

THE

15FQ+

TECHNICAL
MANUAL





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THE 2ND EDITION OF THE 15FQ+

INTRODUCTION

The second edition of the Fifteen Factor Questionnaire (now termed 15FQ+) represents a revision and update of this instrument, which was first published by Psytech in 1992. The 15FQ was developed as an alternative instrument to the 16PF¹ series of tests; measuring the personality dimensions that were first identified by Cattell (1946) and his colleagues. Along with the Adult Personality Inventory (API), developed by Samuel Krug and his colleagues (Krug 1984), there are now a number of modern, reliable instruments which assess Cattell's model of personality in addition to the 16PF series (IPAT Staff 1986, Russell & Karol 1994).

This new edition of the 15FQ remains true to the original version of this test, which measured fifteen of the core personality factors first identified by Cattell in 1946. However, by taking advantage of recent developments in psychometrics and information technology, Psytech have produced a short, yet robust measure of these primary personality factors. Most significantly, the 15FQ+ incorporates a number of recent psychometric innovations; making these developments widely available to the test user for the first time. These innovations include the addition of a measure of Intellectance (Scale B) which was excluded from the first edition of this test for theoretical and practical reasons.

Intellectance (Scale B) was excluded from the original version of 15FQ as it has been well established for many years now that ability factors can only be reliably measured through the use of timed tests. Thus untimed personality tests, such as 16PF, are unable to assess intelligence with an acceptable degree of reliability and validity. As a result, the inclusion of reasoning items in untimed personality tests has always created difficulties for test administration, interpretation and feedback. However, in line with current theory, Intelligence has been reconstructed as a metacognitive personality variable (termed intellectance), as opposed to an ability factor, thus enabling the inclusion of this important factor within an untimed personality questionnaire.

Ever mindful of the problems of response bias when using a personality test in an occupational setting, the 15FQ+ (in keeping with the original version of this test) includes a number of dedicated and non-dedicated impression management scales (some of which are only available via the computer generated narrative report). As well as providing a

dedicated Social Desirability scale (which is available for both the pencil and paper and computer scored versions of the long form of the test), the 15FQ+ also includes non-dedicated Faking Good and Faking Bad scales (which are only available for the computer scored versions of the long form of the test). In addition, like its predecessor, the second edition of this test provides measures for central tendency and infrequency responding. The new Central Tendency scale highlights the possibility that respondents may have been indecisive when answering the questionnaire, or may have been reluctant to respond in an open and direct manner. The new Infrequency scale identifies random or inattentive responding when completing the 15FQ+

A final innovation that has been incorporated into the second edition of the 15FQ+ is the inclusion of a number of dedicated criterion scales, including Work Attitude (Ones & Schmidt 1992) and Emotional Intelligence (Goleman 1996), that can be generated from individual test items. These criterion scales can be calculated from the sub-set of 15FQ+ items that, through research, have been found to best predict well-validated measures of the relevant constructs.

The main features of the second edition of the 15FQ+ are:

1. Items have been revised and re-written to avoid culture, sex and age bias.
2. Items have been written in simple, clear and concise Modern (European) English.
3. The questionnaire has been designed to be brief - comprising of twelve items per scale.
4. Items have been selected to maximise reliability, while maintaining the breadth of the original personality factors.
5. The questionnaire is available for both pencil and paper and on-screen (computer) administration. Moreover, for the pencil and paper version of the questionnaire, self-scoring answer sheets, and computer readable answer sheets, are available.
6. A short form, comprising just six items per scale has been developed for situations where speed of completion is more important than high reliability and validity.

1. The 16PF tests are published by IPAT, Illinois. In the UK ASE are the exclusive UK licensee.

THEORETICAL BACKGROUND TO THE 15FQ+

In 1946, Raymond B. Cattell published his now seminal book 'The Description and Measurement of Personality'. This book identified the three sources of data that can be used as a basis for constructing a comprehensive theory of personality. These data are obtained from objective tests, observer's ratings of behaviour and self-report questionnaire data. Cattell respectively termed these three sources of data: test, or T-data; life, or L-data; questionnaire or Q-data. T-data consists of behaviour that can directly observed and measured in experimentally controlled conditions. These include such things as, measures of the latency of visual after effects; the stroop effect, speed of reaction time, the startle response, EEG activity, etc. Q-data and L-data consist respectively of self-report or other report of typical observed behaviour.

In addition, 'The Description and Measurement of Personality' contains an integrative review of the then extent research that had been conducted into human personality using these three sources of data. By combining this research review with the results of the extensive factor analytic studies that Cattell and his colleagues had undertaken, Cattell was able to map out the basic, or primary, personality factors that are needed to account for the complete human personality sphere. Most importantly, in this regard, Cattell distinguished between surface traits, or observed syndromes of behaviour, and source traits - with the latter referring to the deep structure personality traits that can only be identified via factor analysis. For ease of reference, each of those source traits that had been identified by L-data were denoted by a letter of the alphabet, and those that could only be identified by Q-data were denoted by the letter 'Q' written with a subscript (e.g. Q_i).

The personality traits first identified in 'The Description and Measurement of Personality' were then revised on the basis of further research such that, for example, Factor K was dropped from the model and Factors D and J were excluded from adult measures of personality - as these factors were found only to exist reliably in adolescent and pre-adolescent samples.

It has, however, been recognised for a number of years now that many of these early personality tests lack the degree of reliability that has come to be demanded of modern measures that are to be used for occupational selection and assessment (Barrett & Kline 1982; Blinkhorn & Saville 1982). In many ways, the apparent low reliability of these early personality measures is a reflection of recent advances in computer technology. Just as the sound quality of modern CD players makes gramophones

sound archaic so too, by comparison, do modern personality tests make old instruments appear to have poor psychometric properties. However, it should be remembered that the reliability of modern personality tests is due to the ease and speed with which psychometricians can now analyse large, multiple sets of data to identify those items that have the best properties. Such easy and rapid analysis of big item data-sets was not only impossible, but also unimaginable, for researchers working in the 1930s, '40s or '50s.

However, while the development of reliable scales was emphasised in constructing the second edition of the 15FQ+, Psytech have at all times been careful to ensure that the items assess the same broad personality factors that were first identified by Cattell and his colleagues. Thus the 15FQ+ items assess broad, well researched source traits (Cattell 1965), rather than the narrow surface traits that are associated with a number of modern multi-factorial personality questionnaires. The only factor whose definition has substantially altered from those originally proposed by Cattell is Intelligence. In line with modern thinking, this factor has been re-defined as the metacognitive personality variable intellectance (Hogan 1986). Such meta-cognitive variables aim to assess cognitive style. Namely, individual differences in how people approach cognitive tasks. The interpretation of this factor is described in detail on page 13 of this manual.

However, in brief, it can be defined as follows; 'a self-reported superior level of intellectual capacity, a preference for, and enjoyment of, complex arguments and ideas. A self-reported superior level of: verbal ability; memory; abstract reasoning ability and numerical ability.' With this exception, however, all of the personality factors measured by the 15FQ+ have retained their original definitions from Cattell's early research. Thus, when interpreting 15FQ+ profiles, test users will be able to utilise the knowledge and interpretation skills that they have developed using other measures of these traits e.g. 16PF4 (Cattell, Eber & Tatsuoka 1970).

DEVELOPMENT OF THE NEW 15FQ+

The twelve items that assess each of the sixteen factors measured by the 15FQ+ were developed and refined through a series of iterative data analyses (Kline 1986).

1. Each of Cattell's 15 Factors (excluding Intelligence) was reviewed by means of an extensive literature review. Statements were generated to capture the full breadth of the associated behavioural manifestations and dispositions. All statements were simplified and/or written in modern English that avoided culture bias. Wherever possible existing 15FQ items that fulfilled the above criteria were used.
2. Data on the revised item set were collected alongside data on Form A of the 16PF4. These data were analysed to ensure that the revised items occupied the same position in personality factor space as the factors measured 16PF4 Form A.
3. Those items that were found to yield poor psychometric properties were removed and new items were constructed. Only those items that had acceptable item-total correlations and correlated substantially higher with their target scale than with any other scale, were retained.
4. Steps 2 and 3 were repeated iteratively until twelve items, that had acceptable psychometric properties, were obtained for each of the fifteen (i.e. excluding the Intellectance [β] dimension and Social Desirability) personality dimensions assessed by the 15FQ+.
5. Initial item sets for the Intellectance(β) and Social Desirability scales were constructed (independently) by each member of a panel of psychologists experienced in personality test construction. The panel then reviewed these items and the wording was amended to achieve consensus. Items were excluded from the initial item set if consensus could not be achieved. Step 3 was repeated iteratively until twelve items, that had acceptable psychometric properties, were obtained for each of these scales.
6. The 16 scales (including Intellectance) were then factor-analysed using the total standardisation sample and five global factors, similar to the Big-Five factors originally identified in the late 1950s, were extracted.
7. Once a satisfactory final item set had been achieved the Faking Good and Faking Bad scales were constructed using criterion referencing techniques. Finally the Infrequency scale was constructed by selecting the 26 least frequently endorsed item responses.
8. A short form of the 15FQ+ was then created by selecting the best six items from each item set for each of the 16 scales.

ADMINISTRATION, SCORING AND PROFILING

ADMINISTERING THE 15FQ+

The 15FQ+ can be administered in a pencil and paper, or on-screen (computer) format. In the on-screen format, instructions for administration are provided by the software programme. Detailed instructions for pencil and paper administration are provided in Appendix I.

While the 15FQ+ questionnaire booklet is designed to be virtually self-administerable, and contains detailed instructions on how to complete the test, it is nonetheless **not** recommended that respondents are left to self-administer the test. In order to avoid unnecessary sources of test bias, respondents should complete the questionnaire in comfortable, quiet surroundings - free from distractions and interruptions. Moreover, it is particularly important that respondents are put at their ease before being asked to complete the test. Thus, in line with good practice, it is important that the test administrator deals with the following points before administering the test:

1. Outline the purpose of the assessment.
2. Explain how the test results will be used.
3. Emphasise that the test results are confidential and explain who will have access to test data.
4. Inform the respondents that they will be given feedback on the results.
5. Answer any questions the respondents may have before beginning the test administration process.

For pencil and paper administration, the test administrator should then follow the administration instructions provided in Appendix I. Alternatively, the test can be administered on screen using the software system.

SCORING AND PROFILING THE 15FQ+

When the 15FQ+ questionnaire is administered on screen, the test is automatically scored and profiled by the system. In the pencil and paper format, there are two available methods for scoring the test:

1. A self-scoring answer sheet is available. By following the directions detailed in Appendix II, the test administrator can obtain raw scores on the sixteen personality factors and the Social Desirability scale and plot these directly on the adjacent sten profile chart. Scores for the Faking Good, Faking Bad, Infrequency and Central Tendency scales are not available in the self-scoring pencil-and-paper format.
2. For those test users who have the software based test administration and scoring system, two further options for test scoring are available. Firstly, item data can be entered on the appropriate screen or secondly, computer-readable answer sheets can be scanned. The software system will then automatically generate raw and sten scores for the 16 factors as well as the response style indicators, the criterion referenced scales and global factors.

Scoring the 15FQ+ involves converting the raw scores for each factor to standardised (sten) scores. Raw scores are standardised using a norm table that converts them into sten scores. For hand scoring, the test administrator can use the norm table that is built-into the profile chart. Raw scores are converted into sten scores by marking a cross on the appropriate raw score on the profile chart that corresponds to the sten score for that factor. (Alternatively, it is possible to refer to norm tables constructed from the user's own in-house norms - where available - in order to convert raw scores to sten scores.)

It should be noted that it is not possible to standardise 15FQ+ raw scores with reference to normative data collected on the first edition of the 15FQ.

CALCULATING THE GLOBAL FACTOR SCORES

Once the profile chart has been completed, the next step in scoring the 15FQ+ involves calculating the Global (or second-order) factors. This is simply done by entering the appropriate sten scores (**not raw scores**) into each of the global factor equation boxes on the scoring-key as per the instructions in Appendix II, and then calculating the weighted total for each global factor.

STEN SCORES

Sten scores have a range 1 to 10, a mean of 5.5 and a standard deviation of 2. Sten scores of 5 or 6 are average, while scores of 4 or 7 are respectively slightly below, or slightly above, average; sometimes termed low-average and high-average. Scores of 8, 9 and 10, can be considered to be high, very high and extremely high respectively, and similarly scores of 1, 2 and 3 can be considered to be extremely low, very low and low.



PROFILE INTERPRETATION

IMPRESSION MANAGEMENT

The process of interpreting a 15FQ+ personality profile begins by reviewing the impression management scales. These scales provide important information about the validity of the personality profile, and thus the meaning of the profile should be interpreted in the context of these impression management scales. The Social Desirability scale can be scored either using the self-scoring answer sheet/profile form, or the computerized scoring software. (The additional impression management scales, described below, are only available to those using GeneSys Assessment software.) Unlike the additional impression management scales (described below) the Social Desirability scale is a dedicated scale that is independent of the primary personality factors (i.e. it is not comprised of items selected from the 16 primary factors). As such, it forms the test user's principal source of information about a respondent's response style.

Social Desirability: This scale assesses a person's desire to present an unrealistically positive image of themselves to others, with high scorers being motivated to deny the presence of the minor failings and idiosyncrasies which are typical of most people. Thus high scores on this scale (stems 8-10) may reflect either a deliberate attempt at distortion or, alternatively, a highly over-idealised (and possibly unrealistic) self-image. Therefore, before considering the likely impact of high scores on the validity of the test profile it is important to consider the candidate's motivation for responding in a socially desirable manner. Information elicited from the feedback session may be particularly useful in this regard. For example, individuals who are heavily engaged in charitable activities, or work of a self-sacrificing nature, may have higher than average scores on this scale. Similarly, people who have been brought up according to a very strict moral or religious code may be motivated to opt for more socially desirable responses to test items. When there are good grounds for considering that high scores are likely to reflect a deliberate attempt at distortion, then it is likely that the candidate will have under-reported their true scores on the anxiety global factor, and the primary source traits f^fC , f^fO and f^fQ . (Correlations between the Social Desirability scale and the primary personality factors are reported in Table 20). In addition, when the 15FQ+ questionnaire is being used for occupational assessment and selection, it is possible that

respondents obtaining high scores on the Social Desirability scale may either over, or under, report their scores on other primary source traits that are particularly job relevant.

