

Psychometric Personality Assessment - Reliability and Validity: Technical Data

Identity was developed in strict adherence to psychometric principles. The authors are members of the British Psychological Society and are committed to ensuring the highest professional standards in the use of psychometric data.

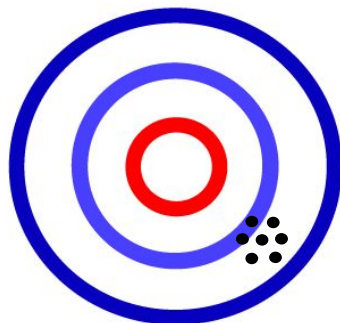
i Overview

This document provides the research evidence that upholds Identity as a reliable and valid measuring instrument. Please note that this area of psychometrics is quite technical, and relies on scientific research and mathematical techniques. This manual is designed to be readable and offer the informed user a clear picture of the supporting research.

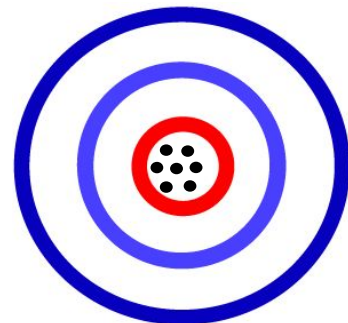
i What is 'Reliability' and 'Validity'?

In occupational testing, we need to look at the two elements of reliability and validity separately. Where reliability is a measurable property of a test – validity is not a property of the test, but rather how it is applied.

The concepts of Reliability and Validity can be described with the target analogy:



Reliable (but not Valid)=Inaccurate



Reliable and Valid = Accurate

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i Internal Consistency

Each individual scale in Identity has its own assessment of internal consistency. This is a measure of how consistently respondents are answering the items that comprise the scale. In other words it looks at how sharply a scale is measuring a specific construct or personality factor.

We can use the statistical method of correlation to assess the relationships between all the items in a scale. In Table 1, this consistency is measured using the Alpha Reliability technique – basically a method of determining the average degree of inter-relatedness between scale items. The minimum Alpha statistic required for a ‘reliable’ scale is generally considered in the literature to be 0.7. Sometimes personality scales can be slightly less if they are measuring a broader domain, although the error in the measurement will be greater.

i Table 1 – Reliability Analysis of Identity

Research undertaken in 1999, updated 2002. Sample size: n = 529. Working Population.

Scale	alpha	mean	SD	Sem
Social Presence	0.84	19.29	4.96	1.40
Direct	0.73	22.71	4.01	1.65
Influence	0.81	23.59	4.07	1.82
Open	0.81	19.77	4.70	1.69
Independent	0.66	20.93	3.62	1.35
Modesty	0.90	19.37	5.27	2.17
Group Affiliation	0.71	23.25	3.57	1.51
Consultative	0.71	25.56	2.96	2.04
Psychological	0.86	23.84	4.31	1.49
Empathy	0.78	24.33	3.82	1.62
Adaptability	0.77	20.76	4.23	2.03

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i Table 1 – Reliability Analysis of Identity continued....

Scale	alpha	mean	SD	Sem
Theoretical	0.75	24.35	3.59	1.29
Rational	0.69	21.72	3.84	1.44
Creative	0.74	24.01	3.67	1.16
Critical	0.69	25.00	3.09	1.38
Foresight	0.82	25.26	3.81	1.48
Systematic	0.77	24.19	3.90	1.56
Completing	0.77	24.91	4.16	1.38
Multi-tasking	0.83	22.59	4.37	1.75
Variety Seeking	0.71	22.73	3.87	1.50
Protocol Following	0.82	22.73	4.49	1.49
Control	0.78	23.57	4.14	1.66
Need to Win	0.79	20.55	4.62	1.31
Determined	0.77	22.44	3.89	1.40
Decisive	0.79	19.99	4.27	1.48
Risk Taking	0.80	17.91	4.38	1.52
Self Potency	0.68	23.57	3.64	1.50
General Anxiety	0.78	18.48	4.56	1.77
Specific Anxiety	0.85	21.41	4.84	2.00
Self Assured	0.85	22.84	4.64	1.74
Resilience	0.72	20.47	3.86	1.68
Positive	0.74	23.64	3.88	1.34
Self Protecting	0.73	16.96	3.98	1.69
Social Desirability	0.66	20.42	3.99	1.65
Self reviewing	0.82	23.44	4.30	1.22
Reflective	0.41	22.10	3.00	1.37

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i Test-Retest Reliability

This form of reliability looks at consistency over time. It is normally calculated by administering the same questionnaire on a number of separate occasions with different time spans in between each. Correlations between different administrations are sought, and these are seen to provide an estimation of peoples responses over time. Test Retest reliability is more a concern for ability or aptitude tests, where these are constructed to measure mental skills that should remain stable over the long-term life period. In the field of personality and self-perception assessment, change and development is often the objective of administration. Therefore Test-Retest studies can be somewhat artificial and also underestimate the reliability of a questionnaire when significant change in personality has occurred between administrations.

i Table 2 – Test-Retest Reliability Coefficients for Identity

Research undertaken in 2003. Sample size: n = 121. Working Population.

