
- 5 Emotionality seems to be associated with just two drivers – they do not want too much variety and have little interest in supporting a cause.

In general there is a very clear relationship between the self reported Facet5 score and the drivers that people have indicated have been influential in their career choices. Emotionality is the least clear cut of the five although it does appear that there is a desire to stay with what they know and to avoid the surprises that come from a lot of variety.

Facet5 and a custom 360

A scientific research organisation intended to create a custom 360 using a range of items some of which were extracted from a well developed 360 tool and other which were designed specifically to address key issues within the organisation. This led to 100 items in the pool. The questionnaire was delivered using the Facet5 web platform to a sample made up as follows:

Viewpoint	Freq	Pct
Customer	63	22.0
Direct Report	67	23.4
Peer	89	31.1
Self	19	6.6
Superior	48	16.8
Total	286	100.0

The following table indicates the behaviours that were correlated with high and low scores on each of the statements. Note that because the statements were presented as Likert scales, we have listed an implied antonym to clarify the negative correlations. This analysis excluded 'Self' reports; it only shows the reviews by other people. N varied slightly due to missing data but was between 222 and 226. For this sample correlations of 0.25 are significant at the 0.0001 level. Correlations of 0.2 are significant at the 0.001 level.

	Corr	
Will		
Does not challenge the status quo	0.32	Constantly challenges the status quo
Slow to challenge ideas	0.29	Quick to challenge ideas
Is not always fair and objective in comments about performance	-0.36	Is always fair and objective in comments about performance
Energy		
Does not keep good records of progress	-0.35	Keeps good records of progress
Does not enjoy telling people what the future looks like	0.32	Enjoys telling people what the future looks like
Discourages risk taking	0.29	Encourages risk taking
Affection		
Doesn't make sure people know who is responsible for assessing results	0.21	Makes sure people know who is responsible for assessing results
Doesn't ensure that the efforts of individuals and teams are coordinated	0.20	Ensures that the efforts of individuals and teams are coordinated
Does not Help people see what they need to do to develop	0.19	Helps people see what they need to do to develop
Control		
Does not keep good records of progress	0.41	Keeps good records of progress
Rarely acts on intuition	-0.29	Often acts on intuition
Does not act decisively to tackle difficult problems	0.28	Acts decisively to tackle difficult problems
Emotionality		
There were no significant correlations between these behaviours and Emotionality		

The clearest relationships are between ratings and Will, Energy and Control. Each of the related behaviours is entirely in the expected direction. Affection was also related in the expected direction (focus on helping individuals) but the relationships are not as strong. The lack of significant relationships with Emotionality is extremely interesting. For this group of scientists there was a negative relationship between every single self rating and Emotionality. The higher the level of Emotionality, the lower they rated themselves. However there was no link between a scientist's level of Emotionality and the ratings received from other people.

Facet5 and SPQ Gold

The sales field is littered with research from people purporting to identify the factors leading to sales success. Organisations such as LIMRA (the Life Insurance Marketing and Research Associations) have been researching the area for decades with considerable success. Other approaches have used existing questionnaires such as the OPQ, 16PF or even MBTI. And successful results can usually be found. Other people have taken a different approach and have developed tools which are specifically designed to predict sales success (or failure). SPQ Gold is one of these. The SPQ Gold questionnaire utilises the concept of Call Reluctance. This concept suggests that failure in a sales role is frequently linked to the inability or reluctance to prospect for sales.

SPQ Gold structure

The questionnaire presents its findings as a set of 12 'types' of Call Reluctance. In addition the process suggests that there are some other aspects which can appear to be similar to Call Reluctance but which are actually something a little different. These are referred to as 'imposters' and are related mostly to elements of goal setting and motivation. The results are presented for:

Overview

- Prospecting Brake – the total amount of energy lost to coping with prospecting rather than actually prospecting.
- Prospecting Accelerator – the amount of energy actually directed toward the goal of prospecting.

Call Reluctance Types

- Doomsayer – preoccupied with worst case scenarios
- Over-Preparer – overanalyses, under acts
- Hyper-Pro – more concerned with image than with doing the job
- Stage Fright – fear group presentations
- Role Rejection – cannot integrate with Sales Career; feels guilty
- Yelder – fears being seen as pushy or rude
- Social Self Consciousness – intimidated by upmarket clientele
- Separationist – won't mix business with friends
- Emotionally Unemancipated – won't mix business with family
- Referral Aversion – hesitates to ask for referrals
- Telephobia – fears using phone as a prospecting tool
- Oppositional Reflex – recoil, automatic criticism, cannot be trained

Call Reluctance Imposters

- Motivation Scale – the amount of physical energy someone brings to his/her career every day
- Goal Level Scale – the degree and focus of goals
- Goal Diffusion Scale – dispersing energy across multiple goals

Filters

- Impression Management – energy is devoted to trying to control the impression made on others and on the test.
- Hedging – the degree of non-committal answers to questions.
- Response Consistency – the degree of care and attention given to providing meaningful information.

Scores

For each element there are two scores given which range from 0 to 100. The first score is labelled a 'Raw Score' while the second is a 'Contrast Score'. We assume the Contrast Score is a normed score since it was labelled as relating to a Contrast Group called 'Australia: Direct Sales'

Facet5 data source

Facet5 data was collected by a recruitment consultancy and was all collected concurrently with the SPQ Gold data.

Sample

We had a total of 116 cases of concurrent Facet5 and SPQ Gold data for this analysis. This data was all from candidates applying for sales positions either with or through a recruitment consultancy. Of the 118 cases 2 contained missing data for one questionnaire or the other so the final analysis was based on the 116 cases where there was complete data. All Facet5 and SPQ Gold data was collected electronically on line.