- 1. Infrequency Scale** This scale assesses the extent to which a respondent has attended diligently to the questionnaire and has avoided infrequent responses. Respondents who obtain scores of 8 or 9 on this scale are likely to have given little thought to the questionnaire items and may not have diligently followed the questionnaire's instructions when responding to the test items. Those who obtain extremely high scores (raw score of 10 or greater) may have responded to the questionnaire in a random manner.
- 2. Central Tendency Scale** This measures the degree to which respondents have been prepared to answer the questionnaire decisively - avoiding middle, or non-committal responses. High scores (90th to 95th percentile) can also indicate that the respondent has a poorly defined self-concept, is indecisive and reluctant to commit themselves to particular attitudes or actions, or is genuinely moderate in respect to many personality traits and dispositions. An extremely high score (above the 95th percentile) may suggest that the respondent has not been willing to reveal very much about him or herself and may have sought refuge in the middle, uncertain or in-between response.
- 3. Faking Good** This scale assesses a respondent's tendency to present themselves in a favourable light, denying a variety of problem behaviours and difficulties that routinely apply to them. If respondents obtain a high Faking Good score and a low Social Desirability score, then this score should be interpreted with caution as it may be elevated due to their scores on the primary factors that contribute to this scale, rather than reflecting an attempt to present a positive impression of themselves. In this situation the test user should interpret the elevated Faking Good score in the context of the person's overall personality profile, including relevant information gained from the feedback session as appropriate.

4. Faking Bad This scale assesses a respondent's tendency to present themselves in an unfavourable light, admitting to a variety of problem behaviours and difficulties that do not routinely apply to them. If the respondent is highly anxious or distressed then a high Faking Good score should be interpreted with caution as it may be elevated due to their scores on the primary factors that contribute to this scale, rather than reflecting an attempt to present a negative impression of themselves. In this situation the test user should interpret the elevated Faking Good score in the context of the person's overall personality profile, including relevant information gained from the feed-back session as appropriate.

When interpreting the meaning of the impression management scales, the test user must give due consideration to the context in which the test was administered. Similarly, when interpreting the profile of a respondent who has obtained a high score on any of the impression management scales, the test user should use their knowledge about the demand characteristics of the assessment process to identify those factor scores that may be distorted.

INTERPRETING THE GLOBAL FACTOR SCORES

The next step in interpreting the 15FQ+ profile is to review the Global Factor scale scores. These Global Factors assess the big five personality dimensions, about which much has been written (Goldberg 1990; Tupes & Crystal 1961; Costa & McCrae 1987). The Global Factor scale names, as well as a brief description of their meanings, are presented in Table 1. When interpreting these factors, it should be noted that they provide a 'broad-based approach' to describing the respondent's personality - only indicating the respondent's general personality orientation. The respondent's scores on these dimensions thus provide the test user with an overall orientation to the respondent's character, and provide a basis for integrating the primary source traits within this 'broader picture'. Thus, when interpreting the meaning of these global personality factors, the test user should bear in mind that these Global Factor scores are calculated from the sixteen source traits assessed by the 15FQ+.

When interpreting the global factor scores, the test user should examine whether each of the primary source traits that contribute to that Global Factor are in the same direction as the Global Factor score. Thus, if the respondent has a high Global Factor Extraversion score, and has above average scores on each of the primary source traits that contribute to extraversion (f^fA , f^fE , f^fH and f^fQ_2), then it is likely that the respondent will act in a consistently extraverted manner. If, however, the respondent has low scores on any of the primary source traits that contribute to the global extraversion factor, then it should be noted that the respondent is unlikely to have all the characteristics of a typical extravert. For example, if the respondent has a low score on Factor f^fA , they may lack warmth, empathy and interest in others, while still having a broadly extraverted personality. Similarly, if they have a low score on Factor f^fH , they may be lacking in social boldness and social presence and be somewhat slower than a typical extravert to come forward in social settings. However, they are still likely to be interested in people, to be sociable, friendly outgoing and fun-loving.

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DEFINITIONS OF GLOBAL FACTORS

E**Extraversion**

Orientated to the outer world of people, events and external activities. Needing social contact and outside stimulation.

f^fA+ , f^fF+ , f^fH+ , f^fQ_2-

Introversion

Orientated towards their own inner world of thoughts, perceptions and experiences. Not requiring much social contact and stimulation.

f^fA- , f^fF- , f^fH- , f^fQ_2+

N**Low anxiety**

Well adjusted, calm, resilient, and able to cope with emotionally demanding situations.

f^fC+ , f^fL- , f^fO- , f^fQ_4-

High anxiety

Vulnerable, touchy, sensitive, prone to mood swings, challenged by emotionally gruelling situations.

f^fC- , f^fL+ , f^fO+ , f^fQ_4+

O**Pragmatism**

Influenced more by hard facts and tangible evidence than subjective experiences. May be insensitive to people and subtleties.

f^fA- , f^fI- , f^fM- , f^fQ_1-

Openness (to experience)

Influenced more by new ideas, feelings and sensations than tangible evidence and hard facts. Open to possibilities and subjective experiences.

f^fA+ , f^fI+ , f^fM+ , f^fQ_1+

A**Independence**

Actively self-determined in own thoughts and actions. Independent minded. Can be intractable, strong-willed and confrontational.

$B+$, f^fE+ , f^fL+ , f^fQ_1+

Agreeableness

Agreeable, tolerant and obliging. Neither stubborn, disagreeable nor opinionated, will be happy to compromise.

$B-$, f^fE- , f^fL- , f^fQ_1-

C**Low self-Control**

Exhibiting low levels of self-control and restraint. Not influenced by social norms and internalised parental expectations.

f^fG- , f^fN- , f^fQ_3-

High self-Control

Exhibiting high levels of self-control determined by social norms and internalised parental expectations.

f^fG+ , f^fN+ , f^fQ_3+

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INTERPRETING THE 16 PRIMARY FACTOR SCORES

Once the Global Factor scores have been interpreted, then the test user should start considering the significance of the primary source traits.

As stated earlier, the 15FQ+ primaries were originally discovered using factor analysis. The particular technique of analysis that was adopted at that time made the assumption that personality characteristics would be related. Hence as a number of different primary factors contribute to the same Global Factor, the 15FQ+ user can expect these to vary in a consistent manner. So generally, the test user would expect a respondent who scores highly on Factor f^fA , (Empathic), also to score highly on f^fF (Enthusiastic) and f^fH (Socially-bold) and low on f^fQ_2 (Group-Orientated).

While this may generally be the case, a cursory glance at the factor scores might suggest that there are inconsistencies in the personality profile. For example, a respondent might be high on Factor f^fE (Dominance) but low on Factor f^fH (Social Boldness). This is where the richness of the 15FQ+ model starts to become apparent. Such a profile is not a contradiction, as the meaning of such a profile should be interpreted in terms of the respondent's broader personality dynamics. For example, if the respondent were also to have a high score on Factor f^fL (Suspiciousness), then this would suggest that they are likely to be resentful and hostile towards others, as they will wish to assert themselves and control others, but will have difficulty doing so due to their lack of Social Boldness. Alternatively, if such a respondent had a high score on Factor f^fQ_4 , then it is likely that they will bottle up their desire to control situations (due to their low Factor f^fH score), but occasionally let this frustration out in uncontrolled bursts of anger.

In interpreting 15FQ+ profiles, it is important that the user treat the initial report as a series of hypothesis that need corroboration through other sources of evidence, ideally, in a feedback session with the respondent.

The factor definitions on the following pages give a broad definition of the meanings of high and low scores respectively. They also provide a guide as to how high and low scorers generally see themselves. The extent to which an individual exhibits all or some of the behaviours associated with each trait will depend on how high or low their scores are on a particular factor and the extent to which that factor is influenced by the other traits measured.

An average score on a scale indicates that the respondent is likely to exhibit some of the behaviour patterns associated with both scale extremes.

FACTOR *f*A

Distant Aloof, Lacking empathy, Distant, Detached, Impersonal

Low scorers tend to be cool, distant and somewhat aloof in their interpersonal relationships. They are disinclined to express their feelings and may feel somewhat uncomfortable with people who are overly friendly or familiar. Being extremely private individuals, they are likely to relate to others in an impersonal manner and may be seen as being somewhat detached and distant by all but their closest friends. They are likely to have difficulty understanding others' feelings, and may be viewed as lacking in empathy and warmth. They dislike talking about personal matters and will be slow to express sympathy or understanding for other's personal problems. Having a low need for affiliation, they are inclined to be cautious when forming close relationships and attachments.

Low scorers say:

People rarely confide in them. They are not quick to offer sympathy and encouragement to friends and colleagues. They find it difficult to relate to others' feelings.

Empathic, Friendly, Personable, Participating, Warm-hearted, Caring

High scorers are friendly, warm, participating individuals who are interested in the people around them and have a natural understanding of 'what makes others tick'. Quick to offer support and encouragement to friends and colleagues, they will be viewed as good listeners. Their interest in other people means they are likely to remember personal details about the people they meet, and be generous in interpersonal relationships. Their natural understanding and empathy for others' feelings, means they will be seen as sympathetic, concerned, caring individuals. Warm-hearted, and attentive to the needs of others, they are likely to be valued team members. Expressing their feelings in a genuine, heartfelt manner, they will have a friendly, personable interpersonal style.

High scorers say:

People often confide in them. They often phone friends for a chat. They find it rewarding to help others. They enjoy buying presents for other people.

Correlations with other factors: Factor *f*A contributes to the Extraversion Global Factor, along with Enthusiastic (*f*F+), Socially Bold (*f*H+) and Group-orientated (*f*Q₂-). This reflects the fact that high *f*A scores (Empathic) are associated with an interest in, and a desire to seek closeness to, other people. Factor *f*A also correlates with Factor *f*I (Hard-headed), indicating that low Factor *f*A (Distant Aloof) scores are often associated with a tough, unsentimental, utilitarian interpersonal style.

Correlation with other test scales

NEO: warmth 0.45, tendermindedness 0.45

JTI: EI 0.52, TF 0.53

OPP: Gregarious 0.44

Bar-on: Empathy 0.66, Emotional Self-Awareness

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INTELLECTANCE B

Low Intellectance, Lacking confidence in own intellectual abilities

Low scorers are likely to lack confidence in their own intellectual abilities. Thus, they may be disinclined to work on intellectually demanding tasks, which they may be prone to view as being 'beyond them'. They are inclined to view themselves as not having a particularly large vocabulary, and as lacking a broad range of general knowledge. Thus, they may be disinclined to discuss issues, which may be considered to be 'high brow'. They may feel uncomfortable in situations where they have to explain complex ideas to others, possibly feeling somewhat 'out of their depth'.

High Intellectance, Confident of own Intellectual Abilities

High scorers are confident of their own intellectual ability. As a result, they are likely to enjoy working on tasks that are intellectually demanding and challenging. Intellectually orientated, they will generally be keen to learn new information and acquire new intellectual skills. They may be quick to take advantage of situations in which they can display their knowledge and intellectual prowess. As a result, they may be prone to use long words and talk about intricate, intellectual matters. Moreover, they are likely to enjoy explaining complex ideas and problems to others.

Note: Scores on Intellectance Scale B should be interpreted with reference to a respondent's reasoning ability - as assessed by timed reasoning tests.

Low scorers say:

They do not enjoy working on complex, intellectually demanding, tasks. They find it confusing when people use long words. It takes them a while to appreciate the key points in complex arguments.

High scorers say:

They have a good vocabulary and a good level of general knowledge. Other people often ask them to explain things to them. They learn things more quickly than most people.

Correlations with other factors: Intellectance Scale B contributes to the Independence Global Factor, along with Dominant (*fE+*), Suspicious (*fL+*) and Radical (*fQ₁+*). This reflects the fact that high Intellectance Scale B scores are associated with an independent minded self-assurance. Intellectance Scale B also correlates modestly with Factor *fE* (Dominant) and Factor *fO* (Confident). This indicates that low Intellectance Scale B scores are associated with a lack of confidence in their own intellectual abilities.

Correlation with other test scales

NEO: Competence 0.52, Assertiveness 0.50, Modesty -0.41



FACTOR *ffC*

Affected by Feelings, Emotional, Changeable, Labile, Mood

Low scorers are inclined to experience mood swings. Lacking emotional resilience, they may at times have difficulty summoning up sufficient energy to face demanding situations. Prone to experience anxiety symptoms, they may find themselves being troubled by sleep problems, psychosomatic symptoms, phobias, etc. Moreover, they may occasionally find themselves bothered by feelings of depression or despondency. They may sometimes 'over-react' to situations, with their judgement being clouded by their strong emotional reactions. They are likely to be changeable, and may be viewed as being fickle, moody or capricious. However, their emotional temperament may also be a source of drive, spurring them on to resolve situations they find unsatisfactory or unrewarding.

Low scorers say:

They are often troubled by feelings of boredom, lethargy and tiredness. From time to time they experience a variety of anxiety symptoms and/or minor health concerns.

Emotionally Stable, Mature, Calm, Phlegmatic

High scorers are likely to be emotionally stable, steady, resilient individuals. They rarely experience anxiety symptoms and are likely to have more than sufficient energy to meet life's challenges. Phlegmatic and inclined to 'take most things in their stride', they are rarely ruffled by life's ups and downs. Thus, they are unlikely to experience feelings of depression or despondency. As a result, however, they may be viewed as somewhat lacking in emotion, drive or passion. They tend to be confident and secure in themselves, and satisfied with their life and their achievements. Sometimes this may prompt them to become complacent, or overly accepting of unsatisfactory situations. Others are likely to view them as being mature, dependable individuals who can be relied upon to cope in a crisis.

High scorers say:

They rarely experience mood swings. They wake feeling refreshed, looking forward to the new day. They experience few anxiety symptoms.

Correlations with other factors: Factor *ffC* contributes to the Anxiety Global Factor, along with Self-doubting (*ffO+*), Tense-driven (*ffQ₁+*) and Suspicious (*ffL+*). This reflects the fact that high *ffC* scores (Affected by Feelings) are associated with high levels of anxiety, tension and threat sensitivity. Factor *ffC* also correlates modestly with Factor *ffH* (Retiring), indicating that low Factor *ffC* (Affected by Feelings) scores are often associated with a tendency to feel anxious in social settings and worry about the impression they create.