First Testing Second Testing

Scale	First Testing		Second Testing		Test – Retest Reliability Coefficients
	mean	SD	mean	SD	
Social Presence	19.27	4.91	19.14	5.10	.92
Direct	21.58	4.16	21.54	4.20	.83
Influence	22.95	3.75	23.09	3.64	.80
Open	20.90	5.33	20.89	5.15	.87
Independent	21.81	4.22	21.76	4.03	.86
Modesty	18.16	4.83	18.45	5.12	.83
Group Affiliation	20.98	4.38	20.85	4.04	.82
Consultative	23.55	3.29	23.61	3.22	.78
Psychological	25.02	4.55	24.69	4.80	.88
Empathy	24.24	4.19	23.60	4.40	.82
Adaptability	22.37	3.57	22.14	3.90	.77
Theoretical	24.15	4.24	24.19	4.20	.87
Rational	19.10	4.30	19.23	4.09	.86
Creative	23.02	4.64	23.08	4.59	.90
Critical	23.87	3.45	23.94	3.37	.80
Foresight	22.63	4.62	23.02	4.67	.85

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i Table 2 continued....

Scale	First Testing		Second Testing		Test – Retest Reliability Coefficients
	mean	SD	mean	SD	
Systematic	21.98	4.84	21.61	4.69	.84
Completing	23.64	4.53	23.60	4.82	.89
Multi-tasking	23.00	4.80	22.87	4.42	.84
Variety Seeking	23.53	4.26	23.23	4.36	.85
Protocol Following	19.90	4.75	20.01	5.10	.89
Control	22.81	4.78	22.44	4.30	.84
Need to Win	19.47	5.20	19.12	5.19	.92
Determined	22.43	4.16	22.31	4.14	.87
Decisive	20.97	4.63	20.90	4.70	.88
Risk Taking	19.12	4.50	18.61	4.65	.88
Self Potency	23.45	4.08	23.37	4.16	.83
General Anxiety	19.54	5.10	19.60	5.15	.85
Specific Anxiety	22.68	4.42	22.65	4.52	.83
Self Assured	21.02	4.50	20.94	4.94	.86
Resilience	19.76	4.19	19.88	3.84	.81
Positive	24.48	4.59	24.40	4.36	.88
Self protecting	15.12	3.71	15.02	3.65	.82
Social Desirability	18.03	3.93	18.09	3.76	.83
Self reviewing	24.68	4.53	24.45	4.63	.92
Reflective	22.02	3.76	21.97	3.53	.79

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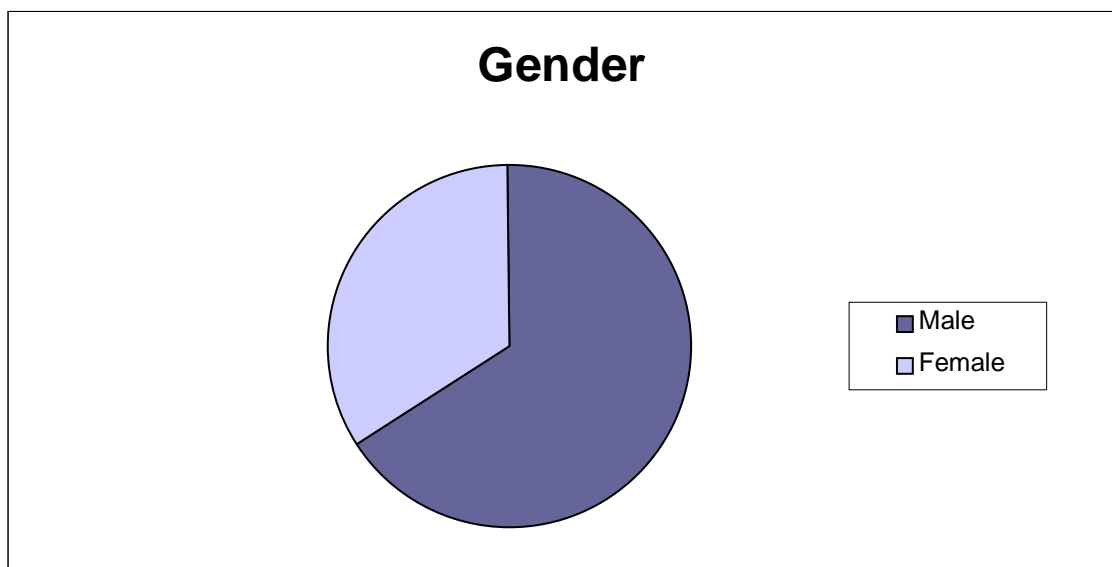
i Norm Group

Norm tables are used to compare an individual's responses against a benchmark group, who have already completed the questionnaire. By comparing an individual's responses to this wider population, we standardise their scores and this gives the resulting profile psychological meaning.

The primary norm group underlying identity is a broad sample of the working population. The composition of this group is described in the tables to follow.

COMPOSITION - TOTAL WORKING GROUP

The total working group for identity is based on a sample of 1083 people. Research was carried out between 1999-2003 and the individuals who make up the group represent a wide range of socio-economic, educational and occupational backgrounds throughout the United Kingdom. Further information on this group is presented below.



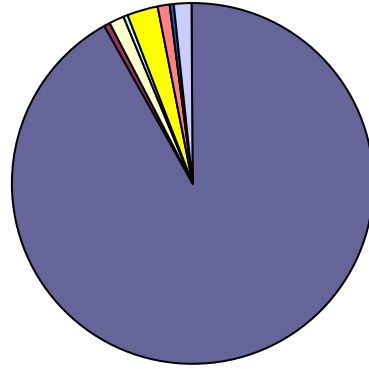
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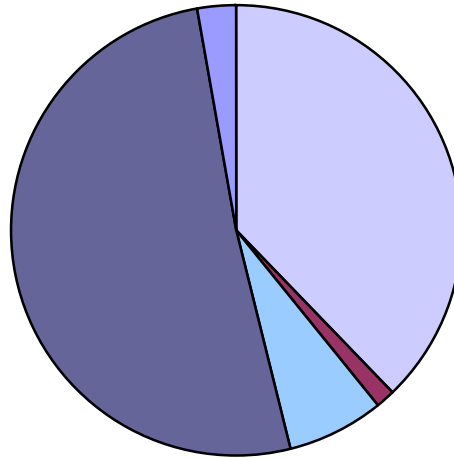
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Ethnic Group