Analysis

The analysis was done in a number of stages as follows:

Data preparation: The questionnaires were entered onto the Facet5 web-based system for processing. The raw data was then downloaded in comma delimited (.csv) format and loaded into an SPSS database for analysis.

Descriptive statistics for sample

Of the 116 cases, 83 were female and 33 male. This represents a reversal of the gender distribution usually found in most western working populations.

The Facet5 Scores for this group were as follows:

n = 116	Will	Energy	Affection	Control	Emotionality
Mean	5.2	6.8	5.9	6.3	4.8
Std. Dev	1.75	1.46	1.77	1.76	1.59
Minimum	1.0	2.7	1.0	1.0	1.5
Maximum	8.9	10.0	10.0	10.0	9.2

The SPQ Gold scores were:

n = 114	Min	Max	Mean	Std. Dev
Prospecting Brake	17	51	32.66	7.84
Prospecting Accelerator	49	83	67.34	7.84
Doomsayer	0	50	8.07	12.40
Over-preparer	0	78	36.03	13.65
Hyper Pro	0	80	45.18	14.28
Stage Fright	13	94	32.65	17.27
Role Rejection	10	57	26.53	9.70
Yielder	0	72	37.48	16.24
Social Self-Cons	0	72	15.88	16.93
Separationist	0	58	59.88	56.62
Emot Unemancipated	0	100	49.78	32.70
Referral Aversion	0	100	18.82	17.38
Telephobia	0	88	20.34	22.53
Opposition Reflex	0	25	4.98	6.42
Pros Motivation	33	100	68.12	14.80
Pros Goal Level	7	100	54.74	16.08
Pros Goal Diffusion	20	100	65.61	20.70
Problem solving	0	100	63.16	25.74
Impression Mgt	0	80	42.98	26.77
Hedging	0	90	20.39	14.47
Resp consistency	13	88	51.45	14.95

Interrelationships between SPQ Gold factors and Facet5

To assess the relationship between the two measures we conducted linear regression analyses to determine whether there were links between the two measures. The raw correlations for these analyses are shown in the table below.

n = 116	Will	Ene	Aff	Con	Emo
Prospecting Brake	-0.14	-0.44	-0.01	0.10	0.35
Prospecting Accelerator	0.14	0.44	0.01	-0.10	-0.35
Doomsayer	-0.13	-0.17	0.09	0.09	0.19
Over-preparer	0.00	-0.17	0.00	0.03	0.15
Hyper Pro	0.30	0.11	-0.05	-0.10	-0.10
Stage Fright	-0.08	-0.30	-0.04	0.03	0.28
Role Rejection	0.01	-0.15	0.02	-0.01	0.13
Yielder	-0.21	-0.24	0.16	0.11	0.16
Social Self-Cons	-0.04	-0.19	-0.37	-0.08	0.42
Separationist	-0.09	-0.14	0.03	-0.06	0.01
Emot Unemancipated	0.01	-0.26	-0.01	0.03	0.03
Referral Aversion	-0.06	-0.22	-0.01	0.04	0.18
Telephobia	0.07	0.02	-0.10	0.12	0.18
Opposition Reflex	0.15	0.00	-0.20	-0.05	0.33
Pros Motivation	0.11	0.27	0.01	0.06	-0.11
Pros Goal Level	0.00	0.00	0.08	0.28	-0.19
Pros Goal Diffusion	0.20	0.27	-0.02	-0.18	-0.03
Problem solving	0.11	0.06	-0.03	-0.16	-0.04
Impression Mgt	0.24	0.21	-0.04	-0.10	-0.15
Hedging	-0.14	-0.19	-0.06	0.03	-0.11
Resp consistency	0.31	0.12	-0.24	-0.30	0.11

For the Facet5 sub-factors the results are below:

n = 116	W1	W2	W3	E1	E2	E3	A1	A2	A3	C1	C2	En1	Em2
Prospecting Brake	-0.21	0.03	-0.15	-0.44	-0.30	-0.41	0.10	-0.03	-0.10	0.10	0.10	0.34	0.30
Prospecting Accelerator	0.21	-0.03	0.15	0.44	0.30	0.41	-0.10	0.03	0.10	-0.10	-0.10	-0.34	-0.30
Doomsayer	-0.13	-0.06	-0.12	-0.15	-0.26	-0.05	0.14	0.06	0.05	0.07	0.10	0.23	0.10
Over-preparer	-0.01	-0.01	0.02	-0.19	-0.17	-0.08	0.08	-0.05	-0.05	0.04	0.03	0.15	0.11
Hyper Pro	0.24	0.25	0.23	0.13	0.07	0.08	-0.07	-0.06	0.00	-0.10	-0.10	-0.04	-0.15
Stage Fright	-0.15	0.06	-0.09	-0.31	-0.18	-0.31	-0.09	0.02	-0.04	0.05	-0.01	0.22	0.30
Role Rejection	-0.02	0.06	-0.01	-0.16	-0.11	-0.13	0.11	-0.03	-0.03	-0.04	0.04	0.18	0.06
Yielder	-0.26	-0.03	-0.22	-0.25	-0.12	-0.27	0.19	0.16	0.10	0.14	0.08	0.19	0.09
Social Self-Cons	-0.04	0.02	-0.07	-0.19	-0.14	-0.15	-0.33	-0.34	-0.35	-0.07	-0.08	0.38	0.39
Separationist	0.03	-0.12	-0.15	-0.16	-0.09	-0.10	0.07	0.01	0.01	-0.07	-0.04	0.01	0.01
Emot Unemancipated	-0.08	0.01	0.09	-0.25	-0.16	-0.26	0.05	-0.03	-0.06	0.01	0.05	0.00	0.07
Referral Aversion	-0.12	0.06	-0.07	-0.25	-0.04	-0.28	0.05	-0.03	-0.05	0.02	0.06	0.18	0.15
Telephobia	0.04	0.15	-0.01	0.03	0.06	-0.05	0.01	-0.14	-0.15	0.11	0.12	0.15	0.18
Opposition Reflex	0.07	0.12	0.18	-0.03	-0.02	0.06	-0.13	-0.19	-0.23	-0.05	-0.03	0.32	0.28
Pros Motivation	0.15	0.03	0.09	0.22	0.16	0.32	0.03	-0.01	0.00	0.08	0.02	-0.10	-0.10
Pros Goal Level	0.04	-0.03	-0.01	0.00	0.13	-0.13	0.05	0.09	0.06	0.30	0.23	-0.04	-0.31
Pros Goal Diffusion	0.22	0.05	0.22	0.25	0.16	0.29	0.01	-0.08	0.01	-0.19	-0.15	-0.02	-0.04
Problem solving	0.04	0.10	0.14	0.06	0.01	0.09	-0.07	-0.01	0.00	-0.15	-0.16	0.00	-0.08
Impression Mgt	0.23	0.17	0.20	0.25	0.14	0.16	-0.10	-0.04	0.04	-0.11	-0.09	-0.09	-0.20
Hedging	-0.18	-0.09	-0.08	-0.18	-0.15	-0.18	0.01	-0.08	-0.10	0.03	0.03	-0.14	-0.06
Resp consistency	0.28	0.17	0.31	0.14	0.06	0.13	-0.24	-0.21	-0.21	-0.30	-0.29	0.05	0.14