Correlation with other test scales

NEO: Anxiety -0.69, Depression -0.69, Vulnerability -0.60

OPP: Phlegmatic 0.37

Bar-on: Self Regard 0.52, Stress Tolerance 0.47, Reality Testing 0.42

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FACTOR *ffE*

Accommodating, Passive, Mild, Humble, Deferential

Co-operative, accommodating and obliging, low scorers tend to give way to others. Passive and unassuming, they will be keen to avoid upsetting friends and colleagues. As a result, they may have difficulty when called upon to take charge of situations and give orders. Self-effacing, humble and mild-mannered, they are likely to be modest and deferential in their inter-personal relationships. They may lack aggression, and be inclined to be passive and overly compliant when dealing with assertive, self-assured individuals. Quick to acquiesce to others' wishes, they may have difficulty 'standing their ground' and asserting their own views and opinions when faced with active disagreement from others. They dislike conflict, arguments and discord, which they are likely to avoid at all costs; even if this means ignoring their own personal needs and goals.

Low scorers say:

They dislike taking the lead and telling people what to do. They try not to force their opinions on others. They try to avoid disagreeing with other people.

Dominant, Assertive, Competitive, Aggressive, Forceful

Determined to get their own way, high scorers may on occasion be aggressively assertive and pushy when dealing with others. Forceful, and vocal in expressing their opinions, they may be seen as opinionated, or even somewhat dogmatic. Not being unduly concerned about upsetting people, they may be disinclined to listen to others' points of view. Thus they may have difficulty compromising, and conceding that others may have a valid point. On occasion, they may 'ride roughshod' over less assertive colleagues, alienating people who do not agree with them. Feeling free to criticise others, they may generate conflict and discord in those around them. They are happy to take charge of a situation, and give clear instructions and orders, but may be overly controlling and domineering with less assertive colleagues.

High scorers say:

They are not afraid of upsetting people. They will freely complain about the quality of a service. They can be tough and sharp with people when needed.

Correlations with other factors: Factor *ffE* contributes to the Independence Global Factor, along with Intellectance ($\beta+$), Suspicious ($ffL+$) and Radical (ffQ_{1+}). This reflects the fact that high *ffE* scores (Dominant) are associated with an independent minded, direct and determined interpersonal style. Factor *ffE* also correlates modestly with Factor *ffO* (Self-doubting), indicating that low Factor *ffE* (Accommodating) scores are often associated with a lack of social confidence and a tendency to worry about how others may view them.

Correlation with other test scales

NEO: Assertiveness 0.69, Modesty -0.60, Compliance -0.55

OPP: Assertive 0.65, Persuasive 0.65

Bar-On: Assertiveness 0.53, Independence 0.48

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FACTOR *ff*F**Sober Serious**, Restrained, Taciturn, Cautious

Low scorers are restrained individuals whom others may view as being rather dour and lacking in a sense of fun. Serious minded, and somewhat inhibited, they are disinclined to attend social events and functions. Their belief is that it is important to maintain appropriate restraint and decorum in social settings. This may cause others to view them as taciturn or saturnine. They have little time for light-hearted, trivial entertainment, preferring instead to engage in more serious, uplifting activities. They find it difficult to 'let their hair down' and have a good time. Lacking a sense of playful spontaneity, and joie de vivre, they may appear somewhat constricted or stiff in social situations. They are likely to have fewer friends than most people, and it may take others a while to warm to them.

Low scorers say:

They dislike loud music and large, noisy parties. They prefer quiet pastimes and hobbies. They tend not to drop in unexpectedly on friends.

Enthusiastic, Lively, Cheerful, Happy-go-lucky, Carefree

High scorers are lively, talkative individuals who enjoy 'letting go' and 'having a good time'. Always 'game for a laugh', they will be keen to take part in any activity that promises fun, thrills and excitement. Drawn to stimulating social situations, they may on occasion act in a somewhat attention seeking manner. Moreover, their sense of fun, and effervescent, carefree character, may cause them on occasion to step beyond the bounds of decorum. Light-hearted, cheerful, easy-going individuals, people are likely to view them as being 'young at heart' and carefree. Actively seeking excitement and stimulation, they are quick to act, and enjoy 'getting stuck into things'. Happy-go-lucky and fun-loving, others are likely to appreciate their enthusiasm for life and their joie de vivre.

High scorers say:

They regularly go out with the express intention of having fun. They are lively, talkative, fun-loving individuals. They like to be surrounded by people.

Correlations with other factors: Factor *ff*F contributes to the Extraversion Global Factor, along with Socially-bold (*ff*H+), Group-orientated (*ff*Q₂-) and Empathic (*ff*A+). This reflects the fact that high *ff*F scores (Enthusiastic) are associated with a desire to have fun, and actively participate in social and group activities. Factor *ff*F also correlates modestly with Factor *ff*N (Restrained), indicating that low Factor *ff*F (Sober-serious) scores are often associated with a socially restrained, diplomatic reserve.

Correlation with other test scales

NEO: Gregarious 0.63, Positive Emotions 0.45, Excitement 0.41

JTI: EI 0.68

OPP: Gregarious 0.64

Bar-On: Happiness 0.41

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FACTOR *ff*G**Expedient**, Spontaneous, Disregarding of rules and obligations

Low scorers tend to lack a strong sense of duty, and may have difficulty persevering with boring or repetitive tasks. They are inclined to disregard well-established rules, and set procedures, which they may view as stifling creativity and spontaneity. Thus, they are inclined to be somewhat careless when attending to detail. They generally approach tasks in an expedient, casual manner, preferring to solve problems as they arise rather than follow a detailed action plan. They may be untidy, and possibly somewhat disorganised, or even a little chaotic, in their both their home and work life. Flexible and spontaneous, they are inclined to view things 'from the broader perspective'. They are likely to prefer attending to issues of strategy, rather than be responsible for creating detailed plans and work schedules.

Low scorers say:

They are not particularly tidy or neat. They rarely double check things. They do not enjoy making detailed plans. They often misplace things.

Conscientious, Persevering, Dutiful, Detail-conscious

High scorers have a strong sense of duty and responsibility. They are persevering and are inclined to be neat, tidy and well organised. They are likely to set high standards both for themselves and for others. They believe it is important to be detail-conscious, precise and exacting in their work. On occasion they may be somewhat obsessive, perfectionistic or rigid. Thus, they may be prone to obsessive-compulsive symptoms (e.g. repeatedly checking, or counting, the same thing, etc.). Meticulous, and systematic in their work, they will be keen to make sure that things are done 'just right'. As a result, they may find that others do not always live up to their own high standards. They may have difficulty viewing things from 'the broader perspective', and on occasion 'may not see the wood for the trees.'

High scorers say:

They are systematic and orderly in their work. They can be perfectionistic. They dislike working in untidy surroundings. They like to have a routine to follow.

Correlations with other factors: Factor *ff*G contributes to the Control Global Factor, along with Restrained (*ff*N+) and Self-disciplined (*ff*Q₃ +). This reflects the fact that high *ff*G scores (Conscientious) are associated with responsibility, an attention to detail and, a preference for well established procedures and routine. Factor *ff*G also correlates modestly with Factor *ff*M (Abstract), indicating that low Factor *ff*G (Expedient) scores are associated with a spontaneous, flexible openness and tendency to view things from the broader perspective.

Correlation with other test scales

NEO: Order 0.75, Achievement 0.44

JTI: JP 0.78

OPP: Flexible -0.58

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FACTOR *ff*H

Retiring, Timid, Socially anxious, Hesitant in social settings, Shy

Shy and retiring, low scorers may be slow to come forward in social situations. They do not find it easy to start conversations with strangers, and as a result it may take others a while to get to know them. If they suddenly, and unexpectedly, become the focus of attention at a social gathering, they may find themselves feeling embarrassed or self-conscious. They may be prone to feelings of 'stage fright', and are likely to be slow to speak up and express their views and opinions in front of people they do not know well. At parties and social events they may find themselves slipping into the background. They may feel ill at ease and self-conscious if they have to speak in front of a large group of people. In group situations they may be inclined to 'take a back seat' and let others do the talking.

Low scorers say:

They feel uncomfortable around strangers. They dislike speaking in public. It takes them a while to get to know new people. They tend not to 'speak up' in meetings.

Socially-bold, Venturesome, Talkative, Socially confident

Quick to come to the fore in social settings, high scorers will be seen as venturesome, socially bold individuals. They feel self-assured and confident in most social settings, and are likely to be happy speaking in front of a large audience. In fact, they may actively seek out roles that place them 'in the lime light' and give them an opportunity to 'perform on the social stage'. Quick to initiate social contacts, they are good conversationalists who enjoy meeting new people. Whatever the setting, they usually have something to say, and readily contribute to group discussions and debates. They are likely to be good at 'making small talk', and bringing 'others out of their shell'. Natural, easy communicators, they are likely to make a big impression on the people they meet.

High scorers say:

They enjoy meeting new people. They find it easy to start conversations with strangers. They would enjoy 'going on the stage'. They are quick to express their opinions.

Correlations with other factors: Factor *ff*H contributes to the Extraversion Global Factor, along with Enthusiastic (*ff*F+), Group-orientated (*ff*Q₂-) and Empathic (*ff*A+). This reflects the fact that high *ff*H scores are associated with a tendency to participate in social and group activities in lively, enthusiastic manner. Factor *ff*H also correlates modestly with Factor *ff*E (Accommodating), indicating that low Factor *ff*H (Retiring) scores are associated with a tendency to take a 'back seat' in meetings and group discussions, and give way to more assertive, self-assured colleagues.

Correlation with other test scales

NEO: Self-Conscious -0.57, Modesty -0.50

JTI: EI 0.62

OPP: Gregarious 0.64, Persuasive 0.62

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FACTOR $f^f I$

Hard-headed, Utilitarian, Unsentimental, Lacks aesthetic sensitivity, tough-minded

Low scorers lack aesthetic sensitivity and have little interest in cultural or artistic matters. They are rarely moved by feelings of beauty, wonderment or awe – adapting rather a tough-minded, no-nonsense approach to life. Having little time for subjective, creative matters, they will be primarily concerned with whether things work efficiently - giving little thought to aesthetic considerations such as design. They are likely to enjoy working with their hands and fixing things, participating in, and watching, sports and other physical activities. Others may see them as lacking refinement, culture or sophistication. They will, however, view themselves as utilitarian realists who have little time for 'artistic people'. Their decisions will be based on rational, functional considerations rather than being influenced by sentiment.

Low scorers say:

They enjoy sports such as boxing and ice- hockey. They have never cried during a sad film. Sponsoring the arts is a waste of money. They do not appreciate poetry.

Tender-minded, Sensitive, Aesthetic aware, Sentimental

High scorers have a strong interest in cultural and artistic activities and pursuits. They are likely to have refined sophisticated tastes and to appreciate fine art, literature, music etc. Highly subjective in their outlook, they often respond to situations and events at an intuitive, emotional level. Focusing on the subtle, aesthetic aspects of a task, they are unlikely to have much interest in science or engineering. They may be viewed as being impractical or 'arty', and are unlikely to approach problems in a particularly task-focused way. Their decisions are likely to be swayed by sentiment, rather than being based on cool, rational logic, or a utilitarian focus on 'what works.' Creative, aesthetically sensitive individuals, they will generally have little interest in working with their hands, or in fixing or repairing things.

High scorers say:

They are often moved by the beauty of nature. They enjoy romantic or historical novels. They enjoy theatre, ballet etc. They enjoy visiting art galleries and museums.

Correlations with other factors: Factor $f^f E$ contributes to the Openness (to ideas) Global Factor, along with Empathic ($f^f A+$), Abstract ($f^f M+$) and Radical ($f^f Q_1+$). This reflects the fact that high Factor $f^f I$ (Tender-minded) scores are associated with an openness to feelings, and to new, radical, artistic ideas. Factor $f^f I$ also correlates modestly with Factor $f^f O$ (Confident), indicating that low Factor $f^f I$ (Hard-headed) scores are associated with a tendency to take a realistic, unsentimental approach towards life.

Correlation with other test scales

NEO: Aesthetics 0.44

JTI: SN -0.55, TF -0.46

OPP: Pragmatic -0.60

Bar-On: Self Advatisation 0.44

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FACTOR f^L **Trusting**, Accepting, Unsuspecting, Credulous

Low scorers tend to take people at face value, rather than question their motives. They are quick to place their faith in others, believing that most people are dependable and trustworthy. Not in the least cynical, they are likely to have a positive view of human nature, believing that people are basically kind, thoughtful and genuinely concerned about the welfare of others. Not at all suspicious or sceptical, they may on occasion appear to be a little naïve or somewhat unsophisticated. Inclined to give others the benefit of the doubt, they may on occasion be overly trusting. If others take advantage of their trust or good-will, they are likely to feel let down. However, only in the most extreme circumstances will such events prompt them to question their positive, trusting view of human nature.

Low scorers say:

People are basically honest and trust-worthy. Most people are genuinely concerned about the welfare of others. It's best to trust other people.

Suspicious, Sceptical, Cynical, Doubting, Critical

High scorers tend to be doubtful and mistrusting of others' motives. Not inclined to take things at face value, they tend to reserve their judgements about people until they have hard, irrefutable evidence of their trustworthiness and honesty. Adopting a suspicious and sceptical approach to life, others may view them as being rather jaded or cynical. Inclined to believe that people are likely to try to take advantage of their goodwill if given the chance, they may have difficulty forming close, trusting relationships. They are likely to adopt a machiavellian, cynical approach to interpersonal relationships. This may reflect either a tendency to be manipulative in interpersonal relationships or, alternatively, may be due to them having been repeatedly let down by others in the past.

High scorers say:

Only the gullible and naïve place their faith in others. Most people are only concerned about themselves. Most people will do almost anything for money.

Correlations with other factors: Factor f^L contributes to the Independence Global Factor, along with Intellectance ($\beta+$), Dominant (f^E+) and Radical (f^Q_1+). This reflects the fact that high f^L scores (Suspicious) are associated with a tendency to be questioning, doubtful and somewhat machiavellian in interpersonal relationships. Factor f^L also correlates modestly with Factor f^O (Confident), indicating that low Factor f^L (Trusting) scores are associated with a tendency to be more confident and trusting in interpersonal relationships.