- White
- Black-Caribbean
- Black-African
- Black-Other
- Chinese
- Indian
- Pakistani
- Other

Reason for Completion



- Applying for a job
- Training / Development
- Own Interest
- Part of a research Study
- Other

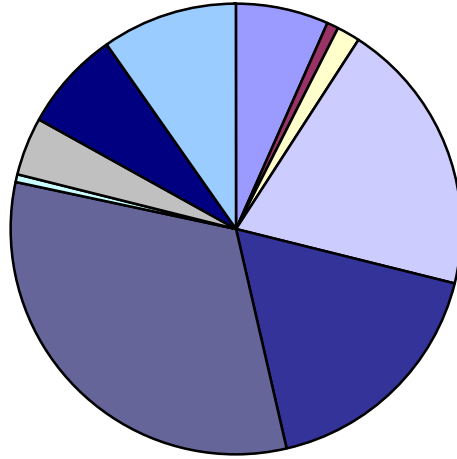
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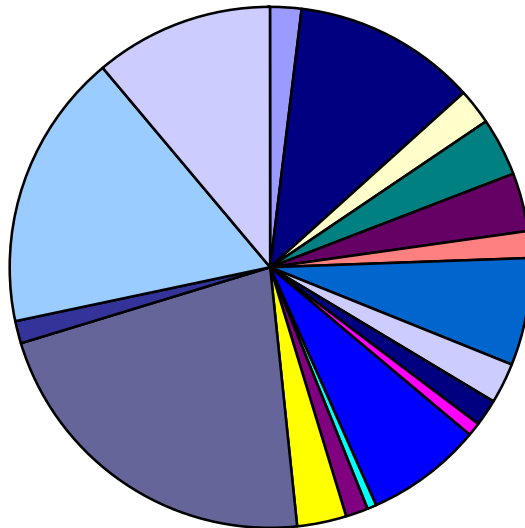
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Job Type



- Clerical
- Creative, crafts & related
- Entrepreneurial
- Managerial
- Professional (non-technical)
- Professional (Technical)
- Sales
- Technical Crafts / Operative
- Student
- Other

Industry

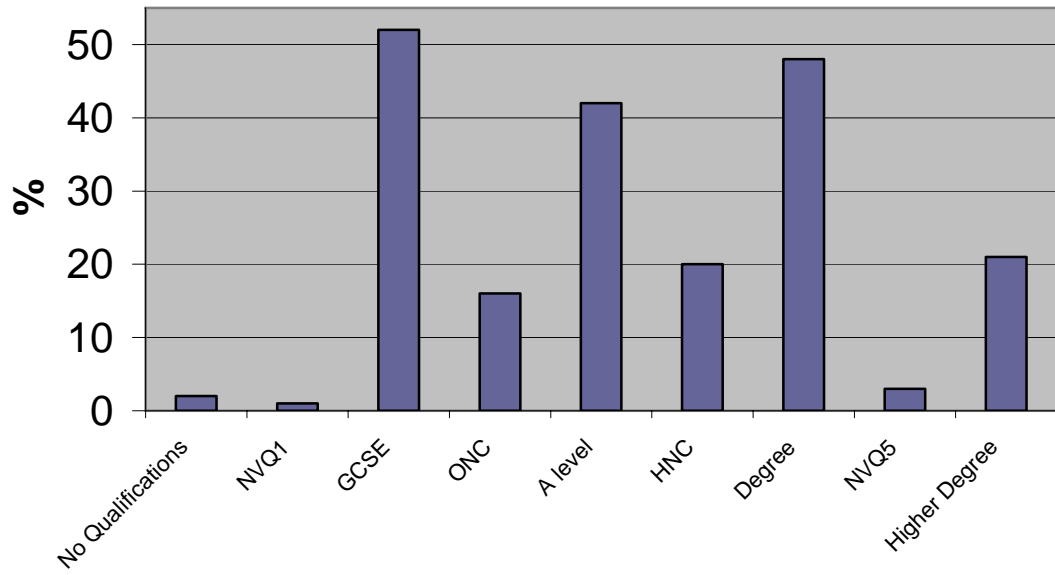


- Arts & Creative
- Business Consultancy
- Charity & Non-profit
- Communication / Information Technology
- Construction / Contracting
- Environmental & Agricultural
- Finance & Insurance
- Healthcare, medical & socialwork
- Hospitality
- Legal
- Manufacturing
- Property
- Public administration
- Retail & Wholesale
- Service utilities & Heavy industry
- Transport
- Public service / Education
- Other

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Educational Qualifications



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i **Validity evidence for Identity®**

There are various forms of validity and these are covered in this section. Firstly, it should be emphasised that validity is not an inherent property of any test or questionnaire. Rather, it is the purpose to which a test is put that is either valid or invalid. For example, using a Identity to support and target an interview is a very valid and useful application. However, using Identity as the sole assessment tool for downsizing and making redundancies would be not only invalid, but clearly very inappropriate.

The theory and practice of using personality instruments is covered in greater detail on a Level B Competence in Occupational Training qualification. Should users wish to use Identity more independently and without the support of occupational psychologists, it is a prerequisite that such professional training is undertaken first.

i **Face Validity**

This is the degree to which respondents accept the instrument as a useful and valid tool for its application. In other words, does it look the part to the untrained eye? This type of validity is not usefully assessed using the scientific method, rather it is a more subjective evaluation, based on customer needs analysis.