As can be seen, when you look down the columns, there were many strong correlations between the two measures especially with Energy and Emotionality. Of the 12 CR types, 6 were strongly correlated with Energy overall and if you just look at E1 (Vitality – the core of Energy) the number climbs to 8. 7 were correlated with Em2 (Tension). There are other relationships between Will (especially Determination) but very few with Affection or Control. These will be examined in more depth in the next section.

Results

A few things became apparent when we started this analysis which need to be mentioned. First there appears to be a great deal of data in the SPQ Gold output. For example there are two separate measures labelled Prospecting Brake and Prospecting Accelerator. These are described as showing two completely different aspects of call reluctance as follows:

- Prospecting Brake – the total amount of energy lost to coping with prospecting rather than actually prospecting.
- Prospecting Accelerator – the amount of energy actually directed toward the goal of prospecting.

Yet the correlation between these two measures is -1.0 for this sample. This is unity and suggests that they are not measuring different things at all. One is simply the inverse of the other. If you create a variable by adding up all 12 CR types, you will get an overall score that correlates 0.929 with the Brake (and -0.929 with the Accelerator) suggesting that the Brake score is nothing other than the total of the CR Type scores.

Second it is worthwhile looking at the structure of the 12 CR Types. A Factor analysis of these 12 shows that they can be viewed as measuring 5 separate factors. This can be seen in the following table:

	Factor				
	1	2	3	4	5
Role Rejection	0.76		0.33		
Separationist	0.75			0.39	-0.32
Emot Unemancipated	0.74				
Referral Aversion	0.62	0.48	0.35		
Stage Fright		0.85			
Social Self-Cons		0.64	0.33	0.30	
Doomsayer			0.73		
Yielder			0.58		-0.46
Over-preparer	0.34	-0.38	0.47		
Telephobia				0.85	
Opposition Reflex				0.59	0.34
Hyper Pro					0.84

All shown correlations are significant at the 0.05 level or higher

The way to interpret this is to look down the columns at the elements that are linked together by the largest numbers. The correlations between each of these putative factors and the Facet5 main factors are shown below.

	Factor 1 Sales Orientation	Factor 2 Self Consciousness	Factor 3 Social Resilience	Factor 4 Socially Assertive	Factor 5 Professional Pride
Will	0.004	-0.076	-0.138	0.110	0.293
Energy	-0.306	-0.251	-0.243	-0.008	0.144
Affection	-0.046	-0.160	0.071	-0.209	-0.144
Control	-0.025	-0.020	0.114	0.026	-0.106
Emotionality	0.197	0.331	0.322	0.250	0.011

All shown correlations are significant at the 0.05 level or higher

They can be interpreted as follows:

Factor 1 – Sales orientation

This factor is made up of Role Rejection, Separationist, Emotionally Unemancipated and Referral Aversion. It is linked to Energy and Emotionality. People who are lower on Energy and higher on Emotionality will score higher on this factor. So people who are more outgoing and confident are likely to accept the sales role, be happy to mix business and pleasure and are happy to take advantage of social and family contacts.

Factor 2 – Self consciousness

The core CR types here are Stage Fright and Social Self Consciousness. As you might expect it is also linked to Energy and Emotionality in exactly the same way as Factor 1. This is fairly obvious since it suggests that people who are more self conscious, shy and modest will avoid public presentation where they can and may be intimidated.

Factor 3 – Social resilience

CR Types in this factor are Doomsayer and Yielder. Referral Aversion and Over-preparer also contribute but to a lesser degree. Again these are correlated mostly with Energy and Control. This is picking up the pessimism of high Emotionality and the tendency of the low Energy person to keep to themselves and rather wish others would too.

Factor 4 – Socially assertive

CR Types include Telephobia and Opposition Reflex. There is a small amount of Separationist and Social Self Consciousness but these are the main ones. Here we have a difference in that the Facet5 factors contributing are Affection and Emotionality. The key to this lies in the awkwardness of the Emotional high Affection person. They will actively avoid imposing on other people for their own ends.