Correlation with other test scales

NEO: Trust -0.74

JTI: TF 0.45

OPP: Trusting -0.82

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FACTOR *f*M

Concrete, Solution-focused, Realistic, Practical, Down-to-earth

Low scorers tend to be practical, down-to-earth realists. They are more concerned to ensure that things work, rather than explore how or why they work. Firmly grounded in the here-and-now, they tend to be very matter of fact in their outlook. Concrete thinkers, they are inclined to reject abstract, theoretical perspectives. As a result, they may be disinclined to look beyond the obvious facts in a given situation in search of broader possibilities and perspectives. As a result, others may view them as being rather pedestrian or unimaginative in their outlook. Focusing on observable facts and hard data, they may on occasion be overly concrete or literal in their thinking style. Not in the least prone to flights of fantasy, and not inclined to day-dream, they will be viewed as sensible pragmatists, whose decisions emphasise the practicable and achievable.

Low scorers say:

They prefer to work on practical, concrete problems. They rarely find themselves deeply engrossed in thought. They value realism over insight.

Abstract, Imaginative, Absent-minded, Impractical, Absorbed in thought

High scorers are creative, imaginative individuals who have a strong interest in abstract, theoretical ideas. Lacking concern for practical, day-to-day realities, they may be seen as being somewhat 'other worldly'. Concerned to understand fundamental principles and concepts, they are likely to have little interest in mundane, practical matters; which they may not give due consideration and thought to. Naturally inclined to look beyond the obvious facts in a given situation, they are likely to come up with novel, innovative ideas. Without clear goals, however, they may find themselves being carried away by their own thoughts and ideas, which may sometimes be quite unrealistic or fanciful. Orientated towards the world of fantasy and imagination, they may often become engrossed in their own ideas and lost in thought to the exclusion of practical realities.

High scorers say:

They are interested in philosophical issues. They are idealists. They sometimes engage in wild flights of fantasy. Some of their ideas are unrealistic or fanciful.

Correlations with other factors: Factor *f*M contributes to the Openness (to ideas) Global Factor, along with Empathic (*f*A+), Tender-minded (*f*I +) and Radical (*f*Q₁ +). This reflects the fact that high Factor *f*M (Abstract) scores are associated with an openness to abstract theoretical ideas and a tendency to become lost in thought. Factor *f*M also correlates modestly with Factor *f*G (Conscientious) and Factor *f*Q₃ (Self-disciplined), indicating that low Factor *f*M (Concrete) scores are associated with a tendency to take a task-focused, realistic approach to problems, and a preference for working on real-work, achievable goals.

Correlation with other test scales

NEO: Fantasy 0.67, Ideas 0.37

JTI: SN -0.68

OPP: Pragmatic 0.57

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FACTOR *f*N

Direct, Genuine, Artless, Open, Forthright, Straightforward

Low scorers tend to be direct and to the point in their social interactions. On occasion, this may even verge on them being somewhat blunt or tactless. Thus, others are likely to view them as lacking discretion or social sophistication. Genuine, forthright individuals, who are open and straightforward, they are unlikely to be manipulative in their interpersonal relationships. Having little concern for the impression they create in social situations, they may on occasion express their views in an artless or ill-considered manner. Inclined to 'put their cards on the table', others are likely to know where they stand with them. Most people will appreciate their honest, open, genuineness. However, lacking awareness of the nuances of social situations, they may on occasion pass ill-considered, thoughtless comments.

Low scorers say:

They sometimes say things that shock people. They are inclined to 'speak first and think later'. They can be blunt and tactless on occasion.

Restrained, Diplomatic, Socially astute, Shrewd, Socially aware, Discreet

High scorers tend to be diplomatic and restrained in their social interactions. Acutely aware of the subtle nuances of social settings, they are likely to be concerned not to do or say anything that may seem out of place. As a result others are likely to consider them to be shrewd and socially astute. Conscious of the impact they make on those around them, they are inclined to monitor their behaviour closely to ensure that they do not upset or offend others. Naturally discrete and diplomatic, others may view them as being excessively guarded private individuals. Shrewd and socially aware, they may on occasion be somewhat manipulative in interpersonal relationships. Tending to 'play their hand close to their chest', they may often be reluctant to reveal their true feelings and opinions.

High scorers say:

They are careful not to use language others may consider inappropriate. They dislike loud, noisy, uncouth people. They are careful of the impression they create.

Correlations with other factors: Factor *f*N contributes to the self-Control Global Factor, along with Conscientious (*f*G+) and Self-disciplined (*f*Q₃+). This reflects the fact that low *f*N scores (Direct) are associated with a tendency to freely express views and opinions heedless of the social consequences of doing so. Factor *f*N also correlates modestly with Factor *f*E (Accommodating) and Factor *f*H (Retiring), indicating that high Factor *f*N (Restrained) scores are associated with a strong tendency to show restraint and decorum in social situations, and a sensitivity to protocol and social expectations.

Correlation with other test scales

NEO: Compliance 0.46, Deliberation 0.40

Bar-On: Emotional Self Awareness 0.40, Interpersonal Relationships 0.41, Social Responsibility 0.45,

Empathy 0.36

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FACTOR *f*0

Confident, Secure, Self-assured, Unworried,
Guilt- free

Low scorers are confident of their ability to deal successfully with life's challenges. As a result, they rarely worry about anticipated problems or difficulties. Secure and self-assured, they are rarely troubled by feelings of guilt or self-doubt. To others, they may on occasion appear to be overly confident, possibly lacking insight into their own personal weaknesses or failings. On occasion, their lack of self-doubt and unquestioning belief in their own abilities may cause them to be heedless of potential difficulties or problems. Not in the least apprehensive about facing potential challenges or threats, they rarely dwell on past problems and difficulties. Satisfied with their own achievements and accomplishments, they may be inclined to disregard potential opportunities for self-evaluation, self-improvement and growth, believing that it is not needed.

Low scorers say:

They rarely dwell on past mistakes and failures. They are not troubled by feelings of self-doubt. They rarely worry about the future or about what others think of them.

Correlations with other factors: Factor *f*0 contributes to the Anxiety Global Factor, along with Affected by Feelings (*f*C-), Tense-driven (*f*Q₄) and Suspicious (*f*L-). This reflects the fact that high *f*0 scores (Self-doubting) are associated with a tendency to be worrying, apprehensive and lacking confidence in their own abilities. Factor *f*0 also correlates modestly with Factor *f*H (Socially-bold), indicating that low Factor *f*0 (Confident) scores are associated with a tendency to feel untroubled and self-assured in social settings and not worry about the impression others form of them.

Correlation with other test scales

NEO: Self Conscious 0.62, Anxiety 0.57, Vulnerability 0.47

OPP: Phlegmatic -0.64, Pessimistic 0.46

Bar-On: Self regard -0.52, Optimism -0.49

Self-doubting, Worrying, Insecure,
Apprehensive

High scorers tend to be self-reproaching and troubled by feelings of insecurity and self-doubt. Threat sensitive, they tend to focus on anticipated dangers and pitfalls. Often fearing the worst, they may feel apprehensive when faced with new, unexpected challenges. Their natural apprehension and self-doubt may spur them on to perfect their own skills and abilities, so as to be better able in the future to deal successfully with challenges. However, their lack of self-confidence, and tendency to doubt their own abilities, may on occasion prompt them to appear tentative, indecisive or lacking in resolve. Guilt prone, they may find themselves dwelling on past, often imagined, failures or mistakes. Sensitive to what others may think of them, they may often need reassurance from those around them.

High scorers say:

They find the thoughtless comments of some people upsetting. They are often troubled by feelings of guilt and they are easily discouraged by criticism.

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FACTOR f^fQ_1

Conventional, Traditional, Conservative, Conforming

Low scorers tend to be quite conventional in their outlook. They value traditional, tried and tested methods and are likely to be wary of change for change's sake. They are inclined to question innovation, often believing that new approaches represent little more than 'change for change's sake'. Accepting of the status quo, they approach life with the motto 'if it's not broken, don't fix it'. As a result they may be overly accepting of the status quo, seeing little reason to innovate. Valuing convention and tradition, more radical colleagues may see them as being 'stick in the muds' who are not open to new ideas. Disliking change, they may on occasion reject novel, innovative ideas out of hand. They are likely to feel uncomfortable in rapidly changing environments that demand constant innovation, adaptation and adjustment.

Low scorers say:

It's generally best to follow tried and tested methods. They dislike breaking with tradition. They value custom and convention. They are conservative in their outlook.

Radical, Experimenting, Open to change, Unconventional

High scorers value progress, innovation and change. They are inclined to reject tried and tested methods in favour of new, radical approaches to problems - even if these are unproven. Their attitudes and opinions are likely to be fairly unconventional, with a tendency to question the status quo. They dislike 'getting stuck in a rut', and will prefer to work in environments where they are free to initiate change, experiment and innovate. They may on occasion be overly quick to reject received opinion, which they may be inclined to dismiss 'out of hand' as being no more than 'old hat'. As a result, they may sometimes ignore the value of acquired wisdom and knowledge. They will be comfortable working in rapidly changing environments, which require constant adaptation and adjustment.

High scorers say:

They like to dress in an unconventional manner. Their views and opinions are very different from those of most people. They rarely see the point of following tradition.

Correlations with other factors: Factor f^fQ_1 contributes to the Openness (to ideas) Global Factor, along with Empathic (f^fA+), Tender-minded (f^fI+) and Abstract (f^fM+). This reflects the fact that high Factor f^fQ_1 (Radical) scores are associated with an openness to new ideas and a willingness to break with tradition. Factor f^fQ_1 also correlates modestly with Factor f^fQ_3 (Self-disciplined), indicating that low Factor f^fQ_1 (Conventional) scores are associated with a tendency to value social protocol and convention and a desire to preserve tradition.

Correlation with other test scales

NEO: Actions 0.46, Values 0.46, Ideas 0.44

OPP: Flexible 0.51

Bar-On: Independence 0.36, Assertiveness 0.36

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FACTOR f^fQ_2

Group-orientated, Sociable, Group dependent, a 'Joiner'

Low scorers like to be surrounded by people. They prefer to take decisions in discussion with others, rather than act in an autonomous, independent manner. They dislike being on their own for long periods of time and may have difficulty working in environments that do not provide high levels of social contact. They like to take an active part in social affairs and will generally be happy to join social organisations, participate in committees, etc. Being extremely group-orientated, they may have difficulty functioning effectively in situations where they have to work independently from others and where social support is not freely available. They are likely to enjoy team-work, but on occasion their strong need for social contact may interfere with their ability to complete work independently of others.

Low scorers say:

They quickly become bored when they are on their own. They prefer working as part of a team. They have their best ideas when discussing things with others.

Self-sufficient, Solitary, Self-reliant, Individualistic

High scorers are autonomous, self-sufficient individuals who prefer to take decisions on their own, rather than in discussion with others. They dislike working in team settings and may be reluctant to ask others for help or advice. As a result, they may not always give sufficient regard to public opinion, or others' expectations, when making decisions. They are comfortable spending time on their own, and are likely to be happy in occupations that offer little social support or contact. They will prefer to avoid becoming actively involved with committees and group activities. They enjoy solitary pastimes, with others possibly viewing them as being somewhat reclusive, or even a little taciturn by nature. As a result, they may not always attend to the interpersonal aspects of a task.

High scorers say:

They try to avoid becoming involved with groups and social organisations. They find being surrounded by people distracting. They like doing things on their own.

Correlations with other factors: Factor f^fQ_2 contributes to the Extraversion Global Factor, along with Enthusiastic (f^fF+), Socially-bold (f^fH+) and Empathic (f^fA+). This reflects the fact that low f^fQ_2 (Group-orientated) scores are associated with a desire to be surrounded by people and participate in social and group activities. Factor f^fQ_2 also correlates modestly with Factor f^fN (Restrained), indicating that high Factor f^fQ_2 (Self-sufficient) scores are often associated with a social reserve and tendency to withdraw from social interactions and group activities.

Correlation with other test scales

NEO: Gregariousness -0.67, Warmth -0.43

JTI: EI -0.48

OPP: Gregarious -0.64

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FACTOR f^fQ_3

Informal, Undisciplined, Uncontrolled, Lax,
Follows own urges

Low scorers have little concern for their social standing or reputation. Tending to question authority, they believe that respect has to be earned rather than simply being due to one's position or rank. Believing that it is important to be free-thinking and 'true to oneself' they tend not to conform to traditional social mores - unless they are personally convinced of their value. Openly questioning accepted moral values, they believe that it is more important to follow the spirit of the law rather than obey it to the letter. As a result they are unlikely to be rigid or moralistic. They may lack discipline and self-control and are inclined to seek immediate gratification of their needs, wants and desires. As a result they may on occasion appear to be impetuous and they are likely to have difficulty conforming to strict rules and regulations.

Low scorers say:
Formality and protocol are unnecessary. It is important to bring children up to be free-thinking and open minded. Politeness and good manners are often over-valued.

Self-disciplined, Compulsive, Fastidious
Exacting willpower

High scorers are concerned to maintain their social standing and reputation. Valuing self-control and self-discipline, they are unlikely to seek immediate gratification of their own needs and desires. In fact, they may actively repress any thoughts or impulses that might be considered to be in any way socially unacceptable. They are respectful of authority, status and social position and believe it is important to follow correct protocol and procedure. They have a clear, well-defined set of moral values, which they believe it is important to adhere to. As a result, others may possibly view them as being somewhat moralistic or rigid. On occasion they may be a little dogmatic or obstinate. This, however, simply reflects the importance they attach to adhering to their strict code of conduct.

High scorers say:
It is important to show appropriate respect for authority. There is a great need for clear moral standards. People should exert more self-control.

Correlations with other factors: Factor f^fQ_3 contributes to the Control Global Factor, along with Conscientious (f^fG+) and Restrained (f^fN+). This reflects the fact that high f^fQ_3 scores (Self-disciplined) are associated with a diligent sense of duty and responsibility, and a strong moral imperative. Factor f^fQ_3 also correlates modestly with Factor f^fI (Tender-minded) and Factor f^fM (Abstract), indicating that low Factor f^fQ_3 scores (Informal) are often associated with a tendency to be free-thinking and questioning.

Correlation with other test scales
NEO: Feelings -0.54, Values -0.51
JTI: JP -0.46
OPP: Flexible -0.63

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FACTOR f^fQ_4 **Composed**, Relaxed, Placid, Patient

Low scorers tend to be relaxed and composed, dealing with frustrations in a calm, steady, easy-going manner. They can work under pressure without getting unduly 'wound-up' or tense. They are unlikely to become short-tempered or irritable if things go wrong. In general, they will be patient with friends and colleagues and tolerant of interruptions. They do not easily lose their temper and are not prone to angry outbursts or fits of rage. They are not easily frustrated by set-backs or failures and are rarely irritable or short-tempered. Others may view them as lacking motivation or drive, possibly appearing somewhat complacent when things go wrong. In general, they will find it easy to relax and unwind after a hard day and are unlikely to experience stress related health problems.