All qualities of the questionnaire should be assessed for face validity. In the development of Identity this was of primary concern to Quest's psychometricians. Even the title of the questionnaire was referred to as a 'self-perception' questionnaire, rather than 'personality' – which can appear to be an all-embracing term for the 'whole of a person'. Clearly a challenging feat of assessment for a paper-and-pencil questionnaire!

The basis for the development of Identity was in the rational mode, with scales determined by their direct application to recruitment and development. All items are transparent and have clear relevance to the world of work and any psychological jargon or 'weird' items eliminated.

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i Content Validity

This type of validity refers to the content of the test i.e. the individual questions or items themselves. More specifically content validity concerns how well a test's content reflects the actual behaviour demonstrated in the job. A test that demonstrates content validity might have a better chance of providing scores that relate to an individual's competence to perform a job.

Identity is developed with a very high transparent content validity to facilitate its use in supporting business decision making.

i Construct Validity

This is perhaps the more abstract and potentially confusing side of validity. It is more concerned with the fundamental nature of what individual scales measure. A researcher interested in construct validity would be keen to ask the following types of questions: "What is the nature of Social Presence?", "How is General Anxiety related to Specific Anxiety?", "What is the underlying, most basic structure of personality?"

Generally, the studies that address questions of construct validity look at correlations between the scales of the questionnaire with themselves, and also with external measures. These external measures will typically be other existing questionnaires, but a more robust measure is real behavioural assessments. Typically, the hypotheses driving the studies look for relationships between measures where expected (convergent evidence) and on the flip side - an absence of relationship where none would be expected (divergent evidence). For example, a measure of anxiety would be expected to correlate positively with a measure of tension, but negatively with a measure of self-confidence. Upon such a finding, the construct validity of the anxiety measure would be supported. One could also correlate the anxiety scale scores with measurements of confidence or similar competences on an assessment centre.

Whilst clearly these questions are of some interest to the business user on a broad level, the esoteric and complex studies are often more of academic interest. Identity is developed with narrow, very clear scales that have obvious behavioural consequences. It is thus less dependent on its relationships with other instruments.

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i Criterion Related Validity

This is the key area of interest when assessing the efficacy of any questionnaire. This is the form of validity that directly addresses the relationship between the questionnaire and what you are looking to measure with it. In a Criterion Related Validity study the questionnaire is the 'predictor' and some form of external measure (the 'criterion' or if more than one – 'criteria') are correlated, with a view to demonstrating a relationship between them. Typical measures of criteria are line manager performance ratings, sales figures, assessment centre ratings, appraisal data etc..

Identity presents two research case studies here to uphold its criterion related validity. These studies primarily uphold the relationship between Identity scores and actual behaviour, and also provide construct validity support for various areas of the profile. Correlations are used to prove statistical relationships between identity scales and work behaviour.¹

i Pragmatic Validity and Limitations of Statistical Study

Pragmatic value has become a very important part of our dealings with clients in the business world. This concept addresses the way questionnaires are used by clients, and why they personally find Identity profiles useful. This is more to do with how well they can support business decisions and inform recruitment and development practice, rather than using statistical modelling. Just as a doctor does not rely on pulse rate alone to make a diagnosis, so recruiters do not rely purely on a personality profile.

The empirical methods of establishing reliability and validity are undoubtedly essential, and provide the first line of defence against unprofessional and poorly designed instruments. However, often a questionnaire 'works' or doesn't 'work' for a client based on their on-going experience of using the tool in the course of their professional practice. For instance, many questionnaires may have extremely robust psychometric mechanics, but just take too long to complete, or use 'weird' psychobabble, or may be too basic to make any useful judgements from. Even untrained users will realise that you cannot expect to measure the

¹ A correlation 'co-efficient' is the output of a single correlation analysis. It is a figure between -1 and +1. 0 is no relationship at all, +1 or -1 is a perfect relationship. Note that these are impossible to attain in complex 'people-systems'. 0.3 is a typical relationship between ability tests and job performance, personality scales tend to be lower at around 0.2. Level A and B training provides a firm grounding in these concepts.

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whole of a person's psyche from a personality questionnaire, but rather learn that they can be useful to support observations on an assessment centre or to make optimal time in a brief interview. Thus, the support systems such as scoring keys, report content and Psychological Models all combine to determine the ultimate validity and usefulness of a given instrument.

As the profile is rarely used alone, the decisions we make about people in either a selection or development situation can become very complicated. Decisions draw from a number of information sources, and to tease out a correlation between a single personality scale and a criterion is often oversimplifying matters. Generally, interpreters will look at the profile and its patterns as a whole, never relying on a single scale or two.

Statistical studies are also based on relatively simple, straightforward relationships. In other words, when a correlation is significant then as one variable goes up - so does the other, in a linear fashion. In reality however, it is likely that a non-linear relationship exists. For instance, the Direct scale may be related to the criterion of 'Expressing Self Effectively' until it becomes too high, when an over direct style is less effective. So one may effectively express oneself with sten scores of 6,7 and 8, but individuals who score 9 or 10 may be less effective and too direct in their style. Such a relationship would be called curvilinear, and may reduce the correlation coefficient.

So criterion-based studies can identify broad trends and patterns in relationships across the sample, but it is always essential to remember that every profile is unique. Whilst validity studies can guide our interpretation, each profile will present different information, and special considerations in relation to the job role.

Identity is a robust psychometric instrument, and satisfies professional standards on reliability and validity. Its final, pragmatic validity is for you to decide. We would very much value any feedback you can provide to help us improve our instrument or support services.