Factor 5 – Professional pride

Finally we have a factor with a single element loading which is Hyper Pro. And there is a single Facet5 factor loading which is Will. Hyper-Pro seems to be very much about ego and image management and these are things which are very important to high Will people.

Linking Facet5 and SPQ Gold

It is possible to predict a number of the SPQ Gold elements from the Facet5 data. The best of these predictions is for the overall Prospecting Brake (and obviously Prospecting Accelerator since it is the inverse of Brake). The main CR Types that can be predicted with some confidence include:

- Prospecting Brake – low Determination, low Vitality, low Sociability, low Adaptability, high Tension and high Apprehension
- Prospecting Accelerator – Determination, Vitality, Sociability, Adaptability, Tension and Apprehension
- Doomsayer – low Sociability and high Tension
- Stage Fright – low Vitality and Adaptability with high Tension and Apprehension
- Social Self Consciousness – low Vitality, high Altruism, Support and Trust, High Tension
- Referral Aversion – Low Vitality and Adaptability, high Tension and Apprehension

Call Reluctance Imposters

- Goal Level – high Discipline and Responsibility, low Emotionality

Filters

- Response Consistency – high Determination and Independence, low Altruism, Discipline and Responsibility

The example below has been computed to demonstrate how effective this would be.

Predicting Overall Call Reluctance (Brake)

When we conducted a simple linear regression analysis it showed that the Overall Prospecting Brake (and Accelerator) can be predicted from Facet5 sub-factors. The overall Multiple Regression Coefficient was 0.64. The formula used is:

$$\text{Predicted Brake} = 41.223 + (-0.290 \times \text{Determination}) + (0.400 \times \text{Confrontation}) + (-0.099 \times \text{Independence}) + (-1.846 \times \text{Vitality}) + (0.594 \times \text{Sociability}) + (-0.720 \times \text{Adaptability}) + (1.908 \times \text{Altruism}) + (-1.162 \times \text{Support}) + (-1.213 \times \text{Trust}) + (-0.562 \times \text{Discipline}) + (1.206 \times \text{Responsibility}) + (0.727 \times \text{Tension}) + (0.208 \times \text{Apprehension}).$$

When applied to this set of data we have a variable distributed as follows:

	N	Minimum	Maximum	Mean	Std. Deviation
Prospecting Brake	114	17.00	51.00	32.66	7.84
Prospecting Brake predicted from Facet5 sub-factors	116	21.58	48.52	32.76	5.07

It is clear that the two scores are distributed in a similar fashion. The correlation between them (0.64) suggests that we should be able to predict one from the other quite well.

But can we? To test this we split the scores for both variables in to 5 roughly equal bands and cross tabulated them.

		Predicted Brake Band					
		Low 20%	Next 20%	Mid 20%	Next 20%	Top 20%	
Actual Brake Band	Low 20%	12	6	5	0	1	24
	Next 20%	7	10	6	4	1	28
	Mid 20%	3	3	7	3	4	20
	Next 20%	1	2	4	8	5	20
	Top 20%	1	2	1	6	12	22
		24	23	23	21	23	114

This table shows a strong linkage between the original Brake Scores and what we can predict from Facet5. Of the 24 people who scored in the bottom 20% on SPQ gold, 12 were predicted accurately from Facet5, 6 were put into the next band up and only 1 was completely wrong. Conversely, of the 22 people who got a top grade on SPQ Gold, 12 were identified as such by Facet5 and a further 6 were put in the next band down. Again only 1 was completely miscalculated.

Concurrent or predictive validity

These are similar concepts in that they both ask whether the model predicts some specific outcome. For example if Facet5 states that a person has scored very high on 'Will' then this should be recognised in some other, independent way. For example a third party could be asked to give independent ratings of the respondent on behaviours which are known to relate to Will. If the ratings agree then the construct can be said to have predictive or concurrent validity.

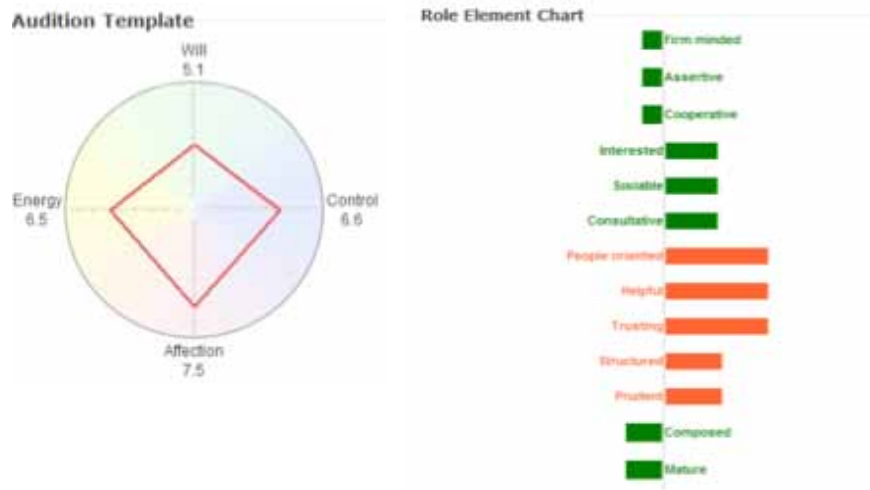
More often people use the term to mean the degree to which test scores can predict a particular outcome. If, for example, sales performance is measured and then compared to Facet5 profiles, this would be a measure of concurrent validity. If the profiles were collected but no action taken until data on job performance was available this would be referred to as predictive. The two terms are very similar but the subtle difference is important.