Low scorers say:

They sometimes find themselves shaking with rage. On occasion they have felt like smashing things. They quickly get frustrated with other people.

Correlations with other factors: Factor f^fQ_4 contributes to the Anxiety Global Factor, along with Emotionally Stable (f^fC^-), Self-doubting (f^fO^+) and Suspicious (f^fL^+). This reflects the fact that high Factor f^fQ_4 scores (Tense-driven) are associated with high levels of anxiety and tension, and a low level of frustration tolerance that prompts them to be short tempered and irritable. Factor f^fQ_4 also correlates modestly with Factor f^fN (Restrained), indicating that low Factor f^fQ_4 (Composed) scores are associated with a tendency to be calm, relaxed and placid in social settings - not being inclined to temper outbursts.

Correlation with other test scales

NEO: Angry hostility 0.80, Compliance -0.67, Impulsiveness -0.45

OPP: Contesting 0.40

Bar-On: Impulse Control -0.68

Tense-driven, Impatient, Low frustration tolerance

High scorers tend to be tense, impatient and hard-driving. Having low levels of frustration tolerance, at times they may appear as restless, fidgety or ill-at-ease. Due to their high levels of personal drive and resultant tense, nervous energy they are likely to be short-tempered with people or things that get in their way. They dislike being kept waiting and may quickly become annoyed or irritable when things go wrong. As a result others may view them as being temperamental, 'touchy' or easily offended. Driven to succeed, they may be prone to believe that the only way to ensure that something is done properly is to do it oneself. As a result, they are likely to have difficulty relaxing and may be prone to stress related health problems.

Note: Extremely high scores should be interpreted with caution, as these may reflect temporary high levels of stress, rather than stable personal traits.

High scorers say:

They rarely raise their voice or shout. They can't remember the last time they got really angry. They rarely get impatient with slow or indecisive people.

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PSYCHOMETRIC PROPERTIES OF THE 15FQ+

INTRODUCTION

This chapter will present details concerning the psychometric properties of the 15FQ+. The aim will be to show that the measure fulfils various technical requirements, in the areas of standardisation, reliability and validity, which ensure the psychometric soundness of the test.

In order to provide meaningful interpretations, the 15FQ+ was standardised against a representative UK sample of professional and males and females. This sample is described in the Standardisation section below.

Standardisation : Normative

Normative data allows us to compare an individual's score on a standardised scale against the typical score obtained from a clearly identifiable, homogeneous group of people.

Standardisation ensures that the measurements obtained from a test can be meaningfully interpreted in the context of a relevant distribution of scores. Another important technical requirement for a psychometrically sound test is that the measurements obtained from that test should be reliable.

Reliability

The property of a measurement which assesses the extent to which variation in measurement is due to true differences between people on the trait being measured or to measurement error.

Reliability is generally assessed using two specific measures, one related to the stability of scale scores over time, the other concerned with the internal consistency, or homogeneity of the constituent items that form a scale score.

Stability coefficients provide an important indicator of a test's likely usefulness in terms of what it measures. If these coefficients are low (< approx. 0.6) then it suggests either that the behaviours/ attitudes being measured are volatile or situationally specific, or that over the duration of the retest interval, situational events have made the content of the scale irrelevant or obsolete. Of course, the duration of the retest interval provides some clue as to which effect may be causing the unreliability

of measurement. However, the second measure of a scale's reliability also provides valuable information as to why a scale may have a low stability coefficient.

Reliability : Internal Consistency

Also known as scale homogeneity, an assessment is made of the ability of the items in a scale to measure the same construct or trait. That is a parameter can be computed that indexes how well the items in a scale contribute to the overall measurement denoted by the scale score. A scale is said to be internally consistent if all the constituent item responses are shown to be positively associated with their scale score.

The most common measure of internal consistency is Cronbach's Alpha. If the items on a scale have high interrelations with each other, and with the total scale score, then coefficient alpha will be high. Thus a high coefficient alpha indicates that the items on the scale are measuring very much the same thing, while a low alpha would be suggestive of either scale items measuring different attributes or the presence of error.

Validity

The ability of a scale score to reflect what that scale is intended to measure. Kline's (1993) definition is 'A test is said to be valid if it measures what it claims to measure'.

The fact that a test has high internal consistency and stability coefficients only guarantees that it is measuring something consistently. It provides no guarantee that the test is actually measuring what it purports to measure, nor that the test will prove useful in a particular situation. Questions concerning what a test actually measures and its relevance in a particular situation are dealt with by looking at the test's validity. Reliability is generally investigated before validity as the reliability of a test places an upper limit on its validity. It can be mathematically demonstrated that a validity coefficient for a particular test cannot exceed that test's reliability coefficient.

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Validation studies of a test investigate the soundness and relevance of a proposed interpretation of that test. Two key areas of validation are known as criterion validity and construct validity.

Validity : Criterion Validity

Criterion validity involves translating a score on a particular test into a prediction concerning what could be expected if another variable was observed.

The criterion validity of a test is provided by demonstrating that scores on the test relate in some meaningful way to an external criterion. Criterion validity comes in two forms - predictive and concurrent. Predictive validity assesses whether a test is capable of predicting an agreed criterion, which will be available at some future time - e.g. can a test predict the likelihood of someone successfully completing a training course. Concurrent validity assesses whether the scores on a test can be used to predict a criterion measure, which is available at the time of the test - e.g. can a test predict current job performance.

Validity : Construct Validity

Construct validity assesses whether the characteristic, which a test is actually measuring is psychologically meaningful and consistent with the test's definition.

The construct validity of a test is assessed by demonstrating that the scores from the test are consistent with those from other major tests which measure similar constructs and are dissimilar to scores on tests which measure different constructs.

STANDARDISATION PROCEDURES AND NORMATIVE DATA

The total standardisation sample is based on 1186 males and females adults. All the questionnaires were completed between August 1999 and April 2000. All questionnaires were administered under strictly standardized procedures by individuals trained to the British Psychological Society's Level B Certificate of Competence in Occupational Testing.

As indicated in Table 1 opposite, the norm sample's age distribution is quite wide and generally representative of the professional working population. The sample is primarily based on people of graduate, professional and managerial categories with a mean age of 31.5 with 50% of the sample falling with the 25 – 39 age band.

Table 2, which provides the breakdown of the norm sample by sex, reveals a very balanced sample with respect to sex. Four respondents failed to indicate their sex, although this constitutes approximately one third of a percent of the total sample.

Table 3 provides a break-down by ethnic origin. Just over 9% of the total sample having identified themselves as belonging to ethnic origin categories other than White. Of this group of 111, approximately 70% were of African or Afro-Caribbean decent, with almost 30% of Asian decent.

Table 1: Descriptive Statistics of age

Mean	31.49
SD	11.15
Minimum	16
Maximum	64
Lower Quartile	25
Upper Quartile	39

Table 2: Breakdown by Sex of Respondent

	Count	Percentage
Male	561	47.30
Female	621	52.36
Unknown	4	0.34
Total	1186	100

Table 3: Breakdown of Ethnic Origin of Respondent

	Count	Percentage
Other	111	9.39881
White	1070	90.60119
Missing	5	0.42337

RELIABILITY OF THE 15FQ+

INTERNAL CONSISTENCY

Table 4 presents the alpha coefficients for each of the sixteen personality factors, for both the standard (Form A) and the short forms (Form C) of the 15FQ+. Inspection of this table reveals that all these scales have good levels of internal consistency, when the length of the scales is taken into account. Most importantly, the alpha coefficients are not sufficiently high as to suggest that these factors are measuring narrow (i.e. highly homogeneous), surface traits. Not surprisingly, the short form scales have significantly lower levels of reliability than do their respective long form factor equivalents. This is to be expected, and reflects the relative brevity (six versus twelve items) of the Form C scales.

TEST-RETEST RELIABILITY

Table 5 presents the test-retest reliability coefficients for each of the sixteen personality factors, for both the standard (Form A) and the short forms (Form C) of the 15FQ+. Inspection of this table reveals that all these scales have excellent levels of reliability, when the relative lengths of the standard and short forms are taken into account. Most importantly, the test-retest reliability coefficients for each scale are substantially larger than are the alpha coefficients for their respective scales. This reflects two factors. Firstly, that the alpha coefficient provides a lower bound measure of the scale's reliability and, secondly, that these factors are measuring broad source traits, rather than narrow (i.e. highly homogeneous) surface traits.

Table 4: Reliability Coefficients (alpha) for the 15FQ+ Scales

Factor	Form A		Form C	
	student sample n=183	professional sample n=325	student sample n=183	professional sample n=325
<i>f</i> A	.83	.78	.64	.64
<i>β</i>	.77	.80	.62	.71
<i>f</i> C	.80	.77	.60	.63
<i>f</i> E	.80	.79	.60	.66
<i>f</i> F	.75	.78	.63	.63
<i>f</i> G	.85	.81	.60	.64
<i>f</i> H	.85	.81	.68	.68
<i>f</i> I	.74	.77	.64	.63
<i>f</i> L	.78	.77	.66	.62
<i>f</i> M	.80	.79	.64	.64
<i>f</i> N	.79	.78	.67	.67
<i>f</i> O	.82	.83	.67	.69
<i>f</i> Q ₁	.81	.79	.60	.72
<i>f</i> Q ₂	.82	.78	.67	.62
<i>f</i> Q ₃	.78	.76	.66	.63
<i>f</i> Q ₄	.84	.81	.60	.62
SD	.72	.70	—	—

Table 5: Reliability Coefficients (test-retest) for the 15FQ+ Scales

Factor	Form A	Form C
	student sample (n=87)	student sample (n=87)
<i>f</i> A	.79	.68
<i>β</i>	.88	.75
<i>f</i> C	.82	.73
<i>f</i> E	.82	.71
<i>f</i> F	.85	.73
<i>f</i> G	.88	.77
<i>f</i> H	.86	.78
<i>f</i> I	.86	.77
<i>f</i> L	.84	.72
<i>f</i> M	.87	.76
<i>f</i> N	.79	.71
<i>f</i> O	.77	.69
<i>f</i> Q ₁	.85	.75
<i>f</i> Q ₂	.86	.76
<i>f</i> Q ₃	.84	.73
<i>f</i> Q ₄	.89	.78
SD	.74	—

RELIABILITY (INTERNAL CONSISTENCY AND TEST-RETEST) OF THE CRITERION REFERENCED (DERIVED) SCALES

Table 6 presents the alpha coefficients for each of the derived scales, for both the standard (Form A) and the short forms (Form C) of the 15FQ+.

Inspection of this table reveals that all these scales have acceptable levels of internal consistency, when the length of the scales is taken into account. Most significantly, the alpha coefficients for these scales are somewhat lower than are those for the sixteen personality factors. This reflects the fact that these scales were constructed via criterion referencing (which maximises the scale’s validity) rather than being constructed via traditional item analytic and factor analytic procedures, (which maximises the scale’s internal consistency).

Table 7 presents the test-retest reliability coefficients for each of the criterion referenced scales, for both the standard (Form A) and the short forms (Form C) of the 15FQ+. Inspection of this table reveals that all these scales have acceptable levels of reliability, when the length of the scales is taken into account.

ALTERNATE FORM RELIABILITY FOR THE STANDARD (FORM A) AND SHORT (FORM C) FORMS OF THE 15FQ+

Table 8 presents the correlations (corrected and uncorrected) between forms A and C of the 15FQ+. (These correlations can be interpreted as being broadly equivalent to alternate form reliabilities.)

The correlations between these forms provide evidence of the congruence of these scales across these two forms of the 15FQ+. However, as all the items in the short form C of this test are included in the standard form A, the uncorrected correlation between these two forms will be inflated due to shared items. Thus the uncorrected correlation provides an upper bound estimate of the ‘true’ correlation between these forms. Similarly, corrected correlations (Levy, 1967) estimate the lower bound of the ‘true’ correlation between these two forms.

Inspection of Table 8 indicates that the corrected correlations between forms A and C of the 15FQ+ are all substantial, demonstrating that these forms are broadly congruent with each other. Thus the validity data presented below (for form A of the 15FQ+) can also be considered to be relevant to form C of the 15FQ+. However, just as the reliabilities for form C are lower than they are for form A (due to the relative brevity of this test), so too will form C have lower validity than form A.

Table 6: Reliability Coefficients (alpha) for the Derived Scales

Scale	15FQ+ Form A		15FQ+ Form A	
	student sample n=183	professional sample n=325	student sample n=183	professional sample n=325
Fake Good	.84	.73	.69	.62
Fake Bad	.78	.72	-	-
eIQ	.73	.71	-	-
WA	.76	.83	-	-

Table 7: Reliability Coefficients (test-retest) for the derived scales

Scale	Form A	Form C
Fake Good	.66	.45
Fake Bad	.61	-
eIQ	.79	-
WA	.79	-
	student sample (n=87)	student sample (n=87)

Table 8: Correlations (uncorrected and corrected) between forms A and C of the 15FQ+

Factor	Uncorrected	Corrected
<i>ff</i> A	.69	.91
B	.76	.93
<i>ff</i> C	.69	.91
<i>ff</i> E	.72	.92
<i>ff</i> F	.69	.90
<i>ff</i> G	.73	.91
<i>ff</i> H	.72	.89
<i>ff</i> I	.67	.87
<i>ff</i> L	.69	.90
<i>ff</i> M	.69	.90
<i>ff</i> N	.68	.89
<i>ff</i> O	.75	.91
<i>ff</i> Q1	.74	.91
<i>ff</i> Q2	.93	.69
<i>ff</i> Q3	.68	.89
<i>ff</i> Q4	.61	.91



VALIDITY of 15FQ+

Once we have ascertained the reliability of a test we must address its validity. It is important to know that the constructs we are measuring are valid, that it is indeed measuring the characteristics it purports to measure. This section of the manual provides a number of tables, which demonstrate that the dimensions of the 15FQ+ are consistent with equivalent scales on other tests.