The technical parameters of a psychometric can become complex, and if you have any queries, or would like to explore the area of validity assessment any further, then please do not hesitate to call a Quest Duty Consultant, who will be pleased to discuss any queries you may have.

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i Study 1: Relationship with long-term workplace behaviour

Criterion Measure

This study sought to establish the link between Identity profile scores and real workplace behaviour. The criterion measure of work performance was a 360 degree feedback appraisal tool. This was considered to be the most robust assessment of actual workplace behaviour. This is because the 360 degree instrument incorporates multi-rater, multi-trait assessments. In other words, where traditional validity studies often rely on one rater (typically a line manager), the 360 approach takes assessments from subordinate and peer staff also. Such multiple perspectives provides a more rigorous and holistic assessment of an individual's performance. The assessments are also based on perceptions of the individual and their behaviour over time in a real work situation.

The multi-trait structure of the 360 instrument was based on a rational competence model developed by the client organisation. The tool had not undergone psychometric assessment, and would thus suffer from the 'criterion problem'. This means that any hypothesised correlations would be reduced because Identity (the predictor) would have a much more robust reliability and accuracy than the 360 data that was to serve as the benchmark. Therefore, the 360 degree instrument was factor analysed to determine the underlying structure of the instrument (n=~400). These factors formed the scales of the criteria and inherently possessed a more reliable structure that could be more usefully applied to the study.

Differences between respondent-type groups were evident (i.e. manager, subordinate and peers). Therefore, each respondent group was separately correlated with Identity ratings, and each essentially forming a 'mini-sample' in itself, thus replicating the study three times. The similar correlations found amongst the 3 groups therefore lends further weight to the observed relationships.

Sample

The 102 individuals were all of a supervisory and managerial level in a large UK electricity generating company. Their roles ranged from Strata II to IV in the Jacques Level of Work model. The sample was also drawn from a number of intra-company cultures - including both plant and corporate departments, and

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this was seen to provide a good mix of different behavioural styles. Composition of the group was around 90% White UK, and 60% male, and the mean age approximately 35 years.

The study was undertaken in 1999 as part of a development activity for the managers. As the data from both Identity and the 360 Appraisal were collected at approximately the same time, this study can be seen as a concurrent validation.

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i Table 3: Change Management 360 scale correlations with Identity broken down by different respondent group (n=100)

Scale	Criterion: Change Management		
	Manager	Subordinate	Peer
Social Presence			
Direct			
Influence		.264**	.230*
Open			.287**
Independent			
Modesty			
Group Affiliation			
Consultative			
Psychological		.200*	.224*
Empathy			.257**
Adaptability			
Theoretical			.247*
Rational	-.318**	-.246*	-.331*
Creative	.231*		.264**
Critical			
Foresight	.220*		
Systematic			-.275**
Completing		-.201*	
Multi-tasking	.245*	.266**	.268**
Variety Seeking		.247*	
Protocol Following	-.227*	-.247*	-.250*

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Table 3 continued....

Scale	Criterion: Change Management		
	Manager	Subordinate	Peer
Control			
Need to Win			
Determined			
Decisive			
Risk Taking	.348**	.405**	.239*
Self Potency		.276**	
General Anxiety			
Specific Anxiety			
Self Assured			
Resilience			
Positive	.198*		
Self protecting			
Social Desirability			
Self reviewing		.206*	
Reflective			.219*

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i Table 4: Networking 360 scale correlations with Identity broken down by different respondent group (n=100)

Scale	Criterion: Networking		
	Manager	Subordinate	Peer
Social Presence			.230*
Direct			.289**
Influence	.242*		.206*
Open			.202*
Independent			
Modesty			
Group Affiliative			
Consultative		-.201*	
Psychological			
Empathy			
Adaptability			
Theoretical			
Rational	-.291**	-.214*	-.304**
Creative	.213*		
Critical			
Foresight			
Systematic		-.300**	
Completing		-.269**	
Multi-Tasking	.249*	.209*	.409**
Variety Seeking	.278**	.313**	.371**
Protocol Following		-.257*	-.247*

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Table 4 – Continued....

Scale	Criterion: Networking		
	Manager	Subordinate	Peer
Control			
Need to Win			.278**
Determined			
Decisive	.276**	.283**	.253*
Risk Taking	.233*	.305**	.322**
Self Potency			.199*
General Anxiety			
Specific Anxiety			
Self Assured			
Resilience			
Positive			
Self protecting			
Social Desirability			
Self reviewing			
Reflective			

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i Table 5: Autocratic 360 scale correlations with Identity broken down by different respondent group (n=100)

Scale	Criterion: Autocratic Style		
	Manager	Subordinate	Peer
Social Presence			.209*
Direct	.205*		
Influence			
Open			
Independent			
Modesty	-.277**		
Group Affiliative			
Consultative	-.245*		
Psychological			
Empathy			
Adaptability		-.206*	
Theoretical			
Rational			
Creative			
Critical			
Foresight			
Systematic			.266**
Completing		.205*	.235*
Multi-Tasking			
Variety Seeking			
Protocol Following			.307**

Table continued overleaf...

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Table 5 – continued.....

Scale	Criterion: Autocratic Style		
	Manager	Subordinate	Peer
Control			
Need to Win			
Determined			
Decisive			
Risk Taking			
Self Potency			
General Anxiety			-.220
Specific Anxiety			
Self Assured			
Resilience	.243*		
Positive			
Self protecting	.211*		
Social Desirability			
Self reviewing	-.240*		
Reflective	-.310**		

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i Table 6: Democratic/Involving/Listening 360 scale correlations with Identity broken down by different respondent group (n=100)

Scale	Criterion: Democratic/Involving/Listening		
	Manager	Subordinate	Peer
Social Presence	-.253*		
Direct	-.266**		
Influence	-.305**		
Open	-.229*	-.254*	
Independent	-.238*		
Modesty	.276**		
Group Affiliative	.213*		.238*
Consultative			
Psychological			.236*
Empathy		.245*	
Adaptability			
Theoretical			
Rational		.221*	
Creative	-.314**		
Critical			
Foresight			
Systematic			
Completing			
Multi-Tasking			
Variety Seeking			
Protocol Following			

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Table 6 continued.....