Predictive and Concurrent validity can only be established through studies where a specific outcome was required. This outcome may be a reduction in staff turnover, increased sales success or something similar. This document summarises some of the concurrent/predictive validity studies for Facet5.

Graduate scientists

Executive summary	A large science and technology company recruits 10–12 future managers from the graduate population every year. They needed a full Assessment Centre of which Facet5 was part. The objective was to bring on board people who were more commercially oriented than the traditional scientists they had previously employed.
Industry	Science and Technology.
Role	Graduates for a variety of roles in different business sectors ranging from Nuclear Engineering to Environmental Controls
Sample	85 Graduate Applicants
Criterion	Binary decision (Hire/Do not hire) based on pooled Observer judgements
Links to Facet5	When faced with an extensive series of job relevant tasks as in this custom built assessment centre, applicants who are significantly more Determined, Assertive and Independent Minded were better able to demonstrate the key behaviours required during this assessment centre. If they were also more Confident and Positive their case was helped further.

Audition template



It should be noted that although the Will scores were significantly higher than those within the Graduate group more generally, they are still below the population average. To have set the ideal point higher would have introduced significant culture shock which would have led to early turnover.

Results

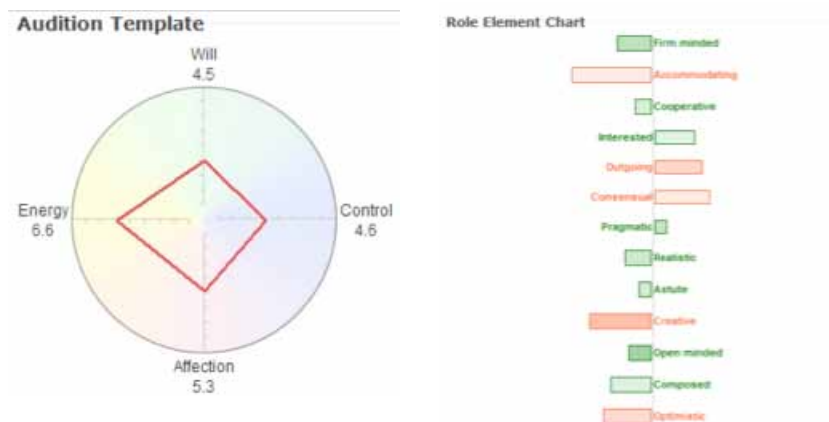
Facet5 was used as a guide to help Observers to understand and assimilate the other observations from the assessment centre. The Facet5 scores were not used as a filter for recruitment.

Account managers – finance

Executive summary	A company is undergoing a major re-structuring as a result of changes to the way it does business.
Industry	Financial Services
Role	Account managers (AMs)
Sample	149
Criterion	Individuals performance was graded into 3 bands. Band 1 – lowest had 27, Band 2 – mid had 53 and Band 3 – highest had 69 making a Total of 149. 30% were male, 70% female.

Links to Facet5 The biggest differences were in Energy and Emotionality. It is clear that higher performers (Band 3s) were higher on Energy and lower on Emotionality. This is a very common finding in sales roles where “stable Extraverts” are seen to perform better. This is also quite logical since people with this combination are more outgoing, more confident and more socially adept. They are more resilient and cope with set backs and stress better.

Audition template



Results

A template just based on the Energy and Emotionality factors produced a correlation with performance of 0.27 (0.41 corrected for attenuation – see note below), which was significant at the 0.001 level ($n = 149$). There were 35 people in the group who scored high on Energy and low on Emotionality. 24 of them were graded Band 3, 11 in Band 3. None of them was Band 1.

So, in summary, High Energy and Low Emotionality (the so-called “Stable Extraverts”) seem to perform particularly well as Account Managers. 70% of them perform at the top grade.

Note Raw validity coefficients were corrected for attenuation due to unreliability in both predictor and criterion using the formula $R_{xy} = r_{xy} / \sqrt{(r_{xx} r_{yy})}$ and using the reliability estimates as follows:

Element	Will	Energy	Affection	Control	Emotionality	Supervisors rating
Reliability	0.75	0.71	0.8	0.78	0.81	0.6

The estimate for rater reliability follows suggestions in the literature although some have suggested this may be actually too high.

Call centre operators – inbound

Executive summary A Call Centre Operator providing both inbound and outbound operations for European utilities

Industry Varied clients ranging from financial services to public utilities

Role Inbound customer service responding to calls from customers

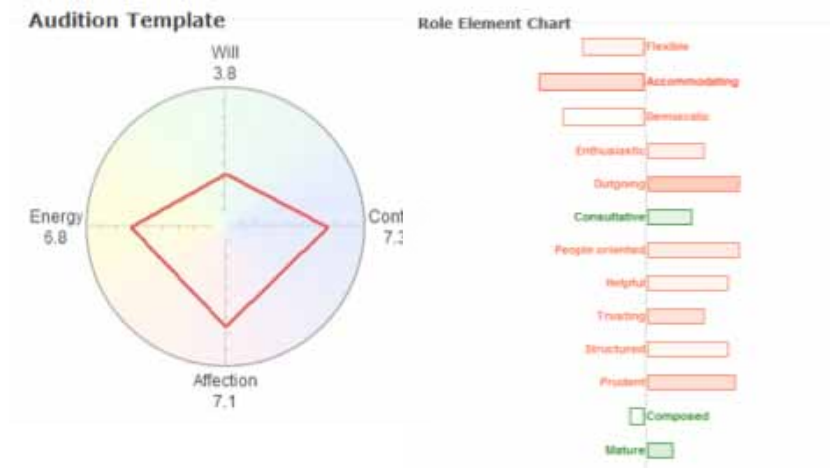
Sample 93 Customer service staff

Criterion Within the centre a group of people were identified as being “effective” performers. The structure of the sample is shown in the table below:

	Performance		
	Other	Effective	Total
Number of Staff	63	30	93

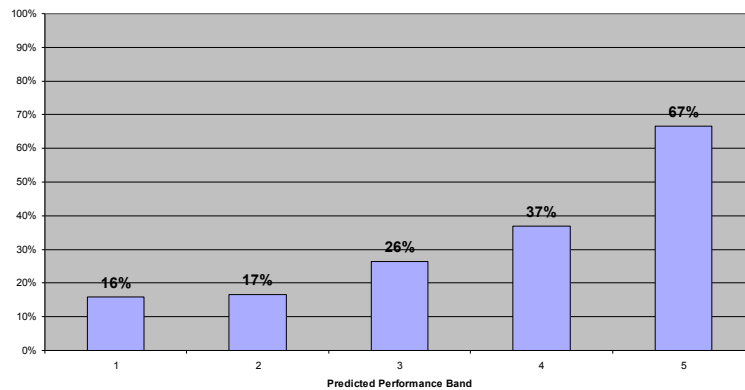
Links to Facet5 Effective performers were less independent (more team oriented), more sociable, more supportive, more self disciplined and work oriented.

Audition template



Results

% "Effective"



Using this approach during recruitment adds to the power of the selection process significantly. The baseline success rate is 32% (30 out of 93). Applying Facet5 at the beginning of the selection process and focussing on people in Service Bands 4 and 5 lifts the success rate to 52% (average of 37% and 67%), an improvement of 73%.

Department store managers

- Executive summary** A major high street retailer used Facet5 as part of a management training programme. Respondents were 36 department managers in UK stores.
- Industry** Retail department stores
- Role** Trainee Department Managers
- Sample** 36 managers
- Criterion** Supervisors ratings
- Links to Facet5** The mean scores are shown in the table below.

n = 36	Minimum	Maximum	Mean	Std. Dev.
Performance	1.00	2.00	1.45	0.50
Will	1.29	10.00	5.40	2.19
Energy	1.00	9.41	5.69	1.80
Affection	1.00	10.00	5.75	2.25
Control	2.92	9.71	6.23	1.65
Emotionality	1.12	8.82	5.16	1.82

Mean scores across the factors were not significantly different between the high and low performing groups except for Emotionality. However, the standard deviations were. The organisation has a reputation for enforcing specific modes of conduct and behaviour upon its managers and it was possible that extremes of any sort were not being seen as effective. It was thought likely that there was a stereotypical expectation and people who did not meet this expectation were rated as less effective.

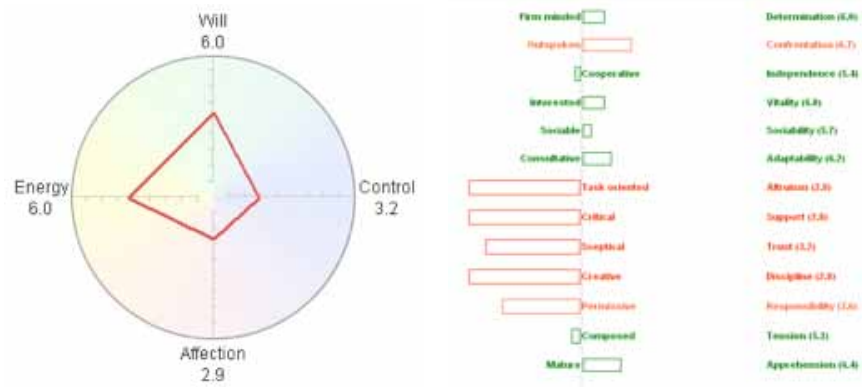
A metric (Euclidean D2) was constructed to identify those managers whose profiles were very different from the average of the higher rated group. The correlation between this measure and the supervisors ratings was -0.32 ($p=0.05$). Each person was then given a score which indicated how similar or dissimilar he/she was to the top rated group. A t-test of the differences between the group means on this measure produced the following result:

	Mean	Std Dev
Good Performers	10.3	6.8
Poor Performers	19.7	18.2
t=2.1 df=34 prob =0.045		

This table confirms that managers who are very different from the "norm" are unlikely to be rated as good performers by their supervisors.

Recruitment consultants

Executive summary	A recruitment consultancy wanted to identify the key attributes of top performers. Results showed is that people are more likely to succeed if they are Business Like and astute, if they are quite tough and challenging. They respond to changes and rely less on rules and procedure. They are more entrepreneurial.
Industry	A nationwide recruitment consultancy with offices in all Australian states specialising in the technology and finance industries.
Role	Individual recruitment consultants with a strong performance ethic.
Sample	106 Recruitment Consultants. The sample included 29 males and 67 females.
Criterion	Within the centre a group of people were identified as being "effective" performers. There were 30 Top performers, 55 Mid Performers and 26 Low performers.
Links to Facet5	It was the Affection and Control scores that proved significant. In particular four sub-factors that differentiated between the Low performers and those who were either Mid or High Performers. They were: <ul style="list-style-type: none"> • A1 (Altruism) Lower is better • A2 (Support) Lower is better • A3 (Trust) Lower is better • C1 (Discipline) Lower is better

Audition template**Results**

We created a similarity index based on these scores to predict performance. This index was recoded into five “performance bands”. Of the people who were graded into Performance Band 5 (least similar to the Low performers therefore most likely to succeed) none was actually a Low Performer. This compares with 19% in the group as a whole who were Low performers. At Performance Band 4, only 5% proved to be Low Performers.