CORRELATIONS BETWEEN THE 15FQ+ FACTORS AND THE ORIGINAL 15FQ

Table 9 presents correlations between the 15FQ+ factors and the personality dimensions assessed by the 15FQ, on a sample of 70 course delegates who completed both of these tests as part of the course requirement. The 15FQ was developed in the early 1990's to assess the personality factors measured by Form A of the 16PF. Considerable evidence demonstrating the congruence between this test and the 16PF A has been reported in the 15FQ manual. As such the correlations between the 15FQ and 15FQ+ factors represent an important additional test of the construct validity of the 15FQ+.

Inspection of Table 9 indicates that ten of the sixteen corrected correlations between the 15FQ+ factors and their corresponding 15FQ scale approach unity, providing strong support for the validity of these 15FQ+ factors. Of the remaining six factors all but two correlate substantially with their respective 15FQ dimension - these are Factors *f*A (Empathic) and *f*Q₄ (Tense-driven). With regard to Factor *f*A this modest correlation reflects the fact that this 15FQ+ Factor *f*A warm-hearted, empathic concern for, and interest in, other people rather than assessing sociability and interpersonal warmth as is measured by the respective 15FQ dimension (Outgoing). Similarly, the modest between the 15FQ+ Factor *f*Q₄ and the respective 15FQ dimension reflects the fact that this 15FQ+ factor assesses a tense, competitive, hostile interpersonal attitude, rather than assessing emotional tension and anxiety as does the corresponding 15FQ dimension.

CORRELATIONS BETWEEN THE 15FQ+, THE 16PF4 (FORM A) AND 16PF5

In order to examine the validity of the 15FQ+ each of the sixteen personality factors were correlated with their equivalent factors on the 16PF (Form A) and the 16PF5. Table 10 presents these correlations, both corrected and uncorrected for attenuation due to measurement error. Inspection of this table reveals that all of these correlations are substantial, and that

Table 9: Correlations between the 15FQ+ factors and the original 15Q

15FQ+ Factor	15FQ	
		(corrected)
<i>f</i> A	.32	.43
<i>B</i>	-	-
<i>f</i> C	.54	.75
<i>f</i> E	.65	.93
<i>f</i> F	.76	1
<i>f</i> G	.74	.97
<i>f</i> H	.88	1
<i>f</i> I	.71	.98
<i>f</i> L	.78	1
<i>f</i> M	.63	.84
<i>f</i> N	.55	.77
<i>f</i> O	.74	.95
<i>f</i> Q ₁	.86	1
<i>f</i> Q ₂	.78	1
<i>f</i> Q ₃	.80	1
<i>f</i> Q ₄	.29	.40

Table 10: Correlations of the 15FQ+ factors with 16PF (Form A) and 16PF5

15FQ+ Factor	16PF (Form A)		16PF5	
		(corrected)		(corrected)
<i>f</i> A	.31	.37	.55	.70
<i>B</i>	.10	-	.34	-
<i>f</i> C	.59	1	.81	1
<i>f</i> E	.68	.99	.82	1
<i>f</i> F	.72	.98	.81	1
<i>f</i> G	.55	.89	.79 ¹	.75
<i>f</i> H	.78	.99	.88	1
<i>f</i> I	.50	.75	.47	.56
<i>f</i> L	.29	.52	.60	.79
<i>f</i> M	.26	.65	.79	1
<i>f</i> N	.30	.70	.25	.31
<i>f</i> O	.68	.99	.83	1
<i>f</i> Q ₁	.29	.43	.60	.84
<i>f</i> Q ₂	.51	.85	.81	1
<i>f</i> Q ₃	.30	.50	.57 ²	1
<i>f</i> Q ₄	.69	.94	.69	.89
FG	.49	.72	-	-
FB	.48	.73	-	-

student sample n=183

many of the corrected correlations approach unity. This demonstrates that the 15FQ+ is measuring factors that are broadly equivalent to those originally identified by Cattell and his colleagues.

Most notably, however, the 15FQ+ Factor *f*G correlated most substantially with the 16PF5 Factor *f*Q3 and the 15FQ+ Factor *f*Q3 correlated most substantially with the 16PF5 Factor *f*G. This reflects the fact that the meaning of these two factors has been reversed in the fifth edition of the 16PE, providing further evidence that the 15FQ+ is measuring the original source traits first identified by Cattell and his colleagues.

THE RELATIONSHIP BETWEEN THE 15FQ+, THE 16PF4 & 16PF5 GLOBAL FACTORS

Table 11 and Table 12 present the relationship between the 15FQ+ global factors and their equivalents in 16PF4 and 16PF5 (respectively) based on distinct undergraduate samples of 82 and 85 participants. It is evident from these tables that there is a considerable degree of overlap at the global factor level between the 15FQ+ and these two forms of the 16PE. The substantial correlations of between the 15FQ+ and 16PF4 Extroversion, Agreeableness and Anxiety Global Factors indicate that these broad personality constructs are measuring comparable constructs across these tests. Although the correlations remain high, and highly statistically significant, some divergence is observed between the self-Control and Openness Global Factors between the 15FQ+ and the 16PF4. In part this is likely to reflect the fact that Factor M, the least reliable of the 16PF4 factors loads very highly on the Openness Global Factor, thus introducing error.

The overlap with the 15FQ+ and 16PF5 global factors is much higher, with the median correlation between the respective global factors being 0.81. Once again the lowest correlation is with the Openness Global Factor, although this remains highly statistically significant.

Another notable feature of the correlations presented in these tables is that they demonstrate excellent, and largely similar, levels of convergent and divergent validity with the global factors in 16PF4 and 16PF5. It can be observed that 15FQ+ Global Factor Extroversion shows some correlation with the Global Factor Independence in both the 16PF4 and 16PF5. This partly reflects the fact that in both the 16PF4 and 16PF5, Factor *f*H (Socially-bold), weights highly on the Independence Global Factor whereas Factor *f*H weights exclusively on the

Table 11: Correlation Between 15FQ+ and 16PF4 Global Factors

	PF4 EX	PF4 AX	PF4 TM	PF4 IN	PF4 SC
I Extroversion	.76	-.29	-.01	.41	-.03
II Anxiety	-.22	.84	-.04	.08	-.17
III Openness	.27	.10	-.48	.25	-.02
IV Agreeableness	-.28	.14	.16	-.71	-.05
V Control	-.05	.14	.09	-.12	.59

Table 12: Correlation Between 15FQ+ and 16PF5 Global Factors

	PF5 EX	PF5 AX	PF5 TM	PF5 IN	PF5 SC
I Extroversion	.88	-.27	-.12	.45	-.29
II Anxiety	-.22	.87	-.04	-.05	-.03
III Openness	.11	.14	-.65	.29	-.29
IV Agreeableness	-.03	.08	.29	-.81	.19
V Control	-.08	.13	.43	-.21	.79

Extraversion Global Factor. The overlap that exists between 15FQ+ Control and 16PF5 Tough-mindedness Global Factors may also be accounted for by the fact that these otherwise distinct Global Factors respectively share Q1 and *f*Q1 as contributing primary factors.

In order to explore further the validity of the 15FQ+, the scale scores were factor analysed (on a student sample) along with the scale scores from the 16PF4. (This is often considered to be the most robust method for examining the validity of a personality questionnaire.) The scree test indicated that these data were best described by a five-factor solution, with five factors being retained and rotated to simple structures via Varimax rotation. The results of this factor analysis are presented in Table 13. Inspection of this table indicates that these data provide broad support for the validity of the 15FQ+, although this factor structure is not totally equivalent with the Global Factors identified in the 15FQ+. (This is likely to reflect issues of sampling error resulting from the relatively small size of the sample - with a ratio of items to participants of only 5.7).

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 1. Correlation with 15FQ+ Factor *f*Q3
 2. Correlation with 15FQ+ Factor *f*G

Table 13 indicates that all the 15FQ+ extraversion scales weight on the first factor, along with the extraversion scales from Form A of the 16PF. This provides strong support for the congruence of these extraversion dimensions across these tests. Moreover, the finding that the 16PF4 Factor E, the 15FQ+ *ff*E and *ff*N factors also weight on the global extraversion factor indicates that, not surprisingly, people who are high in Dominance and Forthright tend to be more extraverted than people who are Submissive and Discreet. Inspection of Table 11 further demonstrates that all the anxiety scales on the 15FQ+ weight on the second factor, along with the anxiety scales from Form A of the 16PF. This provides strong support for the congruence of these scales across these two tests.

The third factor presented in Table 13 is broadly equivalent to the 16PF higher Global Factor Tough-Poise - with the exception that the 15FQ+ dimension *ff*A (Empathic) does not load on this factor. The 15FQ+ factors *ff*L, *ff*M and *ff*Q weight on this factor, along with the 16PF4 factors I and M. This suggests that as these 15FQ+ dimensions are, as would be expected, assessing a broadly aesthetically minded, abstract, radical intellectual orientation.

The fourth factor assesses a broad construct of self-assured assertiveness, with this consisting of the 15FQ+ factors Dominance, Intellectance and Directness. The finding that Intellectance (15FQ+ β) weights on this higher order factor reflects the fact that this scale assesses a person's confidence in their intellectual abilities and hence their willingness to express their views and opinions. Similarly, the finding that *ff*H and *ff*O, as well as the 16PF4 H and O also weight on this factor, reflects the fact that high *ff*H scores are associated with social confidence, and that low *ff*O scores are associated with a lack of threat sensitivity. This results in a willingness to express views and opinions boldly in group settings.

Inspection of Table 13 also indicates that factors G Q₃ and N from the 16PF4 and *ff*G, *ff*Q₃ and *ff*N from the 15FQ+ weight on the fifth and final factor. This is consistent with this higher order factor assessing self-control, thus providing further evidence of the congruence of these scales across these tests. Finally, the fact that the 15FQ+ Factor *ff*I (Tender-minded) weights on this Factor may reflect the finding that in many sample the Global Factors High Control and Tough Poise are often modestly correlated with each other.

Table 13: Factor analysis of the 15FQ+ and 16PF (Form A) scales

Scale	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
15FQ+ <i>ff</i> A	.61	-	-	.31	-
15FQ+ β	-	-	-	.48	-
15FQ+ <i>ff</i> C	-	.76	-	-	-
15FQ+ <i>ff</i> E	.40	-	-	.68	-
15FQ+ <i>ff</i> F	.82	-	-	-	-
15FQ+ <i>ff</i> G	-	-	-	-	.75
15FQ+ <i>ff</i> H	.63	-	-	.42	-
15FQ+ <i>ff</i> I	-	-	.63	-	-
15FQ+ <i>ff</i> L	-	-.38	-	-	-
15FQ+ <i>ff</i> M	-	-	.51	-	-.36
15FQ+ <i>ff</i> N	-	-	-	-.39	.50
15FQ+ <i>ff</i> O	-	-.61	-	-.40	-
15FQ+ <i>ff</i> Q ₁	-	-	.45	-	-
15FQ+ <i>ff</i> Q ₂	-.71	-	-	-	-
15FQ+ <i>ff</i> Q ₃	-	-	-	-	.65
15FQ+ <i>ff</i> Q ₄	-	.71	-	-	-
16PF A	.31	-	-	-	-
16PF B	-	-	-	-	-
16PF C	-	.74	-	-	-
16PF E	.32	-	-	.65	-
16PF F	.69	-	-	-	-
16PF G	-	-	-	-	.74
16PF H	.71	-	-	.31	-
16PF I	-	-	.61	-	-
16PF L	-	-.67	-	-	-
16PF M	-	-	.45	-	-
16PF N	-.43	-	-	-.37	.37
16PF O	-	-.65	-	-.42	-
16PF Q ₁	-	-	-	-	-
16PF Q ₂	-.56	-	-	-	-
16PF Q ₃	-	-	-	-	.69
16PF Q ₄	-	.85	-	-	-
student sample n=183					



RELATIONSHIP BETWEEN THE 15FQ+ AND THE BAR-ON EQI SCALES

Table 14 presents the correlations between the 15FQ+ factors and the dimensions assessed by the Bar-on Emotional Quotient Inventory. Inspection of this table provides further evidence to support the concurrent validity of the 15FQ+. Most notable are the substantial correlations of f^fA (Empathic) with the Bar-on dimension Empathy, and f^fE with the Bar-on dimension Assertiveness. These correlations provide further clear support for the validity of these 15FQ+ factors.

The substantial negative correlation between f^fQ_4 and the Bar-on dimension Impulse Control similarly provides support for this 15FQ+ factor, demonstrating that high f^fQ_4 scores are associated with a low level of frustration tolerance and a tendency for temper outbursts. Similarly, the significant correlation between the Bar-on dimension Stress tolerance and the 15FQ+ Factor f^fC (Emotionally Stable) is consistent with this factor's definition, as is the negative correlation between f^fO (Self-doubting) and the Bar-on dimension Optimism. Similarly, the significant correlation between the 15FQ+ Factor f^fQ_3 and the Bar-on dimension Independence, is consistent with this factor's definition as assessing a tendency to be radical, experimenting and independent of mainstream views and opinions.

The significant correlation between the 15FQ+ f^fG and the Bar-on dimension Problem Solving reflects the fact that this latter dimension assesses a tendency to adopt a planned, systematic approach to problem solving - providing further support for the validity of this 15FQ+ factor. The significant correlation between the 15FQ+ Factor f^fI and the Bar-on dimension Self-actualisation, reflects the fact that this latter dimension assesses a person's desire to seek self-actualisation and personal growth through (amongst other things) an interest in aesthetic and cultural activities - similarly providing further support for this 15FQ+ factor. Similarly, the significant correlations between the 15FQ+ Factor f^fN (Restrained) and the Bar-on dimensions of Social Responsibility and Impulse Control is consistent with this factor assessing a discreet, diplomatic, shrewd awareness of social expectations. These correlations thus provide further support for the validity of the 15FQ+ factor.

Table 14: Correlations between the 15FQ+ and the Emotional Quotient Inventory.