Scale	Criterion: Democratic/Involving/Listening		
	Manager	Subordinate	Peer
Control			
Need to Win	-.199*		.247*
Determined	-.212*		
Decisive	-.235*	-.209*	
Risk Taking			
Self Potency			
General Anxiety			
Specific Anxiety			
Self Assured			
Resilience			
Positive			
Self protecting			
Social Desirability			
Self reviewing		.251*	.234*
Reflective		.211*	

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i Table 7: Totals of 360 questionnaire (averaged across all respondents) and Identity scales (n=100)

Scale	Overall 360 Rating (Mean of all respondents)
Social Presence	
Direct	
Influence	
Open	
Independent	
Modesty	
Group Affiliative	
Consultative	
Psychological	.255*
Empathy	
Adaptability	
Theoretical	
Rational	
Creative	
Critical	
Foresight	
Systematic	
Completing	
Multi-Tasking	
Variety Seeking	
Protocol Following	

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Table 7 – Continued.....

Scale	Overall 360 Rating (Mean of all respondents)
Control	
Need to Win	
Determined	
Decisive	
Risk Taking	
Self Potency	
General Anxiety	
Specific Anxiety	
Self Assured	
Resilience	-.199*
Positive	
Self protecting	
Social Desirability	
Self reviewing	.274*
Reflective	.224*

i Relating findings to Criterion and Construct validity

The data presented above provides striking evidence for the efficacy of Identity in predicting workplace behaviour. There is strong correspondence between self-reported personality and colleague-reports of actual behaviour for the different respondent groups. The numerous correlations achieved uphold the criterion validity of Identity.

The fact that personality questionnaires predict style and approach to work is also supported strongly, with the correlations between different leadership styles as assessed by the 360 tool. This lends strong weight to the construct validity of Identity. There are many areas of the Identity profile that show convergent relationships with conceptually similar domains of behaviour and also areas that show divergent, negative relationships with opposing types of leadership. An example to illustrate this point is in Table 3 - the Change Management criterion. Here, strong positive relationships exist between risk taking and intuitive judgement, and strong negative correlates between more

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structural thinking and protocol following. Other tables show similar trends that lend support to both Criterion and Construct Validity of Identity.

The previous tables of data also present a cautionary warning to overzealous profile interpreters. To a large extent, the research study here was seeking to address the question of which personality effectively predicts leadership. As can be seen from the tables, personality appears to be more predictive of leadership style, rather than a generic leading ability across contexts. Table 7 looks at total leadership performance relationships with personality, and as can be seen, there are few correlations. The only aspects that seem to predict a general leadership ability are psychological insight, self reviewing behaviour and other reflective aspects of personality. This finding supports theories of emotional intelligence, that focus on the cognitive practices that allow others to adapt and be reflexive to different people and environments.

The real value in the Identity profile is matching the person to the particular type of role and job – in this case the type of leadership required to achieve certain organisational goals, whether this is a conscientious administrator, or a risk taking change manager. Therefore, it is always wise to consider the nature of the position with care, before seeking to interpret the profile. This is the crux of ensuring validity in your test-use practice. It is also very important to bear in mind, that in correlational studies such as this, we are looking only at broad and general trends in the relationships. Each profile is unique, and will always need to be treated as such.

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i Study 2 – Relationship with Managerial Skills and Behaviours in an Assessment Situation

Criterion Measure

In this study, Identity was used in conjunction with two behavioural assessments. The recruitment format included an Experience Interview and a One-to-One Roleplay as specifically designed exercises.

All behaviours are observed in a standardised situation, by professionally trained assessors. Ratings were made using carefully designed Behavioural Rating Scales.

It is now a well-established finding in studies of internal assessment centre validity, that the most robust and reliable data comes from exercise totals, rather than seeking to differentiate competences. This is to say that assessors tend to rate performance more along whether an exercise was successful or not, rather than making finer distinctions between individual competences. For this reason, Identity was related to exercise scores, rather than competence scores.

Sample

The 57 individuals were of a mixed level in a large UK utility. Candidates were applying for a Group/Departmental Head level, seen to be between Level II and Level III in the Jacques Levels of Work model. Some candidates were already operating at this level in similar roles. The target roles were in a largely engineering based function, comprising of different technical disciplines.

The assessments were taken in November 2001 as part of a corporate restructuring exercise. The majority were male (80%+) and mainly White UK ethnic group. Age and experience was mixed.

The context of the study is also important, as cultural effects and

identity

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specific drivers for change need to be considered when interpreting the correlational findings. The perceived need by the client was for a shift away from a traditional, transactional form of management towards more transformational, change-orientated leadership. Hence overleaf in Table 8, such aspects of personality are evident as predictive of final rating.

Table 8 shows all significant correlations, and owing to the smaller sample size, also correlations approaching significance.

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i Table 8: Correlations between Exercise scores and Identity scales (n=57)

Scale	Exercise totals:		
	Experience Discussion	One-to-One Roleplay	Assessment total
Social Presence	.2	.183	
Direct	.289*		
Influence	.218		
Open			
Independent			
Modesty	-.339**		.280*
Group Affiliative			
Consultative			
Psychological	.354**	.315*	.328*
Empathy			
Adaptability			
Theoretical		.219	
Rational		-.345**	-.232
Creative			
Critical			
Foresight			
Systematic		-.310*	.219
Completing	-.317*	-.216	-.332
Multi-Tasking	.274*		.285*
Variety Seeking	.221		
Protocol Following	-.253	-.355**	.269*

Continued Overleaf....