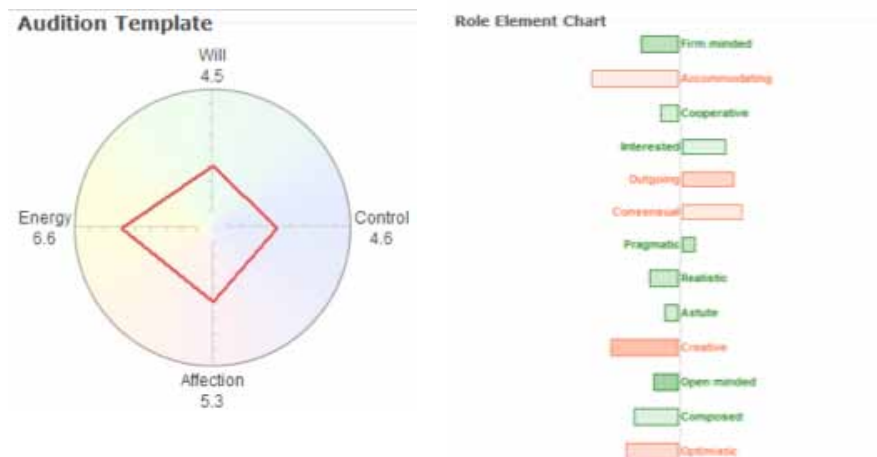
At the other end of the scale, those who were graded Performance Band 1 (Least likely to succeed), 40% proved to be Low performers. Had we just chosen 106 people at random we would expect 19% of them to end up not performing well. So the Facet5 template identified double the expected rate of poor performers.

The correlation between the key Facet5 factors and rated performance was -0.25 (-0.36 corrected for attenuation) which is significant at the 0.01 level.

Trainee accountants

Executive summary	Graduate applicants to a large firm of Chartered Accountants were given Facet5 during the selection stages as part of the selection process. It was incorporated into a one-day assessment centre but, although the data was collected it was not used during the decision making.
Industry	Professional Services - Accounting
Role	Trainee Accountants
Sample	76 in total. 42 were Male, 23 Female, balance unknown
Criterion	Individuals were graded according to their exam performance. 51 passed their exams, 25 failed.
Links to Facet5	The biggest differences were in Will and Energy. People who passed their exams scored higher on both.

Audition template

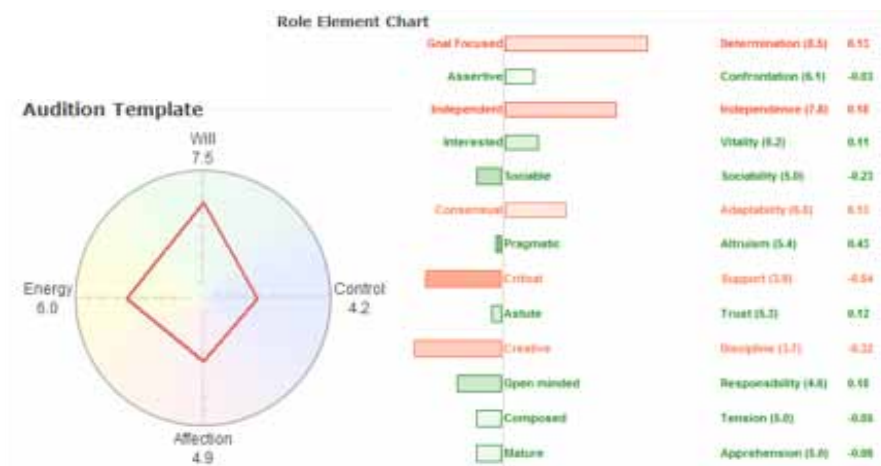


Results	Of the people who scored above average on Will and Energy, 82% passed their exams compared to the 67% overall pass rate. This is an gain of about 20%.
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Management assessment centre

- Executive summary** This study examines a series of managerial assessment centres implemented as part of a large scale integration of three organisations. The results confirmed that the competency ratings were related to the Facet5 and other psychometric tests.
- Industry** Three organisations from a Government owned conglomerate
- Role** Participants were Senior Managers, and General Managers. They were not all graduates although many were. They were from various disciplines.
- Sample** The total number of people who were evaluated through the assessment centres was 283.
- Criterion** A competency analysis was carried out across the three organisations. Eight competencies were felt to be a common requirement for all functions at this level. There were independent ratings on these 8 separate competencies plus an overall rating. However there was considerable overlap (halo) between the separate ratings so this study focuses on the Overall rating.
- Links to Facet5** There was a significant correlation between Will and rated competence ($r=.30$, $p=.000$. 0.44 corrected for attenuation as described below). There is also a link to lower Control ($r=-.13$, 0.20 corrected, $p=.03$) and lower Emotionality ($r=-.15$, 0.22 corrected, $p=.01$). Multiple R was 0.443 ($p=0.000$).

Audition template



This template if applied would filter through people who, according to Facet5, would be described as Goal Focused, Independent, Creative, Critical, Consensual and would try to avoid those who are: Flexible, Democratic, Structured, Helpful.

Results The Facet5 results were embedded within the overall feedback process to provide specific competency related development guides.

Note Raw validity coefficients were corrected for attenuation due to unreliability in both predictor and criterion using the formula $R_{xy} = r_{xy} / \sqrt{r_{xx} r_{yy}}$ and using the reliability estimates as follows:

Element	Will	Energy	Affection	Control	Emotionality	Supervisors rating
Reliability	0.75	0.71	0.8	0.78	0.81	0.6

The estimate for rater reliability follows suggestions in the literature although some have suggested this may be actually too high.