Scale	15FQ+ Dimensions
Emotional self-awareness	f^fA (.51) f^fI (.36) f^fN (.40) f^fQ_4 (.38)
Assertiveness	β (.36) f^fE (.53) f^fH (.34) f^fQ_1 (.36)
Self-regard	f^fC (.52) f^fO (-.52) f^fQ_4 (-.39)
Self-actualisation	f^fA (.48) f^fI (.44)
Independence	f^fE (.48) f^fO (-.31) f^fQ_1 (.36)
Empathy	f^fA (.66) f^fN (.36)
Interpersonal Relationships	f^fA (.55) f^fN (.41)
Social responsibility	f^fA (.52) f^fN (.45)
Problem solving	f^fA (.33) f^fG (.39) f^fN (.31)
Reality testing	f^fA (.41) f^fC (.42) f^fN (.36)
Flexibility	No 16PF scales correlate.
Stress tolerance	f^fC (.48)
Impulse control	f^fN (.52) f^fQ_4 (.68)
Happiness	f^fA (.39) f^fC (.39) f^fF (.41) f^fQ_2 (.32)
Optimism	f^fO (.49)

RELATIONSHIP BETWEEN THE 15FQ+ AND THE JUNG TYPE INDICATOR

Table 15 presents correlations between the 15FQ+ factors and the JTI on a sample of 57 MBA students. (Correlations of less than .3 have been excluded from this table to facilitate the interpretation of these results.) Inspection of this table indicates that each of the 15FQ+ extraversion factors correlate substantially with the Extraversion-Introversion dimension of the JTI, providing strong support for the validity of these 15FQ+ factors. Moreover, the correlation between *ff*E (Dominant) and the JTI dimension Extraversion-Introversion indicates, not surprisingly, that people who are more dominant also tend to be more extraverted. Thus this finding is consistent with the definition of *ff*E, providing further support for the validity of this 15FQ+ factor. Similarly, the correlation between *ff*L (Suspicious) and the JTI dimension Extraversion-Introversion suggests that people who are suspicious by nature are likely to be more manipulative in interpersonal relationships than are more trusting people, and hence are likely to be more extraverted than are more trusting people. Thus, this correlation is clearly consistent with the definition of *ff*L. Finally, the modest correlation between *ff*C and the Extraversion-Introversion dimension of the JTI is likely to reflect the commonly observed finding that extraverts tend to be more stable than introverts.

The substantial correlations between *ff*I (Tender-minded) and *ff*M (Abstract), with the Sensing-Intuiting dimension of the JTI, provides strong support for the validity of these two 15FQ+ factors. This reflects the fact that, in common with these two 15FQ+ factors, the SN dimension of the JTI assesses an interest in aesthetic and artistic matters, and a preference for focusing on abstract ideas and imagination versus focusing on hard facts and objective reality.

The substantial correlation between *ff*A (Empathic) and the JTI dimension Thinking-Feeling provides strong support for the validity of this 15FQ+ factor, as both of these scales assess an empathic concern for others and a sensitivity to others' feelings. Moreover, the finding that *ff*I (Tender-minded) and *ff*M (Abstract) also correlate significantly with this dimension provides further support for these 15FQ+ factors as, in common with the Thinking-Feeling dimension of the JTI, each of these scales assesses an individual's emotional and psychological openness. Finally the significant correlation between *ff*L (Trusting) and JTI dimension Thinking-Feeling, indicates that more emotionally sensitive people are likely to be more

trusting and open in interpersonal relationships. Thus this significant correlation provides further support for the validity of this 15FQ+ factor.

The large correlation between *ff*G (Conscientious) and the JTI dimension Judging-Perceiving provides strong support for the validity of this 15FQ+ factor, as both of these scales assess a preference for order, neatness and structure. Similarly, the significant correlation between *ff*Q₃ (Self-disciplined) and the JTI dimension Judging-Perceiving is consistent with the definition of this 15FQ+ factor, as both of these scales assess the tendency to set high standards for personal conduct and place great weight on social expectation and norms.

Table 15 Correlations between the 15FQ+ and the JTI

	EI	SN	TF	JP
<i>ff</i> A	.52	-	-.53	-
B	-	-	-	-
<i>ff</i> C	.38	-	-	-
<i>ff</i> E	.39	-	-	-
<i>ff</i> F	.68	-	-	-
<i>ff</i> G	-	-	-	.78
<i>ff</i> H	.62	-.37	-	-
<i>ff</i> I	-	-.55	-.46	-
<i>ff</i> L	.47	.32	.45	-
<i>ff</i> M	-	-.68	-.43	-
<i>ff</i> N	-	-	-	-
<i>ff</i> O	-	-	-	-
<i>ff</i> Q ₁	-	-.33	-	-
<i>ff</i> Q ₂	.48	-	-	-
<i>ff</i> Q ₃	-	-	-	-.46
<i>ff</i> Q ₄	-	-	-	-

n= 57 all correlations are significant at the 5% level or less



CORRELATIONS BETWEEN THE 15FQ+ FACTORS AND THE NEO PI-R

Table 16 lists the three most significant correlations between the NEO facets and the 15FQ+ Factors obtained on a sample of 60 undergraduates. (All correlations are significant at the 1% level or less.)

Inspection of the correlations presented in table 16 indicates that these provide further support for the construct validity of the 15FQ+ Factors. Most notably, this pattern of results is broadly similar to the pattern of correlations reported between the NEO PI-R and the 16PF5.

With regard to the 15FQ+ extraversion factors the following points are noteworthy. Firstly, as would be expected, the strongest correlation with f^fA (Empathic) is the NEO PI-R facet Warmth, followed by the facet Tender-minded. This provides strong support for the validity of this 15FQ+ factor which assesses a warm-hearted interest in people. Similarly, the modest negative correlation with the NEO PI-R facet Angry hostility is consistent with this factor's definition as assessing an empathic, caring for concern for others. Secondly, as would be predicted, the strongest correlation between the 15FQ+ Factor f^fE (Enthusiastic) and the NEO PI-R is with the facet Gregariousness, reflecting the fact that high scores on this factor are associated with an enthusiastic, lively interest in people and a participative approach to social relationships. Moreover, the correlations with the NEO PI-R facets Positive emotion and Excitement seeking are consistent with this factor's definition as assessing a happy-go-lucky, carefree approach to life. Thirdly, the negative correlations between the 15FQ+ Factor f^fH (Socially bold) and the NEO PI-R facets Self-consciousness and modesty provide strong support for the validity of this factor, which assesses boldness and confidence in social settings. Moreover, the correlation between f^fH and Activity reflects the fact that this 15FQ+ factor assesses a venturesome orientation towards life. Finally, the substantial negative correlations between f^fQ_2 (Self-sufficient) and the NEO PI-R facets Gregariousness and Warmth is consistent with the definition of this factor, with high scores on this factor assessing a tendency to be self-reliant and independent, and a preference for avoiding group activities.

The correlations presented in Table 16 provide strong support for the validity of the 15FQ+ anxiety factors. Most notably the substantial negative correlations between f^fC (Emotionally stable) and the NEO PI-R facets Anxiety, Depression and Vulnerability indicate that this 15FQ+ factor is,

consistent with its definition, assessing a tendency to be emotionally labile, moody and changeable, and easily affected by feelings. Similarly, the strong correlations between f^fO (Self-doubting) and the NEO PI-R facets Self-consciousness, Anxiety and Vulnerability are consistent with the definition of this 15FQ+ factor as assessing a proneness to be troubled by sundry worries, and feelings of insecurity and self-doubt. Finally, the substantial correlation between f^fQ_4 (Tense-driven) and the NEO PI-R facet Angry hostility provides strong support for the validity of this 15FQ+ factor, which assesses a impatient, short tempered and hostile, reflecting their low ability to tolerate frustration.

The correlations presented in Table 16 provide strong support for the validity of the primary factors that contribute to the Openness global factor. The significant correlation between f^fI (Tender-minded) and the NEO PI-R facet Aesthetics reflects the fact that high scores on this 15FQ+ factor are associated with an interest in aesthetic, artistic pursuits. Similarly, the modest correlation between f^fI and the NEO PI-R facet Warmth is consistent with this scale's definition, with high scores being associated with an openness to emotional experience. Similarly the significant correlations between the 15FQ+ Factor f^fM (Abstract) and the NEO PI-R facets Fantasy and Ideas provides further support for the validity of this 15FQ+ factor, which assesses a tendency to focus on abstract intellectual ideas, fantasy and imagination. Moreover, the modest correlation between f^fM and the NEO PI-R facet Impulsiveness is likely to reflect the fact that high scores on f^fM are associated with a tendency to be lost in thought, a lack of concern for practical matters, and an inclination to approach problems in an unrealistic, fanciful manner. As would be expected f^fQ_1 (Radical) correlates significantly with the NEO PI-R facets Actions, Values and Ideas from the global Openness factor. This reflects the fact that high scores on this 15FQ+ factor are associated with an openness to radical innovation and change in these different domains.

With regard to the 15FQ+ Control factors the following points are noteworthy. Firstly, the substantial correlation between f^fG (Conscientious) and the NEO PI-R facet Order, provides strong support for the validity of this 15FQ+ factor - which assess a preference for order and routine and a tendency to be persevering, dutiful and detail-conscious. Secondly, as would be predicted, f^fN (Restrained) correlates with the NEO PI-R facets Compliance and Deliberation. This reflects the fact

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that high *ffN* scores are associated with a tendency to be diplomatic and restrained in social interactions, and deliberating and shrewd when dealing with others. Similarly, the negative correlation between this 15FQ+ factor and the NEO PI-R facet Angry hostility reflects the tendency for people who obtain high scores on this factor to be restrained in their dealings with others and avoid angry volatile outbursts. Finally, the significant negative correlations between *ffQ₃* (Self-disciplined) and the NEO PI-R Openness facets Feelings, Values and Fantasy is consistent with this scale's definition, with this 15FQ+ factor assessing the tendency to be self-disciplined and retain strict self-control in each of these domains.

The correlations presented in Table 16 provide strong support for the validity of the 15FQ+ Agreeableness factors. Most notably the significant positive correlation between *ffE* (Dominant) and the NEO PI-R facet Assertiveness, and the negative correlations with Modesty and Compliance are consistent with the definition of this 15FQ+ factor. Similarly, the substantial negative correlation between *ffL* (Suspicious) and the NEO PI-R facet Trusting provides strong support for the validity of this 15FQ+ factor. Finally, the significant positive correlations between *β* (Intellectance) and the NEO PI-R facets Competence and Assertiveness and the negative correlation with Modesty reflects the fact that this 15FQ+ factor assesses a person's confidence in their own intellectual abilities and competencies.

Table 17 presents correlations between the 15FQ+ Global Factors and the Big Five personality factors as assessed by the NEO PI-R on a sample of 60 undergraduates. Inspection of this table indicates that all these correlations are substantial in size, and all are statistically significant at the 0.1% level. This demonstrates a broad equivalence between the 15FQ+ Global Factors and the Big Five personality factors as defined by Costa and McCrea.

Table 18 presents correlations between the 15FQ+ Global Factors and the NEO FFI on a sample of 37 MBA students. Inspection of this table indicates that all these correlations are statistically significant at the 0.1% level, demonstrating a broad equivalence between the 15FQ+ Global Factors and the Big Five personality factors as defined by Costa and McCrea.

Table 16: Correlations between the 15FQ+ and the NEO PI-R facets

15FQ+ Factor	NEO facet
<i>ffA</i>	Warmth .46, Tender-minded .45, Angry hostility -.38
<i>β</i>	Competence .52, Assertiveness .50, Modesty -.41
<i>ffC</i>	Anxiety -.69, Depression -.69, Vulnerability -.60
<i>ffE</i>	Assertiveness .69, Modesty -.60, Compliance -.55
<i>ffF</i>	Gregariousness .63, Positive emotion .45, Excitement seeking .41
<i>ffG</i>	Order .75, Fantasy -.46, Achievement .44
<i>ffH</i>	Self-consciousness -.57, Modesty -.50, Activity .46
<i>ffI</i>	Aesthetics .44, Warmth .30
<i>ffL</i>	Trust -.74, Angry hostility .40, Vulnerability .33
<i>ffM</i>	Fantasy .67, Ideas .39, Impulsiveness .38
<i>ffN</i>	Compliance .46, Angry hostility -.45, Deliberation .40
<i>ffO</i>	Self-consciousness .62, Anxiety .57, Vulnerability .48
<i>ffQ1</i>	Actions .46, Values .46, Ideas .44
<i>ffQ2</i>	Gregariousness -.67, Warmth -.43, Dutifulness .36
<i>ffQ3</i>	Feelings -.54, Values -.51, Fantasy -.41
<i>ffQ4</i>	Angry hostility .80, Compliance -.67, Impulsiveness .45

Table 17: Correlations between the 15FQ+ and the NEO PI-R Global Factors

15FQ+ Global Factor	r
E Extraversion with NEO-E	.74
N aNxiety with NEO-N	.77
O Openness with NEO-O	.66
A Agreeableness with NEO-A	.61
C Control with NEO-C	.67
p<.001 for all correlations	

Table 18: Correlations between the 15FQ+ Global Factors and the NEO FFI

15FQ+ Global Factor	r
E Extraversion with NEO-E	.66
N aNxiety with NEO-N	.57
O Openness with NEO-O	.55
A Agreeableness with NEO-A	.59
C self-Control with NEO-C	.69
p<.001 for all correlations	



LEARNING STYLES

As part of a research study to investigate the relationship between learning styles and personality, a sample of 144 undergraduate students (109 female, 35 male) at a UK university completed the 15FQ+ and the revised Approaches to Learning questionnaire (Duff, 1997). Consistent with the researchers' expectations, Deep Approach was found to be positively correlated with both Extraversion ($r = .21$) and Openness ($r = .34$) and negatively correlated with Anxiety ($r = -.18$).

Surface Approach is positively related to Anxiety ($r = .44$) and Agreeableness ($r = .21$). Finally, Strategic Approach is positively related to Extraversion ($r = .38$) and self-Control ($r = .42$) and negatively related to Anxiety ($r = .24$). Of the criterion-referenced scales, eIQ was positively correlated with both Deep Approach ($r = .24$) and Strategic Approach ($r = .27$) and negatively correlated with Surface Approach ($r = -.37$). Whilst Work Attitude is positively associated with Strategic Approach ($r = .39$). Although not the focus of the study, the researchers found a small positive ($r = .14$) correlation between self-Control and academic success and a small negative between Neuroticism and academic success, suggesting that conscientiousness and stability may be related to academic performance.