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Table 8 Continued....

Scale	Exercise totals:		
	Experience Discussion	One-to-One Roleplay	Assessment total
Control	.338*		.210
Need to Win	.290*		
Determined	.205		
Decisive	.371**		.259
Risk Taking	.273*	.275*	.344**
Self Potency			
General Anxiety			
Specific Anxiety	-.287*		-.270*
Self Assured			
Resilience			
Positive	.195		.211
Self protecting			
Social Desirability	-.239	-.255	-.301*
Self reviewing			
Reflective	-.336*		

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i Study 3 - Relationship of Identity to Myers–Briggs Type Indicator (MBTI™)

Exploration of Construct Validity

The MBTI™ was developed by Katherine Briggs and Isabel Myers as a measure of Jungian Type theory (Jung, 1971). The MBTI™ provides a useful measure of personality by identifying 8 different preferences which are organised along four bi-polar scales (or dichotomies) :

- Extraversion-Introversion
- Sensing-Intuition
- Thinking-Feeling
- Judging-Perceiving

It is the particular combination of the 4 preferences that determines your Type and this is where individual differences will arise.

Both Identity and the MBTI™ were administered to a sample consisting of 52 working professionals within the UK. Table 9 reports the significant correlations between Identity scales and MBTI™ types.

• **Extraversion**

Extraversion concerns focusing externally for stimulation therefore Extraverts have a preference for dealing with other people, activities and things. As one might predict, the highest correlations were found for scales within the 'forwarding self' dimension which looks at interpersonal relationships and interactions with other people. In particular, strong correlations were found for the Social Presence (.734), Open (.613) and Group Affiliation (.493) scales.

• **Introversion**

The preference for introversion relates to concentrating internally for stimulation, thus Introverts will focus on the world of their own thoughts, ideas and emotions rather than the outside world. Strong negative correlations were found for scales within the 'forwarding self' dimension, particularly Social Presence (-.696), Open (-.551) and Group Affiliation (-.452). A strong correlation was also found for the Positive scale (-.497). A possible explanation for this might be that the Introvert's

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preoccupation with all that is internal may make them more likely to be sceptical when viewing anything that is external to their inner world.

- **Sensing**

Sensors orientate themselves to the practical and the here and now. As we might expect, the highest correlations were obtained for the Protocol Following (.644), Theoretical (-.585), Independent (-.577) and Creative (-.557) scales. These correlations are all commensurate with the Sensing preference which entails an orientation towards dealing with practical realities, and a focus on the factual and concrete.

- **Intuitive**

Intuitives focus upon on the world of possibilities rather than what actually exists and are enthused by change and novelty. The highest correlations were for the Protocol Following (-.631), Independent (.601), Theoretical (.595) and Creative (.537) scales. This is in accordance with the Intuitives' interest in all that is conceptual or abstract, autonomy, their distain for routine and their preference for doing things with an innovative bent.

- **Thinking**

Thinkers will make decisions using rational and logical thought processes, paying more attention to objective information than subjective information. They decide impersonally and may hurt people's feelings without knowing it. It is not surprising then that the highest correlations were therefore found for the Empathy (-.568), Direct (.445), Rational (.463) scales, which are all in alignment with the thinkers' preferences for deciding.

- **Feeling**

Those who prefer Feeling will make decisions using their own personal values and emotional values, taking into consideration the likely impact on other individuals. Feelers are also less likely to cause offence in others, and will tend hold back from personal confrontation. This preference is well reflected in its relationship with Identity scales as the highest correlations were found amongst the Empathy (.502), Direct (-.52), and Rational (-.479) scales.

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- **Judging**

The Judging preference relates to living life in a planned and organised way, and to having lots of structure. The highest correlations yielded were amongst the Risk Taking (-.587), Protocol Following (.584) and Independent (-.562) scales which show good support for the efficacy of the Identity model. High correlations were also observed for the Systematic (.539) and Completing (.359) scales which are also in alignment with the Judgers' preoccupation with working in a methodical and organised way and their focus on closure.

- **Perceiving**

The preference for Perceiving concerns living life in a flexible and spontaneous way. Perceivers enjoy flexibility in their work and feel restricted without change. The highest correlations were found amongst the Risk Taking (.603), Independent (.615) and Protocol Following (-.606) scales which are all indicative of a preference for living life autonomously and flexibly.

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Scale	Extra-version	Intro-version	Sensing	Intuitive	Thinking	Feeling	Judging	Perceiving
Social Presence	.734**	-.696**						
Direct					.445**	-.502**		
Influence	.311*	-.277*						
Open	.613**	-.551**			-.280*			
Independent			-.577**	.601**			-.562**	.615**
Modesty	-.410**	.440**						
Group Affiliation	.493**	-.452**			-.276*			
Consultative					-.247			
Psychological			-.322*	.307*			-.291*	.273*
Empathy	.388*	-.296*			-.568**	.501**		
Adaptability		.298*	-.309*	.325*			-.264	.289*
Theoretical			-.585**	.595**			-.517**	.515**
Rational	-.439**	.405*	.263	-.275*	.463**	-.479**	.278*	-.249
Creative			-.557**	.537**			-.323*	.333*
Critical			-.305*	.310*	.388**	-.376**		.279*
Foresight							.290*	-.296*
Systematic			.413**	-.436**			.539**	-.553**
Completing			.392**	-.412**			.359**	-.350*
Multi-tasking	.373**	-.340*						.503**
Variety Seeking			-.518**	.529**			-.502**	
Protocol Following			.644**	-.631**			.584**	-.606**
Control	.232			.241				
Need to Win	.273							
Determined	.263	-.252						
Decisive	.257	-.290*						
Risk Taking		-.232	-.511**	.532**			-.587**	.603**
Self Potency	.230			.236				
General Anxiety								
Specific Anxiety								
Self Assured	.428**	-.412**						
Resilience	.385**	-.402**						
Positive	.490**	-.497**						
Self protecting								
Social Desirability								
Self reviewing			-.275*	.254			-.241	
Reflective		.263		.233				