Executive assessment centre

Executive summary A Management Development Programme was designed to evaluate a number of Leadership skills identified as critical to success. Facet5 was included with a variety of assessment processes. Higher ratings were given to executives who were more consultative and team oriented but also more individualistic, prepared to challenge the status quo and to encourage innovative solutions. More conservative, process oriented executives were given lower ratings.

Industry Telecommunications

Role Participants were Senior Managers, and General Managers. They were not all graduates although many were. They were from various disciplines.

Sample This programme had 40 participants. 3 of these were granted automatic access to the programme at executive request. Therefore ratings were not available for these 3. Full ratings were available for 37 executives.

Criterion Observer ratings. Observers included company representatives and form an external consultancy. All raters were thoroughly familiar with the competencies being measured and the methods used to evaluate them. The exception was Facet5 where not all raters were familiar with the tool. Therefore a number of raters were Facet5 experts who acted as advisors. Raters assigned values between 1 and 5 for each participant on each competency. In addition an overall rating was given which was the sum of all the ratings across all competencies. These ratings were assigned following a discussion between all raters.

Links to Facet5

There was a significant relationship between overall ratings given and the Facet5 factor of Control. However it is interesting that these ratings are associated with lower levels of Control (negative correlation) rather than higher ones. Therefore people who are more free thinking and individualistic are rated as better overall. The table below shows this in more detail.

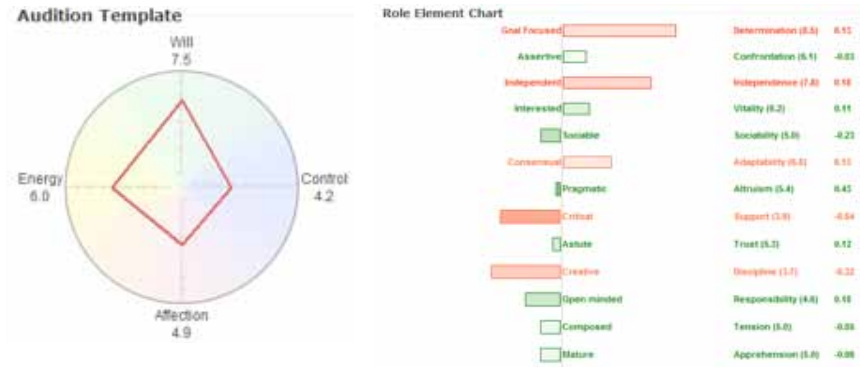
Facet5 Factor	Raw Correlation	Correlation corrected for unreliability
Will	-0.03	-0.05
Determination	0.08	0.12
Confrontation	-0.03	-0.04
Independence	-0.07	-0.11
Energy	0.24	0.37
Vitality	0.20	*0.31
Sociability	0.16	0.24
Adaptability	*0.32	0.48
Affection	0.07	0.10
Altruism	0.11	0.16
Support	0.07	0.10
Trust	0.02	0.03
Control	†-0.41	-0.60
Discipline	†-0.37	-0.55
Responsibility	†-0.44	-0.64
Emotionality	-0.21	-0.30
Tension	-0.19	-0.27
Apprehension	-0.18	-0.26

does this need a key?

The strongest relationship is for Control and in particular 'Responsibility' which (given that the correlation is negative) indicates that people who are more laissez faire, unstructured and 'hands off' in their approach were rated higher.

There is also a relationship between Energy (especially Adaptability) and ratings on overall competence. This suggests that people who are more consultative and willing to take others' ideas on board are rated higher.

Audition template



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Comments from inter-departmental survey

Executive summary	This study took place in an investment bank, and came about as a result of complaints about a team of investment bankers. This team included international investment bankers whose style of operation was being poorly received by other banking functions. They were very gung-ho, aggressive and forthright, and this caused difficulties internally in their dealings with other departments.
Industry	Investment Banking
Role	Team included international investment bankers based in New York and London
Sample	This programme had 13 participants. Survey comments were received from 58 people
Criterion	Consistency between comments made from the survey and comments made by trained Facet5 practitioners. The consistency of comments was evaluated and coded according to whether the two sources of information agreed i.e. could comments made by cross functional peers be predicted from the Facet data and vice versa? The peer comments were not made available to the consultant making predictions from the Facet Data. The information was then written up under the headings 'Positive' and 'Negative' Comments as follows:

Links to Facet5

Negative Comments	Made from Facet			
	Yes		No	
Made by Peers	No.	%	No.	%
Yes	16	94%	1	6%
No	1	6%	16	94%
Total comments	17	100%	17	100%
ChiSQ	23.06	Df=1		P=0.0001

Positive Comments	Made from Facet			
	Yes		No	
Made by Peers	No.	%	No.	%
Yes	10	83%	2	17%
No	2	17%	10	83%
Total comments	12	100%	12	100%
ChiSQ	8.17	Df=1		P=0.004

Results

These results show a very strong correlation between the inferences drawn from the Facet5 profiles by the Facet5 practitioner and the comments made by cross functional peers. This suggests that the behaviours suggested by the Facet5 profiles were seen in the work place.

References & notes

- 1 Kline, P. (1999). The handbook of psychological testing (2nd ed). London: Routledge.
- 2 For a fuller discussion of issues of validity see any major psychology text such as ANASTASI, A. 'Psychological Testing', Collier MacMillan International, London
- 3 Antonioni D, (1994) 'The Effects of Feedback Accountability on Upward Appraisal Ratings', Personnel Psychology, 47, 349-356