Table 19: Correlations between 15FQ+ and Approaches to Learning and academic success (N = 144)

	Deep Approach	Surface Approach	Strategic Approach	Academic Success
I Extraversion	.214 ¹	-.084	.384 ²	.030
II Neuroticism	-.178 ¹	.442 ²	-.241 ²	-.140
III Openness	.341 ²	-.033	.179 ¹	.063
IV Agreeableness	-.175 ¹	.209 ¹	-.072	.092
V Conscientiousness	.191 ¹	-.025	.422 ²	.142
EQI	.237 ²	-.374 ²	.268 ²	.135
WA	.154	.085	.394 ²	.135

¹p < 0.01

²p < 0.01

Table 20: Relationship between Intellectance and Reasoning Ability

GRT2 (N=28)	GRT1 (N=34)	CRTB2 (N=32)	16PF (N=183)
VR2 .10	VR1 .29	VCR2 .32	16PF4-B .10
NR2 .38	NR1 .20	NCR2 .12	16PF5-B .34
AR2 .23	AR1 .27		

RELATIONSHIP BETWEEN INTELLECTANCE (B) AND REASONING ABILITIES

Unlike the B Factor of 16PF, the Intellectance scale of 15FQ+ is not a measure of reasoning ability. Defined as a measure of personality, β assesses how confident a person is in their intellectual ability. What then is the relationship between confidence in one's ability and one's measured ability? Can β be used as an estimate of reasoning ability? To investigate this further, three small samples of candidates (in total 94) completed 15FQ+ and GRT1, GRT2 and CRTB2 respectively. In addition, data on the relationship between β and Factor B on 16PF4 and 16PF5 was obtained in the early validation of 15FQ+. Taking all these data into account, the results indicate that there is indeed a positive relationship between intellectual self-confidence and ability as measured by the tests, but it is not very strong, ranging from 0.10 to 0.38 with a median value of 0.25. The implication is clear. The β dimension cannot and should not substitute as a dedicated measure of ability. Used alongside a measure of ability, it does, however, provide very useful information about how self-report ratings match more objective assessments. In the ideal world there should be a level of congruence between the two measures. Development opportunities are identified when, for example, the self report β is low but the measured ability is relatively high. Arguably a more challenging development intervention is required when the reverse is found.

CONTAMINATION OF THE PRIMARY PERSONALITY FACTORS WITH SOCIAL DESIRABILITY

In order to explore whether the primary personality factors were contaminated by social desirability correlations were calculated between the Social Desirability scale and the sixteen primary factors. These are reported in Table 21. Inspection of this table indicates that most of these correlations are small, demonstrating little contamination of the primary personality factors with social desirability. Moreover, as would be expected, the largest correlations are with the anxiety dimensions. As noted above this result should be born in mind when interpreting test profiles.

Table 21: Correlations between the 15FQ+ factors and SD

15FQ+	Correlation with SD
fA	.18
B	.06
fC	.31
fE	.13
fF	.09
fG	.14
fH	.21
fI	-.11
fL	-.26
fM	.01
fN	.20
fO	-.39
fQ ₁	.17
fQ ₂	-.05
fQ ₃	-.20
fQ ₄	-.34

VALIDITY OF THE CRITERION REFERENCED SCALES

1. 15FQ+ Emotional Intelligence (eIQ) Scale

Why do some people possess better emotional well-being than others? Why are some better able to succeed in life? Why do some who are blessed with obvious intelligence fail in life, while others with only moderate intelligence succeed?

The answer, it is claimed is an individual's Emotional Quotient – a measure of your emotional intelligence – the emotional, personal, social, and coping dimensions of intelligence.

The Bar-on Emotional Quotient Inventory is reported to be the first scientifically developed and

validated measure of emotional intelligence. Consisting of 133 items, and taking approximately 30 minutes to complete, the Bar-on provides an overall EQ score as well as scores for 5 composite scales and 15 subscales.

The Bar-on EQ-I measure was used as the criterion for validation of the 15FQ+ emotional intelligence criterion referenced scale. The 15FQ+ eIQ scale was administered to a sample of 62 undergraduate students who also completed the Bar-on measure of emotional intelligence (EQ-i). The correlation was 0.80 (corrected $r_{c=1}$), demonstrating an exceptionally high degree of concurrent validity when compared to this well validated measure of emotional intelligence.

2. 15FQ+ Work Attitude Scale

In order to examine the validity of the criterion referenced Work Attitude scale this 15FQ+ scale was correlated with the Absa Work Habits and Attitudes Questionnaire (WHAQ). The WHAQ was commissioned by ABSA, South Africa's largest banking group whose aim it was to recruit honest, high calibre staff with a positive work ethic.

The 15FQ+ and WHAQ were administered to a sample of 196 U.K. undergraduates. The uncorrected correlation between the overall WHAQ Integrity score and the 15FQ+ Work Attitude scale was 0.52, demonstrating a reasonable degree of concurrent validity when compared to a comparable measure of integrity.

The PFI Work Attitude scale was further validated by correlating this scale with a checklist of acts of delinquency and counterproductive workplace behaviour. The 15FQ+ (criterion referenced) Work Attitude scale correlated 0.61 with this checklist, demonstrating a substantial degree of overlap between the 15FQ+ Work Attitude scale and reported acts of dishonest behaviour. This substantial correlation therefore provides further support for the validity of this criterion referenced scale.

GENDER FAIRNESS

In order to examine the possibility of gender bias in the 15FQ+ factors, the internal consistency of these scales was examined separately for men and women. Tables 22 and 23 present alpha coefficients for these scales, for both the standard (Form A) and short forms (Form C) of this test broken down by sex. Inspection of this table reveals that the alpha coefficients for each scale are broadly equivalent for both men and women. This demonstrates that these scales do not show any major sex bias with regard to their respective internal consistencies.



Table 22: Reliability Coefficients (alpha) for Men and Women for the 15FQ+ Scales

Factor	Form A		Form C	
	men	women	men	women
<i>fA</i>	.76	.70	.71	.68
B	.79	.81	.71	.72
<i>fC</i>	.77	.75	.66	.61
<i>fE</i>	.79	.79	.65	.67
<i>fF</i>	.78	.75	.65	.61
<i>fG</i>	.83	.80	.64	.69
<i>fH</i>	.80	.82	.67	.64
<i>fI</i>	.72	.69	.65	.62
<i>fL</i>	.75	.78	.66	.66
<i>fM</i>	.81	.77	.67	.71
<i>fN</i>	.82	.81	.72	.69
<i>fO</i>	.83	.81	.70	.66
<i>fQ</i> ₁	.75	.75	.70	.67
<i>fQ</i> ₂	.80	.76	.69	.69
<i>fQ</i> ₃	.79	.75	.62	.62
<i>fQ</i> ₄	.84	.79	.72	.67
	professional sample n=163	professional sample n=161	professional sample n=163	professional sample n=161

RACIAL FAIRNESS

In order to examine the possibility of ethnic bias in the 15FQ+ factors, the internal consistency of these scales was examined separately for different ethnic groups. Table 24 presents alpha coefficients for these scales for Form A, based on a sample of respondents (n=64) drawn from a variety of ethnic backgrounds. Inspection of this table reveals that the alpha coefficients for each scale are broadly equivalent to those reported above. This demonstrates that these scales do not show any major ethnic bias with regard to their respective internal consistencies.

Table 24: Alpha Coefficients for an ethnic minority sample (n=64)

Scale	
<i>fA</i>	.76
B	.68
<i>fC</i>	.71
<i>fE</i>	.73
<i>fF</i>	.70
<i>fG</i>	.83
<i>fH</i>	.79
<i>fI</i>	.71
<i>fL</i>	.74
<i>fM</i>	.71
<i>fN</i>	.79
<i>fO</i>	.74
<i>fQ</i> ₁	.71
<i>fQ</i> ₂	.66
<i>fQ</i> ₃	.78
<i>fQ</i> ₄	.79

Table 23: Reliability Coefficients (alpha) for Men and Women on the Derived Scales

Scale	Form A		Form C	
	men	women	men	women
Fake Good	.76	.69	.67	.65
Fake Bad	.75	.68	-	-
eIQ	.71	.65	-	-



APPENDIX ONE – ADMINISTRATION OF 15FQ+

BEFORE STARTING THE QUESTIONNAIRE

1. Put candidates at their ease by giving information about yourself, the purpose of the questionnaire, the timetable for the day, if this is part of a wider assessment programme, and how the results will be used and who will have access to them.
2. Administer the questionnaire with due formality, following exactly the instructions below.

ADMINISTRATION INSTRUCTIONS

The instructions below should be read out verbatim and the same script should be followed each time the 15FQ+ is administered to one or more candidates. Instructions for the administrator are printed in ordinary type. Instructions designed to be read aloud to candidate are printed in bold type.

You will now be asked to complete a personality questionnaire. The questionnaire to be used is called the 15FQ+. I will shortly hand out the question booklet and answer sheet for the questionnaire, but before I do I would like to make a couple of general points.

- The 15FQ+ is untimed and you will have as much time as you need to complete the questionnaire, though you should aim to complete all the questions in between 30 and 45 minutes.
 - For the 15FQ+ there is a question booklet and a separate answer sheet. Please do not mark the question booklet in any way, as we like to use them more than once.
 - When completing the answer sheet, it is important to give a clear indication of your answer. If you want to change an answer, do not rub out your original, but cross it out clearly and mark your alternative. Ensure that there is no doubt, which is your preferred answer.
 - Are there any questions about what I have said so far?... Good. I will now give out the question booklets and answer sheets
-

Hand out the answer sheets and the question booklets. Then say:

Put your name and the date in the space provided on the answer sheet. Then please open the question booklet and we will go through the instructions together.

Take plenty of time to make sure that you understand what is expected of you. When we have been through the instructions please ask any questions that you may have. Then, wait to be given the instruction to start.

You will now read aloud the instructions on page 1 of the question booklet.

- This is a questionnaire concerning your interests, preferences and opinions.
- There is no time limit, though most people take about 30 minutes to complete the questionnaire.
- Make sure that you have an answer sheet and a pen (or pencil) before you begin.
- You are asked to choose between three possible answers to each question – A, B or C. When you have selected your answer, record this by completely filling in the appropriate box on your answer sheet.
- Study the example in the booklet. If your choice of answer is A 'true' then you would fill in box A against that question on your answer sheet. If your choice is C 'false' then you would fill in box C.

Are there any questions?

Before we start completing the questionnaire please make sure that you record name and any other details requested on the answer sheet.

When answering the questions remember the following:

- Make sure you answer every question, even those which do not seem to apply directly to you
- Do not spend too much time considering your answer to each question – your first reaction is usually the best. The information given may not be as full as you would wish, but answer the best you can.
- Try to avoid the middle answer wherever possible.
- Be as honest and truthful as you can. Don't give an answer just because it seems to be the right thing to say.
- If you wish to change an answer, please cross it out clearly (do not attempt to rub it out) and insert your new answer.

Are there any questions?

Make sure that everyone is comfortable with the instructions and knows what they are required to do. When everyone is ready, say:

Please turn over and start. Once you have finished, please put your pen/pencil down and wait quietly until everyone else has finished.

Once all the candidates have indicated that they have completed the questionnaire, collect all the test materials. The answer sheets should be kept until they are scored and the other test materials should now be stored away securely until they are required again.

Make sure that you collect all information, materials and equipment before finally thanking the candidates and allowing them to go. Record any event, which might have disturbed the candidates for future reference.



APPENDIX TWO SCORING OF 15FQ+

1. Checking

The first step in scoring the 15FQ+ is to ensure that the respondent's details have been entered clearly into the appropriate boxes on the answer sheet and that all 200 items have been answered. This should ideally be done before the respondents have left the test session. Look out specifically for questions that may have been omitted or any answers that have been changed, as all the boxes need to be clearly marked. If necessary, refer back to the respondent to answer any outstanding questions.

The Answer Sheet is a single A3 sheet folded and sealed. Open the sheet, by inserting a pencil or pen in the top right hand corner. Slide the pen across the top, down the right hand edge and along the bottom, but not along the left-hand edge. Gently separate the two halves and open the sheet out flat to expose the scoring key on the left and profile chart on the right.

2. Scoring

Starting at the top of the score-key, count up all the item scores for Factor ffA, allowing 1 or 2 points as indicated and enter the total raw score in the box for Factor ffA. Continue with all the remaining factors β through to ffQ4. The minimum raw score is 0 and the maximum 24 for each of these factors. The scoring for the Social Desirability scale is the same as ffA-ffQ4 although the maximum score for SD is 16.

3. Profiling the Primaries

The 15FQ+ raw scores are converted into sten scores using the integral norm table contained within the Profile Chart. For Factor ffA, locate the raw score on the first line of the profile chart and blacken in the dot. This process is repeated for each factor in turn including Fake Good, which has a separate section.

4. Calculating Global Factors

Each of the five Global factor scores is calculated using the equations provided. First transfer the sten scores from the Primary Factors into the appropriate boxes. Then, using a calculator, multiply each sten by its weight and enter the result in the subtotal space below.

Calculate the 'Global Sten' by adding & subtracting these weighted scores.

Although the final global should be within the range of 1 to 10, it is possible, although rare, to obtain values just outside this range. If this is the case, just round to the nearest legitimate sten value, 1 or 10.

Transfer the 'Global Sten' score onto the profile chart.

A worked example for Global II is provided on the next page.



A respondent has scored a sten of 6 on Factor f^c , 3 on Factor f^L , 2 on Factor f^O and 7 on Factor f^{Q_4} .

Figure 1: Global Factor equation for Global Factor N

$$-.35 \times \boxed{f^c} + .15 \times \boxed{f^L} + .31 \times \boxed{f^O} + .41 \times \boxed{f^{Q_4}} + 2.64 = \boxed{}$$

1. Transcribe the sten scores for f^c (6), f^L (3), f^O (2) and f^{Q_4} (7) into their respective boxes.
2. Multiply .35 by 6 and enter the product into M- (memory minus) as the weight is negative.
3. Multiply .15 by 3 and enter the product into M+ (memory plus).
4. Multiply .31 by 2 and enter the product into M+ (memory plus).
5. Multiply .41 by 7 and enter the product into M+ (memory plus)
6. Enter 2.64 into M+
7. Press MR and write the total in the N box.

The calculator keys that were pressed are as follows:



Figure 2: Completed Global Factor equation for Global Factor II

$$-.35 \times \boxed{6} + .15 \times \boxed{3} + .31 \times \boxed{2} + .41 \times \boxed{7} + 2.64 = \boxed{4.48}$$

The global factor score can be rounded to the nearest whole number, where .5 is rounded up. In the example, we would round .48 down and use a sten value of 4.

5. Profiling the Global factors

In the global factor section of the profile chart, blacken the dot corresponding to the sten values for each of the Global factors, I to V.

6. Final Step

As a convention, the dots for each of the primaries and global factors are joined by straight interconnecting lines.



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