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i Further Exploration of Construct Validity

Factor Analysis of Identity

A factor analysis is essentially a statistical technique for identifying how scales cluster together. It is a way of demonstrating a secondary, underlying structure behind the explicit questionnaire model. It is also a way of investigating the relationships between the questionnaire scales.

The investigation used a technique referred to technically as 'Principal Components Analysis, using Varimax rotation to clarify simple structure. Varimax (short for Variance-Maximising) was employed, owing to its tendency to produce clearer, less 'noisy' factors). Only factors demonstrating an eigenvalue of 1 or above are addressed here. Sample size, n=666, working population.

The key correlations between Identity scales and its underlying factors are shown later. Please note that correlations below 0.3 were deemed to be of little interest, and thus omitted from the table.

The 'Big Five' Factors of personality, typically seen in multiscale inventories are evident in the analysis, supporting previous findings that most questionnaires share a similar underlying structure of measurement.

There is much debate in the psychological literature regarding the exact nature of the 'Big Five' constructs and how they interrelate. It is observed that different questionnaires will produce different factor solutions that overlap with the Big Five, and such variance is due not only to the fact that different questionnaires measure different things, but also that researchers will use different Factor Analytic techniques to derive their models. Different rotation methods are based on certain assumptions and can produce subtly different factor patterns. Whilst it is helpful that Identity demonstrates a correspondence with existing inventories, Identity is not intended to be a direct measure of the Big Five, but rather more specific constructs related to the business world. Hence, there are additional factors underlying the Identity model structure.

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The underlying factors in Identity are as follows (please note that although the labels applied to each factor are intended to be interpretative and helpful, they are essentially arbitrary - in the sense that the model is based purely on mathematical relationships between scales):

Factor 1 – ‘Neuroticism’ – this corresponds directly with the Big Five construct, although of interest here is the inclusion of both Social Desirability and the Self protecting measure, demonstrating the general tendency for high scores on this factor to be seen as less positive and desirable in a business population. This is unsurprising, and the scores on Neurotic scales in a self-report questionnaire appear to be strongly linked to a willingness to disclose such information and confront emotional issues. The factor structure here supports the view that Neuroticism scores are politically sensitive and will require further evidence in a selection situation.

Factor 2 – ‘Conscientiousness’ – although similar to the Big Five Conscientiousness factor, this scale also comprises an element of drive. This is borne out through much of Quest’s organisational research that seems to suggest conscientiousness (or perhaps more appropriately – a ‘Need for Structure’) is on the opposite pole of a behavioural cluster that predicts change orientation. A drive to act and take risks appears to be opposed to a need for clarity, predictability and organisation in ones’ work.

Factor 3 – ‘Achievement Orientation’ – comprising elements of a desire to control, assertiveness and self-assurance, this factor would appear to be characterised by a competitive drive to influence ones’ environment.

Factor 4 – ‘Independence of Thought’ – clearly related to the Big Five construct of Independence-Agreeableness, this factor also comprises elements that previous models suggest is an oblique or separate supra-factor of Openness to Experience. Factor 4, as evident in this analysis suggests that evaluative, creative and open-minded styles overlap significantly with elements of drive to comprise a factor that may be best thought of as an independence or questioning style of thought. Similar to achievement orientation, this is a driving and creative cluster.

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This factor is distinct from Factor 7, to which we have ascribed the label of 'Autonomy of Action'. The distinction is one of *thought process* (Factor 4) versus manifest *behaviour* (Factor 7).

Factor 5 – 'Emotional Intelligence' - Theorists and research studies have upheld a view that one's 'Emotional Intelligence' can be a powerful factor in predicting behaviour and success at work. Identity was developed with a consideration of this driving the development of the Identity scale structure. This discrete factor indicates the extent to which the respondent will reflect on their own behaviours and interactions and the amount of time they devote to thinking about others. Also evident in this construct is a self-awareness of their own potential biases (through the reflective scale) and an element of looking ahead, and seeing their behaviour and actions as having consequences. This factor is demonstrated to be relevant to overall leadership performance as evident in Criterion Validity Study 1, earlier.

Factor 6 – 'Extraversion' – the typical self-expressiveness of the extraversion scale is evident in this factor. Of interest is the inclusion of the reflective scale, which suggests that the strong Extravert is less questioning of their initial judgements, and potentially more likely to see things in black and white. Such a finding is in keeping with many conceptions of this construct.

Factor 7 – 'Autonomy of Action' – this specific factor relates to a lower interest towards integrating with others, and a preference towards focusing on own objectives and work demands.

Factor 8 – 'Rigidity' – this is an interesting factor. It relates to behaviours that suggest an assertion of one's self and identity, and the presentation of a consistent identity across situations. High scorers across this small cluster of scales probably expect others to 'take them as they are' and will seek not to 'water themselves down for others'. They are less prepared to adapt their behaviour to suit the situation. They may also be less critical about themselves and seek to express their more critical evaluation of others.

Understand the person beneath the surface

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